Building Energy Performance Standards T&E Committee Panel Discussion Testimony

Panelists

Meeting #1 January 24, 2024: Hospitals - Jake Whitaker, Maryland Hospital Association - Andrew Nicklas, Deputy General Counsel & Director of Government Relations, Adventist Healthcare - Dr. Louis Damiano, President, Holy Cross Hospital - Todd Cohen, Associate Vice President, Facilities and Real Estate, Adventist HealthCare - Leslie Weber, Associate Director, Maryland Government Affairs, Johns Hopkins University & Medicine - David Toole, Energy Manager, MedStar Health	Video of Meeting
Meeting #2 February 26, 2024: Affordable Housing - Rob Goldman, Montgomery Housing Partnership - Sarah Reddinger, Habitat for Humanity - Stephanie Prange Proestel, Housing Initiative Partnership - Todd Dorien, Victory Housing - Ken Silverman, Housing Opportunities Commission	Video of Meeting
Meeting #3 March 18, 2024: Life Sciences/Technology Sector - Kelly Schulz, CEO, Maryland Tech Council - Avi Halpert, Vice President of Government and Community Affairs - United Therapeutics	Video of Meeting
Meeting #4 July 15, 2024: Multi-Family Housing Beryl Blecher, Board member, Willoughby of Chevy Chase Condominium Leadership Council Jeanne Anderegg, Grosvenor Park Joe Bucherer, The Elizabeth (Friendship Heights) Henry Jordan, Board member, Leisure World Community Corporation Miriam Hamilton, Ph.D., Board member. The Promenade Brian Anleu, Vice President Government Affairs, Maryland, Apartment and Office Building Association (AOBA) Luke Lanciano, Director of Sustainability, The Tower Companies Gunnar Gingery, Commodore Mgt Co, Inc. Rebecca Becker, Vice President, Environmental and Climate Adaptation, Equity Residential Katie Rothenberg, Vice President, ESG (AvalonBay Communities) Adam Landsman, President, PulseIQ	Video of Meeting
Meeting #5 September 16, 2024: Financial Issues/Green Bank - Stephen Morel, Chief Executive Officer, Montgomery County Green Bank - Julie Wolfington, Certified Energy Manager, Energy and Sustainability Leader, Boland - Scott Falvey, Senior Energy Program Manager, Community Development Administration, Maryland Department of Housing and Commmunity Development - Eric Coffman, Director of Programs, Maryland Energy Administration - Rebecca Price, Clean Energy Hub Policy Manager, Maryland Energy Administration - Hans Riemer, Senior Advisor (Consultant), US Department of Energy Loan Programs Office	Video of Meeting
Meeting #6 September 23, 2024: Representatives from Faith Communities - Jill Feasley, Takoma Park Presbyterian Church - Mirele Goldsmith, Adat Shalom Reconstructionist Congregation - Lucia Vasquez, Resident of Westchester West and part of the Action in Montgomery (AIM) Nitrogen Dioxide Testing Team - Adama Moussa Harouna, Islamic Center of Maryland, and Project Organizer for AIM - Djamila Jamilatou Bah, Resident of Montgomery Village, Member of the Islamic Center of MD, & the AIM NO2 Testing Team - Walter Weiss, River Road Unitarian Universalist Congregation - Bob Simon, Member of St. Camillus Catholic Church - Ana Argueta, Resident of Northeast Park Apartments in Silver Spring - Joelle Novey, Director, Interfaith Power and Light –(IPL-DMV) - Sergine Yango, Resident of the Enclave Apartments in Silver Spring and Action in Montgomery Volunteer	Video of Meeting

See attached testimony and correspondence received

November 30, 2023
BY EMAIL

Ms. Emily Curley
Montgomery County Dept. of Environmental Protection
Energy, Climate, Compliance Division
2425 Reedie Drive, 4th floor
Wheaton, MD 20902

Dear Ms. Curley:

Thank you for the opportunity to comment on the draft Building Energy Performance Standards (BEPS) Executive Regulations which were posted in the November 1, 2023 Montgomery County *Register*.

The proposed regulations indicate a final performance standard of 144 (kBtu/sq. ft) also described in the draft regulations as "weather normalized net site EUI" for Hospitals (General Medical and Surgical).

We are writing to express our shared serious concern about this target and urge a delay in implementation until this can be considered further.

According to your department's website, the February 2022 BEPS technical report by Steven Winter Associates (SWA) provided the information to inform the regulations resulting from Bill 16-21 including "A recommended method for setting building performance standards, what the targets can be, and the estimated impacts of meeting those targets." This report was used to support the performance standards for all buildings, despite none of the nine case studies in the SWA report involving a hospital or healthcare setting.

On page 4 of the SWA report, the authors note that "…a site EUI target lower than the ZNC [zero net carbon-compatible] may not be technically achievable for most buildings." The chart on the following page identified a ZNC level of 187 for "Health Care – Inpatient" buildings. However, the proposed standard is 144 – far below both the current median of 305 (site EUI) for our hospitals and what the SWA consultants considered "technically achievable" at the ZNC level. Meeting a ZNC standard of 187 would be very challenging for hospitals, especially under the time frame required in the draft regulations, however, meeting a target of 144 may simply be impossible under any timeframe.

We respectfully request that the draft regulations be reviewed to ensure feasibility and we would like the chance to meet with you and any other members of your team who participated in the determination process for the hospital target.

We are also concerned about the County's deadline for meeting final standard by 2033, a full seven years before the state deadline of 2040. Doing so would put Montgomery County's hospitals, operating under a fixed revenue model, at a disadvantageous cost position relative to the rest of the state.

The healthcare sector is committed to the goals of creating a healthier environment for all of us, but it must be done in in both a technically and financially feasible manner.

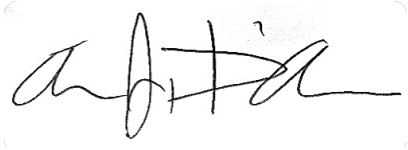
Thank you. We look forward to our further discussions.

Geoff Morgan
Vice President, Chief Facilities & Real Estate Officer
Adventist Healthcare

Kate Wellner

Kate Wellner
Vice President – Integrated Operations

Holy Cross Health



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SUBURBAN HOSPITAL
JOHNS HOPKINS MEDICINE

February 8, 2024
BY EMAIL

The Hon. Evan Glass
Chair, Transportation & the Environment Committee
Montgomery County Council
100 Maryland Avenue
Rockville, MD 20850

Re: Executive Regulation 17-23 Building Energy Performance Standards

Dear Councilmember Glass:

Thank you for the opportunity to participate in the hospital panel at the January 24 discussion about the proposed *Executive Regulation 17-23 Building Energy Performance Standards*. I promised to provide a written summary of my remarks with the data that I discussed.

I spoke that afternoon about the serious concerns all of the Montgomery County hospitals and health systems have with the manner in which the Montgomery County Department of Environmental Protection (DEP) derived the specific weather-normalized net site EUI ("net EUI") target proposed for hospitals.

When the Council passed *Bill 16-21 - Environmental Sustainability - Building Energy Use Benchmarking and Performance Standards – Amendments* in April 2022, it gave specific instruction about how baselines for buildings should be established. Bill 16-21 says that baselines should be established based on the average of two complete years with the highest normalized site EUI between calendar year 2018 and calendar year 2022. Bill 16-21 is silent, however, on how the interim and final targets should be set, which results in great discretion to DEP.

This chart on the next page shows the reported net EUI from our six hospitals during this period as reported in the annual benchmarking reports submitted to DEP. As you can see, the range is from 193 to 542. The aggregate baseline for all six hospitals using the methodology outlined in the statute is 341.

Reported Net EUI from Montgomery County Hospitals 2018-2022

(Weather Normalized site EUI)	2018	2019	2020	2021	2022		*baseline? **
Organization							
Adventist Shady Grove	326.8	330.3	347.2	357.2	327		352.2
Adventist White Oak	n/a	n/a	235.1	193.4	149.5		214.25
HCH Germantown	276	304.4	322.9	310.8	314.3		318.6
HCH Silver Spring	323.5	305.3	301.3	286.1	294.6		314.4
Medstar Montgomery	*Not reported*	300.2	282.7	233.5	247.2		291.45
Suburban (JHM)	542.3	338.5	214.6	211.8	233		440.4
median	326	305	292	312	271		319
mean	367.15	315.74	283.97	265.47	261		341.445
* from Bill 16-21: the average of 2 complete years with the highest normalized site EUI between calendar year 2018 and calendar year 2022							

As the bill was being considered, DEP engaged the Stephen Winters Associates Group to produce a technical report. That report was delivered in February 2022 and discussed target options the Department could consider at three different levels: Energy Efficiency (EE), Zero Net Carbon-Compatible (ZNC) and a mid-point. During the discussion on January 24, DEP noted that the standards were set utilizing the ZNC methodology in the technical report.

The technical report has case studies for several building types and none of those studies were for hospitals. Nevertheless, the consultants did provide illustrative technical analyses, based on calendar year 2019 energy use, while also noting that "the proposed BEPS bill would use the two highest years in a three-year baseline period". [The final enacted version of the bill calls for a five-year baseline period]. In the illustration, the 2019 median Net EUI reported by the county's hospitals was 305. The consultants applied a formula using the CNCA EBPS tool resulting in an illustrated ZNC of 187 for hospitals.

In other parts of the technical report, the consultants also noted: "...a site EUI target lower than the ZNC target may not be technically achievable for most buildings" (p. 4)

They specifically discussed the BEPS challenges for hospitals noting:

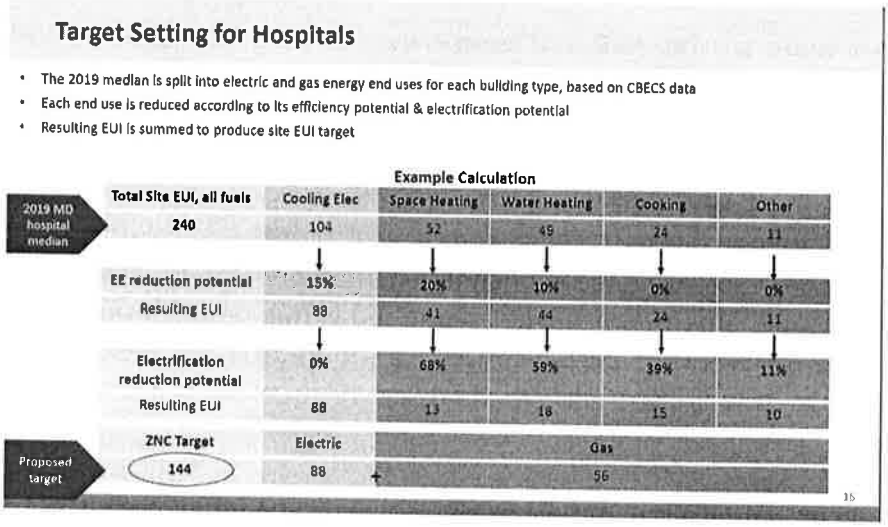
- "Electrification technology...[for] some processes may be more difficult, such as steam humidification and high-temperature sanitization. Space conditioning efficiency through energy recovery ventilation can help most building types but may be limited for health care as exhausting potential pathogens without contaminating incoming air is a greater concern." (p. 60)
- If there were retro-commissioning and retro-fitting interventions at the inpatient hospitals, "the resulting EUI is in the 200-240 range" (p. 199)

The technical report was available to the public before the proposed regulations were published and our hospitals were prepared to see a target consistent with the illustrations discussed above. However, Executive Regulation 17-23 proposes a net EUI target of 144 for Hospital (General Medical & Surgical), significantly lower than ZNC level identified in the technical report.

In a meeting with DEP on December 11, 2023, we learned that DEP chose to apply the CNCA EBPS tool not to the 341 actual aggregate baseline for Montgomery County hospitals during the reporting period in the statute, or even the 305 starting point in the technical report illustration, but rather a figure of 240.

When we asked DEP how they derived this, they acknowledged that the base of 240 was pulled from the median of an EPA dataset of 29 de-identified Maryland hospitals in 2019. As Mr. Whitaker of the Maryland Hospital Association noted during our discussion last month, there are 62 hospitals in Maryland. DEP doesn't know which of the state's hospitals are in the EPA dataset, nor why they were voluntarily reporting net EUI data in 2019. It is a completely arbitrary choice.

DEP Target Setting Methodology for Hospitals (*provided by DEP in December 2023*)



If DEP had applied the CNCA EBPS formula to the actual baseline for Montgomery County hospitals, the resulting Net EUI target would be 205. This might actually be attainable and avoid the need to enter into DEP's Building Performance Improvement Plan process.

Our Montgomery Council hospitals are asking the Council to exercise its authority to reject proposed Executive Regulation 17-23 and send it back to DEP for revision. We also request that you provide direction to DEP to follow the process outlined in statute and base the targets on the actual reported baselines from the years of benchmarking data that is available.

Thank you for your consideration of this request.

With best regards,

Leslie Ford Weber
Associate Director, Maryland Government Affairs
Johns Hopkins University & Medicine

P.S. All of our hospitals and health systems also provide healthcare in other facilities throughout the County. The proposed targets for medical office buildings and other facilities for outpatients seem consistent with the technical report.

cc:
Marilyn Balcombe, Montgomery County Council
Kate Stewart, Montgomery County Council
Stan Edwards, Montgomery County Dept of Environmental Protection
Todd Cohen, Adventist Healthcare
Lou Damiano, Holy Cross Health
David Tooley, Medstar Health
Jake Whitaker, Maryland Hospital Association

Adventist HealthCare

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Gaithersburg, MD 20878
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January 24, 2024

Building Energy Performance Testimony to Montgomery County County Council Transportation and Environment Committee

Todd M. Cohen, FACHE, EDAC
Associate Vice President, Adventist HealthCare Facilities and Real Estate

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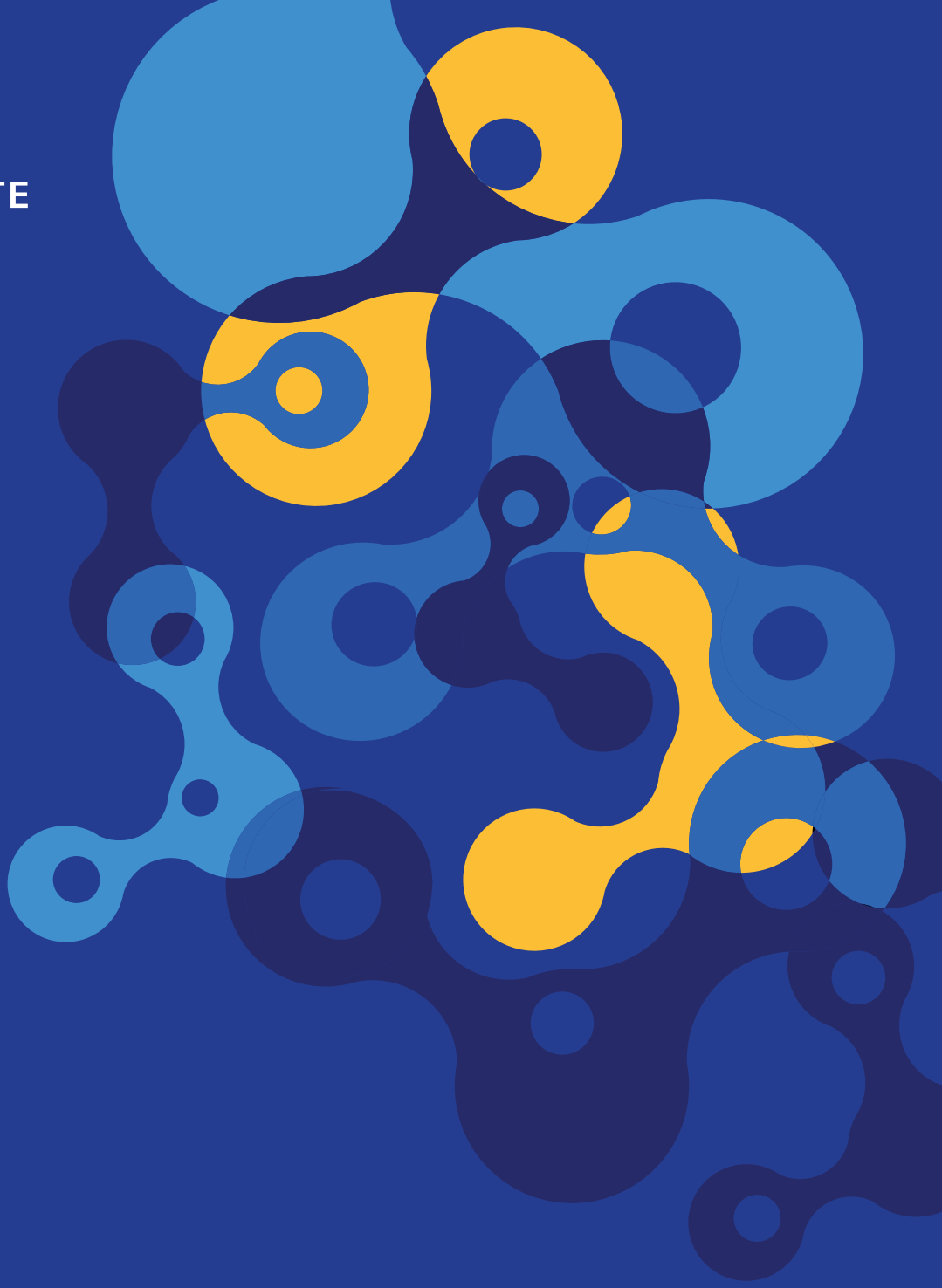
- Rate of Change – Timeline/Runway to Improve has Cost/Affordability Risks
  - The required ambitious rate of changes will require us to divert capital away from clinical care (a $500K capital infrastructure replacement prevents procurement of roughly 24 new heart monitors)
  - Fines cripple us, shunt money away from advancements in medicine
  - We have long term investments in equipment that will need to be replaced before end of their useful life-cycles
  - The necessary technology/approaches are cost prohibitive (e.g., making steam from electric only is not widely available) and we cannot compromise patient safety.
- Our business requires redundancy that is less green/efficient.
  - Diesel fired Generators: by federal rule require 96 hours self-sufficiency from electrical grid required by CMS/Accreditation
- The solution proposed by DEP to file an explanation and building energy performance plan after a failure to meet the interim target is not satisfying
  - We want to be compliant, but targets need to be attainable
  - Optic to community of consumer driven healthcare has its risks
  - Improvement Plan – needs further discussion and impact analysis, costing
- Maintenance and Operations Workforce
  - Labor for technologically advanced buildings is not in place
  - Apprenticeship programs being developed by hospitals to develop workforces with MD Dept of Labor now but generally the workforce is not prepared to manage the sophistication of new building technologies without significant re-education
- Hospitals are like submarines – integrity of compartments allow us to keep patients safe while incapacitated.
  - Doing major overhauls of infrastructure are risky maneuvers, system shutdowns and maintaining patient care is extremely challenging, Metaphor: building while sailing the ship under the waterline
- Current Grid Capacity/Integrity
  - Curtailment – demand response and requests from PEPCO to use diesel fired generators to rest the grid during high demand is a current practice because the grid is inadequate, this signifies a holistic approach and the need for outside sectors to participate in this discussion and readiness activities; the grid isn't ready for this and won't be in ten years.

- Culture of sustainable improvements on campuses exists.
    - No-Low-Cost items are already in place – conversion to LED bulbs, EV vehicles, supply chain and buying behaviors, carbon footprint, local/regional materials.
    - Brand NEW Cogeneration and other microgrid sustainability approaches at Adventist HealthCare Hospitals as subsidized by MEA and PEPCO means natural gas dependency increases while electrical grid dependency reduces to save cost/grid efficiency.
    - What does the future mean for natural gas-based investments made today (these incentive programs are still offered while the new code/laws are being written to reduce Natural Gas use)
- Design community in healthcare is only beginning to really look at electrification of hospitals from a greenfield, ground up new construction basis
    - Renovation of systems is far more elaborate in live patient care areas for the design community and construction community let along risks to patients in our care while upgrades or renovations are being made
    - Is DPS ready to work with us on new approaches to Healthcare construction? Alignment?
- Energy Procurement – buying cleaner energy on the supply side would be a good first requirement, supply of wind turbines offshore is another advancement that is reasonable and no-low costs.
    - We don't have affordable Supply Side energy profile alternatives (e.g., solar farm/wind turbines as a source of renewable energy)
    - Buying RECs is one method of addressing GHG but again does it productively create a culture of long term sustainable operations improvement?
- Historical Context of US Hospitals:
    - Hill Burton Act – 1960's funding for hospitals – 65 years of keeping our buildings working on fossil fuel-based systems, we won't be able to make targets of ten years to wholesale change the way we energize life supporting care.



MILKEN INSTITUTE

New Opportunities for Job Creation in Maryland's Life Sciences Industry

BY ALISSA DUBETZ, CHARLOTTE KESTEVEN, AND AARON MELAAS

ABOUT US

About the Milken Institute

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These activities are designed to help people build meaningful lives in which they can experience health and well-being, pursue effective education and gainful employment, and access the resources required to create ever-expanding opportunities for themselves and their broader communities

About the Center for Regional Economics

The Milken Institute Center for Regional Economics produces research, programs, and events designed to inform and activate innovative economic and policy solutions to drive job creation and industry expansion.

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EXECUTIVE SUMMARY

Maryland has one of the nation's strongest life sciences industries. The state's array of universities, federal labs, and firms employ 54,000 people, generate breakthrough discoveries, and supply a range of technologies that have been key to the COVID-19 pandemic response. Despite Maryland's high concentration of employment in research and development (R&D), the sector's 7.4 percent growth between 2015 and 2020 trailed other leading states such as Massachusetts (58 percent) and North Carolina (38 percent). Beyond R&D employment, the state's life sciences manufacturing sector expanded at one of the fastest rates nationwide (31 percent), but remains relatively less concentrated than the national average, indicating significant potential for further growth. Maryland's life sciences industry also faces competition from other states for investment, particularly in entrepreneurs and startup firms that have the potential to sustain job creation across the state.

The state's existing policy architecture provides a foundation for state leaders to develop new, collaborative strategies among public, private, and non-profit actors that expand not only the total number of job opportunities but also their accessibility to state residents. Streamlining industry job creation could provide an incentive for employers to invest in creating more local jobs in these sectors and increase Maryland's attractiveness to venture capital.

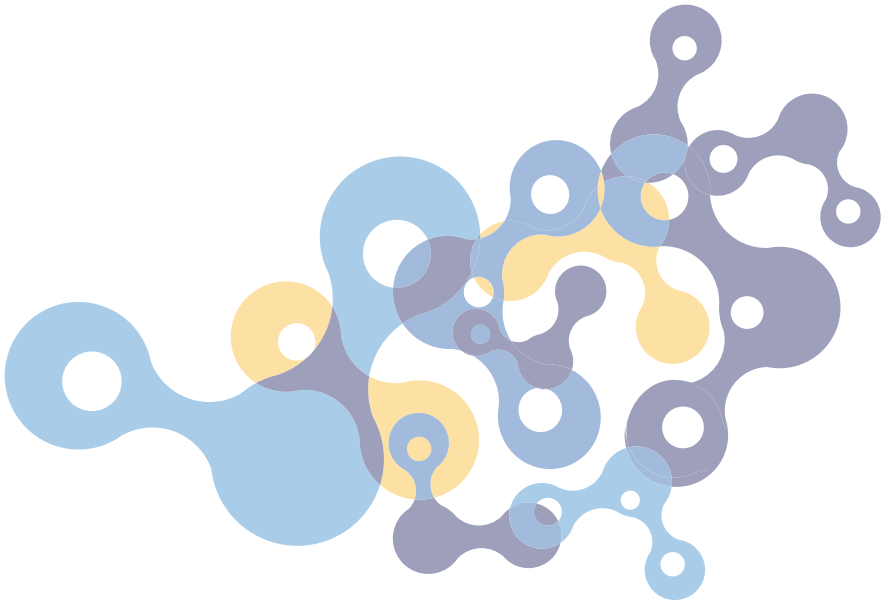
To grow the talent pipeline and improve workforce development, programs are needed to inform and attract workers and equip them with the skills they need to perform these jobs. State leaders should:

- Collaborate on developing an industry-certified training curriculum that maximizes the number of workers capable of meeting existing industry needs and that prepares prospective employees for occupations with future growth potential, particularly jobs that do not require four-year degrees.
- Increase awareness of life sciences career opportunities for residents in more rural counties through industry skills training extension programs hosted by community colleges.
- Support dedicated training programs and facilities for advanced biomanufacturing, especially cell and gene therapies.

To enhance Maryland's entrepreneurial ecosystem and increase its attractiveness to venture capital, greater public-private cooperation is needed to make the state a place worth investing in, by providing an innovation-ready workforce and expanding access to physical infrastructure that can help entrepreneurs and startups move from R&D to development and testing. State leaders should:

- Evaluate the feasibility of matching private funds raised by institutions of higher education to establish technology incubators and provide early-stage companies with greater resources—particularly lab and manufacturing space—that will support local job creation. These efforts could parallel the Maryland E-Nnovation Initiative Fund's matching support for endowed university chairs.[1]
- Explore the viability of additional region-specific incentives targeting the conversion of existing commercial or industrial spaces for use in small-scale, modular life sciences manufacturing.

Maryland could also generate additional opportunities through the adoption of place-based investment strategies used in other states, such as an expansion of local manufacturing and improvements to career and technical education programs. A more cohesive strategy among industry, government, academic, and nonprofit leaders could enhance the life sciences industry's growth trajectory and further increase the number of job opportunities available to residents across the state.



INTRODUCTION

Maryland is at the forefront in many areas of the national life sciences industry economy. The state is home to 2,700 life sciences firms and more than 500 biotech companies, and its 74 federal research labs—including the National Institutes of Health (NIH) and the Food and Drug Administration (FDA)—and leading research universities deploy innovative research and entrepreneurial drive to generate technological breakthroughs. Maryland is also the cornerstone of the BioHealth Capital Region—a regional collaboration with Virginia and Washington, DC, to drive life sciences innovation and entrepreneurship—which was ranked No. 4 in the top biopharma clusters in the nation in 2021.[2] Furthermore, the state has the world's largest cell therapy manufacturing facility and leads the world in adult stem cell production and vaccine research and development (R&D), with 20 percent of the world's top influencers in vaccine development.[3]

Since the beginning of the COVID-19 pandemic, Maryland's leadership in the life sciences has become even more evident. The National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda received $1.5 billion in federal funding to conduct research and clinical trials to develop treatments and vaccines.[4] The NIH Rapid Development of Diagnostics (RADx) initiative led development of new technologies for COVID-19 testing.[5] And experts at Johns Hopkins University in Baltimore have been at the forefront of data reporting and analysis. The BioHealth Capital Region received more than $7 billion in total federal funding,[6] and five of the 10 funding recipients from Operation Warp Speed—the federal effort to speed the development and production of COVID-19 vaccines—are in the state.[7]

As R&D in the life sciences industry continues to expand the frontiers of human knowledge, the commercialization of new technologies also offers the potential to create new jobs. However, Maryland's employment in biotechnology R&D increased by 52 percent from 2015 to 2020, below the national growth rate of 60 percent during that period.[8] Despite playing a prominent role in the life sciences industry, Maryland faces increasing competition from other states for investment in R&D and particularly in manufacturing new technologies, from vaccines and gene and cell therapies to medical devices and tools for digital health. Consequently, any efforts for sustained job creation in the industry will require enhanced collaboration among public, private, and non-profit actors.

By harnessing its already substantial assets, Maryland can create new opportunities to enhance its life sciences industry leadership. Key components of a proactive approach include expanding the local talent pipeline, supporting the entrepreneurial ecosystem through greater public-private cooperation, and developing a strategy for place-based investment that generates new industry connections for communities across the state.

CURRENT STATUS OF THE LIFE SCIENCES WORKFORCE

Maryland's life sciences industry has a substantial footprint, directly employing over 54,000 people across a wide range of jobs in R&D, manufacturing, and laboratories—more than the number of workers employed in the state's information or real estate industries.[9] Jobs in the scientific R&D sector account for roughly two-thirds of total industry employment, while job creation in the life sciences manufacturing sector registered the highest rate of growth from 2015 to 2020, as shown in **Table 1**.[10]

TABLE 1: LIFE SCIENCES INDUSTRY EMPLOYMENT IN MARYLAND (BY SECTOR)

INDUSTRY	2015		2020		EMPLOYMENT GROWTH (PERCENT)
	Employment	Concentration*	Employment	Concentration*	
R&D in the Physical, Engineering, and Life Sciences	**31,734**	**2.76**	**34,069**	**2.61**	**7.4**
R&D in Biotechnology & Nanotechnology	8,002	2.72	12,150	2.66	51.8
All other R&D	23,732	2.79	21,917	2.60	–7.6
Life Sciences Manufacturing	**9,262**	**0.77**	**12,104**	**0.95**	**30.7**
Pharmaceutical & Medicine	7,278	1.40	9,593	1.69	31.8
Medical Equipment & Supplies	1,821	0.32	2,335	0.41	28.2
Electromedical & Electrotherapeutics	163	0.15	176	0.13	8.0
Life Sciences Laboratories	**7,452**	**0.94**	**8,322**	**1.01**	**11.7**
Medical & Diagnostic	5,632	1.16	6,325	1.24	12.3
Testing	1,820	0.60	1,997	0.64	9.7

** **Note:** Concentration measured by location quotient (LQ). If LQ>1, area employment has a larger relative share than it does nationwide.*

***Source:** US Bureau of Labor Statistics—Quarterly Census of Employment and Wages (2020)*

Although Maryland has a relatively high concentration of R&D jobs compared with most states, its growth rate in R&D employment from 2015 to 2020 did not keep pace with rates in some other leading states, as shown in **Table 2**. Its life sciences manufacturing sector expanded at one of the fastest rates nationwide, but remains relatively less concentrated than the national average, indicating significant potential for further growth.

TABLE 2: LIFE SCIENCES INDUSTRY EMPLOYMENT ACROSS US STATES (BY SECTOR)

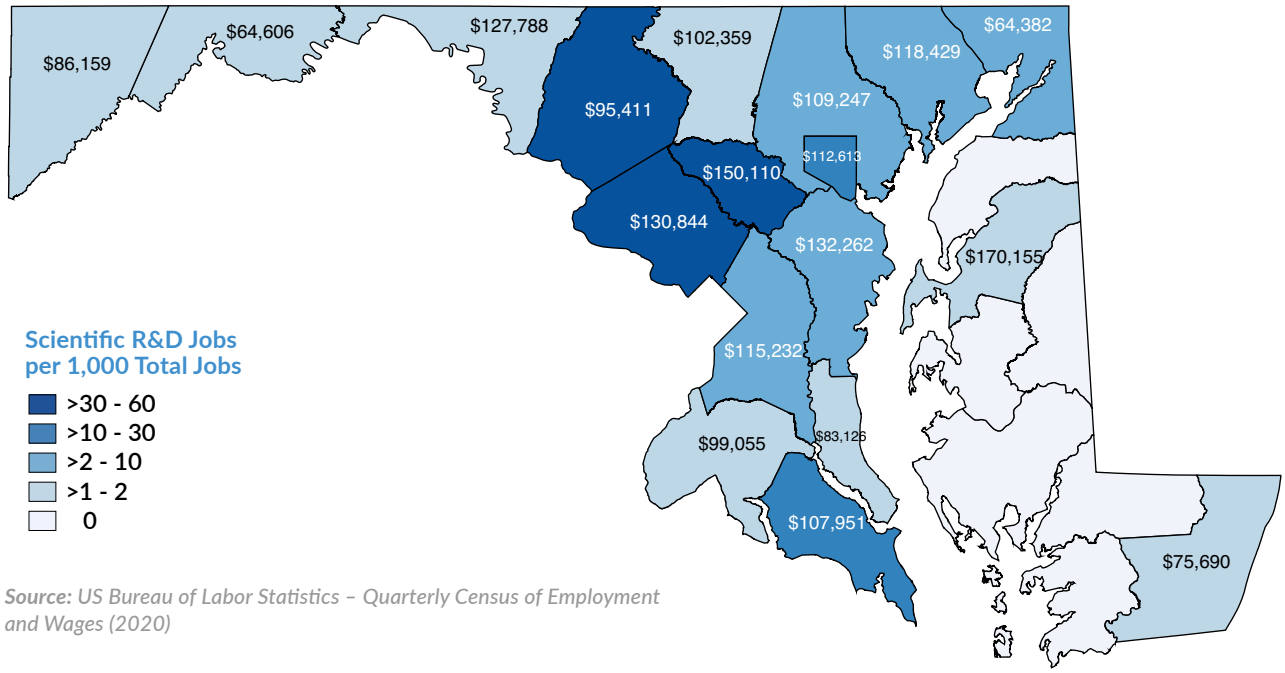
STATE	R&D EMPLOYMENT		MANUFACTURING EMPLOYMENT	
	Concentration 2020*	Growth 2015-2020	Concentration 2020*	Growth 2015-2020
California	1.78	17.6%	1.47	8.7%
Maryland	2.61	7.4%	0.95	30.7%
Massachusetts	4.74	58.1%	1.42	–6.7%
New Jersey	1.57	5.1%	1.98	4.1%
North Carolina	1.24	38.3%	1.42	0.3%
Virginia	1.19	11.8%	0.36	8.6%

** **Note:** Concentration measured by location quotient (LQ). If LQ>1, area employment has a larger relative share than it does nationwide.*

***Source:** US Bureau of Labor Statistics—Quarterly Census of Employment and Wages (2020)*

The distribution of life sciences employment across the state remains relatively concentrated. Montgomery County has long been the industry's primary hub due to the presence of the NIH, FDA, and 38 federal labs. As the industry grew, R&D employment spilled over to neighboring Frederick and Howard counties, as shown in **Figure 1**, while the city of Baltimore also started to account for an increasing number of R&D jobs supported by the presence of Johns Hopkins University and the University of Maryland Medical Center.

FIGURE 1: MARYLAND SCIENTIFIC R&D EMPLOYMENT CONCENTRATION AND AVERAGE ANNUAL INCOME (BY COUNTY)



***Source:** US Bureau of Labor Statistics – Quarterly Census of Employment and Wages (2020)*

In addition to institutions of higher education and federal labs, major life sciences firms such as AstraZeneca, Kite, BioNTech, Catalent, Charles River Laboratories, Emergent BioSolutions, Lonza, and Novavax have a substantial presence in Maryland and account for some of the state's highest-paid jobs. Annual incomes in the life sciences average $128,800 across the state, almost $60,000 more than the statewide average for all industries ($68,900).[11]

NEXT STEPS TO SUPPORT INDUSTRY JOB CREATION

Maryland's life sciences manufacturing and laboratories show significant potential for further expansion, and the state's existing policy architecture provides a foundation for state leaders to develop new, collaborative strategies that expand not only the total number of job opportunities but also their accessibility to state residents. On the industry side, the same companies that develop breakthrough technologies can be enlisted to help identify the skills that an expanded life sciences workforce will require, and on the government side, expanding laboratory and manufacturing space can entice more local innovators and entrepreneurs to remain in Maryland as they expand. Preparing Marylanders to fill these positions will provide an incentive for employers to invest in creating more local jobs in these sectors, particularly since the state can already leverage its extensive assets in the knowledge economy to stimulate additional investment. It can also address some of the main limits on Maryland's attractiveness to venture capital highlighted by prior reports, such as helping coalesce and expand the state's innovation ecosystem, increasing the number of business accelerator spaces, and providing more workers with exposure to career paths in startups.[12]

The remainder of this section reviews two central policy considerations for state leaders: Grow the talent pipeline by improving workforce development and enhance the entrepreneurial ecosystem through greater public-private cooperation.

Grow the Talent Pipeline

With the state's renowned research universities and numerous federal labs, Maryland has a high concentration of PhD recipients relative to other US states. Overall, Maryland ranks No. 1 in the nation for the concentration of employed doctoral scientists[13] and No. 5 for the number of life sciences PhD holders per capita—ahead of California but behind Massachusetts.[14] A large population of residents with doctoral degrees can spur innovation, but non-degree workers with training in other areas, such as laboratory technology and manufacturing, are also crucial for industry growth. As researchers spin off their innovations to become entrepreneurs and seek to develop new companies, the presence of a technically proficient local workforce is a key consideration for making Maryland an attractive place to do business in the long term. Expanding technical education, training, and certification programs is therefore crucial to growing the state's talent pipeline. Maryland could help satisfy the demand for qualified workers by expanding awareness of these opportunities as well as programming to help develop new pathways in career and technical education.

Attracting workers to these opportunities need not be a daunting challenge. The state's unemployment rate—which counts unemployed individuals who are actively looking and available for work—remained relatively high in June 2021 at 6.2 percent,[15] and overall manufacturing employment had not returned to pre-pandemic levels, with approximately 5,400 fewer employees than in January 2020.[16] In addition to the large supply of available workers, many life sciences manufacturing jobs pay higher wages than the median wages by degree level in the state (the median wage with an associate's degree is $43,000 and $31,000 with a high school diploma or equivalent) without requiring a bachelor's or graduate degree, as shown in **Table 3**.[17] And a recent survey of life sciences firms found that more respondents considered an employee's competencies and skills to be very important (59 percent) than a degree from a four-year college (53 percent).[18]

TABLE 3: MARYLAND LIFE SCIENCES INDUSTRY OCCUPATIONS AND EDUCATIONAL REQUIREMENTS

OCCUPATION	TYPICAL ENTRY-LEVEL EDUCATION	TOTAL EMPLOYMENT	MEDIAN ANNUAL INCOME
Clinical laboratory technologists and technicians	Bachelor's degree	6,900	$55,100
First-line production and operation supervisors	HS diploma or equivalent	6,070	$66,600
Biological technicians	Bachelor's degree	3,670	$45,900
Life, physical, and social science technicians, all other	Associates degree	1,750	$61,900
Helpers–production workers	HS diploma or equivalent	1,500	$30,400
Medical equipment preparers	HS diploma or equivalent	1,000	$41,000
Chemical plant and system operators	HS diploma or equivalent	840	$67,000
Chemical equipment operators and tenders	HS diploma or equivalent	520	$46,700
Medical appliance technicians	HS diploma or equivalent	240	$47,800

Source: US Bureau of Labor Statistics—Occupational Outlook Handbook (2020) and Occupational Employment and Wages (2020)

Programs are needed to equip workers with the skills they need to perform these jobs. Several existing initiatives provide a solid foundation for further growth of the talent pipeline. For example, the Biotechnical Institute of Maryland (BTI) offers a tuition-free Laboratory Associates Program to help participants secure laboratory jobs or paid internships and earn credits toward an associate's degree in biotechnology.[19] The state-funded workforce development grant program, EARN Maryland, establishes industry partnerships to train, educate, and employ workers.[20] And several academic institutions in Montgomery County have partnered to launch a "Bio Boot Camp" for training entry-level workers in local biotechnology companies.[21]

With many companies in Maryland already at the forefront of biomanufacturing,[22] this presents an opportunity for the state to support the development of training programs and facilities to provide workers with skills they need. This advantage, combined with the current boom in biomanufacturing,[23] presents Maryland with a unique opportunity to support the growth of a skilled workforce which would help attract and retain companies in the state.

NEXT STEPS FOR STATE LEADERS

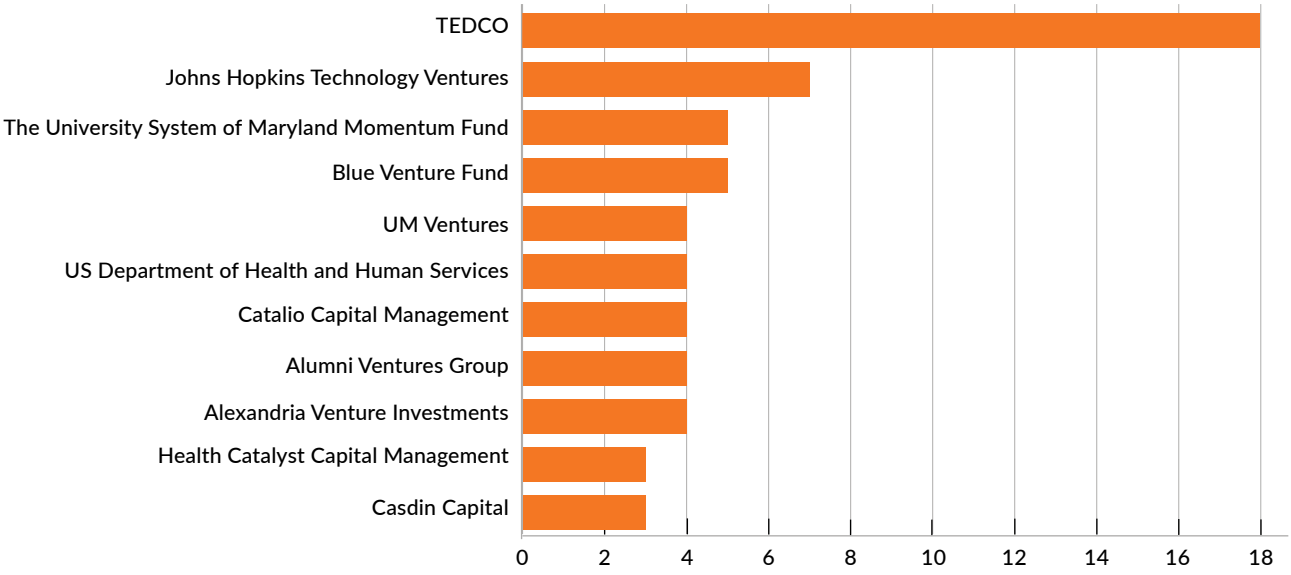
- *Collaborate on developing an industry-certified training curriculum that maximizes the number of workers capable of meeting existing industry needs and that prepares prospective employees for occupations with future growth potential, particularly jobs that do not require four-year degrees.*
- *Increase awareness of life sciences career opportunities for residents in peripheral counties through industry skills training extension programs hosted by community colleges.*
- *Support dedicated training programs and facilities for advanced biomanufacturing, especially cell and gene therapies.*

Enhance the Entrepreneurial Ecosystem

Historically, Maryland has struggled to develop an entrepreneurial ecosystem to rival its counterparts in Massachusetts and California. A disproportionate share of Maryland's doctoral graduates work in federal labs—more than 26 percent, compared with 2 percent in Massachusetts and 3 percent in California[24]—where barriers to commercialization are often higher than in academia or industry.[25] Whereas federal R&D investment in Maryland during 2016 totaled $115.0 billion, total technology licensing income was just $179.2 million, representing a return on investment of 0.16 percent.[26] And Maryland ranked No. 18 on the Milken Institute's State Technology and Science Index 2020 for risk capital and entrepreneurial infrastructure—a measure of states' ability to attract venture capital investment, patenting, and business formation—far behind California at No. 1 and Massachusetts at No. 3.[27] The life sciences industry clusters in Boston, the San Francisco Bay Area, and San Diego captured 70 percent of all venture capital investment in the industry in 2019.[28]

Nonetheless, the total volume of life sciences venture capital invested in Maryland over the last five years ($22.50 per 100,000 residents) compares favorably to other states with a significant industry presence such as New Jersey ($21.05) and North Carolina ($11.63), as well as to the US national average ($20.55).[29] Maryland's universities and federal labs are a tremendous starting point for developing assets for attracting venture capital to the life sciences industry, but government agencies (such as the Maryland Technology Development Corporation [TEDCO]) and institutions of higher education remain the predominant sources of venture capital investments, as shown in **Figure 2**.

FIGURE 2: MARYLAND LIFE SCIENCES VENTURE CAPITAL INVESTMENTS, 2015–2021



Source: PitchBook Data, Inc. (through July 2021)

Although these government agencies and institutions of higher education can play crucially important roles in providing seed funding, experience has demonstrated that the private sector (particularly venture capital) plays a more central role in providing the sustained investment required for life sciences companies to grow. Because these investors seek relatively larger potential rewards and lower risks, ensuring that technologies and talent stay in Maryland could enhance its attractiveness to venture capital, such as by improving workforce development to supply a ready workforce. Unlike other leading states (including California and Massachusetts), Maryland offers a refundable R&D tax credit for small businesses with limited tax liabilities, and the state also provides a Biotechnology Investment Incentive Tax Credit designed to expand funding available to firms that are less than 10 years old and have fewer than 50 full-time employees.[30] Existing programs available through the Maryland Innovation Initiative and the Maryland Stem Cell Research Fund also support the commercialization of research.

Another significant need facing many entrepreneurs and startups is access to physical infrastructure that can help them move from R&D to demonstration and testing. Interviews with stakeholders across Maryland's life sciences industry indicated that a relatively limited amount of laboratory and manufacturing space[31] is a significant constraint on the state's ability to incubate the growth of local firms (as discussed in the previous section). Technology incubators such as the Johns Hopkins University Technology Ventures initiative have made important strides in this area.[32] Nonetheless, there are relatively few manufacturing spaces in Maryland available to support early-stage commercialization, and working with contract development and manufacturing organizations (CDMOs) can often be prohibitively expensive.[33]

Counties adjacent to Washington, DC, and metro Baltimore not only have the highest concentration of scientific R&D activity but are also the site of most life sciences manufacturing, with additional activity extending into Washington and Anne Arundel counties as well as Talbot County on the Eastern Shore, as shown in **Figure 3**. Although most of Maryland's more rural counties have few connections to the life sciences industry, they play much larger roles in the state's overall manufacturing activities. These regions include Caroline, Cecil, Dorchester, Kent, Queen Anne's, Somerset, and Wicomico counties on the Eastern Shore as well as Allegany and Garrett counties in Western Maryland, as shown in **Figure 4**.

FIGURE 3: MARYLAND SCIENTIFIC MANUFACTURING JOB CONCENTRATION

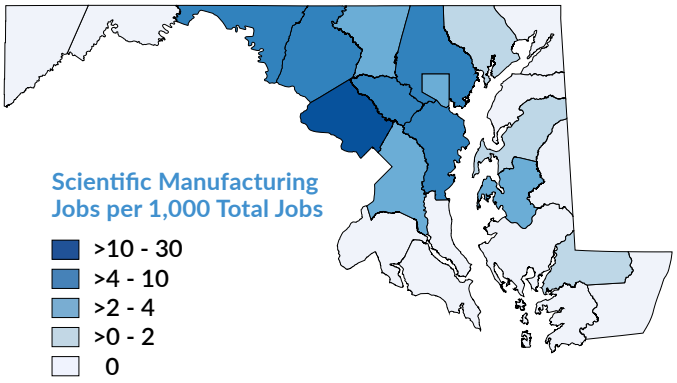
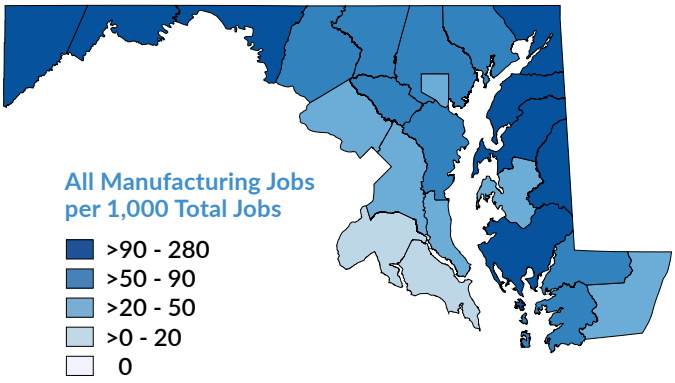


FIGURE 4: MARYLAND MANUFACTURING JOB CONCENTRATION ALL INDUSTRIES



Source: US Bureau of Labor Statistics—Quarterly Census of Employment and Wages (2020)

Several existing incentives already support industry expansion in these regions: the Biotechnology Investor Incentive Tax Credit currently provides tax credits of up to 33 percent for eligible investments in a qualifying company and up to $250,000 or 50 percent for investments up to $500,000 in specific counties (Allegany, Dorchester, Garrett, and Somerset); enhanced tax credits are also available for investments in Opportunity Zones.[34] Moreover, Maryland's affordability relative to other life sciences hubs offers a potentially significant advantage for companies scaling up and needing additional space. In 2020, average rents for life sciences companies in Maryland were $28.85 per square foot, or less than half the cost for similar companies in San Francisco ($58.30) and Boston ($69.31).[35] Taken together, these incentives provide a strong rationale for expanding hiring in counties outside the industry's existing core.

NEXT STEPS FOR STATE LEADERS

- *Evaluate the feasibility of matching private funds raised by institutions of higher education to establish technology incubators and provide early-stage companies with greater resources—particularly lab and manufacturing space—that will support local job creation. These efforts could parallel the Maryland E-Nnovation Initiative Fund's matching support for endowed university chairs.*[36]
- *Explore the viability of additional region-specific incentives targeting the conversion of existing commercial or industrial spaces for use in small-scale, modular life sciences manufacturing.*

FINAL CONSIDERATIONS: A MORE STRATEGIC APPROACH

Prior initiatives, including the Excel Maryland development strategy focused on the life sciences, have established the value of a more coherent approach to pursuing growth by leveraging the state's existing assets.[37] The next steps outlined above are largely tactical measures that merit additional consideration for their ability to attract investment and stimulate job creation in the life sciences industry. However, it is still important for state leaders to consider strategies for adopting best practices that have been successful elsewhere, particularly in the face of increased competition from other states:

- Massachusetts has fostered one of the nation's strongest life sciences industries by implementing multiple initiatives that have been specifically designed to support investment across the state. For example, MassDevelopment deployed its Brownfields Redevelopment Fund to convert a former General Electric campus in Pittsfield to the Berkshire Innovation Center,[38] and the Massachusetts Biotechnology Council has developed a BioReady rating system to evaluate municipal zoning and infrastructure as a means of helping life sciences companies find the most favorable destination in the state.[39]
- North Carolina's strong connection between industry and institutions of higher education has helped firms recruit and hire local residents. For example, the BioWork community college initiative trains process technicians in biotechnology, pharmaceutical, or chemical manufacturing[40] and the Biomanufacturing Training and Education Center at North Carolina State University provides training in biomanufacturing technologies, ensuring that program graduates have the requisite skills while minimizing the time and costs incurred by industry when taking on new hires.[41]

- Pennsylvania has successfully demonstrated that existing facilities can be converted to expand the state's life sciences manufacturing capacity. In Philadelphia, the former Budd Company Hunting Park auto and train parts plant is slated for redevelopment as the Budd Bioworks.[42] And in King of Prussia, the Center for Breakthrough Medicines is being developed as a CDMO through partnerships among Discovery Labs, GlaxoSmithKline, WuXi Biologics, and the University of Pennsylvania Gene Therapy Program.[43]

Using these examples, Maryland's state leaders should focus on developing—and executing—strategies that can help sustain the state's identity as a leader in the life sciences industry by enhancing the entrepreneurial ecosystem through greater investment in early-stage life sciences companies, increasing the amount of manufacturing and lab space available to entrepreneurs and startup firms, and expanding the size of its innovation-ready workforce.

The state already has considerable assets, particularly the large volume of new technologies generated through research by academics, federal labs, and the private sector. And Maryland's prominent role in responding to the COVID-19 pandemic—from testing and analysis of data to the development, manufacturing, and distribution of treatments and vaccines—clearly demonstrated the value of these assets. Pursuing new opportunities for job creation in Maryland's life sciences industry will require using these assets to support even greater collaboration among industry, government, academic, and nonprofit leaders. And a more cohesive strategy—such as the broad range of place-based initiatives found in other states—can enhance the life sciences industry's growth trajectory and further increase the number of job opportunities available to residents across the state.

ENDNOTES

1. "Maryland E-Nnovation Initiative Fund," Maryland Department of Commerce, accessed August 19, 2021, https://commerce.maryland.gov/fund/maryland-e-nnovation-initiative-fund-(meif).

2. Alex Philippidis, "Top 10 US Biopharma Clusters," *Genetic Engineering & Biotechnology News*, March 10, 2021, https://www.genengnews.com/topics/drug-discovery/top-10-u-s-biopharma-clusters-8/.

3. "BioHealth & Life Sciences," Maryland.gov, accessed August 8, 2021, https://open.maryland.gov/industries/biohealth/.

4. "National Institutes of Health (NIH) Funding: FY1996–FY2022," Congressional Research Service, June 29, 2021, https://fas.org/sgp/crs/misc/R43341.pdf.

5. "NIH-Funded Tool Helps Organizations Plan COVID-19 Testing," National Institutes of Health, December 7, 2020, https://www.nih.gov/news-events/news-releases/nih-funded-tool-helps-organizations-plan-covid-19-testing.

6. Alex Keown, "Billions Pour into BioHealth Capital Region to Battle COVID-19," *BioBuzz*, November 10, 2020, https://biobuzz.io/billions-pour-into-biohealth-capital-region-to-battle-covid-19/

7. Jeff Clabaugh, "The Big Business That COVID-19 Has Boosted in Montgomery County," *WTOP News*, April 26, 2021, https://wtop.com/business-finance/2021/04/the-big-business-covid-has-boosted-in-montgomery-county/.

8. Milken Institute analysis of US Bureau of Labor Statistics (2020).

9. The life science industry's impact on Maryland's economy also includes indirect support for employment by contract manufacturers and suppliers of key inputs as well as a broad range of service industry jobs. When these are considered, the bioscience industry supported a total of 117,600 jobs in 2018. See "Maryland. The Bioscience Economy: Propelling Life-Saving Treatments, Supporting State & Local Communities," *Teconomy Partners LLC and Biotechology Innovation Organization*, 2019, https://www.bio.org/sites/default/files/2020-06/BIO2020-report.pdf.

10. The US Bureau of Labor Statistics (BLS) does not specifically distinguish between scientific R&D employment in specific fields (such as life sciences, physical sciences, or engineering). As such, employment in the fields of biotechnology and nanotechnology are included here as a type of proxy for the broader life sciences industry.

11. Milken Institute analysis of US Bureau of Labor Statistics (2020)

12. "Excel Maryland 2017: Getting to Number 1," Maryland Economic Development Corporation, August 2017.

13. "BioHealth & Life Sciences," Maryland.gov, accessed August 8, 2021, https://open.maryland.gov/industries/biohealth/.

14. Milken Institute analysis of National Science Foundation Survey of Earned Doctorates (2018).

15. "Unemployment Rates for States," US Bureau of Labor Statistics, accessed August 18, 2021,

https://www.bls.gov/web/laus/laumstrk.htm.

16. "State and Area Employment, Hours, and Earnings," (US Bureau of Labor Statistics, 2021), https://data.bls.gov/timeseries/SMS24000003000000001?amp%253bdata_tool=XGtable&output_view=data&include_graphs=true.

17. Milken Institute analysis of American Community Survey Public Use Microdata Sample (2019).

18. "2021 Life Sciences Workforce Trends Report" (TEConomy Partners and Coalition of State Bioscience Institutes, June 2021), https://mdtechcouncil.com/wp-content/uploads/2021/07/csbi-workforce-report.pdf.

19. "Laboratory Associates Program," BioTechnical Institute of Maryland, accessed August 19, 2021, https://btiworks.org/our-programs/laboratory-associates-program/.

20. "EARN Maryland: Industry-Led Partnerships," Maryland Department of Labor, accessed August 19, 2021, https://www.dllr.state.md.us/earn/earnwhatisearn.shtml.

21. Sarah Hansen, "UMBC Launches Biotech Boot Camp to Train Workers Displaced by COVID-19 for In-Demand Jobs," University of Maryland-Baltimore County, February 25, 2021, https://news.umbc.edu/umbc-launches-biotech-boot-camp-to-train-workers-displaced-by-covid-19-for-in-demand-jobs/.

22. Chris Frew, "Why Advanced Biomanufacturing in Maryland is a Thriving Industry," *BioBuzz*, 2020, https://biobuzz.io/why-advanced-biomanufacturing-in-maryland-is-a-thriving-industry/.

23. Patrick Sisson, "Why the Boom in Biomanufacturing Is Just Getting Started," *BisNow*, June 10, 2021, https://www.bisnow.com/national/news/life-sciences/why-the-boom-in-biomanufacturing-is-just-getting-started-109187.

24. Milken Institute analysis of American Community Survey 1-Year Public Use Microdata Sample (2019).

25. "Advancing Commercialization of Digital Products from Federal Laboratories," The National Academies Press, 2021, https://www.nap.edu/catalog/26006/advancing-commercialization-of-digital-products-from-federal-laboratories; "Government in the Innovation Economy: Finding Untapped Value by Transforming Federal Technology Transfer," Deloitte, 2018, https://www2.deloitte.com/us/en/pages/public-sector/articles/federal-technology-transfer-innovation-economy.html; "For the Competitiveness of the Nation and the Prosperity of the Region: Improving Technology Commercialization and Localizing the Impact of Federal Laboratories in the Greater Washington Region" (Maryland Life Sciences Advisory Board Task Force on Federal Commercialization Opportunities, June 14, 2018), https://www.montgomerycountymd.gov/COUNCIL/Resources/Files/REPORTS/LSAB_Darmody_Report.pdf.

26. "Federal Laboratory Technology Transfer" (National Institute of Standards and Technology, 2016), https://www.nist.gov/document/fy2015fedttreportpdf.

27. Kevin Klowden, Aaron Melaas, Charlotte Kesteven, and Sam Hanigan, "State Technology and Science Index 2020" (Milken Institute, November 2020), https://milkeninstitute.org/report/state-technology-and-science-index-2020.

28. "2020 Life Sciences Real Estate Outlook" (JLL, 2020) https://www.us.jll.com/en/trends-and-insights/

research/life-sciences-real-estate-outlook.

29. Milken Institute analysis of PitchBook Data, Inc. (2021) and Census Bureau population estimates (2019).

30. "Business Tax Credits," Comptroller of Maryland, accessed August 19, 2021, https://www.marylandtaxes.gov/business/tax-credits.php.

31. The Milken Institute engaged with various stakeholders in Maryland's life sciences industry to evaluate prior performance and identify key challenges and areas of opportunity

32. "FastForward," Johns Hopkins Technology Ventures, accessed July 30, 2021, https://ventures.jhu.edu/programs-services/fastforward/.

33. Gian-Carlo Walker, Eduard Viladesau, Hob Brooks, and Elliot Vaughn, "What's Next for CDMOs after COVID-19?" BCG, March 4, 2021, https://www.bcg.com/publications/2021/the-four-critical-steps-for-cdmos-post-covid-19.

34. "Biotechnology Investment Incentive Tax Credit," Maryland Department of Commerce, accessed August 19, 2021, https://commerce.maryland.gov/fund/programs-for-businesses/bio-tax-credit.

35. "2020 Life Sciences Real Estate Outlook" (JLL, 2020) https://www.us.jll.com/en/trends-and-insights/research/life-sciences-real-estate-outlook.

36. "Maryland E-Nnovation Initiative Fund," Maryland Department of Commerce, accessed August 19, 2021, https://commerce.maryland.gov/fund/maryland-e-nnovation-initiative-fund-(meif).

37. Jonathan Aberman, "Building Entrepreneurial Innovation in the Greater Washington Region: A Report to the 2030 Group," Amplifier Advisors, May 18, 2017, https://commerce.maryland.gov/media/governor-larry-hogan-announces-excel-maryland-initiative-to-grow-life-sciences-and-cyber-startups;

38. "Brownfields Redevelopment Fund: Annual Report" (MassDevelopment, 2020), https://www.massdevelopment.com/assets/pdfs/annual-reports/brownfields_annualreport_2020.pdf.

39. "BioReady Communities," MassBio, accessed August 25, 2021, https://www.massbio.org/initiatives/bioready-communities/.

40. "BioNetwork: The Life Science Training Initiative of the North Carolina Community College System," accessed August 25, 2021, https://www.ncbionetwork.org/.

41. "Biomanufacturing Training and Education Center," North Carolina State University, accessed August 25, 2021, https://www.btec.ncsu.edu/index.php.

42. Zoe Rosenberg, "Budd plant to be redeveloped as life sciences hub," *The Philadelphia Inquirer*, August 6, 2021, https://www.inquirer.com/business/biotech-lab-manufacturing-budd-plant-20210809.html.

43. "The Discovery Labs Signs Foundational Lease with the University of Pennsylvania Gene Therapy Program as Anchor Tenant," Discovery Labs, May 25, 2021, https://thediscoverylabs.com/press/the-discovery-labs-signs-foundational-lease-with-the-university-of-pennsylvania-gene-therapy-program-as-anchor-tenant/

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Decarbonizing Biotech facilities: Practical considerations for strategic planning

The biotechnology industry is in the business of improving human health and is actively working on reducing our carbon footprint while serving patients. The manufacturing processes for biopharmaceuticals do not directly utilize fossil fuels. However, fossil fuels are used in the generation of raw materials, consumables, packaging, and in supplying energy to building systems and indirectly to manufacturing equipment.

Other studies have looked at the impact of single use systems and consumables on the environment [1]. Various groups are working on reducing embedded carbon in raw materials [2]. Over the years the biotechnology industry has viewed sustainability through the lens of reducing energy usage, particularly regarding building systems and water treatment [3]. The consideration to decarbonize manufacturing has mostly been done internally to companies as part of the capital project planning. This paper will provide a case study of an antibody drug substance production facility for retrofit and envisioned as new construction. The quantification of estimated costs, land use, and production scale limits can help in the capital planning process.

This quantification looks at a monoclonal antibody drug substance facility built in 2018/2019 with two stainless steel upstream trains (2300L production bioreactors) feeding one single use purification train.

For many facilities, building systems and process utilities rely on steam and hot water for major heating loads. The technology to replace fired steam boilers and hot water heaters with electrically heated units exists but from a limited set of vendors. The cost analysis looked at two methods: direct replacement of fired equipment (e.g. steam boilers, hot water heaters) and distributed systems (e.g. point of use steam generation, electric re-heat coils). Electrification of these systems requires new electrical service and more backup generation capacity. While a particular facility might be in a location where electrical infrastructure for this increase in demand is supported, many facilities need upgraded grid connections and upgrades on the grid itself. **The electrical infrastructure to transition the whole industry off natural gas and other fuel fossils doesn't exist yet.** Biogas has the potential to reduce global warming by converting escaping methane to CO2, which is 34 times less impactful to global warming [4]. Although not a true decarbonization solution, biogas could be a bridging solution with the development of the infrastructure to mix/replace natural with biogas. The studied facility has a 2500 KVA switchboard, electric boilers and hot water heaters and would need a dedicated 6000 KVA switch board. There isn't room for the additional gear within the facility and the utility company will need to provide a new larger feeder and transformer. In this case those space constraints require a campus wide approach with a new building for gear and transformer pad. Only the cost of the gear is included in the cost analysis.

Manufacturing requires continuous power to minimize the risk of product loss. Replacing fired equipment with electrically heated equipment significantly increases the backup power demand. Today that demand is met with diesel or natural gas engine generators. These demands are a large portion of the power going to the facility and commercially available **non-fossil fuel back up power solutions to meet that need are not viable**. For example, the studied facility would need an additional plot of land larger than the building for batteries that provide only 4hrs of backup. Site layouts need to consider more than just the batteries and inverters. Large installations of batteries have building code prescribed offsets from buildings, property lines, and other exposures. For example, NFPA 855 requires a remote installation (>100ft form buildings, property lines, and public ways) for Li-ion battery systems that exceed 600kWh. 4hrs of battery backup would add a cost premium of 14% to a new facility before land

costs. Typically, facilities are looking for days of backup power, increasing the battery storage to 12hr and adding solar panels to provide sufficient power is a solution that is intensive in capital (over 50% increase in facility cost) and land use (~10 acre per MW required). Current battery technologies also introduce a new hazard to the community which could require new training and equipment for emergency response personnel. Hydrogen fuel cells or dual fuel engines are novel electrical generation systems that could become attractive for certain sites with the development of hydrogen infrastructure. To meet the backup power needs of the studied facility for 24 hrs. ~52,000L of liquid H2 or 3600kg. Due to safety concerns and handling technologies this type of H2 storage is reserved for special applications [5]. With the high expense of increased onsite generation equipment (combustion or renewable) high reliability power transmission systems (mulitple sourced ring, mesh networks) could be more cost effective if available at the location.

Capturing carbon has been proposed as a way to retrofit existing systems in a bolt on fashion. Commercially available carbon capture technology exists from limited vendors but results in significantly more fossil fuel burned. A carbon capture unit for the studied facility's steam boilers would double the natural gas consumption of the facility and require doubling the facility plot size. Today's commerical technology also introduces ethanolamine (MEA), which presents health risks to the community if released. The addition of this chemical could require new training and equipment for emergency response personnel. The carbon capture unit would add a cost premium of 8% to the facility before land costs and adds 12% to the operating cost of the facility. This is for modern low NOx boilers using an ultralow sulfur fuel (<15 ppm), boilers using fuel oil with higher sulfur content could need additional treatment equipment. At this time resale solutions for the CO2 captured are highly variable by region, with many regions not having an existing solution for resale. The CO2 produced is of a quality that could be used for cell culture with compendial testing or resold to beverage manufacturers.

For existing facilities uptime is paramount so retrofits require careful consideration and planning. Boilers and heaters nearing their end of life could provide the best opportunity for retrofit as the outage will be needed for replacement regardless and the equipment will be fully depreciated. The complexity and cost of the demolition / repair portion of the work is going to vary significantly. One point is access, some facilities have roll up doors that can allow replacement of boilers and others have boilers in more built-in locations that require significant ancillary demolition / repair. Table 1 compares the retrofit capital costs of the different options discussed excluding demolition or write off costs.

Table 1. Estimated retrofit capital costs in USD.

			Electric Direct Replacement			
	Base (NG)	Carbon Capture	w/ NG Generator	w/ 4hr Battery	w/ Solar & 12hr Battery	Electric Device Level Replacement/ NG Generator
Potable Water Heaters	$48,000	-	$135,000	$135,000	$135,001	$135,000
HHW HX Package	$72,000	-				
HHW piping & VAVs	$1,049,000	-	$50,000	$1,099,000	$1,099,000	$1,773,500
Boilers	$380,000	-	$325,000	$325,000	$325,000	$163,000
Switch board	$205,000	-	$62,000	$62,000	$62,000	
Panel Board	$330,000	-	$78,000	$78,000	$78,000	

Generator	$701,000	-	$2,103,000	-	-	$2,103,000
UPS	$306,000	-	-	-	-	-
Battery Backup	-	-	-	$9,379,000	$28,137,000	-
Solar	-	-	-	-	$8,325,000	-
Utility vault	$73,000	-	$80,000	$80,000	$80,000	$80,000
Utility fee	$39,000	-	$50,000	$50,000	$50,000	$50,000
Amine CO2 capture	-	$5,425,000	-	-	-	-
Capital Cost	$3,203,000	$5,425,000	$2,883,000	$11,208,000	$38,291,001	$4,304,500
$/sqft	$102	$173	$92	$357	$1,220	$137
% of initial facility cost	4.9%	8.3%	4.4%	17.2%	58.9%	6.6%
Land (acre)	0.2	0.33	0.31	0.72	25.9	0.31

New buildings present an opportunity to find economies in planning facility systems. If battery systems are going to be used for backup power, a UPS might not be required. The expense of piping can be reduced particularly in the case of device level replacement where heating hot water is completely removed. Utility connections and power distribution systems can be designed to the higher demand rather than adding in separate systems. The estimated cost impact to a new facility are shown in Table 2.

Table 2. Estimated new facility capital costs in USD.

			Electric Direct Replacement			
	Base (NG)	Carbon Capture	w/ NG Generator	w/ 4hr Battery	w/ Solar & 12hr Battery	Electric Device Level Replacement/ NG Generator
Potable Water Heaters	$48,000	$48,000	$135,000	$135,000	$135,000	$135,000
HHW HX Package	$72,000	$72,000	$72,000	$72,000	$72,000	$0
HHW piping & VAVs	$1,049,000	$1,049,000	$1,049,000	$1,099,000	$1,099,000	$1,573,500
Boilers	$380,000	$380,000	$325,000	$325,000	$325,000	$163,000
Switch board	$205,000	$205,000	$267,000	$267,000	$267,000	$267,000
Panel Board	$330,000	$330,000	$408,000	$408,000	$408,000	$408,000
Generator	$701,000	$701,000	$2,804,000	$0	$0	$2,804,000
UPS	$306,000	$306,000	$306,000	$0	$0	$306,000
Battery Bkp	$0	$0	$0	$9,379,000	$28,137,000	$0
Solar	$0	$0	$0	$0	$8,325,000	$0
Utility vault	$73,000	$73,000	$100,000	$100,000	$100,000	$100,000
Utility fee	$39,000	$39,000	$75,000	$75,000	$75,000	$75,000
Amine CO2 capture	$0	$5,425,000	$0	$0	$0	$0
Capital Cost	$3,203,000	$8,628,000	$5,541,000	$11,860,000	$38,943,000	$5,831,500
Change from base	-	$5,425,000	$2,338,000	$8,657,000	$35,740,000	$2,628,500

$/sqft change from base	-	$173	$75	$276	$1,139	$84
% change of base facility	-	8.3%	3.6%	13.3%	55.0%	4.0%
Additional land (acre)	-	0.13	0.11	0.52	25.5	0.11

With the change in how systems are heated the operating cost changes. Table 3 shows a high-level impact on the cost to operate the building systems of studied facility. With limited data on performance of electrical systems of this scale: maintenance, staffing, and differences in life expectancy are not included.

Table 3. Estimated operation costs in USD

	Base (NG)	Carbon Capture	Electric Direct Replacement	Electric Device Level Replacement
Gas Energy (kW) connected	4,695	4,695	0	0
Gas Energy (kW) design	3,101	3,711	0	0
Gas rate ($/kWh)	$0.06	$0.06	$0.06	$0.06
Gas cost/yr ($)	$1,629,813	$1,950,429	$0	$0
Energy (kW) connected	3,458	3,588	9,334	9,801
Energy (kW) design	2,711	2,841	6,428	6,116
Electric rate ($/kWh)	0.08	0.08	0.08	0.08
Electric cost/yr ($)	$1,899,537	$1,990,641	$4,504,636	$4,286,174
Total	$3,529,350	$3,941,070	$4,504,636	$4,286,174
% Change	-	12%	28%	21%

This quantification of estimated costs, land use, and production scale limits can help in the capital planning process. Decarbonized facilities will cost more to build, cost more to operate, use significantly more land, require upgrades to utility infrastructure (electrical and biogas), and require novel approaches for backup power. These factors require the industry to continue to focus short term efforts on reduction of energy used and prepare for the future by engaging with utility providers.

References

1 Kristi Budzinski, David Constable, Daniel D'Aquila, Phillip Smith, Sri R. Madabhushi, Andy Whiting, Tom Costelloe, Michael Collins, *Streamlined life cycle assessment of single use technologies in biopharmaceutical manufacture*, New Biotechnology, Volume 68, 2022, Pages 28-36, ISSN 1871-6784, https://doi.org/10.1016/j.nbt.2022.01.002.

2 MilliporeSigma's DOZN™ Green Chemistry Tool Named Top Project of the Year by Environment + Energy Leader, Merck KGaA, 30 JUL 2020, https://www.emdgroup.com/en/news/dozn-wins-top-project-award-30-07-2020.html

3 Allan Hart, *Airflow Reduction in Cleanrooms after Closing Hours*, Pharmaceutical Engineering, November/December 2019

4 Tim Juliani, Pete Pearson, *Is Biogas a "Green" Energy Source?*, World Wildlife Fund, 24 Sept 2020, https://www.worldwildlife.org/blogs/sustainability-works/posts/is-biogas-a-green-energy-source accessed 16 MAR 2022

5 Storing Hydrogen, Air Liquide, https://energies.airliquide.com/resources-planet-hydrogen/how-hydrogen-stored, accessed 16 MAR 2022

Good morning and thank you Chair Glass, Councilmember Stewart and Councilmember Balcombe and members of the Montgomery County Department of Environmental Protection.

My name is Avi Halpert, I am the Vice President of Government Affairs and Community Relations at United Therapeutics. Prior to this position, and for 17 ½ years, I headed up the real estate and construction group at United Therapeutics, developing not only our campus in downtown Silver Spring, but over a billion dollars of administrative, manufacturing, research and development and warehousing throughout North America, UK and the EU.

I am here today on behalf of the life science industry in Montgomery County to share with you that all the 400+ life science firms, tens of thousand of employees which helped make the State of Maryland the third largest bio-life science hub in the United States that we all want to do the right thing, and that right thing is to save lives. UT's CEO, Dr. Martine Rothblatt said that our mission is to save lives and we cannot do so while negatively impacting the environment. This was the mission we were challenged with when we built the Unisphere, the largest urban site net zero building in the United States. We used existing technology at the time to construct this amazing testament to sustainability but had to change regulations at the State level to allow for geothermal wells to be constructed under the footprint of the building. The Maryland Department of Environmental Protection had tried for over 7 years to change the regulations. It took a state agency, several lobbyists, and a determined life science company to make this happen. Change takes time.

I commend Montgomery County for all the initiatives in sustainability it has already implemented and those it plans implement, but I am here today to tell you that the life science industry as a whole is not capable

of adhering to the proposed regulations as outlined in the Building Energy Performance Standards. It is not because we don't want to adopt these standards, it is because the industry hasn't fully adapted to electrification of the equipment necessary to make this happen.

I was part of a real estate team that executed the needs of our technical operations group, manufacturing, research and development and facilities and engineering teams at United Therapeutics. In preparation for my testimony today, I engaged with all these groups, as well as outside design teams, our general contractors as well as manufacturers of equipment who shared with me that the industry is currently not capable of full electrification.

According to one of our design engineers "while basic support labs for the life science industry are perhaps capable of the transition, scalable R&D and manufacturing is not ready for the jump into an all-electric world. While some of the backbone components of our manufacturing process are beginning to test smaller electric boilers, for example, the ability to find local service technicians who do not have to be flown in from the Midwest or other areas is still an issue. Switching an existing natural gas system to electric in an existing building would also require upgrades to the electric service and gear with rippling effects to the emergency generators and switchgear. To make the full transition to electricity, you would have to redesign your central utility plant or switch to a "plant steam" operation to serve all the new electrified equipment".

One of general contractor mechanical engineers stated that:

- Energy Intensity: Lab/Pharma facilities are energy intensive due to requirements for greater air changes and other thermal demands driven by lab programming ~5x-10x more demand /sf. A

lot of this energy requirement is currently met with combustion of natural gas. Electrifying thermal processes would have the following implications:

  - Increased operating costs – most of what I've seen is that steam generated with electric boilers for instance is >2x as expensive as steam generated with combustion boilers.
  - Increased capacity of emergency back-up systems – because of the critical nature of the work, generators would have to be sized to support thermal processes currently supported by gas which would make emergency generation plants significantly larger. This would come with additional Capex and (potentially air permitting issues for generators)
  - Public utility strain – suitable sites for office to lab retrofits would be fewer thereby driving more utility heavy-ups – particularly in urban areas where there is limited opportunity for onsite generation and storage.
- Flexibility of specialized program equipment – fewer choices for all electric lab equipment particularly sterilization/sanitization equipment (i.e. all electric autoclaves, parts washers, biokill, etc.) may make it challenging to find equipment that both supports the electrification scheme and supports fundamental process requirements.

And from one of United Therapeutics Associate Directors of Process Engineering:

Electrification of existing buildings under normal operations will require:

-substantial downtime of facilities making critical pharmaceuticals, potentially leading to drug shortages

-improvements to the power grid to deliver the additional power

-additional space for increased electrical switching and distribution gear, may be prohibitive in some cases. For example, in studying electrification of 1101 Spring St an additional 6000 KVA switch is required but there wasn't enough space within the building or on the lot to fit the additional gear.

-Back up power

-current natural gas and diesel generators have limited emissions since they only run during testing and grid outages

-current battery technology requires substantial additional space for limited outage coverage. Studied buildings would require a plot of land larger than the building footprint to provide 4hrs worth of batteries. With current battery technologies, this quantity of Lithium would require additional property setbacks and community hazard planning.

-H2 fuel cells and/or H2 fired equipment are available in the market, but H2 supply is by on-site tankage. Handling of large quantities of H2 has similar property setbacks and community safety issues with the additional over road shipping hazard. For a studied 31,000 sq. ft. biopharma facility, 24-hrs of backup would require 52,000L of liquid H2 equivalent to two tanker trucks. Commercially available H2 in these quantities is produced from Natural Gas reformation. Development of green hydrogen generation and pipeline distribution is needed to make hydrogen a safe and practical solution to reducing emissions.

-Carbon capture requires addition land, introduces new hazardous chemicals to the community. The resale solutions for CO2 are very limited and broad scale adoption would require a new market / distribution infrastructure.

-Incentives driving the improvement of the grid reliability and transition of grid to renewables/ green sources is needed.

-The ability to have a facility on ring or dual feeds from different power sub stations and transmission line hardening can reduce or eliminate the need for on-site backup power.

-Renewable energy credits / offsets can provide the economic driver for transition of grid to renewables/ green sources overextending the lifetime of existing fossil fuel plants to meet future increased electrical demand.

We have a thriving life science community in Montgomery County Maryland. I'm here today because I have the luxury to monitor legislation at the state, county, and municipal level. Most of the start-up and mid-size life science firms are focused on their research, their drug trials or raising the next round of funding to keep the lights on, pay their staffs salaries and buy the consumables to conduct their life saving research. Many don't own their own facilities and are relying on their landlords to monitor legislation. These firms as they grow and scale will seek out locations where the economics of expansion and building or retrofitting new facilities make the most economic sense. Over 800 firms are members of the Maryland Tech Council who is represented by Kelly Schulz who gave/will give her testimony today and share some of the same data points and concerns.

United Therapeutics is a bit of an anomaly. We have tested the limits of sustainability and in North Carolina, where we have the land, have built a cold storage logistics facility where we have two Tesla Megapacks as our emergency backup. At a cost of several million dollars, having the necessary land, helping enact changes at permitting, inspection, zoning and with the assistance of Duke Power, we made electrification work, but most companies or landlords cannot afford to

do prove out this opportunity in electrification. We are all about saving the environment and at the same time saving lives. We need to do so in a thoughtful manner which allows the industry and the infrastructure time to adapt.

Thank you for your dedication to the environment and people of Montgomery County and allowing me to share my thoughts on this subject.

DONOHOE

Integrity and Vision Since 1884

January 26, 2024

Montgomery County Council
100 Maryland Avenue, 6th Floor
Rockville, MD 20850

RE: Declining Commercial Property Tax Base and BEPS

Dear Councilmembers:

I share with you a recent commercial property transaction that exemplifies the commercial real estate crisis we are experiencing and that will likely last through this decade. When you see the stunning decline in commercial real estate values I think you will conclude that this is not the time to adopt BEPS and is the time to restrain government spending.

Here's a recent transaction:

7500 OLD GEORGETOWN ROAD (The Clark Building at the Bethesda Metro)
338,844/SF + 500 parking spaces

Purchased in 2019	$134,000,000	$395.46/SF
Renovations	$26,000,000	$76.73/SF
Total Investment	$160,000,000	$472.19/SF
Sold in 2023	$30,000,000	$88.54/SF
Loss	$130,000,000 or 81% in four years	

This 339,000 square foot Class A-/B+ office building, atop the Bethesda Metro, including 500 parking spaces, sold last month for $30,000,000. It lost $130,000,000 in value in just 4 years. It is currently assessed at $111,000,000.

Commercial Property Tax Drought

There is a massive real estate property tax drought worsening over the next 5 years. Take 7500 Old Georgetown Road as an example. It remains on the tax rolls at $111M, despite the recent sale for $30M.

7101 Wisconsin Avenue, Suite 700
Bethesda, MD 20814

202.333.0880

Commercial property values are declining at a rate much faster than assessments so future revenue forecasts are overstated. This lag effect is due to several reasons including:

- Tri-annual assessment cycle
- Lengthy tax appeal process
- Commercial tenants do not indicate intentions to vacate or reduce SF until close to lease expiration (we don't have all the bad news yet).
- Many lenders who've been given the keys have not sold the property or recognized the loss.

BEPS

The commercial real estate sector cannot afford BEPS much less debt service on properties that have become largely vacant. I urge you to delay action on BEPS and reconsider the aspirational goals, applicability and how it will be funded. Consider the following:

- Maryland's mandate is the most aggressive in the Nation – 20% greater than California's
- Lower reduction goals and extend the target dates – all property types
- Allow more time and lower goals for older buildings
- Establish public financing tools
- Recognize that private capital investment will increase rents (commercial and multi-family)
- Do not advance BEPS until you have guaranteed assurances from Pepco and BG&E they can accommodate the increased power demand when gas appliances convert to electric.
- Perform ASHRAE Standard 211 Level 1 and 2 Audits to understand real costs and real benefits.

I urge you to exercise fiscal restraint to enable the County to weather this developing property tax drought. Many commercial properties are in crisis and cannot pay additional taxes, fees or BEPS mandated capital improvements.

I've attached an article published on January 24th by BISNOW concerning plunging office building values Regionally.

Thank you for your consideration.

Sincerely,

Christopher Bruch
President and CEO

Attachment

‘Shocking’ Plunge In Office Values Reveals Depth Of D.C.’s Looming Economic Crisis

January 24, 2024 | Emily Wishingrad and Jon Banister

It’s not easy to watch $64M evaporate.

But that’s what Doug Donatelli (https://www.bisnow.com/tags/doug-donatelli) did last month when he and his partners decided that selling a downtown D.C. office building for $36M that they had bought for $100M was the smarter decision than putting more money into the asset.

“We would love to have seen a signal from the market telling us it made more sense to make the investment than to bail, but that signal was never there,” said Donatelli, co-founder of DSC Partners (https://www.bisnow.com/tags/dsc-partners).

The sudden disappearance of nearly two-thirds of the building’s value was difficult for Donatelli, the former CEO of First Potomac Realty Trust (https://www.bisnow.com/tags/first-potomac-realty-trust) and a 35-year veteran of D.C.’s office market. He had seen a clear path to adding value when he bought it in 2018, but his firm is far from alone in mistiming the market.

A string of investors has been wiped out in recent months by the most dramatic disruption to the city’s office market most commercial real estate professionals have ever seen.

“It’s shocking, but it’s reality,” Donatelli said.

Several building sales in recent weeks have peeled back the curtain on just how hard office values have been hit by remote work and the trend of companies downsizing and fleeing to newer buildings.

After a lengthy freeze in sales transactions due to rising interest rates and cautious capital sources, this wave of deals shows that owners have capitulated — accepting that many of their buildings are worth no more than the value of the dirt they sit on — and they are deciding to cut their losses.

The properties sold in recent weeks have all traded for less than 40% of their previous sale prices, and there is concern that values have further to fall.

“From a longtime market participant, it is astounding what you see some of these deals trading for,” said Solitude Cove Capital founder John Kevill (https://www.bisnow.com/tags/john-kevill), the former president of U.S. capital markets for Avison Young (https://www.bisnow.com/tags/avison-young). “What is to me more interesting is even at that level, I think some of these deals are overpriced.”

Bisnow spoke to 15 D.C. office experts and city leaders for this story, and they described a market facing an existential problem without precedent. They say the crisis is just beginning to unfold, as more office owners this year will decide to sell at dramatic losses.

This will not only lead to the loss of hundreds of millions of dollars that investors and lenders put into buildings — it is also expected to blow a massive hole in the city's budget.

The rapid deterioration of property values comes at an alarming time for the nation's capital, as local leaders grapple with coinciding crises of rising crime, depressed foot traffic, low transit ridership and the loss of economic anchors like the Capitals and Wizards sports franchises.

"There are enormous implications for everybody," said Tracy Hadden Loh (https://www.bisnow.com/tags/tracy-hadden-loh), a Brookings Institution fellow who serves on the board of the Washington Metropolitan Area Transit Authority. "We're talking about millions, trillions of dollars."

The District of Columbia has 126M SF of office space across 650 buildings, according to CBRE (https://www.bisnow.com/tags/cbre). Roughly 300 of those buildings are classified as Class-B and C. Those buildings, which total 33M SF, have largely been deemed worthless by the market, their only value lying in the land beneath them where something else could be built.

Nina Albert (https://www.bisnow.com/tags/nina-albert), D.C.'s deputy mayor for planning and economic development, told *Bisnow* that city leaders realize this disruption in the office market is "more extreme" than past cycles, and the District is working to encourage the repositioning of assets.

But to convert or tear down a building for redevelopment, investors say prices must fall even more to make the math work. And that fall isn't possible without huge financial pain to the city's real estate industry and its property tax revenues.

The depth of the plunge is expected to become a battle of its own, as landlords and local assessors argue over how much a property that hasn't sold is worth.

That fight will begin to unfold in the coming weeks: D.C. is expected to release its annual tax assessments by March 1, then landlords have one month to file an appeal. Those appeals will undoubtedly be widespread, and many will have to be adjudicated by the courts.

"We're buckling in," said Grant Steinhauser, principal at property tax consulting firm Ryan (https://www.bisnow.com/tags/ryan). "We expect a lot of these appeals to be long, hard fights."

The Fall

The ride for office owners over the last year has felt less like a roller coaster and more like the Tower of Terror.

Landlords have known their property values were in free fall as vacancy soared, interest rates spiked and investors soured on the sector, but they didn't know when the drop would stop.

A lack of sales for months left D.C. with few examples to show how the market was valuing office buildings, but a series of year-end trades has now revealed where the market's floor is: roughly a third of a property's pre-pandemic price.

"We've certainly never seen [values] evaporate this quickly," said Kyle Luby (https://www.bisnow.com/tags/kyle-luby), head of the D.C. office for brokerage firm Stream Realty (https://www.bisnow.com/tags/stream-realty). "It just seems like a perfect storm of struggles in the leasing market, increases in rates, rising construction cost. It's just this whole whirlwind."

The recent string of D.C. deals, largely older buildings in the downtown area, illustrates how far values have fallen.

- 1850 M St. NW sold out of foreclosure in August (https://www.bizjournals.com/washington/news/2023/08/25/jpmorgan-manulife-auction-1850-m.html) for $37.5M, down 66% from its 2017 price of $109M.

- 1201 Connecticut Ave. NW sold out of foreclosure in November (https://www.bizjournals.com/washington/news/2023/11/15/longfellow-building-auction.html) for $21.2M, down 71% from its 2019 price of $73.6M.

- 1250 Eye St. NW sold for $36M last month (https://www.bizjournals.com/washington/news/2023/12/29/franklin-

square-office-sale-dsc-kairos.html), down 64% from its 2018 price of $100M.

- 1101 14th St. NW sold for $18.2M early this month (https://www.bisnow.com/washington-dc/news/deal-sheet/this-weeks-dc-deal-sheet-122301), down 70% from its 2017 price of $62M.

- 919 18th St. NW sold early this month (https://www.bizjournals.com/washington/news/2024/01/03/michael-scott-thomas-dungan-office-building.html) for $16.3M, down 69% from its 2013 price of $53M.

When office investors buy a building, they typically take out a loan for at least 50% of its value. When they are forced to sell for around a third of that previous price, that means the entirety of their equity in the deal is erased, and the lender also takes a sizable loss.

"We're in the early stages of how much value has been destroyed, how much value has been lost," Donatelli said.

The average price of Class-A office buildings in D.C. fell 43% from its 2018 peak to $339 per SF last year, and the combined Class-B and C segments fell 44% from their 2020 peak to $254 per SF last year, according to Newmark data.

Several older buildings over the last year have sold for around $150 per SF. Brokers see some older midblock buildings that were once worth over $300 per SF now on the market for around $100 per SF, a price that values the buildings themselves as basically worthless.

"Essentially, they're valuing it at the dirt level for that stuff," Newmark (https://www.bisnow.com/tags/newmark) Executive Managing Director James Cassidy (https://www.bisnow.com/tags/james-cassidy) said.

Part of the reason values have fallen so far — in addition to the high vacancy, lack of leasing demand and elevated interest rates — is that sellers needing to unload a building have had a hard time finding a buyer.

"Our market's been fundamentally broken over the last 12 months because there's not a lot of equity to buy the asset class," Cassidy said.

The first nine months of 2023 saw just $444M of office sales volume in D.C., well below the historical average, according to Newmark. But the final three months saw a spike in deals, with $837.5M in assets trading hands, the busiest quarter for office sales in two years.

This string of transactions has continued into January. Cassidy said it has been helpful for the market in creating comparables for owners to value their properties, and the publicity around the deeply discounted deals has brought in some opportunistic investors.

More deals have begun to close because of the shifting attitude of sellers, who one year ago had a wait-and-see approach with some optimism that the capital markets could improve, Kevill said. But now, with interest rates remaining high and the cost of holding and leasing their buildings making it a risky bet, many have realized the smartest decision is to cut their losses.

"We're on a slow, steady march to that realization for many sellers," Kevill said.

Stonebridge (https://www.bisnow.com/tags/stonebridge) principal Doug Firstenberg (https://www.bisnow.com/tags/doug-firstenberg), a longtime D.C. office owner who has developed more than 10M SF of properties throughout the region, came to this realization when his firm, along with joint venture partner Rockwood Capital (https://www.bisnow.com/tags/rockwood-capital), sold 7500 Old Georgetown Road in Bethesda (https://www.bisnow.com/tags/bethesda) last month for $29.9M. The price for the building, which long served as Clark Construcion's headquarters, was roughly 22% of what they paid for it in 2019 (https://www.bisnow.com/washington-dc/news/office/bethesdas-clark-office-tower-takes-over-100m-haircut-in-short-sell-122260).

Firstenberg declined to comment on that deal, but he said owners across the market are beginning to accept lower prices for their assets.

"We have a product type that fundamentally is never going to be the same," he said. "Overall demand is down, and the type of demand has fundamentally changed. That is a huge implication for where values are going. It's not just where rents are down. You can't fill these buildings. They don't meet the needs of the tenants."

Several of the deals have come from lenders selling properties after foreclosing on buildings where owners defaulted on their loans. MRP Realty (https://www.bisnow.com/tags/mrp-realty) Associate Vice President Nick Gordon said most lenders aren't set up to hold large amounts of office assets on their books and have immediately initiated sale proceedings, a trend he expects to continue this year.

"If you're forced to take these back and you can't handle them, you have to sell for whatever the market gives, and that's just creating this situation where they're taking what they can get," he said.

The string of sales has started to draw the attention of city officials and appraisers, who will soon be battling over the value of hundreds of office assets that haven't traded hands.

"This is the most drastic, most dire situation we've seen from the D.C. office market," Ryan's Steinhauser said.

'Enormous Implications For Everybody'

As it becomes clear just how far office values are falling, a better picture is also forming of just how deep the ramifications could be for all Washingtonians.

A significant share of the District's budget is on the line. About 15% (https://www.taxpolicycenter.org/taxvox/future-commercial-real-estate-and-big-city-budgets) of the city's revenue comes from commercial properties, according to the Urban-Brookings Tax Policy Center (https://www.bisnow.com/tags/urban-brookings-tax-policy-center). Sinking revenue means less money for everything from police officers to schools to the Metro and pothole repair.

"Everyone stands to lose," D.C. Policy Center Executive Director Yesim Sayin (https://www.bisnow.com/tags/yesim-sayin) said. "Tax revenue pays for government support and services that all D.C. residents need or use. So that is a very, very disconcerting, very nerve-wracking picture for me."

In February, D.C.'s Office of the Chief Financial Officer released a letter (https://cfo.dc.gov/sites/default/files/dc/sites/ocfo/publication/attachments/FEB%202023%20Revenue%20Estimate%20Lett the city would lose $464M (https://www.bisnow.com/washington-dc/news/office/plunging-office-values-cause-dcs-tax-revenue-projections-to-fall-464m-117898) in tax revenues from real estate between 2024 and 2026.

"The expansion of remote work, coupled with higher interest rates, pose a serious long-term risk to the District's economy and its tax base," Chief Financial Officer Glenn Lee wrote in the letter.

The office market's impact on city revenues is posing a challenge across the U.S. (https://www.taxpolicycenter.org/taxvox/future-commercial-real-estate-and-big-city-budgets), but D.C. is especially vulnerable, Brookings' Loh said, because it has a higher share of commercial properties compared to residential, and those commercial properties are taxed at a higher rate than housing.

"The ramifications for D.C. are particularly severe," Loh said.

In its most recent revenue estimate (https://cfo.dc.gov/sites/default/files/dc/sites/ocfo/release_content/attachments/Dec%202023%20Revenue%20Estimate%20 the OCFO last month projected commercial revenues would drop every year for the next four years. While the District received nearly $1.7B in tax revenues from occupied commercial buildings in 2022, the OFCO predicted that figure would be $136M lower in 2027. The report says continued office market decline would pose an added risk to the outlook.

"If you look at the CFO's forecast, you can see that we're feeling the pain," Loh said. "This isn't a subject that's up for debate."

But the costs to the city don't stop at commercial tax revenues. Loh said it will be important to watch the "second-order effects" from the office disruption, like a decline in fares for the transit system and falling downtown sales tax revenue, factors that could additionally hinder D.C.'s finances.

WMATA (https://www.bisnow.com/tags/wmata) is facing a $750M budget shortfall for fiscal year 2025. The transit system laid out a stark picture in December (https://dcist.com/story/23/12/12/metro-budget-proposal-drastic-service-cuts-fare-increases-hiring-wage-freezes/), saying that without more investment, the region could expect drastic cuts to rail and bus service, fare hikes and layoffs. Loh said the system's health is especially dependent on office traffic.

"The D.C. Metro's share of trips that are journey-to-work-related is higher than any other transit system in the United States," she said.

'We Are Buckling In'

In a few weeks, owners will find out how much the city thinks their properties are worth.

On March 1, D.C. will send out assessment notices (https://www.wilkesartis.com/form/dc-tax-timeline/) to owners, thereby conveying how much they are expected to pay in property taxes. That kick-starts a typically routine appeals process — owners fighting for lower values by presenting updated data on what has occurred at their properties and in the market.

But in recent years, the spread between how owners believe their properties should be valued and what the government thinks has been getting wider as the office market falls into more distress. This year, owners are bracing for an especially high-stakes battle.

"[When] the new assessments come out, everyone's going to be looking for them, everyone's going to have their eyes open," Steinhauser said. "Certainly, I expect there to be some uproar if there isn't a pretty proactive step taken by the assessor's office to lower office values."

The vast majority of owners of large office buildings appeal their assessments every year, Steinhauser said. But this year, landlords are expected to seek massive discounts, freshly armed with a cache of sales data to justify just how far values have plunged.

Last year, office valuations were lowered by between 5% and 10%, Steinhauser said.

"Owners thought value should have gone down pretty aggressively last year, and they didn't," he said.

This year, with office landlords facing record-high vacancy (https://www.bisnow.com/washington-dc/news/office/tenants-jockey-for-dwindling-trophy-space-giving-landlords-a-leg-up-122287) and more distress than any other city in the country (https://www.bisnow.com/washington-dc/news/office/dc-tops-nation-in-office-loan-distress-122170), Steinhauser said owners will be more concerned with their tax bills and will seek reductions of 30%, 40%, 50% or more.

"They're going to be looking for something drastic," Steinhauser said.

The big variable that will affect how far assessments will drop is what assessors determine to be each office class's capitalization rate, the measure of return investors can expect on the money put into the properties.

"What is at stake right now, as some of these buildings start to transact at these very low dollar valuations, is this opens up a question for every kind of office building, whether it's commodity or trophy: Is the cap rate changing for office as a product?" Loh said. "This is an open question that people are going to be disputing."

Even in a year like this, Steinhauser said, it is unlikely that the District would do anything radically different with property assessments.

"I don't think that the assessor is going to proactively reduce values by 50%. That would be drastic, and we really never see a change that drastic from one year to the next," he said. "But certainly, some sort of proactive reduction on the assessors' part could be expected."

Regardless of how much assessed office property values drop this year, it is clear they are moving in a downward trajectory that will be difficult to recover from. For longtime D.C. office owners like Donatelli, it is unlike any prior cycle they have seen in their careers.

"It's going to be painful, really painful, especially for people who are fully invested in office in D.C.," Donatelli said. "It's going to be really painful for the city government. The tax revenues they've depended on from commercial real estate are really threatened."

Climbing Out Of The Hole

D.C. leaders say they recognize the problem and are taking action.

Mayor Muriel Bowser (https://www.bisnow.com/tags/mayor-muriel-bowser)'s administration is betting that filling downtown with apartment buildings is its path to recovery, creating mixed-use neighborhoods rather than the traditional office-centric district that exists now.

The city has a goal of housing 15,000 new residents downtown (https://www.bisnow.com/washington-dc/news/mixed-use/dc-mayor-outlines-plans-for-15k-new-residents-downtown-in-5-years-117097) by 2028, in part by incentivizing developers to turn obsolete office buildings into housing.

In July 2022, Bowser signed into law a 20-year tax abatement (https://www.bisnow.com/washington-dc/news/office/dc-launches-abatement-program-as-office-to-resi-projects-stall-out-downtown-117598) program for owners that add housing, 15% of which must be affordable, to their properties in a designated portion of downtown. The program allocated $2.5M of annual funding from 2024 through 2026 and $6.8M in 2027. The Mayor's FY 2024 budget increased funding (https://dmped.dc.gov/sites/default/files/dc/sites/dmped/page_content/attachments/Housing%20in%20Downtown_DMPED $41M for tax year 2028.

Last summer, Bowser announced a forthcoming Downtown Action Plan that would provide a framework to transform the heart of the District by spurring new development. Albert, the deputy mayor, said the plan will be rolled out in the coming months.

"There's a doom-and-gloom perspective, which assumes that nobody's doing anything," she told *Bisnow*. "What we are doing is making sure that we position ourselves so that as the market rebounds, that we are well-positioned as a city to rebound with it."

But to achieve the city's vision of turning offices into housing en masse, developers say values will have to drop even further, creating more short-term pain for office owners and city revenues.

Gordon said MRP looked at buying older D.C. office buildings last year to potentially convert into apartments, but the prices sellers wanted were still too high.

"Some of the deals that got done were at numbers that didn't pencil to us," he said. "Whereas we think the opportunities that will are coming."

In the meantime, Bowser is asking owners not to give up on downtown. Speaking at an event hosted by the D.C. chapter (https://www.bisnow.com/tags/crew-dc) of Commercial Real Estate Women this month, the mayor said she recognizes there is "a lot of angst" among property owners about values, but the long-term trend shows that investing in downtown is a moneymaker.

"It's true, we're having a few soft years, but they will go up," she said. "We are asking the property community downtown: Hold on. Stay invested."

Contact Emily Wishingrad at emily.wishingrad@bisnow.com (mailto:emily.wishingrad@bisnow.com)

See Also: Investors Sue Thor Equities Over Lack Of Distributions From Fifth Avenue Building (/new-york/news/retail/thor-equities-didnt-pay-its-investors-at-530-fifth-lawsuit-alleges-122577)

Related Topics: MRP Realty (https://www.bisnow.com/tags/mrp-realty), Doug Donatelli (https://www.bisnow.com/tags/doug-donatelli), Kyle Luby (https://www.bisnow.com/tags/kyle-luby), Rockwood Capital (https://www.bisnow.com/tags/rockwood-capital), Doug Firstenberg (https://www.bisnow.com/tags/doug-firstenberg), James Cassidy (https://www.bisnow.com/tags/james-cassidy), Mayor Bowser (https://www.bisnow.com/tags/mayor-bowser), DMPED (https://www.bisnow.com/tags/dmped), John Kevill (https://www.bisnow.com/tags/john-kevill), DSC Partners (https://www.bisnow.com/tags/dsc-partners), Stonebridge (https://www.bisnow.com/tags/stonebridge), Nina Albert (https://www.bisnow.com/tags/nina-albert), D.C. Policy Center (https://www.bisnow.com/tags/d.c.-policy-center), The Brookings Institution (https://www.bisnow.com/tags/the-brookings-institution), Tracy Hadden Loh (https://www.bisnow.com/tags/tracy-hadden-loh), Solitude Cove Capital (https://www.bisnow.com/tags/solitude-cove-capital), Yesim Sayin (https://www.bisnow.com/tags/yesim-sayin)

Commodore
MANAGEMENT COMPANY, INC.

BEPS Electrification Case Study[1] 1960s Vintage 24 unit Garden Style Apartment with Split System (Gas Forced Air / Electric AC)	**Cost as of:**	**Jul-24**
Scope of Work	**Total Cost**	**Cost/Unit**
Electrification - Circuit Upgrades (does NOT include Pepco Service Costs)		
Labor / Materials - 1200 Amp Service Installation	$ 42,420.00	$ 1,767.50
Labor / Materials - Service Feeder Installation	$ 10,500.00	$ 437.50
Labor / Materials - 200 Amp In Unit Subpanel Installation	$ 50,108.33	$ 2,087.85
Labor / Materials - 30 Amp Circuit Installation to support Electric Dryer	$ 7,233.33	$ 301.39
Labor / Materials - 225 Amp Circuit Installation to support Electric Water Heating System	$ 84,000.00	$ 3,500.00
Labor / Materials - Electric Stove, Furnace, and Air Conditioning Circuit Installation	$ 40,110.00	$ 1,671.25
Total Cost - Electricifcation - Circuit Upgrades	**$ 234,371.67**	**$ 9,765.49**
Equipment Replacements		
Building Water Heater Upgrade / Installation	$ 52,150.00	$ 2,172.92
Building HVAC (Heat Pump) Upgrade / Installation	$ 204,501.00	$ 8,520.88
In Unit Stove (GE Electric) Replacements / Labor	$ 17,133.60	$ 713.90
Laundry Room Replacements / Labor (Speed Queen)	$ 9,761.40	$ 406.73
Total Cost - Equipment Replacements	**$ 283,546.00**	**$ 11,814.42**
Total Cost - Circuit Upgrades & Equipment Replacements	**$ 517,917.67**	**$ 21,579.90**
10% General Contingency	$ 51,791.77	$ 2,157.99
5% Construction Management	$ 25,895.88	$ 1,079.00
Financing Costs (3 Year 75% LTC Bank Construction Loan @ SOFR + 300)	$ 220,758.04	$ 9,198.25
Pepco Heavy Up Costs - Onsite Service Delivery to Structure / Transformer Upgrades	$ 96,000.00	$ 4,000.00
Engineering Design Fees / Permits	$ 50,000.00	$ 2,083.33
Lost Rental Income and Releasing Expense	$ 191,484.00	$ 7,978.50
Displaced Tenant Relocation Costs ($1k/Unit Relocation Allowance)	$ 24,000.00	$ 1,000.00
Total Soft Costs	**$ 659,929.69**	**$ 27,497.07**
Total All In Cost to Electrify[2]	**$ 1,177,847.36**	**$ 49,076.97**
Average Current Monthly Rent		$ 1,773.00
Max Capital Improvements Surcharge (20%, Per DHCA)		$ 354.60
Monthly Rent after Electrification		$ 2,127.60
Annual Increased Out of Pocket Cost to Tenants		**$ 4,255.20**
Years Until Other Capital Projects Can Become Recoverable		11.53

Footnotes:

1.) Project Scope strictly to convert building from Gas to Electric, **additional work required** to meet current Site EUI targets

2.) All In Cost does NOT include: Asbestos Abatement (if any), Drywall Hanging / Replacements, Painting, Insulation Repairs / Replacement, Unit Upgrades / Improvements, Building Envelope Work, Fire Life Safety Improvements or ADA Improvements.

Strathmore Park at Grosvenor Condominium

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TO: County Councilmembers Albornoz, Balcombe, Fani-Gonzales, Friedson, Glass, Jawando, Katz, Luedtke, Mink, Sayles, and Stewart
Council Office Building
100 Maryland Avenue, 6th Floor
Rockville, MD 20850

FROM: Marilyn Block, President
Board of Directors
Strathmore Park at Grosvenor Condominium Association

DATE: June 5, 2024

SUBJECT: Executive Regulation 17-23, Building Energy Performance Standards (BEPS)

It is my understanding that the County Council is in the process of reviewing Executive Regulation 17-23 (ER 17-23) and will approve final language in September. The Strathmore Park association is requesting that you assist us and other similarly structured condo associations in Montgomery County with a significant issue regarding specific language that fails to address the unique situation of condo associations such as ours.

We are a small, low-rise condo composed of three 20-unit buildings with only a small entry lobby in each building. Other than the hallways that lead to individual units (five units per floor), there are no interior common areas. All the units are individually owned and metered for gas and electricity, so the Association has no control over energy usage.

On October 27, 2022, I participated in the CCOC "Energy Efficiency – Informational Webinar." During the Webinar, I described our situation and asked how an Association such as ours would be expected to impose energy reductions. The response from Emily Curley, BEPS Manager, Montgomery County Department of Environmental Protection was that our situation is "tricky."

The language in ER 17-23 addresses multifamily housing without differentiating between rental buildings and condo buildings in which each unit is occupied by an individual owner. It appears that the different ownership situations for apartment buildings and condo

buildings are immaterial to the BEPS which includes the following definition: "Owner means an individual or legal entity in whose name a building is titled, or in the case of a community association, the governing body of either a condominium or cooperative housing corporation."

Of specific concern to Strathmore Park is Section 18A.43A.01.10 "Building Performance Improvement Plan Submission" (page 10). This section refers to "a building" but does not appear to address a situation in which each unit in a condo building is individually owned. Section A refers to "the owner;" our condo does not have a single building owner. ER 17-23 also refers to potential energy upgrades (Section B2) and a retrofit plan (Section C).

It is unclear how condo buildings will be able to comply with the requirements imposed by these sections.

In April 2024, I contacted Emily Curley to express my concern that ER 17-23 does not address the situation of condo associations. Her reply stated that the BEPS regulations had been delivered to the County Council's Transportation & Environment Committee and have not yet been finalized. Before the Council takes final action in September, I am asking that ER 17-23 be revised to include specific language that addresses the unique situation of condo associations such as ours.

It is worth noting that townhouses are exempt from the BEPS regulations because they do not share interior common areas. It would seem that the residential spaces in condo buildings are analogous to townhouses – units are individually owned and controlled. It would seem logical, then, to require energy plans and retrofit upgrades for only the shared common areas under control of the Board of Directors (lobbies, hallways, stairways, and garages).

Our association has no authority to control owner use of energy within their individual units. I am sure we are not the only condo association struggling with this issue.

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CONDOMINIUM REPORT

10401 Grosvenor Pl
Rockville, MD 20852

JUNE 2024

Contents

PRIME PARTNERS ENGINEERING

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Prime Partners Engineering, LLC (PPE) is a full-service project management, design engineering, and dry utility consulting firm based in the District of Columbia. As a certified Minority Business Enterprise (MBE) and District of Columbia Certified Business Enterprise (CBE), PPE boasts a team with an average of 15 years of experience in project management and design oversight. Specializing in project management, PPE excels in project planning, risk mitigation, execution, stakeholder engagement, monitoring and controlling, and project closing. The firm has a proven track record managing high-profile commercial developments in Maryland and the District of Columbia. PPE's specialty lies in utility-scale electrical challenges, where they work closely with clients to understand security requirements and technical challenges associated with connecting to the grid. Despite being a small firm, PPE possesses the expertise and skills to deliver projects within scope, schedule, and budget, leveraging industry relationships to provide cutting-edge solutions. Committed to safety and accountability, PPE aims to enhance communities and environments through their services.

SHUMATE ENGINEERING

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Shumate Engineering operates as a comprehensive mechanical, electrical, and

plumbing engineering firm dedicated to understanding and meeting clients' needs. With over 20 years of specialized experience in mission-critical design, the team leads in delivering effective solutions. Expertise is exemplified by a deep understanding of client program needs and broad experience in various mechanical and electrical topologies. Additionally, technical leadership, led by the Mission Critical Director, brings nearly 40 years of complex engineering and management experience.

Shumate Engineering especially offers a wide range of electrical engineering capabilities, including power design, lighting design, lighting control design, fire alarm design, design standards development, energy services, energy modeling, lighting system modeling, and LEED Design Services. At Shumate Engineering, clients benefit from the expertise of a large firm with the agility of a small business, providing direct access to the principal and delivering exceptional results for every project.

Abbreviations

Φ, Ph	Phase	LEED	Leadership in Energy and Environmental Design
A	Ampere(s)	MCB	Main Circuit Breaker
AFCI	Arc-fault circuit interrupter	MCC	Motor Control Center
ANSI	American National Standards Institute	MLO	Main Lugs Only
ATS	Automatic Transfer Switch	MVA	Megavolt-ampere(s)
AWG	American Wire Gauge	NEC	National Electric Code
CT	Current Transformer	NEMA	National Electrical Manufacturers Association
Cu	Copper	OCPD	Overcurrent Protection Device
EM	Emergency	P	Pole(s)
EMR	Elevator Machine Room	PEPCO	Potomac Electric Power Company
EMT	Electrical Metal Tubing	Sq ft	Square Foot
EV	Electric Vehicle	SWBD	Switchboard
FPE	Federal Pacific Electric	UL	Underwriters Laboratories
G	Ground	V	Volt(s)
GFCI	Ground-fault circuit interrupter	W	Wire
kVA	Kilovolt-ampere(s)	Y	Wye

Executive Summary

Objective:

This report, a collaborative effort between Prime Partners Engineering and Shumate Engineering, aims to address essential electrical upgrades necessary for GPIII Condominium to comply with new energy standards mandated by the Condominium Act and Maryland and Montgomery County Building Energy Performance Standards (BEPS) Mandate. It outlines the requisite upgrades to modernize the condominium's electrical infrastructure, facilitating access to EV charging stations, transitioning all gas ranges/cooktops and ovens in the apartment units to electric, replacing the gas dryers in the laundry room and five dryers on the 17th floor to full electric ranges, and exploring the possibility of electric boiler integration. An examination of the existing infrastructure, conducted during a site visit on December 7th, 2023, forms the basis of our recommendations.

Report Summary:

Grosvenor III's infrastructure includes two 1000 kVA transformers forming a spot network. Analysis of utility bills reveals a consistent peak load of 802.9 kW, below the maximum system capacity of 1,200 kVA, leaving a surplus capacity of 197.1 kW for additional loads.

The aging electrical equipment necessitates replacement, with potential mandatory upgrades to meet modern safety standards. Detailed assessments of apartment unit equipment and switchboards are essential, indicating the need for retrofitting or full replacements in the near future.

The building currently has capacity for new energy projects below 197.1 kW. Proposed projects include converting dryers to electric (75 kW) and installing Level II charging stations (57.5 kW).

Several energy projects reviewed exceed current transformer capacity, requiring upgrades to the distribution system. Projects include the conversion of gas cooking appliances (1,010.8 kW), Level I charger installations (948.5 kW), and boiler conversions (7,357 kW). Challenges include spatial limitations, the substantial increase in electrical demand and the existing outdated electrical system.

A proposed timeline for equipment replacement or upgrades is provided, noting potential variations based on intervention costs. Outages ranging from 10 days to 4 weeks may be necessary for specific sections of the building. PPE suggests consulting with contractors to obtain a realistic understanding of the different anticipated timelines for various options. Given the age of the building, it is highly probable that additional time will be required to address unforeseen challenges, such as updating new components to meet current code standards.

The report first delves into the existing conditions of GPIII, elucidating the electrical configurations and infrastructure limitations. Subsequently, proposed upgrades and alternative options will be outlined, alongside associated costs and considerations. Discussions will also encompass utility coordination and regulatory compliance, ensuring alignment with pertinent codes and standards.

It is our intent that this report serves as a guide to help GP3 evaluate its decision to transition into a modern building with updated electrical equipment and the integration of EV charging stations, fostering enhanced sustainability, and moving toward reduced dependence on fossil fuels.

Key Takeaway:

Grosvenor III Condominium faces significant challenges in meeting modern energy standards and addressing the demands of climate change. The building's age and existing electrical infrastructure, originally designed to meet the needs of the 1960s, present substantial hurdles to compliance with current regulations.

To align with the new standards set by the Condominium Act, Maryland, and Montgomery County Building Energy Performance Standards (BEPS) Mandate, Grosvenor III requires a comprehensive overhaul of its electrical system. This includes transitioning gas appliances to electric, integrating EV charging stations, and upgrading outdated equipment. However, these necessary upgrades come with a substantial financial burden, estimated at a minimum of $4.8 to $7.4 million.

Without significant financial backing and support from government or grant programs, it will be challenging and financially burdensome for Grosvenor III to undertake these essential improvements alone. Despite these obstacles, the

proposed upgrades are crucial for enhancing sustainability and reducing dependence on fossil fuels. This report aims to guide Grosvenor III through this transition, ensuring compliance with regulatory standards and fostering a more sustainable future.

I. Existing System Capacities & Load Conditions

Existing electrical conditions were evaluated via on-site survey conducted by Prime Partners Engineering and Shumate Engineering, as well as prior design drawings and a previously compiled report issued by Facility Engineering Associates, P.C. (FEA) dated 2020-03-19 and Ted Ross Consulting Engineering dated 2017 -03 -19.
During the on-site survey, no invasive procedures were performed, such as opening equipment, disconnection, demolition, or any other actions requiring licensed electrician services. As such, information pertained in this report is limited to that which could be directly observed via simple inspection and what has already been provided in previous reports.

A. Utility & Standby Generator

During the onsite assessment, the following critical infrastructure elements were confirmed at the Grosvenor III facility: Two 1000 kVA transformers constituting a spot network, are supplied by radial feeders serving the building that operates on 120/208V, three-phase voltage. The primary service is delivered via underground feeders from a PEPCO utility vault located on the front parking lot of the building, with a 300 kW/375 kVA backup generator (also located in the front parking lot) in case of PEPCO outage. Three conduit runs connect to individual services (SWBD A, B, C), each assigned a specific PEPCO meter.

During the site visit the following elements were confirmed through visual observation:

- 2- 1000 kVa transformers set in network and fed by 2 radial feeders to form a spot network.
    - Cables from 2 existing transformers to Bus and Bus (conduits for electrical wiring) will need to be verified by Pepco for appropriate capacity. Checking the transformers for empty conduits will need to be done with PEPCO.
    - The network service seems to be fed by 2 Radial distribution feeders from Grosvenor Pl (Feeder 14438 & Feeder 14447). (See section E - *Utility Upgrades considerations & challenges*)
        - Feeder 14447 is fed from Kensington Substation

- Feeder 14438 is fed from Kensington Substation

- The building services were confirmed to be of voltage 120/208V – 3 phases fed from a Network setup.

- 3 sets of conduits run from Pepco Network Bus to 3 individual services (SWBD A (Service 1), SWBD B (Service 2), SWBD C (Service 3).
  - SWBD A has a 4”-4 way and 4 sets of 250 KCMIL CU service cable and 0 empty conduits.
  - SWBD B & C have 4”-10 ways with 5 sets of 500 KCMIL CU cable and 5 empty conduits.

Primary service is provided via 3Φ, 4W, 120Y/208V feeders from a PEPCO utility vault located under the parking lot in front of the building, and transmitted underground to three switchboards in the main electrical room. The building also has an emergency fuel-based backup generator located on the parking lot as shown in Figure 1.

Figure 1 – Equipment location -Grosvenor III

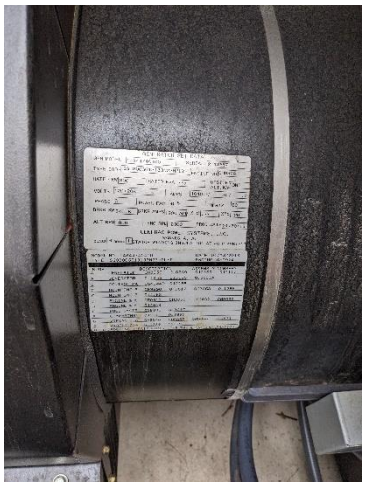
The transformer vaults could not be accessed during the survey however it is confirmed that the underground equipment is 2 transformers, each 1000 kVa in capacity. Based on the amperages of the corresponding switchboards, it can also be reasonably assumed that SWBD A & SWBD B are served by 500 kVA to 1MVA capacity and that SWBD C is served by a service ranging between 250 kVA to 500 kVA.

PEPCO meters were present for all three switchboards individually, as well as the feeds for the grocery store and beauty salon, which appeared to be tapped from SWBD A. Therefore 5 meters (3 for each switchboard, the grocery store, and the beauty salon) make up the building's overall electrical consumption.

SWBD A, B, C PEPCO meters

Beauty Salon (left) and Grocery Store (right) PEPCO meters

As also shown in Figure 1 is a 300 kW/375 kVA generator adjacent to the parking lot which provides emergency power to the building. Separate feeds were observed for life safety (200 A), elevators (200 A), EM panel (400 A), and the grocery store (400 A). Feeder sizes were ascertained from the frame sizes printed on the disconnect enclosures but could not be directly observed.



Generator nameplate

Disconnects for EM feeders

B. Current Power Distribution Configuration

The building is served by 3 main switchboards that divide the condominium in three. SWBD A and SWBD B serve the apartment units and other building electrical needs such as the grocery store, hair salon and the current EV charging station as well as other necessary services. SWBD C exclusively serves the chillers only.
The risers (electrical conduits within the building), ranging from 60 A to 200 A, serve 6 to 9 apartments each, limiting potential upgrades due to their low power allowance.

Two 4,000 A switchboards (SWBD A/B) and one 2,000 A switchboard (SWBD C) provided the main service to the building, as well as the adjoining grocery store and beauty salon. Power cables/conduit were not directly observed outside of the laundry and elevator rooms during this survey, but in a prior study, were noted to be either primarily insulated copper in EMT conduit, or armored cable.

SWBD B provided power to the MDP switchboards (noted later in this section) and a 400 A feed tapped from its main for EM power, excepting elevators and the grocery store.

SWBD C exclusively served the chillers. All other services in the building appeared to originate from SWBD A.

The following Figure 2 gives an idea of the building setup. For a more accurate description of the design, the one line is available in Appendix 1.

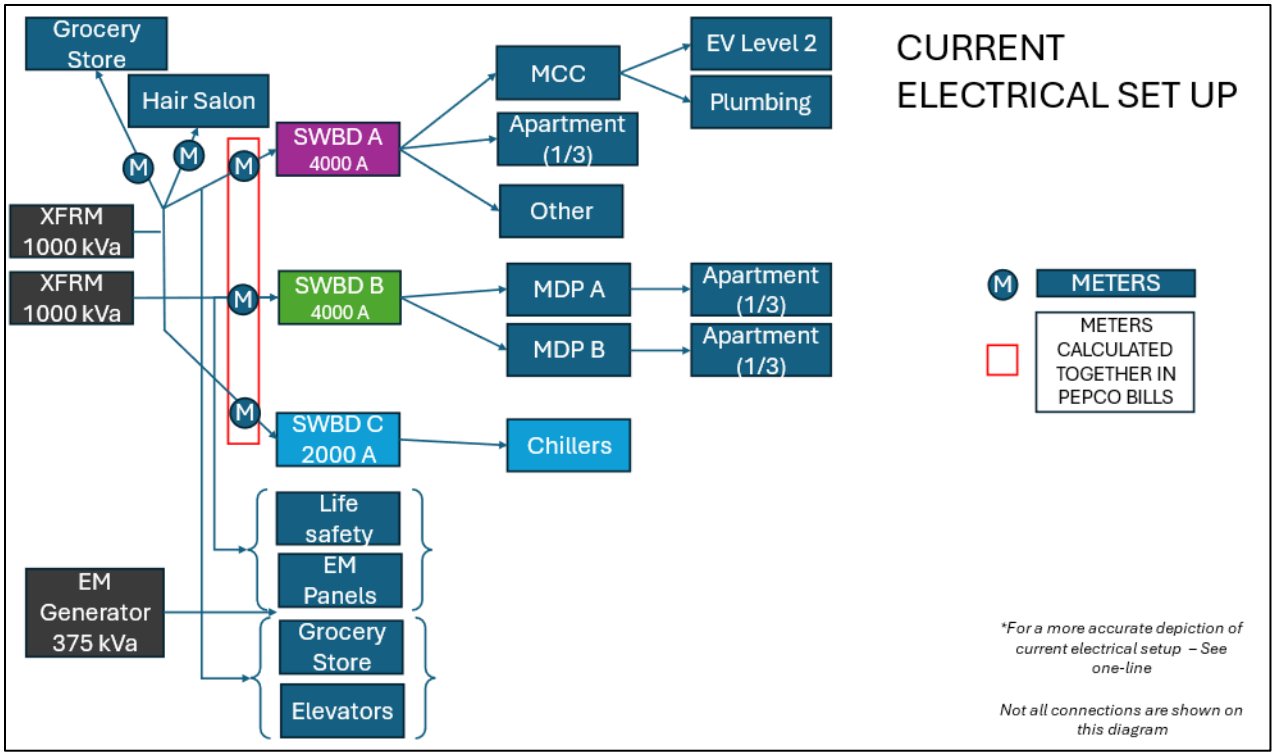


Figure 2 – Current Electrical Setup of Grosvenor III

As inferred from previous design drawings and fuse labeling, the residences were powered via risers that roughly divide the building into thirds. A "riser" refers to a vertical conduit or channel used to run electrical wires or cables between different floors or levels of a building. Risers are typically installed within walls or shafts and serve to connect the electrical distribution system from one floor to another. The center third was supplied directly from SWBD A, while the left/right thirds were supplied by two fused switchboards of sizes 1600 A (MDP A) and 2000 A (MDP B), which were in turn supplied by SWBD B.

The risers ranged in size from 60 A to 200 A and serve 6 to 9 apartments each. As will be noted later in this report, this is a very low power allowance by modern standards and will limit potential upgrades. A modern 600 sq ft apartment might be designed for over 20 kVA of load (excluding laundry, water heater, and HVAC), whereas this arrangement can provide 12 kVA at most to any individual apartment, assuming power is distributed evenly.

Major mechanical and plumbing systems (excluding chillers) were served by

an MCC located in the boiler room, which was in turn powered via SWBD A from a 1200 A feed (not visible during the survey but noted on prior drawings). This MCC also served the existing EV chargers on site.

MCC

MDP A

MDP B

ATS (Automatic Transfer Switch) units for the various EM systems were observed in the main electrical room. An ATS is a critical device used in electrical systems to ensure a seamless and safe transition of power from a primary source (like the electrical grid) to a backup source It is inferred from prior design drawings and fuse labels that the tap feeder was intercepted from SWBD B for the life safety and EM panel branch, whereas the other systems were derived from SWBD A. However, this could not be directly observed by inspection alone. ATS sequence of operations also could not be observed.

The elevator machine room had recently completed upgrades and was in excellent condition. New disconnects and drive isolation transformers were installed for all elevator motors. In other areas of the building, electrical equipment was visibly showing wear due to age but appeared to be well-maintained and in good condition.

C. Current Load Conditions

The proposed new electrical design for Grosvenor III to accommodate new loads would entail installing two new 4000 A services, operating at a 120/208V configuration, prioritizing cost-effectiveness over a 480/277V setup that would increase load capacity.
The current equipment on site has a maximum system capacity of 1,200 kVA. Through peak load analysis based on utility bills spanning three years, apartment usage consistently peaks at 703 kW, with the grocery store and salon reaching 91.6 kW and 8.3 kW, respectively. This cumulative peak load amounts to an estimated 802.9 kW, leaving an available surplus capacity of 197.1 kW.

- Recommendation to keep House service at 120/208V versus 277/480V

Our design strategy entails the provision of two new services, each rated at 4000 A and operating at 3-phase, 4-wire, 120/208V configuration, to cater to the building's electrical needs. Although initially considering a 277/480V configuration for the house service, the associated costs were deemed excessive relative to the anticipated benefits. This decision was influenced by the fact that all existing equipment and distribution panelboards within the building are designed for operation at 120/208V.

Adopting a 277/480V configuration for the house service would necessitate immediate voltage step-down either at the house switchboard or at each load feeder endpoint, introducing challenges in terms of space requirements and efficiency due to the need for multiple transformers. While apartment risers typically align with the preference for 277/480V utility service, the lack of adequate electrical rooms for large transformers and meter stacks on each floor poses practical constraints. Consequently, any potential benefits of a 277/480V setup would be limited to the utility feeder, with no discernible advantage realized beyond this point.

For further insights and discussion on proposed utility upgrade conditions, please refer to the Section E -*Utility Upgrade considerations & challenges* for comprehensive details.

- Load calculation - PEPCO.

In accordance with PEPCO's safety standards, the maximum system capacity for Grosvenor III in a spot network configuration is capped at 1,200 kVA. Residual transformer capacity has been determined by analyzing the highest peak load data points sourced from utility bills spanning 2023, 2022, and 2021.

Each of the three main service points (SWBD A, SWBD B, SWBD C) is equipped with a dedicated meter, as depicted in Figure 2. By scrutinizing the PEPCO bills provided by Grosvenor III, we derived the collective peak load of these meters, while separate bills for the Hair Salon and Grocery Store facilitated individual load assessments for the last 2 meters.

Here is the current Building peak load summary:

CURRENT LOAD	
Load breakdown	kW
Apartments & building (Meter A, B &C)	703.00
Grocery (Meter Grocery)	91.60
Hair Salon (Meter Hair Salon)	8.90
CURRENT LOAD TOTAL	**803.50**

Figure 3 – Current Peak Load Summary

- Apartment Load Calculation:

To obtain the max peak load experienced by the condominium we analyzed the electrical bills provided by Grosvenor III that were dated from 2023 and 2022. In a previous email provided by a PEPCO engineer it was said that the peak amount in 2021 was 703 kW. In 2023 kW peak was 575.6 kW (August 2023) whereas in 2022 kW peak was 643.6 kW (June 2022).

We therefore based our analysis on the highest peak amount of 703 kW (2021 provided by PEPCO).

- Grocery Load Calculation:

We analyzed the bills provided by the Grocery store from 2023 and 2022. We will use the peak amount of 91.6 kW obtained in July 2023.

- Hair Salon Calculation:

The peak load of 8.3 kW is an estimate based on the hair salon's square footage. The amount is significantly small and will not affect the transformer capacity calculation. We estimate a peak amount at 8.3 kW based on the square footage of the commercial area, and on the appliances, we saw during our site visit.

The building's total peak load over the last 3 years is estimated to be at 802.9 kW. Therefore, there is 197.1 kW additional transformer capacity available.

II. Code Requirements

The upgrade projects must adhere to codes such as the 2017 National Electrical Code and the 2018 International Building Code. Given the building's age, modifications to existing equipment may necessitate additional upgrades to ensure compliance. Any alteration to elements not meeting code standards typically mandates their adjustment to meet current requirements. Therefore, addressing elements not up to code could initiate a cascade of necessary updates to maintain regulatory alignment.

The governing codes (at the time of this writing) are as follows**:**

- 2017 National Electrical Code (NFPA 70)
- 2018 International Building Code (IBC) and 2018 International Existing Building Code (IEBC)
- 2018 International Residential Code (IRC)
- 2018 International Plumbing Code (IPC)
- 2018 International Mechanical Code (IMC)
- 2018 International Fuel Gas code (IFGC)

- 2018 International Energy Conservation Code (IECC)
- 2015 International Green Construction Code (IgCC)
- 2010 ADA Standards
- 2018 NFPA 1 Fire Code
- 2018 NFPA 101 Life Safety Code
- 2016 NFPA 13, 13R, 13D Fire Sprinkler Codes
- 2016 NFPA 72 Fire Alarm Code
- 2018 The Code of Maryland Regulations (COMAR)

Relevant requirements distilled from the applicable codes, regulations, and standards are as follows. For this purpose, we will limit our scope to the local apartment panel and downstream items. Note that this is not intended as an exhaustive list, but rather the most impactful items for the given scope. See applicable section for discussion of expansion to the available service.

- Before starting any electrical work for installing an electric range or dryer, a permit is required from the Authorities Having Jurisdiction (AHJ), and an inspection is mandatory to certify that the new work meets all the necessary safety standards and code requirements. (2018 Adopted Chapter 5, Buildings and Building Regulations Amendments, Sec 5-121 and 5-122)

- Dedicated circuits and breakers (typically 40-50 A for ranges, 30 A for dryers) are recommended.

- Properly rated receptacles (typically NEMA 14-50R for ranges, NEMA 14-30R for dryers) must be installed. Range receptacles may be sized on the load of a single range demand load (NEC 210.19(A)(3) and 210.21(B)(4)), but the manufacturer's recommendation would take precedence.

- Receptacles must be within 6 ft of the intended appliance location. (NEC 210.50(C))

- The wiring must adhere to the size and material specifications as per the NEC and local amendments. Code does permit 40A circuits to serve a 50A receptacle (NEC Table 210.21(B)(3)), but a 50A circuit is advised.

- Underwriter Laboratories mandated grounding plugs on all major appliances in 1969, and the 1971 NEC required all residential receptacles to be installed with a ground. The building's original design documents are dated to 1964 and thus any existing outlets may not be to this standard.

- Gas service should be disconnected as far as possible upstream, and the lines capped and sealed appropriately.

- While technically permissible by code, typical industry standards strongly discourage use of aluminum for any branch circuiting.

- Arc-Fault Circuit Interrupter or AFCI protection is required in most residential spaces. (NEC 210.12) This may be provided at the circuit breaker.

- The 2020 NEC (210.8) extended the requirement for 120V receptacles within 6 ft of a sink to be Ground-Fault Circuit Interrupter (GFCI) protected to all receptacles regardless of voltage. Depending on layout, this may include either the dryer or range, or both. This code has not yet been adopted by the state/local jurisdiction but may be in effect depending on the timeline of future construction. GFCI protection may be provided at the circuit breaker.

- The 2023 NEC (210.8) extended the requirement of GFCI protection for all dryers and ranges, as well as nearly all other kitchen appliances, regardless of location. This code has not yet been adopted by the state/local jurisdiction but may be in effect depending on the timeline of future construction. GFCI protection may be provided at the circuit breaker.

III. Electrical Service Equipment Condition and Replacement Planning

The Maryland Condominium Act determines that all condominiums' governing bodies established in Montgomery County before October 1, 2021 "shall have an updated reserve study conducted within 5 years after the date of that reserve study and at least every 5 years thereafter.". The last to date reserve study realized by GPIII was finalized in March 2020 by the Facility Engineering Associates (FEA) and underlined the potential need for GPIII to replace their current electric service equipment in 2025.

The report below provides a comprehensive breakdown of the estimated total cost for replacing the electrical service equipment as recommended by the FEA report.

One of the recommendations from previous reports to GPIII is that the building should replace all Federal Pacific Panel Stab-Lok circuit breakers in the apartment units. GPIII did so in 2017 and therefore we assume that no further updates are required to bring the building up to code.

A. Maintenance & Replacement

We confirm the FEA's assessment and equipment replacement time frame. Based on the site visit performed by PPE and Shumate Engineering, all the electrical equipment appeared to be in fair to good condition with an average of 45 years of use. The equipment was not opened for further inspection during the onsite survey.

Further analysis of the panelboards in the apartment units was not conducted, however it is noted that in May 2017 Federal Pacific Panel breakers were replaced in each apartment unit.

- Apartment unit equipment

No survey of the apartment units was performed during the site visit, however based on building drawings and previous reports provided by TRC Engineering we were able

to get an assessment of the current electrical infrastructure:

- 100-amp, 120/240-volt single phase load center (electrical panel or breaker box) equipped with a combination of 15 amp and 20-amp circuit breakers.

- Each unit load center is connected to a shared electrical riser from 100 amp to 150 amp, 3-phase, 120/208-volt main risers located in one of the two electrical switchboards located in the basement levels. There are 80 separate electrical risers within the building.

- All FPE breakers were replaced with new breakers manufactured by Connecticut Electric Company throughout the condominium in 2017.

The current information provided enables us to confirm that the apartment units do not have the available capacity to host any additional load, such as converting the gas stoves and ovens to electric. According to NEC regulation, we should expect that the total electric range to be approximately around 8 kW per unit, which equals to a total demand load of 3,328 kW, which the current distribution system could not accommodate.

A full retrofit and electrical upgrade is needed if GPIII wishes all units to switch from gas to electric ranges.

- Apartment Panels and Circuits

We currently lack sufficient details regarding the apartment panels. They may not need further action, pending confirmation by an electrician ensuring there is no arcing damage or other visible issues. We will assume that no replacements are needed considering the FPE breakers were replaced in 2017 under the supervision of a certified electrician.

Similarly, we lack information on the number of circuits in each apartment and may need to add more to comply with current building codes. It's important to note that any modifications we make must adhere to modern code standards.

- Switchboards and Garage MCC

Estimated lifespans of building components in residential multifamily construction are maintained by Fannie Mae, available here: https://multifamily.fanniemae.com/media/6701/display. The estimated lifespan of electrical distribution components is 40 years, which appears to be exceeded by all observed distribution equipment excluding the elevator machine room.

The Federal Pacific brand underwent bankruptcy and was acquired by other companies, and ultimately was dissolved. Therefore, replacement of any internal components will involve retrofitting from another manufacturer at minimum, and a full replacement should be considered for the increased availability of replacement components and knowledgeable service.

The following costs cover the direct cost of the replaced equipment and the labor cost of dismantling and installing the new equipment based on standard union rates in the Baltimore region. New feeders, terminations, and other costs external to the unit are not included.

The estimated cost of fully replacing SWBD A with copper busbars and new circuit breakers is **$227,000**, regardless of if preserving existing distribution or upgrading to new design. By replacing SWBD A during the Electrical Service Equipment (ESE) replacement program, Grosvenor III will be able to activate several enhancement projects that are contingent on the switchboard upgrade.

The estimated cost of fully replacing SWBD B is **165,000$** if preserving existing distribution service. In the updated design SWBD B no longer serves as a main switchboard.

The estimated cost of fully replacing an MDP switchboard with copper busbars and new circuit breakers is **$165,000 per MDP**, if preserving existing service. The estimated cost is **$227,000 per MDP**, if upgrading to new design.

The estimated cost of fully replacing SWBD C with copper busbars and a new main circuit breaker is **$46,000**, regardless of preserving existing distribution or upgrading to new design.

The estimated cost of fully replacing the MCC with copper busbars and new fused disconnects with combination starters is **$85,000**, regardless of if preserving existing distribution or upgrading to new design.

The estimated cost of the new house switchboard with copper busbars and new circuit breakers is **$192,000**, if upgrading to new design.

Considering the age of the current electrical distribution systems GPIII should plan the replacement of the main electrical service, internal distribution switchboards and panels within the following years.

- Fuses and Circuit Breakers

The exact lifespan of a breaker or fuse will depend on its usage and the conditions under which it routinely operates. Circuit protection under relatively low currents and infrequent trip conditions may last decades longer than components under harsh conditions.

NFPA 70B, "Recommended Practice for Electrical Equipment Maintenance" and ANSI / NETA MTS-2011, "Standard for Maintenance Testing Specifications for Electrical Distribution Equipment and Systems" lay out practices for both frequency and procedure of testing of overcurrent protection. A NETA Accredited Testing Company can provide this testing and track OCPD conditions throughout the system. The manufacturer of any particular fuse or breaker may also have additional recommendations supplementing these standards.

Circuit breakers and fuses in good condition are recommended for visual inspection, cleaning and lubrication, mechanical service, and electrical testing every five years. This schedule may be shortened if any particular unit is noted to be in declining condition. (NFPA 70B, Table 9.2.2). Test procedures for visual, mechanical, and electrical testing are outlined in NFPA 70B Chapters 15 & 16 and ANSI/NETA Section 7.6.1.1. Any unit found to fail any test is recommended for immediate replacement.

The following Figure 4 details the estimated cost of replacement of the current electrical components. We assume that the current electrical panels in units and risers are in good standing and do not need to be replaced.

OPTION #1 - ESE REPLACEMENT WITH NO ENHANCEMENTS			
120/208V - Electrical Service Equipment proposed replacement *Replacing electrical equipment due to estimated end of lifespan of Condominium electrical distribution components.*			
Electrical Component and Equipment Replacement			
SWBD A	$	227,000.00	total
SWBD B	$	165,000.00	total
SWBD C	$	46,000.00	total
MDP Switchboard	$	330,000.00	2 MDP (MDP A / MDP B replaced)
MCC	$	85,000.00	total
TOTAL- ESE replacement	**$**		**853,000.00**
TOTAL - OPTION #1	**$**	**853,000.00**	

Figure 4 – Option 1 – Cost breakdown for ESE replacement.

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment)*
- *Assume appropriate space equipment.*
- *Assume no other necessary upgrades to bring building to modern code.*

B. Metering Options

Metering at the tenant level offers notable advantages by promoting energy efficiency and transparency in billing. By providing tenants with direct feedback on their energy consumption, this practice encourages more mindful usage, often resulting in reduced overall energy consumption and cost savings. However, transitioning a large building with 414 units to full individual metering does present challenges. Two potential options are available to Grosvenor III to activate this optional project:

- Option #1 - Meter stack

Meter stacks are modular assemblies that house multiple electric meters in a single, compact unit. These stacks are typically installed in centralized locations such as electrical rooms on each floor or every two floors. The primary advantage of meter stacks is their centralized access, which simplifies maintenance and meter reading by consolidating multiple meters into fewer locations. This setup can be more space-efficient compared to having individual meters scattered throughout the

building. However, meter stacks require significant space in electrical rooms, which is limited in the case of Grosvenor III's building and require higher installation costs due to the complexity of placing the extensive conduit routes to connect to each unit's panel.

We assume that the meter stack would accommodate on average 10-meter sockets and branches. A meter branch typically refers to a segment of the building's electrical distribution system that supplies power to an individual meter. In an apartment building with unit metering, each apartment will have its own meter branch. Each branch includes the wiring and associated protective devices (such as circuit breakers) that lead from the main distribution panel to the meter socket and then to the individual unit.

The replacement of these services will depend on the available space. If possible, the use of a more traditional meter stack in the electric rooms would be ideal, with a conduit routed directly to each unit's panel. However, from our site visit the meter stacks would not physically fit in the MDP rooms, as they have significant space requirements and are typically located in electrical closets on a per-floor or every-second-floor basis.

Meter Stack, Center Tapped
(Excerpted from Square D Metering Equipment Catalog, https://www.se.com/us/en/download/document/0100CT1901_SEC-02/)

Figure 4 – Meter Stack – Center Tapped Example

The meter stack solution is the only viable solution if Grosvenor III wishes for real time metering that will be accepted by PEPCO for billing purposes. The overall estimated cost to accommodate meter stacks at Grosvenor III is roughly as follows:

OPTIONAL - UNIT METERING			
10 socket Meter Stack option. (42) meter stacks installation contingent on available spacing. Cost roughly estimates meter stacks installed at every secondary floors.			
Meter Stack			
Meter stack w/ main circuit breaker & terminal box	$	504,000.00	(42) Meter Stack (10 branches) - 12,000$/meter stack
10 branch meters (circuit)	$	1,470,000.00	10 branch system per meter stack
Total - Unit Metering	**$**		**1,974,000.00**
TOTAL -UNIT METERING	**$**	**1,974,000.00**	

Figure 5 – Meter Stack Cost estimate

**Cost Assumptions:*

- *Meter stacks located on every second floor - assuming available space.*
- *Cost of labor included (standard union rates in the Baltimore region, using the most recent data)*
- *Assume drywall for apartment units, available space for equipment.*

- Option 2 - Busway option – Usage monitoring

The busway option involves upgrading the building's electrical circuits to install individual meters directly at the tenant's electrical panel within each apartment. This approach uses busways to route power in limited spaces, with busway plug-in tap boxes placed at each unit's panel feeder.

I-Line Plug-in Busway 225-600 A

(Excerpted from Square D Busway Catalog, https://www.se.com/us/en/download/document/5600CT9101/)

Figure 6 – Plug-in Busway Example

The main advantage of this option is the lower cost of such an installation albeit at the costly expense of additional complexity in terms of maintenance. It also utilizes space more efficiently by avoiding the need for large meter stacks in common areas.

In the case of Grosvenor III's building, we would recommend replacing the distribution with new switchboards and using busway to route power in the limited space to each group of 6-9 apartments. The existing riser OCPD is expected to at least double in size, for 200 – 400 A per group, with a busway plug-in tap box placed for each unit's panel feeder. Any desired data monitoring will have to take place at the tenant panel mains. The distribution layout shown in Appendix A follows this design path.
The total estimated cost of this option, which would just entail data collection is as follow:

OPTIONAL - DATA COLLECTION		
Data Collection at the tenant level for consumption tracking. Cannot be used for sub-billing purposes.		
Meter /apartments		
Single phase meter - data collection	$ 624,000.00	1,500$/unit - total for 414 units
Total - Data collection	**$**	**624,000.00**
TOTAL - DATA COLLECTION	**$ 624,000.00**	

Figure 7 – Individual usage monitoring option at the tenant level cost estimate

**Cost Assumptions:*

- *Cost of labor included (standard union rates in the Baltimore region, using the most recent data)*
- *Assume drywall for apartment units, available space for equipment & available space for upgraded risers.*

PEPCO, as with most utilities, will only issue electric bills based on data collection from their own meters and typically do not allow sub-billing per regulations against power reselling. Any intention of issuing electric bills to residents will require discussion with PEPCO to determine what options may be suitable. However, "submetering" simply as a means of collecting data is perfectly permissible, and in fact encouraged by modern LEED credit requirements. This solution is proposed in the above cost estimate table in Figure 7.

Total apartment usage may be collected either at the stack (if using the meter

stack option) or at the panel mains (if using the busway option). LEED credit requirements for multifamily housing typically call for additional metering of major appliances, where data from individual branch circuits will also be reported to the residents.

The initial cost of installing real meters and the unit level and data collection systems can be significant, and integrating these systems into existing infrastructure may require extensive modifications. Additionally, while "submetering" simplifies the billing process by charging tenants based on their actual usage, it also necessitates consideration of who bears the cost of system upgrades and ongoing maintenance. Balancing these benefits and drawbacks is crucial when considering the implementation of submetering in large-scale residential buildings.

However, metering whether through meter stacks or individual meters, offers substantial benefits by promoting energy efficiency and providing tenants with transparency in their own energy usage. While both options have their advantages and disadvantages, the busway option involving individual meters at the tenant level appears more feasible in terms of space utilization and overall cost, albeit it would require confirmation and PEPCO's approval.

IV. Partial Load addition – No utility upgrades.

Considering the Maryland Condominium Act and the Building Energy Performance Standards (BEPS) requirements, Grosvenor III has tasked us with evaluating the addition and/or conversion of various building equipment. To assess the different recommended pathways to meet the new mandates, PPE & Shumate provides a detail breakdown of the additional loads to expect from:

- Conversion of apartment units from gas stove/ovens to electric
- Conversion of gas boilers to electric
- Conversion of gas dryers to electric
- Installation of infrastructure for Level I chargers per parking spot as mandated by the Condominium Act
- Expansion of 5 additional Level II chargers

The table below summarizes the additional load calculations, as determined

by PEPCO, which are detailed in the following sections.

ANTICIPATED NEW LOADS	
Load breakdown	kW
Electric Ranges (414 units + Garden and Skyview Kitchens)	1,010.80
(5) Level 2 Chargers	57.60
25 Dryers (19 regular + 6 large)	75.00
Boilers	7,357.00
(247) Level 1 Chargers	948.50
ADDITIONAL LOAD TOTAL	**9,448.90**

Figure 8 – Summary of expected new load per project.

It has been determined that the current utility transformers can support an additional load of up to 197.1 kW without necessitating upgrades.

Consequently, the additional loads will require upgrading Switchboard A, but the cost of either replacing the switchboard or upgrading the switchboard to accommodate these new loads is the same. Grosvenor III could proceed with the installation of Level 2 chargers and the conversion of gas dryers to electric without triggering utility upgrades.

However, should Grosvenor III opt to implement any other electrical upgrades, the additional load requirements would require PEPCO to upgrade the current network transformers to accommodate the new building loads. A total design retrofit of the distribution service would therefore be pursued to accommodate the total additional load (See Section V. *Total Upgrades- Utility Upgrades*)

A. Level II EV chargers Expansion.

In response to the regulatory requirement set forth by the Condominium Act for Level I charger installation, GPIII is compelled to prepare for an additional 948.5 kW of load. To address this significant demand, GPIII wishes to strategically assess the installation of (5) Level II chargers adjacent to existing charging pads in the exterior parking lot. This alternative, requiring only 57.6 kW of added load, could serve as a prudent mitigation measure against the burden imposed by the strict requirement imperative of Level I charger installation.

Adding the Level II chargers to the current electrical setup could happen in two ways:

- **Tapping the incoming switchboard A feed** as was done for the grocery store and hair salon. This solution implies obtaining the appropriate authorization from the utility and obtaining the necessary permits.
  This option is not recommended considering the Hair Salon and Grocery store already currently tap the feed leading to Switchboard A.

The installation of the following option would require the following equipment: Fused disconnect switch with CT cabinet rated at 600 A: **5,400$**

- **Upgrading SWBD A to host the additional chargers**. Considering that new loads are to be added further down the line this is our **recommended course** of action.

Our design includes provisions such that up to (6) Level 2 chargers may be in simultaneous operation at full capacity, and more may be installed in the future under load sharing. The associated EV distribution panelboards for each may be located wherever is convenient, preferably close to the point of service. SWBD A will require an upgrade to be able to safely service the additional continuous load from the 5 extra charging points.

Per NEC, EV charging is to be considered a continuous load, so panelboard ampacities will exceed the anticipated load. Chargers beyond the allowable ampacity of the panel may be added through use of load management, discussed in

a future section (Section V.B).

A branch from SWBD A been designated for (6) Level 2 Chargers, assumed at 1Φ, 208 V, 70 A each. The operation of Level 2 chargers is largely the purview of the manufacturer – beyond providing a branch circuit, little else is necessary from the design engineer.

The estimated cost for a 200 A, 3Φ, 4W, MLO, 208/120V panelboard (serving all Level 2 chargers) plus 30 ft feeder is **$2,500**. The estimated cost for each 2P-70 A circuit breaker (serving one Level 2 charger) is **$270 per breaker**. The cost of the charger itself and its branch circuit will depend on the units selected and their locations.

Level 2 EV chargers for all major manufacturers can implement load control as part of their native hardware. No additional relay circuiting or control is necessary. The exact provisions necessary will vary with the selected manufacturer; for example, ChargePoint units require only available cell phone service in their installed location to enable load management.

The total cost estimated for the installation is as follow:

LEVEL 2 CHARGERS			
120/208V - Electrical Building Partial Upgrade *Installing (5) extra Level II Chargers to current electrical distribution system. Level II charger installation contingent on activation of Option #1 ESE replacement program (specifically SWBD A).*			
Level 2 Charger Installation			
Panelboard for 5 extra chargers	$	2,500.00	Serving all chargers + 30ft feeder line
Breakers	$	1,350.00	total (270$ / breaker)
TOTAL - Electrical Service	**$**		**3,850.00**
5 Chargepoint Level 2 - Material	$	38,750.00	$7,750/charger - 10% bulk discount
Chargepoint Install	$	46,000.00	$23,000 install - 60% bulk discount
TOTAL - Level II chargers	**$**		**84,750.00**

TOTAL	**$**	**88,600.00**

Figure 9 – Summary of total cost for installation of Level II chargers

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment)*

- *** Cost provided by GPIII*
- *Assume appropriate space for panelboard.*
- *Assume no necessary upgrades to bring circuit to modern code.*

B. Dryer Conversion from Gas to Electric

Grosvenor III is equipped with a laundry room that currently accommodates (19) gas regular dryers and (6) large ones. To align with Maryland and Montgomery County's BEPS requirements, which aim to enhance energy efficiency, we're evaluating the feasibility and cost of converting these gas dryers to electric. This section will explore the process of transitioning the laundry room to electric dryers, considering both regulatory mandates and practical implementation.

Electric dryers, much like slide-in electric ranges, typically necessitate a 1-phase (1Φ), 208-240V circuit rated at 30 A (approximately 5.8 kW). We consider in this design that the circuit will be connected to a **NEMA 14-30R receptacle**, facilitating (2) hot wires, a neutral wire, and a ground connection. Standard practice involves dedicated breakers, with #10 AWG Cu conductors commonly employed for dryers, although specific needs may vary depending on the selected units and conductor length.

NEMA receptacles, including the NEMA 14-30R, are commonly mandated for dryers. Estimated power consumption per unit typically falls within the 2-5 kW range. For dwelling units, NEC load calculations stipulate that dryers should be sized at 5 kW or the nameplate load (whichever is greater) before accounting for demand factors. Outside of dwelling units, nameplate loads may be included as typical non-continuous loads, aligning with NEC regulations (NEC 220.14(A)).

The final cost of electrical upgrades and gas line sealing, incorporating NEMA 14-30R receptacles for dryers, may fluctuate based on factors such as the laundry room layout, conductor lengths, local labor rates, but these parameters describe typical design provisions. A rough estimate is **$1,200 per receptacle, assuming drywall repair only.**

Partial image excerpted from
https://commons.wikimedia.org/wiki/File:NEMA_simplified_pins.svg
Original image created by Orion Lawlor and licensed under CC BY-SA 3.0.

Figure 10 – NEMA receptacles typically required for dryer and electric ranges

The new load will be handled by a new Panelboard rated at 400 Amps, 3 Phase, 208 Volts, with a main circuit breaker and 42 branch circuits featuring 1P breakers. Total installation costs are estimated at **$10,500 for the new panelboard and breakers**.

To support this load, an upgrade to SWBD A is required, with an estimated cost of $277,000. This upgrade is assumed to occur during the ESE replacement program. Currently the dryers are under a lease contract, therefore no appliance cost are assumed.

You will find the detailed breakdown of the estimated cost of converting the dryers:

DRYER CONVERSION			
120/208V - Electrical Building Partial Upgrade *Converting 14 regular dryers and 6 large dryers to electric* *Dryer Conversion contingent on activation of Option #1 ESE replacement program (specifically SWBD A).*			
Dryer Conversion			
NEMA receptacle installation/ dryer	$	25,000.00	$1,000/dryer
Sealing & Capping -Gas lines	$	5,000.00	$200/dryer
Panelboard + breakers installation	$	10,500.00	
TOTAL- Dryer Conversion	**$**		**40,500.00**

TOTAL	**$**	**40,500.00**

Figure 11 – Dryer conversion cost breakdown

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment)*
- *Assume drywall for laundry room & available space for new panelboard.*
- *Assume no additional breakers than beyond their MCB.*
- *Assume no necessary upgrades to bring circuit to modern code.*

It should be noted that the upgrade to SWBD A we estimated is designed to accommodate the new load created by the conversion of the dryers as well as the additional (5) level II chargers.

In summary, the evaluation of equipment additions and conversions in response to the Maryland Condominium Act and BEPS requirements provides valuable insights for Grosvenor III.
The proposed alternatives for addressing increased electrical demand, such as installing Level II chargers rather than accommodate Level I charger and transitioning dryers to electric, offer strategic solutions to mitigate load impact all while meeting energy requirements.

While no utility upgrades are needed by the activation of these two electrical options, it is noteworthy that the installation of either option would trigger the need for a switchboard upgrade (SWBD A) to accommodate the new load.

It is imperative to acknowledge that upgrades to aging equipment may initiate a cascade of subsequent upgrades to ensure compliance with current codes and standards.

A summary of the total cost expected by the activation of the dryer conversion program and Level II charging station initiatives is as follow:

OPTION 2# - PARTIAL PROJECT ACTIVATION & ESE ENHANCEMENT			
120/208V - Electrical Building Partial Upgrade *Installing 5 extra Level 2 Chargers & converting 25 dryers from gas to electric. Option #2* contingent on activation of Option #1 (more specifically on SWBD A replacement).			
Level II EV Chargers			
Panelboard for 5 extra chargers	$	2,500.00	Serving all chargers + 30ft feeder line
Breakers	$	1,350.00	total (270$ / breaker)
5 Chargepoint Level 2 - Material	$	38,750.00	$7,750/charger - 10% bulk discount
Chargepoint Install	$	46,000.00	$23,000 install - 60% bulk discount
TOTAL - Level II chargers	**$**		**88,600.00**
Dryer Conversion			
NEMA receptacle installation/ dryer	$	25,000.00	$1,000/dryer
Sealing & Capping Gas Lines	$	5,000.00	$200/dryer
Panelboard + breakers installation	$	10,500.00	total
TOTAL- Dryer	**$**		**40,500.00**
TOTAL - OPTION 2#	**$**	**129,100.00**	

Figure 12 – Option #2 Cost summary for energy projects with no utility upgrades

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment).*
- *Assume SWBD A has already been upgraded to accommodate new load projects.*
- *Assume drywall for laundry room & available space for new panelboards.*
- *Assume MCC can accommodate new EV load with no upgrade.*
- *Assume no necessary upgrades to bring circuit to modern code.*

The new electrical setup to accommodate these new projects would be as follow:

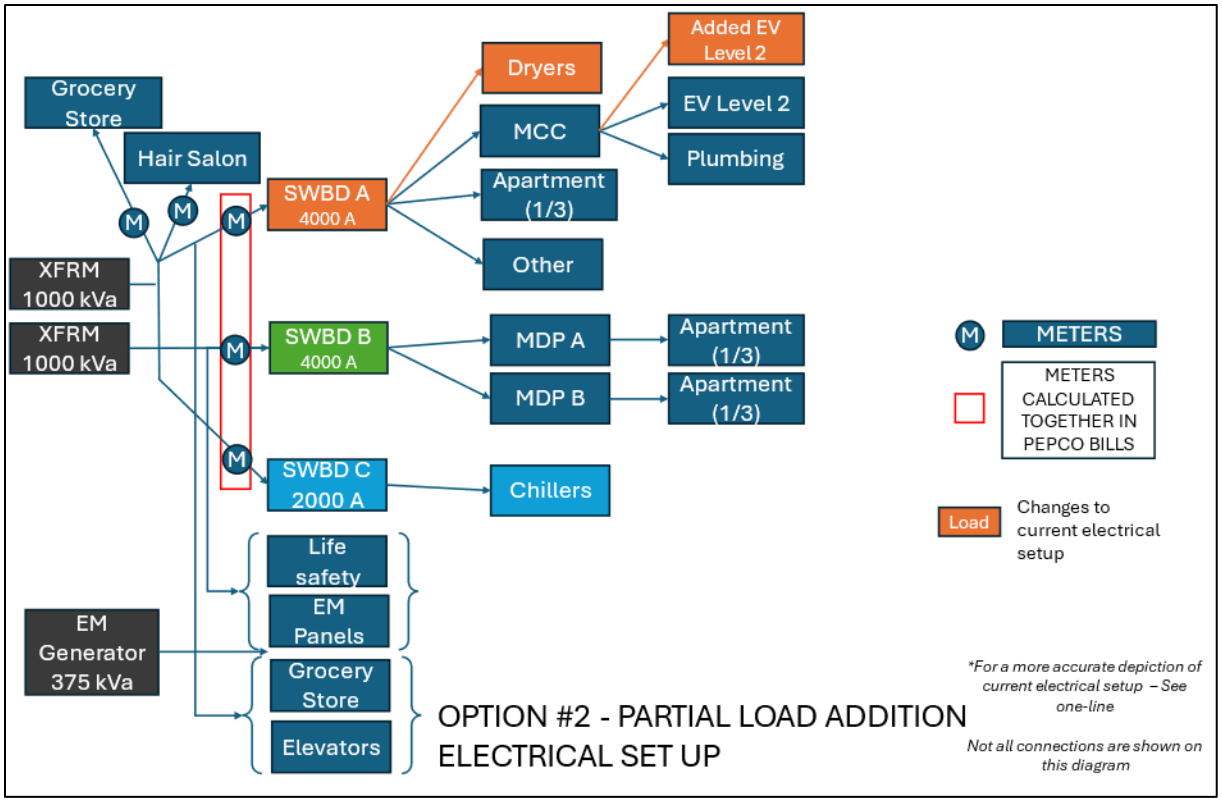


Figure 13 – Option #2 Electrical Setup drawing

V. Total Upgrade – Utility Upgrades

Several energy projects have been assessed, revealing that some exceed the current capacity of the available transformers. The implementation of any of these energy projects would necessitate an upgrade of the current PEPCO distribution system. This would commence with an augmentation of the number of transformers servicing the building as well as potentially a change from a Network Service to Radial Distribution Design.

The upcoming section will delve into a comprehensive review of the electrical upgrade projects. It will offer insights into the recommended distribution design options required to accommodate the new load. Additionally, it will elaborate on the various costs and prerequisites associated with the anticipated utility upgrade.

The energy projects under consideration and their estimated loads are as follows:

- Conversion of gas appliances (stove and ovens) to electric in the apartment units (414 units + Graden room & Skyview Kitchens): 1,010.80 kW
- Installation of (247) Level I chargers in the underground parking lot: 948.5 kW

Indeed, as detailed below (Section A) the conversion of gas fed boilers to electric is impossible due to lack of available space in the building to accommodate the equipment.

We also included in this section the conversion of dryers & installation of Level II charging stations to have a complete overview of the necessary upgrades to cover all the energy projects considered by GPIII.

A. Boiler Conversion

Converting existing natural gas boilers to electric alternatives presents challenges due to space constraints, electrical load requirements, and costs. While 208V boilers would demand twelve units and significant space, 480V boilers, (while requiring only three units) would overload existing electrical service and necessitate costly upgrades.

Two existing boilers serving the domestic hot water system are operating off natural gas, producing a combined 25,106,000 BTU/hr (25,106 MBH) for hot water production. The process of converting this system from natural gas to electricity would require several considerations:

Converting the 25,106 MBH gas load into its electrical equivalent results in a power load of 7,357 KW.

- While electric 208 V boilers are available, it would require **twelve or more** of these boilers (e.g. Precision Boiler's HW24D-600B at 600 KW) to achieve the same thermal performance.

The HW24D-600B, selected for consideration in this design, occupies an area of 193 square feet per unit. Consequently, the installation of twelve boilers would require a total space of 2,316 square feet within the boiler room. To put this into perspective,

this space requirement equates to approximately the size of a standard tennis court if the boilers were to be positioned adjacently. **From the site visit we can confirm that there is no adequate space in the boiler room to accommodate such equipment.**

The estimated cost at 208V, for (12) boilers with 1200 A fused disconnect plus start-up is **$635,000**. This does not include any expanded electrical service.

- 480 V boilers are a better fit for this site with **three boilers** at 2,453+ KW matching the thermal output of the gas boilers.

While Precision Boiler's HW48D-2460B could potentially meet the design specifications, it's crucial to note that each unit demands a substantial electrical load, requiring 3739 A and 82 circuits per unit. In total**, this equates to approximately 9.3 MW of load, nearly four times the capacity of the existing service.** Furthermore, opting for 480V boilers would necessitate the installation of a new 480V service, entailing significant additional costs associated with utility coordination to meet additional electrical distribution requirements.

The estimated cost at 480 V, for (3) boilers with 4000 A fused disconnect plus start up is **$544,000**. This does not include any expanded electrical service.

Based on the considerations outlined above regarding the conversion of the existing natural gas boilers to electric alternatives, it is evident that significant challenges arise in terms of space constraints, electrical load requirements, and associated costs. The feasibility of accommodating either 208V or 480V electric boilers within the existing infrastructure is limited, primarily due to spatial limitations and the substantial increase in electrical demand.

Therefore, the focus of the later sections will continue to address the necessary upgrades to accommodate the existing electrical demand and future growth projections, excluding the additional load associated with the conversion of the boilers. By prioritizing these essential upgrades, we can ensure the continued reliability and efficiency of the electrical infrastructure serving the condominium while mitigating potential risks and constraints associated with the boiler conversion process.

B. Installation of Level I EV Charging stations

In Maryland, the Condominium Act includes provisions that protect the rights of unit owners to install electric vehicle (EV) charging equipment in their deeded parking spaces within the condominium property (*MD Code, Real Property, § 11-111.4 § 11-111.4. Electric vehicle recharging equipment*). While the condominium association is not directly responsible for installing EV charging equipment for residents, it must facilitate the approval process for unit owners seeking to install such equipment.

Presently, residents face technical barriers as there's no existing electrical design to support the installation of chargers, thereby hindering their ability to connect electric vehicles. The following section reviews the necessary installation and upgrades the Condominium would have to go through to meet the Condominium Act requirements.

- Electrical Setup for installation of 247 EV Level I charge stations.

To serve all Level 1 charging receptacles, 1- 400 A, 3Φ, 4W, MLO, 208/120V distribution panelboard plus 30 ft feeder will be installed near the new house switchboard in the new design setup (See details in Section V.E Apartment Unit Electric Range Installation & Design retrofit), estimated at a cost of **$4,000**.

The associated EV distribution panelboards for each may be located wherever is convenient, preferably close to the point of service (assumed to be the house switchboard).

Per NEC, EV charging is to be considered a continuous load, so panelboard ampacities will exceed the anticipated load. Chargers beyond the allowable ampacity of the panel may be added through use of load management, discussed below.

In designing options for the addition of EV chargers, we will assume a **typical 120V outlet (NEMA 5-20R) charging** at 10 A for Level 1, with each receptacle sub-metered such that power usage may be tracked to an individual parking space.

For each group of (18) spaces, a satellite panelboard (fed from the above distribution panel) will be installed at some central location on the garage wall, for branch circuits to each space. The estimated cost per group is **$7,500,** providing:

- 225 A MCB branch circuit panelboard and (18) 1P-20 A breakers
- (1) 3P-225A breaker added to the 400 A EV distribution panel
- (1) feeder of (4) #4/0, #4 G, Cu with 2" EMT conduit, 100 ft

For a tenant to add a charging receptacle to a space, the estimated cost is **$2,000 per space**, providing:

- (1) submeter, with 2 CTs
- Between 10 and 60 ft (depending on location relative to the satellite panel) of 1/2" RGS conduit, w/ hot, neutral, and ground conductors to the receptacle location.
- (1) standard NEMA 5-20R receptacle, with weatherproof cover and backbox

EMT conduit is not recommended in garage spaces due to the possibility of vehicle damage and may even not be permitted by the jurisdiction. If the data collection from the meter is to be automated, an additional data cable (presumably CAT5e) will need to be routed back to a central switch.

Here is a detailed breakdown of the cost for the Condominium and an estimate of a $/parking space.

This cost excludes the building design upgrade costs and utility upgrade costs. A detailed breakdown per option is available in Appendix 3.

LEVEL I CHARGERS			
Installing electrical infrastructure for the installation of 247 parking spot chargers. Estimate of customer end cost included for reference. Project contingent on activation of Option #3 redesign.			
Level I Charger Installation			
Base Panelboard	$	4,000.00	total
Satellite panels	$	105,000.00	14 satellite panels - total
TOTAL - Distribution System	**$**		**109,000.00**
Distribution system cost/ parking spot	*$*	*441.30*	*per parking spot*
Total last feet cost-customer installation	$	494,000.00	247 parking spots
TOTAL Customer Installation	**$**		**494,000.00**
Customer Installation cost/parking spot	*$*	*2,000.00*	*per parking spot*

TOTAL	**$**	**603,000.00**
TOTAL /PARKING SPOT	**$**	**2,441.30**

Figure 14 – Cost of Level I charger installation (distribution design upgrade excluded)

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment)*
- *Assume no necessary upgrades to bring circuit to modern code.*

- Load Management

It is highly recommended that any garage-wide EV system implements a load management system. The NEC currently regards all EV charging as a continuous load (NEC 625.42), requiring ampacity sizing for 125% of the nominal load value, and by default will require sizing without diversity (as if all spaces were charging at once). This is far from the reality of EV charging, where not all spaces will be equipped for EV charging, and even then, not all of them will be charging at full load simultaneously. This leads to a massive oversizing of the required service, far in excess of what will realistically be used.

To account for this, the NEC does allow for active load management to reduce the size of the required service, by disconnecting branches of load if the power draw starts to exceed design values. By prioritizing branches with the highest power draw, then reconnecting lower power branches as the others finish, the system can utilize a much lower design amperage.

Level 1 charging (receptacles) can accomplish this goal via digital control of relays to open and close branches of distribution as required. The tentative size chosen for the complete system is 400 A of dedicated service – actual power draw will depend on EV adoption and general driving needs of the residents, but this is likely to exceed any expected usage for the foreseeable future.

C. Apartment Unit Electric Range Installation

The comparison between PEPCO's load calculation and NEC standards reveals crucial insights for any GPIII projects to transition the apartment units to electric ranges. The size of the additional load that is to be expected from the transition (1,713.8kW) will trigger a major electrical design retrofit. In order to meet the increased power demands of modern-day living spaces and allow for electrification of various home appliances, suggested modifications to the electrical distribution to allow for additional incoming feeds are discussed and analyzed here.

- Pepco Load Calculation VS NEC calculation

- Pepco calculation assumptions:

When liaising with PEPCO regarding the transition to fully electric ranges in apartment units, the utility conducts a load estimate to assess potential upgrades. This estimate considers electric ranges, and the installation of electric washer-dryers (excludes heating) in each unit.

However, as detailed in Ted Ross Consulting's report, the apartment units cannot accommodate washer-dryers not only due to lack of electrical distribution capacity but also for plumbing constraints. It is important to note that PEPCO will still factor washer-dryer per unit in their load calculations as a precaution. Indeed, PEPCO utilizes a more "precise" load calculator, leveraging usage data from the grid to be able to forecast a more accurate grid demand.

- Pepco calculator applied to Grosvenor III:

When considering the available capacity left on the current utility service Pepco will calculate the total peak kW to expect from the transition of 416 (414 apartment units and Skyview & Garden room) units to full electric.

Pepco will assume that the total load of 416 units transitioning to electric ranges is 1,788.8kW.

- PPE calculation of estimated apartment total load:

To ensure accuracy of our estimate, we have omitted the laundry room conversion load from PEPCO's estimate to obtain the most precise capacity demand assessment. This approach ensures that the utility upgrades are tailored to the actual electrical demands of Grosvenor III, optimizing efficiency and resource allocation. As pointed out in *Section IV. B Dryer Conversion from Gas to Electric* the transition is expected to add 75kW of load.

Therefore, the total peak load assumed by Pepco for the transition of all units will be 1,713.8 kW. This means that the NEW additional load due to the transition amount to 1,010 kW.

- Electric Range Cost installation

The final cost for the electrical upgrade and gas line sealing will depend on many factors, including the exact apartment layouts, the code in effect at the time of installation, local labor rates at the time of installation, the requirements of the selected units, etc. A rough estimate **is $1,200** per NEMA 14-30R or NEMA 14-50R receptacle, assuming drywall repair only and the sealing and capping of the gas lines. (See Figure 7).

ELECTRIC RANGES			
Installing appropriate equipment to accommodate electric appliances (oven & stove) + capping and sealing of gas lines. Contingent on activation of Option #3 full design retrofit.			
Apartment Upgrades			
NEMA receptacle material and installation	$	416,000.00	414 apartment +2 condo rooms
Sealing & Capping of gas lines	$	83,200.00	414 apartment +2 condo rooms
TOTAL - Apartment Upgrade	**$**		**499,200.00**

TOTAL	**$**	**499,200.00**

Figure 15 – Cost estimate of installation of electric ranges in 416 units.

D. Internal Distribution Service Design retrofit.

To accommodate the anticipated new electrical loads, an upgrade to the electrical service design is imperative. This involves a comprehensive overhaul of the existing electrical infrastructure to ensure long-term functionality, safety, and compliance with current code requirements.

The upgrade encompasses various aspects, including enhancing the main electrical service, upgrading internal distribution components such as switchboards and panel boards, and revising the wiring within living units. In cases where necessary, relocation of condominium unit power panels to open wall locations, away from kitchen counters and sinks, may be required.

This report outlines a new house service design tailored to meet emerging needs, depicted in the simplified in Figure 12 below. For a more detailed depiction, refer to the appendix accompanying this report. This comprehensive approach aims to address the evolving electrical demands of the building while ensuring adherence to safety standards and regulatory guidelines.

- Design details.

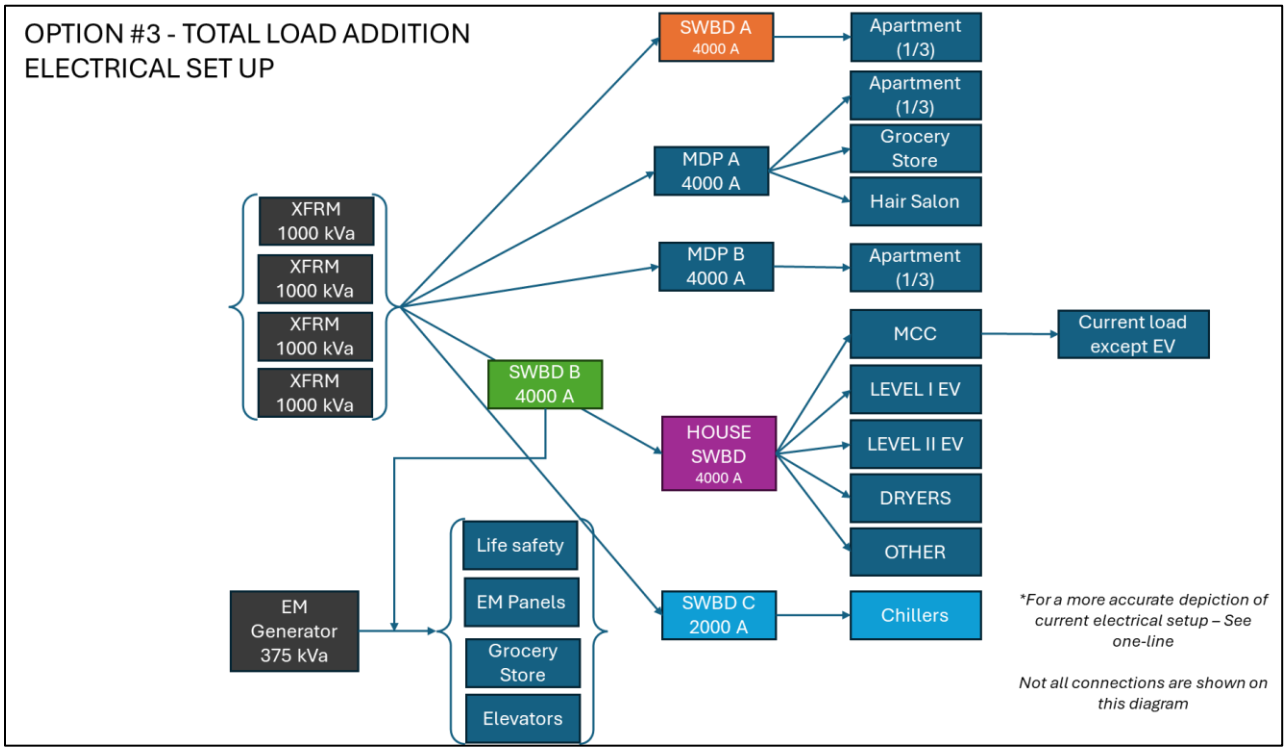


Figure 16 – New Design retrofit Setup to host expected new loads.

As of today, the existing Switchboard B does not have the physical space to accommodate a replacement and instead will serve only as a tap point for the existing-to-remain EM distribution. The feed will continue to a new switchboard to serve ONLY house loads. The House Switchboard location has not been determined, pending discussion of a suitable code-compliant location. In addition to absorbing the existing house loads, EV charging (discussed in a later section) and the MCC feeder (also to be replaced) will be served by the House Switchboard.

Switchboard C is to be preserved in-place. As it serves only the chillers, it effectively is a single OCPD and metering point. The feeders, terminations, and main circuit breaker should be replaced as determined during electrical inspection, but no major modification is necessarily required unless inspection reveals a cause for concern, or parts are unavailable. Refer to the Maintenance and Replacement section for additional information.

The two new utility service transformers will provide new distribution replacing MDP A, MDP B, and Switchboard A. Existing feeds to MDP A and B are to be demolished, replaced with the new incoming utility service. Together with a new

Switchboard A, these three will serve the existing apartment risers for their respective wings of the building, each with their own 4000 A service. As MDP A serves slightly less load than the others, it has been selected to carry the grocery and salon utility feeds, although SWBD A may continue to be tapped pending utility approval.

- Cost estimates for upgrades

The estimated cost for upgrading electrical systems hinges on various factors, such as apartment layouts, local labor rates, and the requirements of selected units. In Grosvenor's case, there is a risk that the buildings' current design and equipment do not meet modern code safety requirements. It is important to underline that any upgrades made to the current system could trigger mandatory upgrades in the distribution system. However, considering the age of the building and the necessity to bring it up to modern code, a full electrical upgrade is recommended. This would encompass upgrading the main electrical service, internal distribution, and living unit wiring, including the relocation of condominium unit power panels to compliant locations.

You will find as follows a detailed breakdown of the estimated cost of the building upgrades to integrate all new loads.

OPTION #3 TOTAL UPGRADE			
120/208V - Electrical Building Design Retrofit for new Load *Upgrading all electrical equipment with new design to accommodate all new loads. Option #3A & #3B provides total cost with associated utility upgrades*			
Internal Distribution Electrical Component and Equipment Upgrades			
SWBD A	$	227,000.00	total
SWBD C	$	46,000.00	total
HOUSE SWBD	$	192,000.00	total
MDP Switchboard	$	454,000.00	2 MDP (MDP A / MDP B replaced)
MCC	$	85,000.00	total
TOTAL - Distribution Electrical Upgrade	**$**		**1,004,000.00**
Apartment Upgrades			
NEMA receptacle material and installation	$	416,000.00	414 apartment +2 condo rooms
Sealing & Capping of gas lines	$	83,200.00	414 apartment +2 condo rooms
Apartment rewiring + riser upgrades*	$	2,229,900.80	414 apartment units + 2 condo rooms
TOTAL - Apartment Upgrade	**$**		**2,729,100.80**

SUB TOTAL -UNIT UPGRADES	**$ 3,733,100.80**

Level I EV Chargers			
Base Panelboard	$	4,000.00	total
Satellite panels	$	105,000.00	14 satellite panels - total
TOTAL - Level I chargers	**$**		**109,000.00**
Dryer Conversion			
NEMA receptacle installation/ dryer	$	25,000.00	$1,000/dryer
Sealing & Capping - Gas Lines	$	5,000.00	$200/dryer
Panelboard + breakers installation	$	10,500.00	total
TOTAL - Dryer Conversion	**$**		**40,500.00**

SUB TOTAL -PROJECT UPGRADES	**$ 3,882,600.80**

Level II EV Chargers			
Panelboard for 5 extra chargers	$	2,500.00	Serving all chargers + 30ft feeder line
Breakers	$	1,350.00	total (270$ / breaker)
5 Chargepoint Level 2 - Material	$	34,875.00	$7,750/charger - 10% bulk discount
Chargepoint Installation	$	46,000.00	$23,000 install cost - 60% bulk discount
TOTAL - Level II chargers	**$**		**88,600.00**

TOTAL -OPTION 3#	**$ 3,971,200.80**

Figure 17 – Cost breakdown of Distribution Upgrades to accommodate electric ranges in 416 units.

**Cost Assumptions:*

- *Cost of labor included (dismantlement & installation of equipment)*
- *Assume drywall for apartment units & available space for new panelboards.*
- ** TRC cost estimate increased for inflation (CPI-U March 2024).*

PPE & Shumate could not provide the cost estimate for riser upgrades and apartment rewiring due to lack of information and review of the apartment units during the site visit however a cost estimate was provided in 2017 by Ted Ross Consulting Engineering that estimated the total retrofit to be between 2,600,000 to $2,900,000, or $6,280 to $7,000 per unit. This cost reflects the need to retrofit the building to meet new electric load to modern standards. We have included this cost in our estimate increased for inflation and excluding our own cost estimate of distribution component upgrade and apartment electric range installation.

E. Utility Upgrades considerations & challenges

The comparison between network and radial service distributions illuminates key considerations for Grosvenor III's electrical infrastructure. While network systems offer redundancy and resiliency, they entail higher complexity and costs. Conversely, radial setups boast simplicity and lower expenses but sacrifice redundancy and resiliency. PEPCO's preference between these systems depends on factors like grid reliability and available feeder networks to accommodate an increase service for a network system. The type of upgrade will have to be discussed with Pepco.

- Network VS Radial Service Distribution

A network distribution system and a radial setup represent two distinct methodologies for distributing electrical power within Pepco's grid. Presently, Grosvenor III operates under a network setup. Below is a comprehensive analysis of each:

Network Distribution System: This system entails interconnected power sources, ensuring redundancy and reliability. However, its implementation and maintenance are associated with inherent complexities and higher costs.

- Advantages:
  - Redundancy: The presence of alternate paths guarantees uninterrupted power supply during failures.
  - Resiliency: The interconnected nature of the network enhances the system's ability to withstand faults.
  -
- Challenges:
  - Complexity: Interconnecting multiple sources and lines results in a system of higher complexity.
  - Cost: The initial installation and ongoing maintenance costs are comparatively higher.

Radial Distribution System: In contrast, a radial setup facilitates unidirectional power flow from a single source, typically a substation, to individual loads via feeders.

- Advantages:
  - Simplicity: Simplified design and operational procedures compared to network systems.
  - Cost: Radial systems typically incur lower initial and maintenance expenses.

- Challenges:
  - Reduced Redundancy: Limited alternative paths may lead to localized outages.
  - Lower Resiliency: The linear configuration renders the system less resilient to disruptions.

The selection between these systems is contingent upon factors such as the requisite level of reliability, the significance of the loads served, and financial considerations. Additionally, PEPCO's position on emerging energy initiatives may influence the decision-making process. Potential actions encompass maintaining the existing network configuration or transitioning to a radial setup.

Determining PEPCO's preferred option necessitates engaged discussion. PEPCO's primary commitment lies in ensuring the safe and dependable distribution of electricity, potentially entailing the coverage of upgrade costs mandated for safety,

reliability, or compliance purposes. The specifics of these responsibilities vary based on regulatory frameworks and contractual agreements. Detailed cost estimations for both options will be provided, with the ultimate expenditure contingent upon PEPCO's chosen trajectory and the preference of Grosvenor III's stakeholders.

- Option #1- Maintain Network design for 208V service.

To accommodate the new load that is estimated at 2,016.9 kW (Boiler Upgrade Excluded) the planned scope of work will be to extend feeders for Network service upgrade at full proposed load.

Pepco scope of work:

- Pepco to extend feeder 14448 approximately 908' underground to site in new 5" fiber glass concrete encased conduit.
- Pepco to extend feeder 14440 approximately 1608' underground to site in new 5" fiber glass concrete encased conduit.
- Pepco to install manholes for feeder extension and resurface roadway.
- Pepco to install 2 new 1000kVA 120/208 3 phase network transformers and additional secondary for service.

Expected cost from PEPCO be billed to the Customer: $2,173,102.

Customer Cost for work on private property

- Install approximately 500' of 5" fiberglass and 20' of 4' PVC concrete encased conduit.
- Install 2 new manhole for network transformers.
- Resurface parking lot.

Expected Customer cost $1,312,240.

Total Estimated Service Upgrade Cost $3,485,34

Figure 18 – Concept Drawing – Proposed route of extension of Network Feeder for new load under Option 1

- Option #2 – Upgrade to radial design for 208V service.

In the case where Pepco requests that the network setup be changed to a radial service from existing feeders, the installation of 4 new pad-mount transformers keeping customer voltage at 120/208V is to be expected.

1. Install (4) new 1000kVA pad mount transformers in predetermined location at 120/208V to avoid installing new customer owned stepdown transformers.
2. Install approximately 200' of #2 primary cable.
3. Replace existing secondary cable and add additional sets.

Expected cost from PEPCO be billed to the Customer: $91,560

Customer Cost for work on private property

- Install approximately 100’ of 4” – 4 way.
- Install approximately 200’ of 4” – 10 way.
- Install 4 concrete transformer pads
- Resurface parking area

Customer Cost $749,330

Total Service cost $840,890

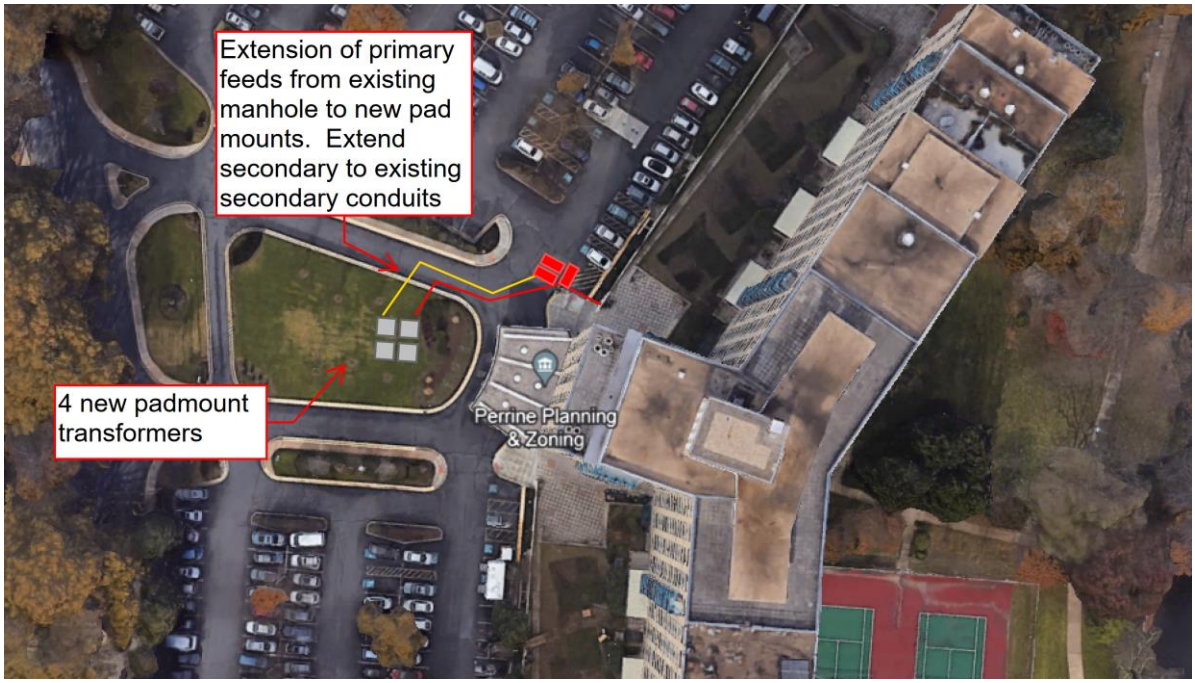


Figure 19 – Concept Drawing – Extension of feeders and installation of radial transformers for future load needs under Option 2

- Upgrade to radial design for 480V service.

If Grosvenor III updates its buildings setup to a 480V service (not recommended) then Pepco will request that the service upgrade be changed to a radial service from existing feeders. Scope of work would be to utilize the existing manhole and replace network transformers with subsurface radial transformers at 265/460V.

- Replace existing network transformers with a 2500kVA and 1000kVA subsurface transformers at 265/460V, this will reduce the footprint needed for transformers needed.
- Replace the existing secondary cable and add additional sets.

Expected cost from PEPCO be billed to the Customer: Pepco Cost $62,550

Customer Cost for work on private property

- Rebuild approx. 40' of 4" – 10-way conduit and approx. 200; of 4" – 4-way
- Install 2 new transformer pads

Customer Cost $761,795

Total Service Upgrade Cost $ 829,600.

After assessing the feasibility of a 480V service system, we advise against pursuing this option due to significant expenses and space limitations within the building. Despite utility-side costs for interconnection being relatively comparable to a 120V option, the substantial expense of step-down transformers for the building outweighs this slight difference.

VI. Phasing

The following section aims to provide GPIII with an estimated timeline for equipment replacement or upgrade, as outlined in the report sections. It's important to acknowledge that these timelines can vary significantly, particularly depending on the pathway of choice, which can impact the timeframe. PPE suggests consulting with contractors to obtain a realistic understanding of the different timelines they can anticipate for various options.

A. Replacement timeframe of key equipment (replacement or upgrade).

The current equipment requiring replacement according to the FEA report includes all switchgears, distribution panels, MBD, and MCC equipment. The duration of outages during the replacement of each respective switchgear (one-third of the building at a time) depends largely on the urgency of the project and the available funds made available to cover the replacement. Indeed, the provided timeframes are based on the assumption that no significant complications arise during the installation process and are highly dependent on the availability of skilled labor resources to be managed by the contractor. Additionally, the timelines are influenced by the level of investment the condominium is willing to make, including considerations such as off-hours work and the implementation of rotating shifts.

This could range from a swift 48-hour turnover (involving scheduled continuous rotating shifts and immediate commissioning/inspection, albeit at a higher cost) to a more typical couple of weeks.

GPIII should expect approximately 7-28 days per switchgear replacement. There are several essential steps involved in ensuring the safe replacement of the equipment, from disconnecting the existing panel while coordinating with the utility to installing the new panel and testing its functionality. Overall, the entire process could span from about 1 to 4 weeks, allowing for possible additional time for unforeseen complications or delays. Safety and thoroughness should be prioritized throughout each phase of the project to ensure a successful and reliable installation.

Overall, the replacement of all mandatory equipment is anticipated to take between 30 to 40 days. Residents should prepare for outages lasting approximately 10 days

to 4 weeks per selected section, as each switchboard serves one-third of the apartment units. It's important to note that this estimate is based on factors such as the size and age of the building but may vary significantly depending on on-site inspections conducted by contractors. Additionally, unforeseen contingencies, typical for a building of this age, are not included in this estimate.

B. Full design retrofit phasing recommendation.

Upgrading both the service and the building simultaneously would necessitate relocating all residents for a minimum of 5 to 6 months. During this period, all units would be disconnected from electrical services while upgrades are carried out on both the customer and utility sides. The expense and inconvenience of displacing residents far outweigh the logistical savings of upgrading the condominium in one time.

As for upgrading individual units, the boiler, and Level I EV charging stations, this cannot be done sequentially, as it would still require installing utility equipment beforehand, which must be completed in one operation.

If GPIII wishes to only activate the installation of Level 2 chargers and upgrade the laundry room dryers, with appropriate planning, the replacement of switchboard A would take roughly (industry standard) 10 to 14 days, if previous preparatory work was done for the laundry room and Level II chargers.

The following is a suggested phasing schedule for upgrades. Note that many factors must be considered when developing a finalized plan, including availability of funding, fluctuating lead times, and utility coordination.

- **Phase 1 –Utility Transformers –** ***Appendix 1_Page 2***

All of the infrastructure for the conversion of the Pepco feed to a radial system needs to be completed for the installation of new pad mounted transformers. Once completed Pepco can install the transformers and install primary cable to energize the system.

- **Phase 2 – New House Switchboard, EV Charging – *Appendix 1_Page 2***

The new house switchboard can be installed in this phase at a to-be-determined location, and the new EV charging provisions added. A temporary connection to a new utility transformer will be established. No significant disruption or outages to existing services are required. The remaining existing gear will need to be re-fed from new radial transformers due to both network and radial not being able to operate simultaneously.

- **Phase 3 – House Switchboard load transfer – *Appendix 1_Page 3***

All existing house loads are to migrate to the new house switchboard. One panel may relocate at a time, and the new rerouted feeder may be installed prior to the final connection. As such, no significant outages are required. If preparatory work is done beforehand then the outage per panel would roughly take between 5 hours to 1 day (House service is represented by "Other" in following graph).

- **Phase 4 – Replace Switchboard MDP B – *Appendix 1_Page 4***

Switchboard MDP B will be replaced in this phase. The new switchboard will have its own utility feed, with field-adjustable breakers ready to accommodate the larger feeders to each dwelling unit. This will result in an outage for roughly 1/3 of residents, for the duration of time it takes to replace the switchboard and reconnect the feeds. This can take between 5 days to 2 weeks to complete but will depend on the available labor contracted. This estimate can be increased due to unforeseen challenges.

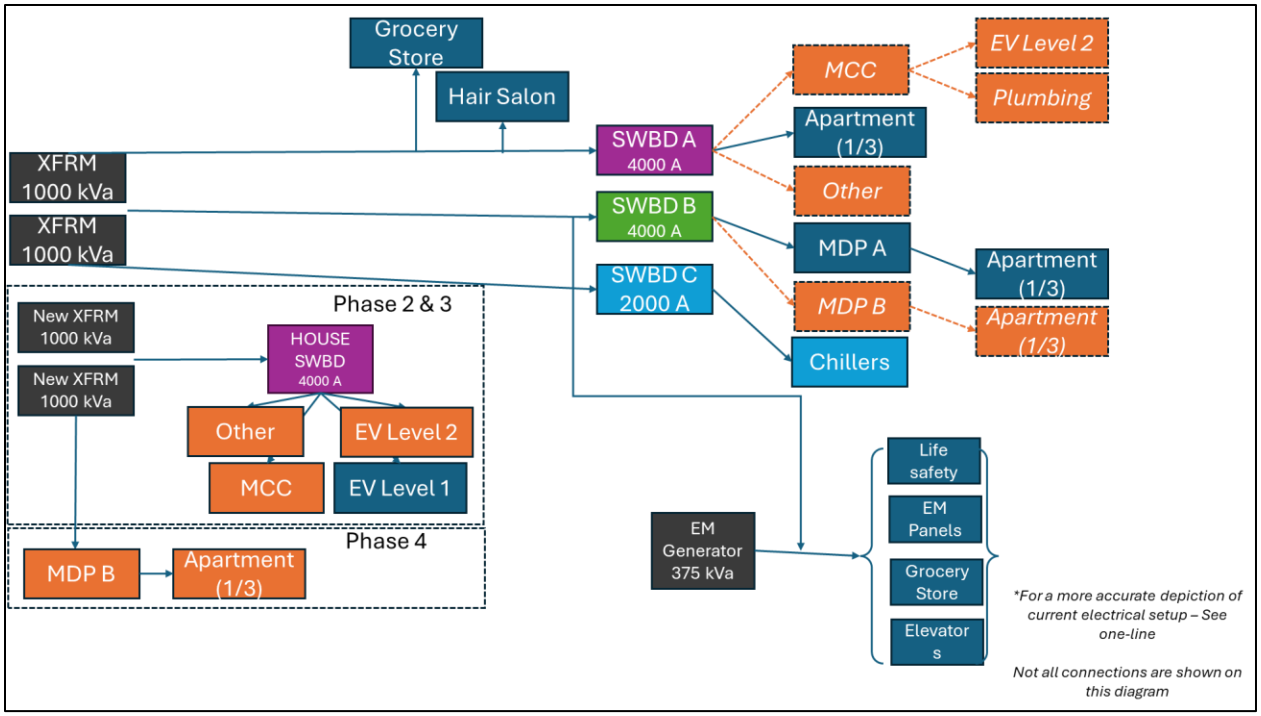


Figure 20 – Phase 2/3 & 4 detailed breakdown

- **Phase 4B – Upgrade MDP B Units – *Appendix 1_Page 4***

This phase may take place in parallel with Phases 5 and up. Busway (if necessary due to space constraints) or a large feeder (if space is not a concern) will be installed for a group of dwelling units served by MDP B, one at a time, and their respective panels replaced if necessary (assuming not already placed in Phase 1). The feed from MDP B will be replaced for increased ampacity, and the breaker settings modified accordingly. Individual unit metering will also be installed here if so desired, at the unit panel mains.

This will require an outage of 6-9 dwelling units at a time, which is likely to last for an extended time depending on the extent of demolition required to install the new feeders. Coordination with the residents will be necessary. GPIII should plan between 1 to 4 weeks per lot of dwelling units (without unforeseen complications).

- **Phase 5 – Replace Switchboard MDP A, Reconnect House Switchboard – Appendix 1_Page 5**

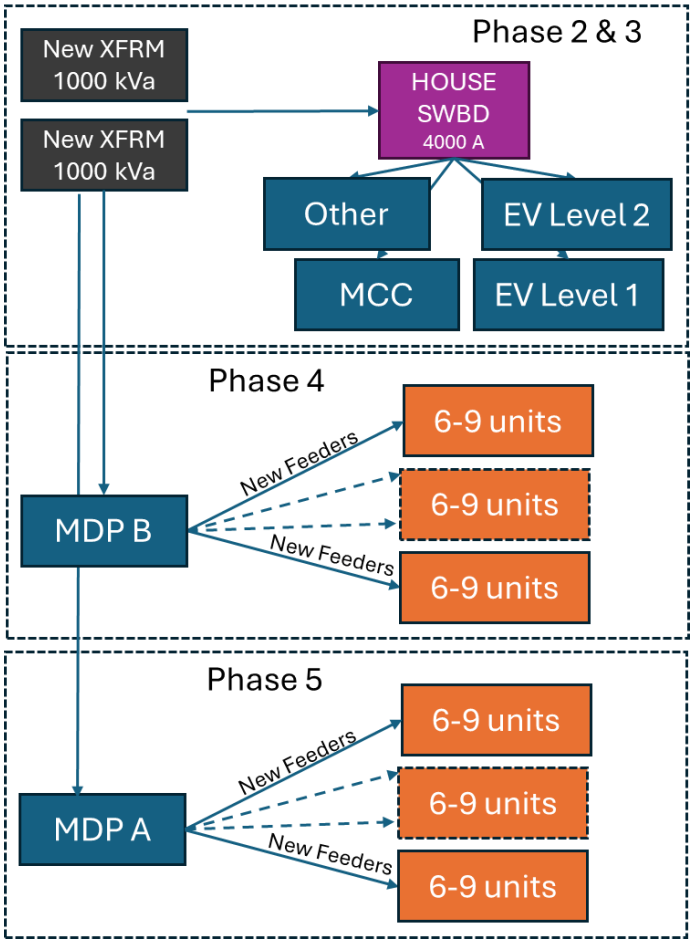


Figure 21 – Phase 4 & 5 detailed breakdown

Switchboard MDP A will be replaced in this phase, in the same manner that MDP B was in Phase 4. This will also result in a similar outage for roughly 1/3 of residents from 1 to 4 weeks. Switchboard MDP A will be powered by demolishing the temporary connection to the house switchboard and rerouting to the new MDP A. At the same time, the house switchboard will be powered via a new permanent connection to the feed formerly serving Switchboard B, which will be taken completely out of service. Switchboard B will serve only as a tap point for the EM system, and its feeder extended to the house switchboard. This will require briefly deenergizing the EM system for the length of time required to connect the new feed, and appropriate precautions must be taken.

- **Phase 5B – Upgrade MDP A Units- *Appendix 1_Page 5***

This phase may take place in parallel with Phases 6 and up, while the same changes made in Phase 4B are made for the MDP A dwelling units. Again, this will require an outage of 6-9 dwelling units at a time, and coordination with the residents will be necessary.

- **Phase 6 – Grocery and Salon reconnection – *Appendix 1_Page 6***

Grocery and Salon feeders will be rerouted from Switchboard A to the new MDP A and reconnected. This should not result in a significant outage, merely reconnecting the incoming feeders to utilize a different switchboard.

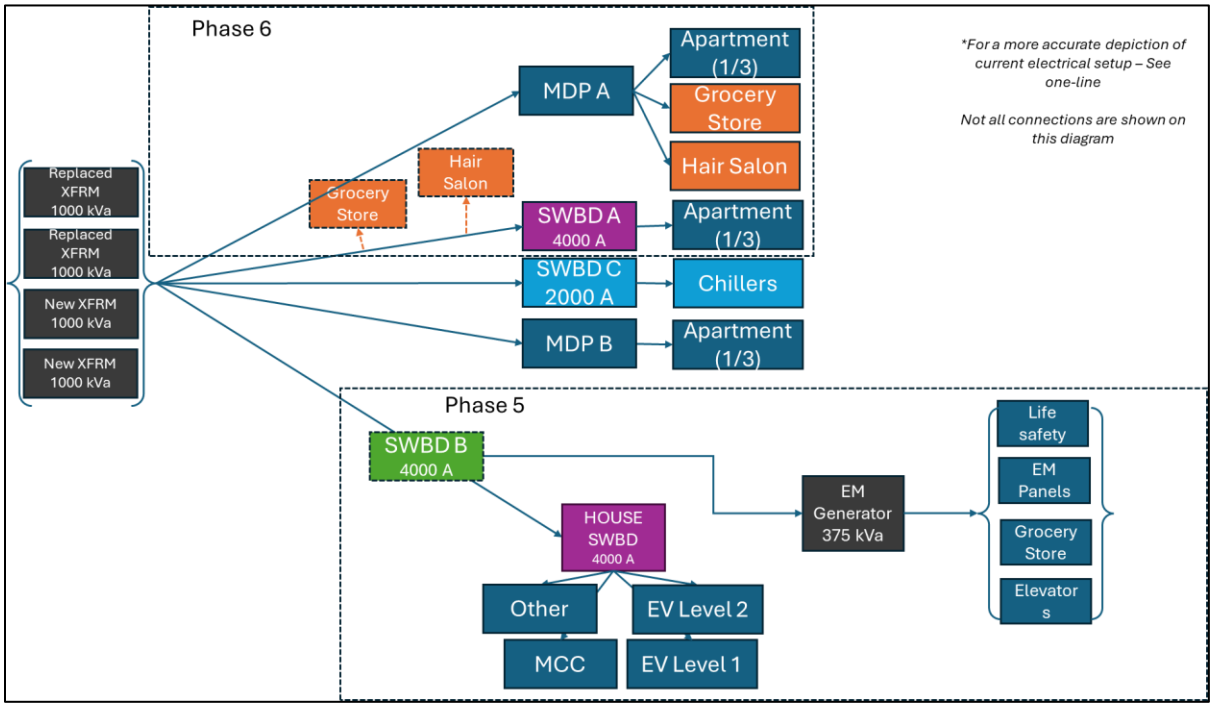


Figure 22 – Phase 5 & 6 detailed breakdown

- **Phase 7 – Replace Switchboard A – *Appendix 1_Page 7***

Switchboard A will be replaced in this phase, in the same manner that MDP A/B were in Phase 4/5. This will also result in a similar outage for roughly 1/3 of residents from 1 to 4 weeks. However, Switchboard A will retain the same utility feed.

- **Phase 7B – Upgrade Switchboard A Units – *Appendix 1_Page 7***

The same changes made in Phase 4B/5B are made for the Switchboard A dwelling units. Again, this will require an outage for 6-9 dwelling units at a time, and coordination with the residents will be necessary between 1 to 4 weeks depending on the amount of demolition and work needed.

Conclusion

In conclusion, the analysis conducted by Prime Partners Engineering and Shumate Engineering offers a nuanced understanding of the current state and future needs of GPIII Condominium's electrical infrastructure. Through a detailed examination of existing systems, coupled with projections of energy demands and regulatory imperatives, this report presents actionable insights to guide GPIII's transition to a modernized and sustainable electrical framework.

The assessment has illuminated several key findings. While GPIII currently enjoys surplus transformer capacity, the building, akin to numerous similar structures constructed in the 1960's, encounters difficulties in meeting modern energy standards due to its outdated electrical systems.

Albeit the imperative to shift from gas to electric appliances, incorporate EV charging stations, and replace aging equipment is evident to enhance sustainability and reduce our reliance to fossil fuels, the financial and structural burdens associated with these upgrades can be considered substantial. At a minimum (excluding the conversion of the gas boilers, which cannot be done with the current building structure) the estimated costs for the total upgrades range from $6 million to $8 million dollars.

However, analysis reveals opportunities for energy efficiency improvements, such as the conversion to electric dryers and the integration of a smaller amount of Level II EV charging stations, which align with GPIII's sustainability goals without activating very costly utility and service upgrades. What's more, these projects integrate themselves in a more community-based mindset seeing that the laundry room is shared and that the Level II charging stations would be open to all.

One notable aspect is the delicate balance between meeting evolving regulatory requirements and ensuring operational efficiency. The convergence of the Condominium Act and Maryland and Montgomery's BEPS Mandate necessitates careful planning and strategic investments to navigate compliance challenges while maximizing cost-effectiveness. For instance, the proposed

deployment of Level II charging stations strategically leverages existing infrastructure to minimize the need for extensive utility upgrades, showcasing a pragmatic approach to regulatory adherence.

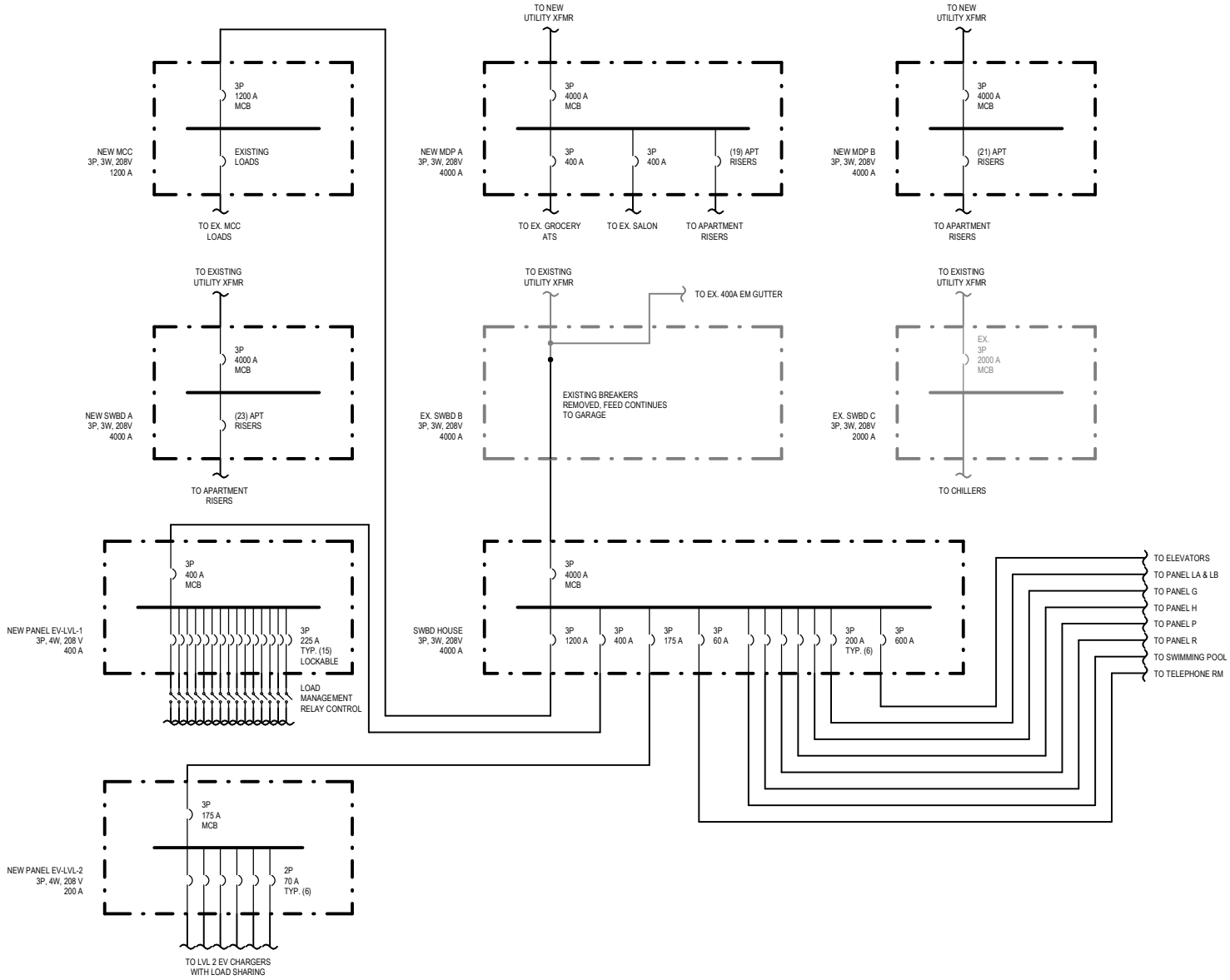
This report aims to serve as a strategic roadmap for Grosvenor III's transition to a modernized and sustainable electrical infrastructure. It underscores the importance of timely upgrades and emphasizes the need for a coordinated approach involving both condominium management and regulatory bodies. Through collective efforts, we can ensure that buildings from this era meet contemporary energy standards and contribute to a more sustainable future.

Appendix

Appendix 1 – One line Phased.

Appendix 2 – One line Final

Appendix 3 – Estimated Cost Table


TO NEW
UTILITY XFMR
3P
1200 A
MCB
NEW MCC
3P, 3W, 208V
1200 A
EXISTING
LOADS
TO EX. MCC
LOADS
TO NEW
UTILITY XFMR
3P
4000 A
MCB
NEW MDP A
3P, 3W, 208V
4000 A
3P
400 A
3P
400 A
(19) APT
RISERS
TO EX. GROCERY
ATS
TO EX. SALON
TO APARTMENT
RISERS
TO NEW
UTILITY XFMR
3P
4000 A
MCB
NEW MDP B
3P, 3W, 208V
4000 A
(21) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
3P
4000 A
MCB
NEW SWBD A
3P, 3W, 208V
4000 A
(23) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EXISTING BREAKERS
REMOVED, FEED CONTINUES
TO GARAGE
EX. SWBD B
3P, 3W, 208V
4000 A
TO EXISTING
UTILITY XFMR
EX.
3P
2000 A
MCB
EX. SWBD C
3P, 3W, 208V
2000 A
TO CHILLERS
3P
400 A
MCB
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
3P
4000 A
MCB
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
1200 A
3P
400 A
3P
175 A
3P
60 A
3P
200 A
TYP. (6)
3P
600 A
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
3P
175 A
MCB
NEW PANEL EV-LVL-2
3P, 4W, 208 V
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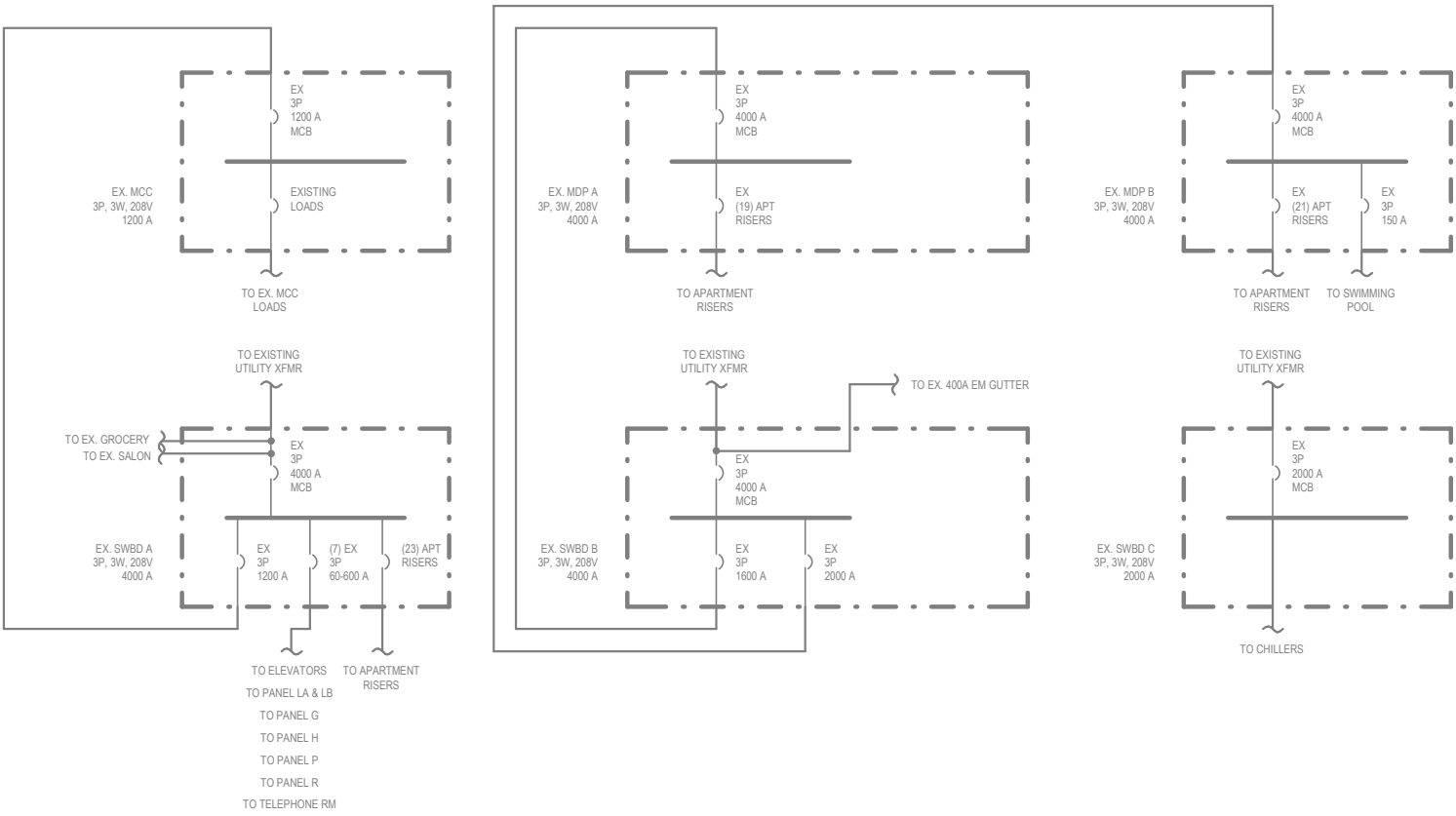
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING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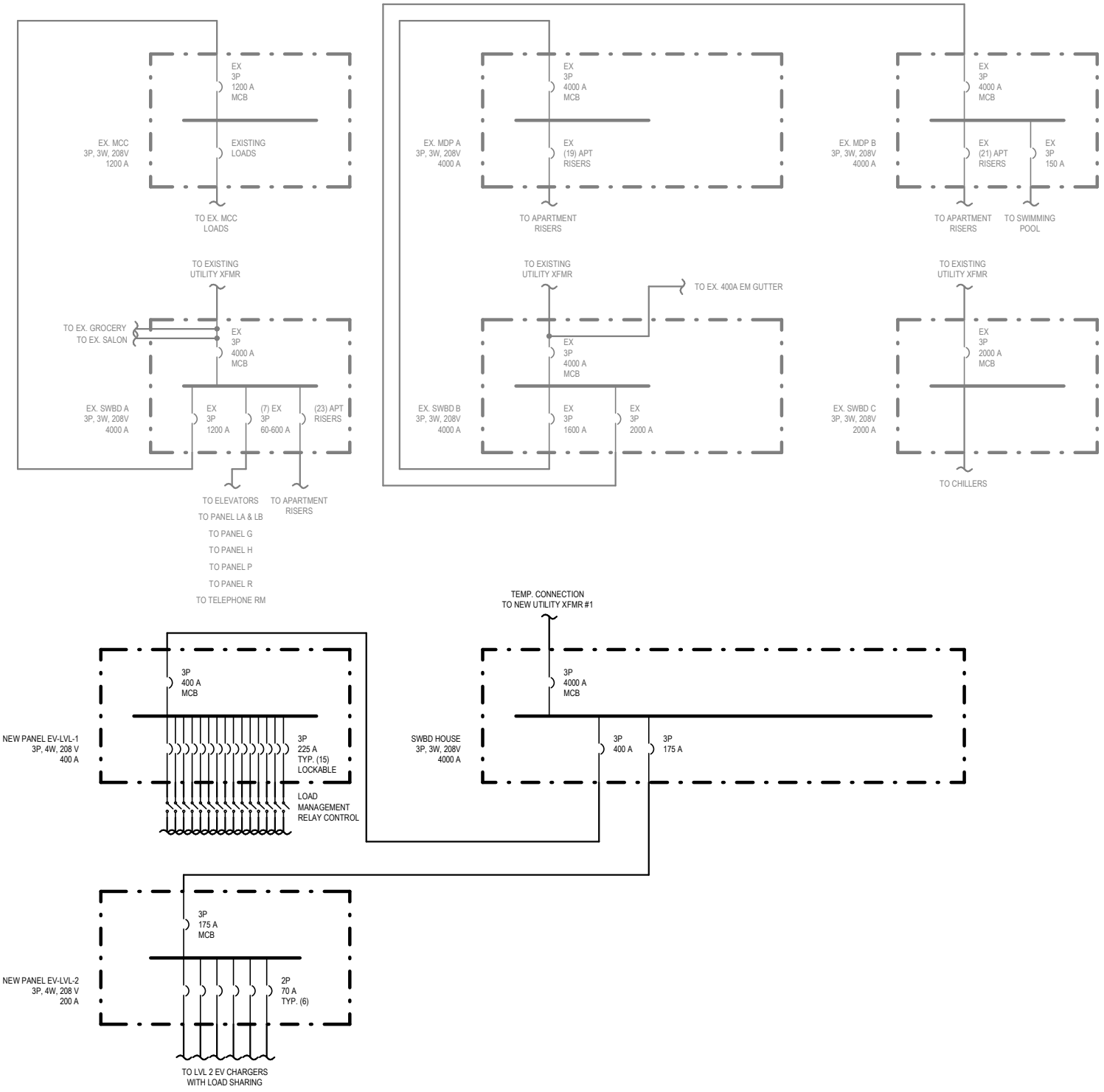
MCB
EX. MCC
3P, 3W, 208V
1200 A
EXISTING
LOADS
TO EX. MCC
LOADS
EX
3P
4000 A
MCB
EX. MDP A
3P, 3W, 208V
4000 A
EX
(19) APT
RISERS
TO APARTMENT
RISERS
EX
3P
4000 A
MCB
EX. MDP B
3P, 3W, 208V
4000 A
EX
(21) APT
RISERS
EX
3P
150 A
TO APARTMENT
RISERS
TO SWIMMING
POOL
TO EXISTING
UTILITY XFMR
TO EX. GROCERY
TO EX. SALON
EX
3P
4000 A
MCB
EX. SWBD A
3P, 3W, 208V
4000 A
EX
3P
1200 A
(7) EX
3P
60-600 A
(23) APT
RISERS
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO TELEPHONE RM
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX
3P
4000 A
MCB
EX. SWBD B
3P, 3W, 208V
4000 A
EX
3P
1600 A
EX
3P
2000 A
TO EXISTING
UTILITY XFMR
EX
3P
2000 A
MCB
EX. SWBD C
3P, 3W, 208V
2000 A
TO CHILLERS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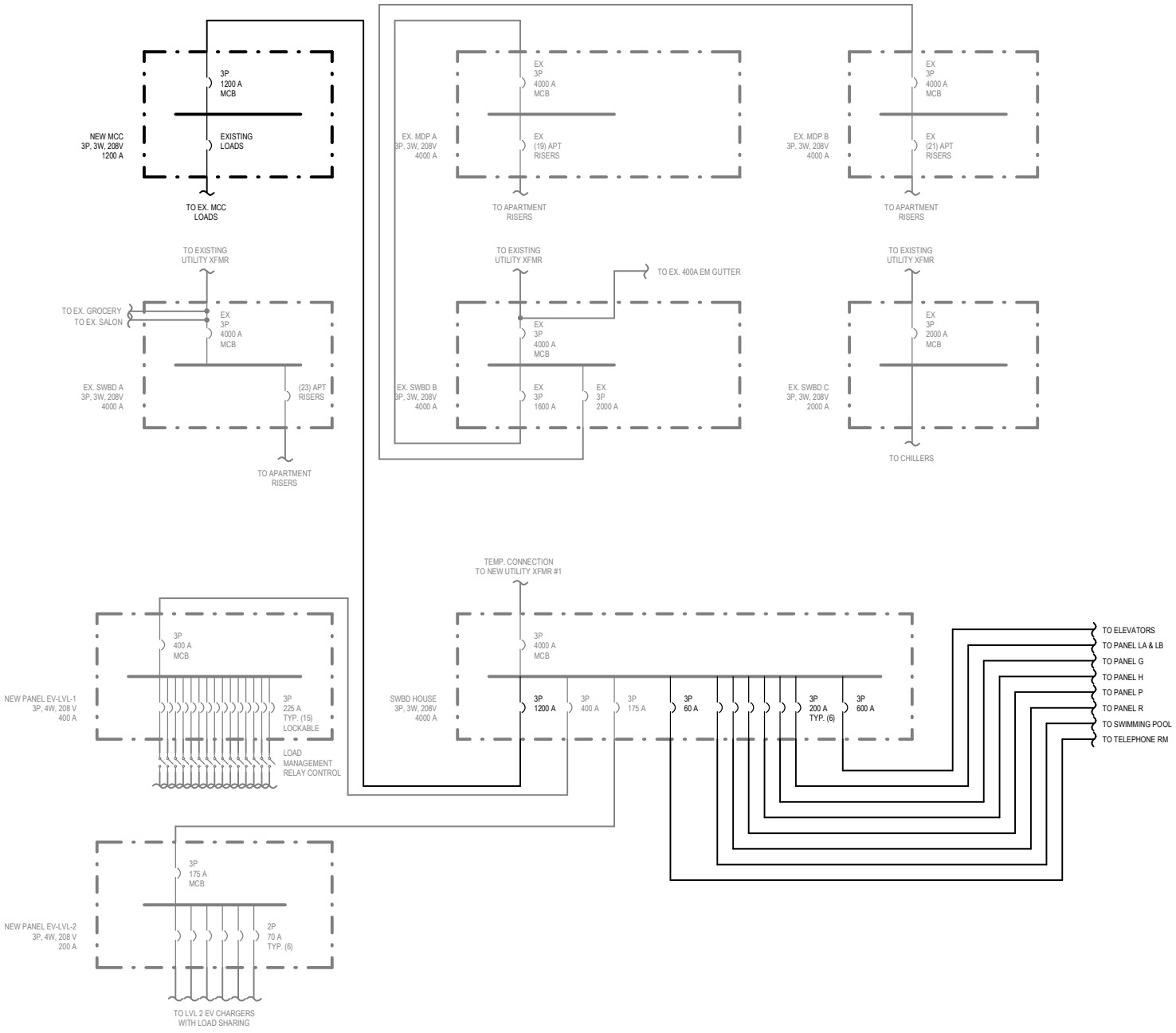
1200 A
MCB
EX. MCC
3P, 3W, 208V
1200 A
EXISTING
LOADS
TO EX. MCC
LOADS
EX
3P
4000 A
MCB
EX. MDP A
3P, 3W, 208V
4000 A
EX
(19) APT
RISERS
TO APARTMENT
RISERS
EX
3P
4000 A
MCB
EX. MDP B
3P, 3W, 208V
4000 A
EX
(21) APT
RISERS
EX
3P
150 A
TO APARTMENT
RISERS
TO SWIMMING
POOL
TO EXISTING
UTILITY XFMR
TO EX. GROCERY
TO EX. SALON
EX
3P
4000 A
MCB
EX. SWBD A
3P, 3W, 208V
4000 A
EX
3P
1200 A
(7) EX
3P
60-600 A
(23) APT
RISERS
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO TELEPHONE RM
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX
3P
4000 A
MCB
EX. SWBD B
3P, 3W, 208V
4000 A
EX
3P
1600 A
EX
3P
2000 A
TO EXISTING
UTILITY XFMR
EX
3P
2000 A
MCB
EX. SWBD C
3P, 3W, 208V
2000 A
TO CHILLERS
TEMP. CONNECTION
TO NEW UTILITY XFMR #1
3P
4000 A
MCB
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
400 A
3P
175 A
3P
400 A
MCB
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
3P
175 A
MCB
NEW PANEL EV-LVL-2
3P, 4W, 208 V
200 A
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING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1200 A
EXISTING
LOADS
TO EX. MCC
LOADS
EX
3P
4000 A
MCB
EX. MDP A
3P, 3W, 208V
4000 A
EX
(19) APT
RISERS
TO APARTMENT
RISERS
EX. MDP B
3P, 3W, 208V
4000 A
EX
(21) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. GROCERY
TO EX. SALON
EX
3P
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MCB
EX. SWBD A
3P, 3W, 208V
4000 A
(23) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
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3P
4000 A
MCB
EX. SWBD B
3P, 3W, 208V
4000 A
EX
3P
1600 A
EX
3P
2000 A
TO EXISTING
UTILITY XFMR
EX
3P
2000 A
MCB
EX. SWBD C
3P, 3W, 208V
2000 A
TO CHILLERS
TEMP. CONNECTION
TO NEW UTILITY XFMR #1
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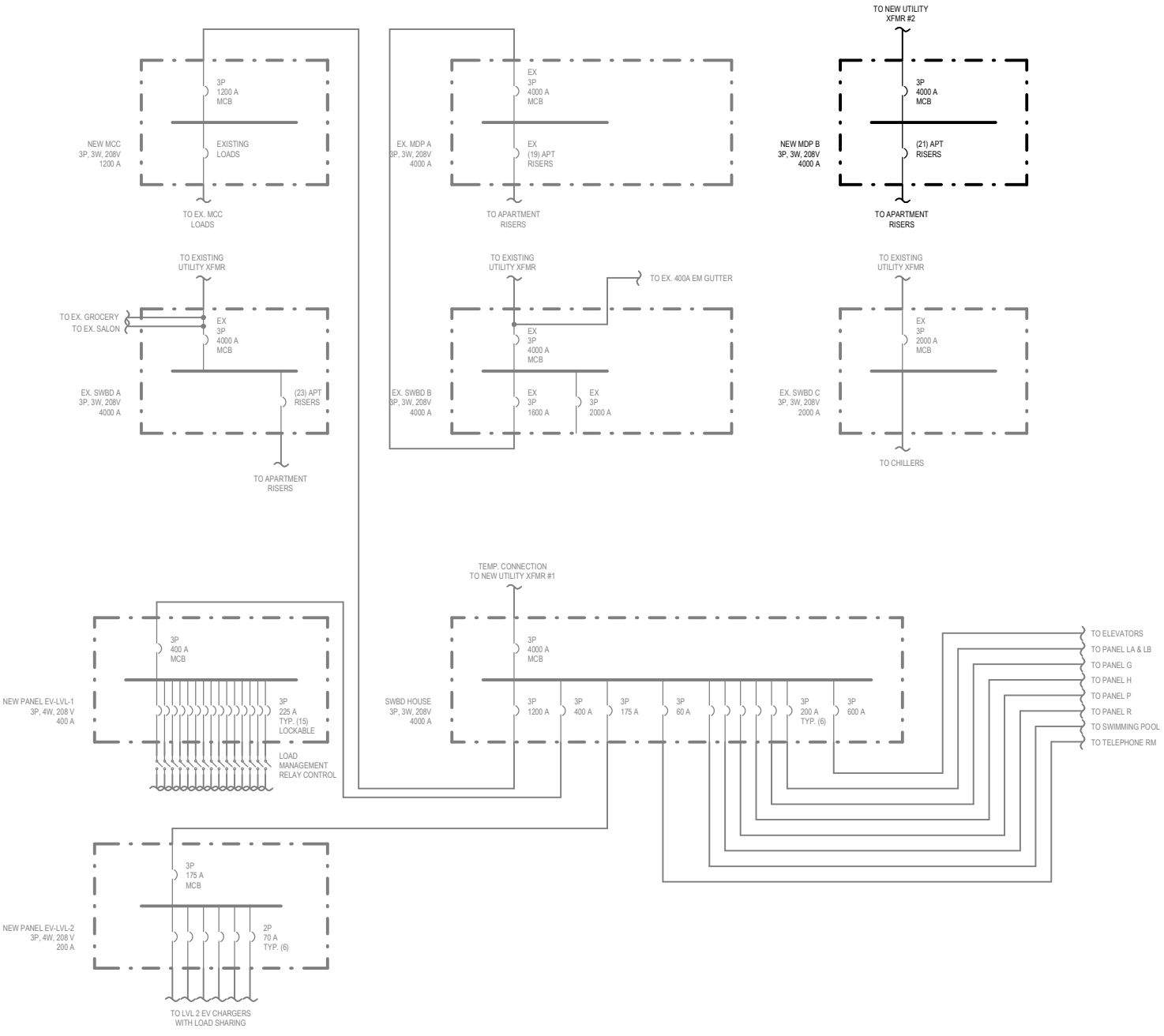
400 A
MCB
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
3P
4000 A
MCB
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
1200 A
3P
400 A
3P
175 A
3P
60 A
3P
200 A
TYP. (6)
3P
600 A
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
3P
175 A
MCB
NEW PANEL EV-LVL-2
3P, 4W, 208 V
200 A
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING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3P, 3W, 208V
1200 A
3P
1200 A
MCB
EXISTING
LOADS
TO EX. MCC
LOADS
EX. MDP A
3P, 3W, 208V
4000 A
EX
3P
4000 A
MCB
EX
(19) APT
RISERS
TO APARTMENT
RISERS
TO NEW UTILITY
XFMR #2
NEW MDP B
3P, 3W, 208V
4000 A
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MCB
(21) APT
RISERS
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RISERS
TO EXISTING
UTILITY XFMR
TO EX. GROCERY
TO EX. SALON
EX
3P
4000 A
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EX. SWBD A
3P, 3W, 208V
4000 A
(23) APT
RISERS
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RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX
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MCB
EX. SWBD B
3P, 3W, 208V
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UTILITY XFMR
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3P, 3W, 208V
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TO CHILLERS
TEMP. CONNECTION
TO NEW UTILITY XFMR #1
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MCB
NEW PANEL EV-LVL-1
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3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
3P
4000 A
MCB
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
1200 A
3P
400 A
3P
175 A
3P
60 A
3P
200 A
TYP. (6)
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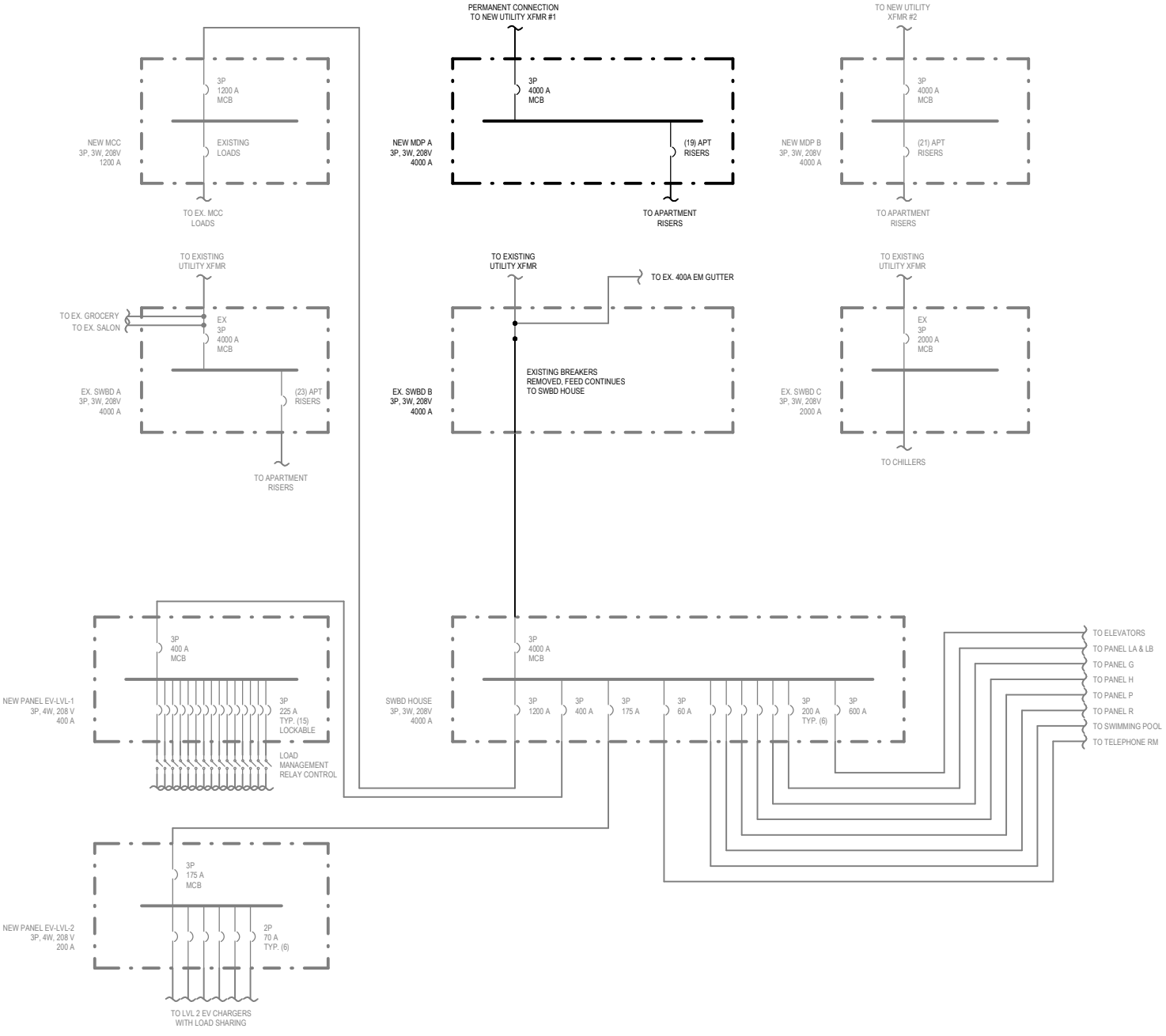
600 A
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
3P
175 A
MCB
NEW PANEL EV-LVL-2
3P, 4W, 208 V
200 A
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING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3P, 3W, 208V
1200 A
3P
1200 A
MCB
EXISTING
LOADS
TO EX. MCC
LOADS
PERMANENT CONNECTION
TO NEW UTILITY XFMR #1
NEW MDP A
3P, 3W, 208V
4000 A
3P
4000 A
MCB
(19) APT
RISERS
TO APARTMENT
RISERS
TO NEW UTILITY
XFMR #2
NEW MDP B
3P, 3W, 208V
4000 A
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4000 A
MCB
(21) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. GROCERY
TO EX. SALON
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4000 A
MCB
EX. SWBD A
3P, 3W, 208V
4000 A
(23) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX. SWBD B
3P, 3W, 208V
4000 A
EXISTING BREAKERS
REMOVED, FEED CONTINUES
TO SWBD HOUSE
TO EXISTING
UTILITY XFMR
EX
3P
2000 A
MCB
EX. SWBD C
3P, 3W, 208V
2000 A
TO CHILLERS
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
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400 A
MCB
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
SWBD HOUSE
3P, 3W, 208V
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3P
4000 A
MCB
3P
1200 A
3P
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175 A
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3P
200 A
TYP. (6)
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600 A
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
NEW PANEL EV-LVL-2
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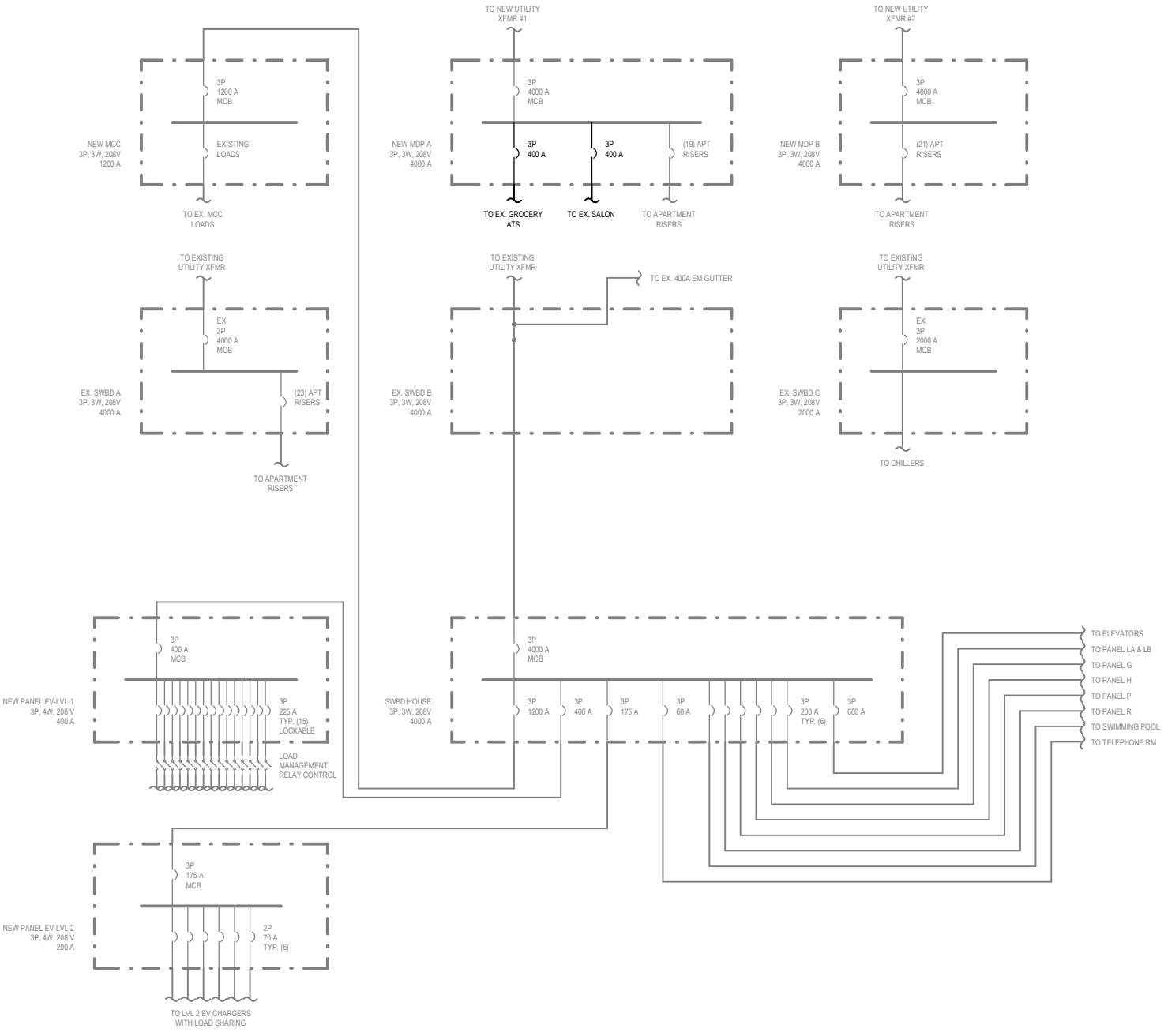
MCB
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING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3P, 3W, 208V
1200 A
3P
1200 A
MCB
EXISTING
LOADS
TO EX. MCC
LOADS
TO NEW UTILITY
XFMR #1
NEW MDP A
3P, 3W, 208V
4000 A
3P
4000 A
MCB
3P
400 A
3P
400 A
(19) APT
RISERS
TO EX. GROCERY
ATS
TO EX. SALON
TO APARTMENT
RISERS
TO NEW UTILITY
XFMR #2
NEW MDP B
3P, 3W, 208V
4000 A
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MCB
(21) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
EX. SWBD A
3P, 3W, 208V
4000 A
EX
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4000 A
MCB
(23) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX. SWBD B
3P, 3W, 208V
4000 A
TO EXISTING
UTILITY XFMR
EX. SWBD C
3P, 3W, 208V
2000 A
EX
3P
2000 A
MCB
TO CHILLERS
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
3P
400 A
MCB
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
4000 A
MCB
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1200 A
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TYP. (6)
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TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
NEW PANEL EV-LVL-2
3P, 4W, 208 V
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MCB
2P
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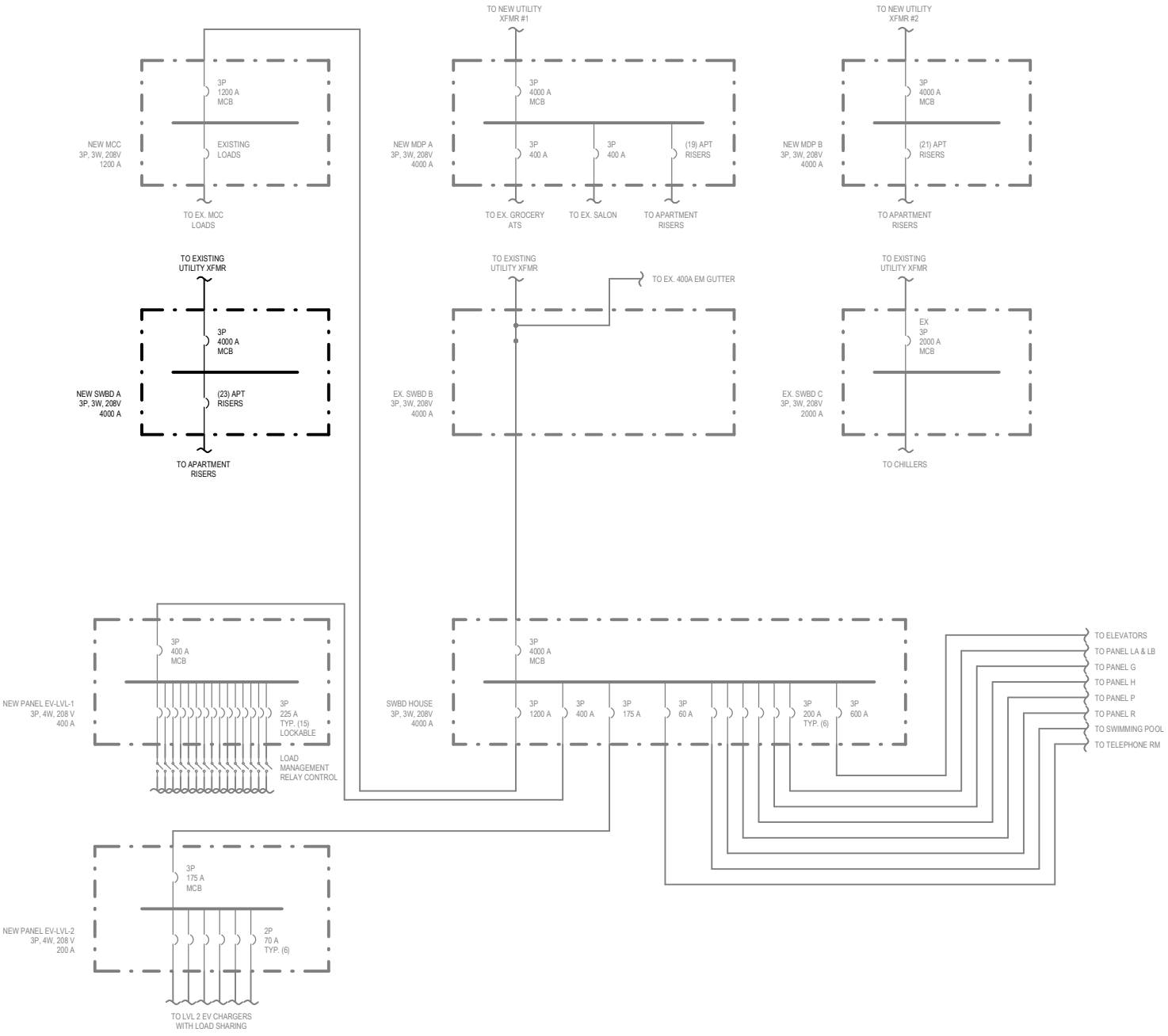
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING


NEW MCC
3P, 3W, 208V
1200 A
3P
1200 A
MCB
EXISTING
LOADS
TO EX. MCC
LOADS
TO NEW UTILITY
XFMR #1
NEW MDP A
3P, 3W, 208V
4000 A
3P
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MCB
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(19) APT
RISERS
TO EX. GROCERY
ATS
TO EX. SALON
TO APARTMENT
RISERS
TO NEW UTILITY
XFMR #2
NEW MDP B
3P, 3W, 208V
4000 A
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4000 A
MCB
(21) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
NEW SWBD A
3P, 3W, 208V
4000 A
3P
4000 A
MCB
(23) APT
RISERS
TO APARTMENT
RISERS
TO EXISTING
UTILITY XFMR
TO EX. 400A EM GUTTER
EX. SWBD B
3P, 3W, 208V
4000 A
TO EXISTING
UTILITY XFMR
EX. SWBD C
3P, 3W, 208V
2000 A
EX
3P
2000 A
MCB
TO CHILLERS
NEW PANEL EV-LVL-1
3P, 4W, 208 V
400 A
3P
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MCB
3P
225 A
TYP. (15)
LOCKABLE
LOAD
MANAGEMENT
RELAY CONTROL
SWBD HOUSE
3P, 3W, 208V
4000 A
3P
4000 A
MCB
3P
1200 A
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400 A
3P
175 A
3P
60 A
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200 A
TYP. (6)
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600 A
TO ELEVATORS
TO PANEL LA & LB
TO PANEL G
TO PANEL H
TO PANEL P
TO PANEL R
TO SWIMMING POOL
TO TELEPHONE RM
NEW PANEL EV-LVL-2
3P, 4W, 208 V
200 A
3P
175 A
MCB
2P
70 A
TYP. (6)
TO LVL 2 EV CHARGERS
WITH LOAD SHARING

OPTION #1 - ESE REPLACEMENT WITH NO ENHANCEMENTS			
120/208V - Electrical Service Equipment proposed replacement *Replacing electrical equipment due to estimated end of lifespan of Condominium electrical distribution components.*			
Electrical Component and Equipment Replacement			
SWBD A	$	227,000.00	total
SWBD B	$	165,000.00	total
SWBD C	$	46,000.00	total
MDP Switchboard	$	330,000.00	2 MDP (MDP A / MDP B replaced)
MCC	$	85,000.00	total
TOTAL- ESE replacement	**$**		**853,000.00**
TOTAL - OPTION #1	**$**	**853,000.00**	

ESTIMATE NUMBERS ONLY BASED ON INDUSTRY STANDARDS. WE ADVISE GPIII TO CONSULT WITH INDIVIDUAL VENDORS FOR MORE ACCURATE PRICING BASED ON SCOPE OF WORK.

OPTION 2# - PARTIAL PROJECT ACTIVATION & ESE ENHANCEMENT			
120/208V - Electrical Building Partial Upgrade *Installing 5 extra Level 2 Chargers & converting 25 dryers from gas to electric. Option #2* contingent on activation of Option #1 (more specificaly on SWBD A replacement).			
Level II EV Chargers			
Panelboard for 5 extra chargers	$	2,500.00	Serving all chargers + 30ft feeder line
Breakers	$	1,350.00	total (270$ / breaker)
5 Chargepoint Level 2 - Material	$	38,750.00	$7,750/charger - 10% bulk discount
Chargepoint Install	$	46,000.00	$23,000 install - 60% bulk discount
TOTAL - Level II chargers	**$**		**88,600.00**
Dryer Conversion			
NEMA receptacle installation/ dryer	$	25,000.00	$1,000/dryer
Sealing & Capping Gas Lines	$	5,000.00	$200/dryer
Panelboard + breakers installation	$	10,500.00	total
TOTAL- Dryer	**$**		**40,500.00**
TOTAL - OPTION 2#	**$**	**129,100.00**	

ESTIMATE NUMBERS ONLY BASED ON INDUSTRY STANDARDS. WE ADVISE GPIII TO CONSULT WITH INDIVIDUAL VENDORS FOR MORE ACCURATE PRICING BASED ON SCOPE OF WORK.

OPTION #3 TOTAL UPGRADE			
120/208V - Electrical Building Design Retrofit for new Load			
Upgrading all electrical equipment with new design to accommodate all new loads.			
Option #3A & #3B provides total cost with associated utility upgrades			
Internal Distribution Electrical Component and Equipment Upgrades			
SWBD A	$	227,000.00	total
SWBD C	$	46,000.00	total
HOUSE SWBD	$	192,000.00	total
MDP Switchboard	$	454,000.00	2 MDP (MDP A / MDP B replaced)
MCC	$	85,000.00	total
TOTAL - Distribution Electrical Upgrade	**$**		**1,004,000.00**
Apartment Upgrades			
NEMA receptacle material and installation	$	416,000.00	414 apartment +2 condo rooms
Sealing & Capping of gas lines	$	83,200.00	414 apartment +2 condo rooms
Apartment rewiring + riser upgrades	$	2,229,900.80	414 apartment units + 2 condo rooms
TOTAL - Apartment Upgrade	**$**		**2,729,100.80**
Level I EV Chargers			
Base Panelboard	$	4,000.00	total
Satellite panels	$	105,000.00	14 satellite panels - total
TOTAL - Level I chargers	**$**		**109,000.00**
Level II EV Chargers			
Panelboard for 5 extra chargers	$	2,500.00	Serving all chargers + 30ft feeder line
Breakers	$	1,350.00	total (270$ / breaker)
5 Chargepoint Level 2 - Material	$	38,750.00	$7,750/charger - 10% bulk discount
Chargepoint Installation	$	46,000.00	$23,000 install cost - 60% bulk discount
TOTAL - Level II chargers	**$**		**88,600.00**
Dryer Conversion			
NEMA receptacle installation/ dryer	$	25,000.00	$1,000/dryer
Sealing & Capping - Gas Lines	$	5,000.00	$200/dryer
Panelboard + breakers installation	$	10,500.00	total
TOTAL - Dryer Conversion	**$**		**40,500.00**

TOTAL -OPTION 3#	**$**	**3,971,200.80**

ESTIMATE NUMBERS ONLY BASED ON INDUSTRY STANDARDS. WE ADVISE GPIII TO CONSULT WITH INDIVIDUAL VENDORS FOR MORE ACCURATE PRICING BASED ON SCOPE OF WORK.

OPTION #3A - RADIAL UTILITY SERVICE UPGRADE			
120/208V - Necessary Utility upgrade - Radial option			
Discussion with PEPCO necessary to determine activation of OPTION #3A or Option #3B			
Pepco Scope of Work			
Primary Cable installation	$	29,008.85	
Replace Secondary Cable and add sets	$	62,552.00	
Installation of 4 -1000kVA Transformers 120/208V	$	-	Transformer cost covered by PEPCO
TOTAL - Pepco Scope of Work	**$**		**91,560.00**
Customer Scope of Work			
Installation of Fiberglass and PVC conduit	$	656,070.00	
Installation of pad-mounts for Transformers	$	78,490.00	
Resurface Parking lot	$	14,770.00	
TOTAL - Customer Scope of Work	**$**		**749,330.00**

TOTAL -OPTION #3A	**$**	**840,890.00**

TOTAL OPTION #3&3A	**$**	**4,812,090.80**

OPTION #3A - NETWORK UTILITY SERVICE UPGRADE			
120/208V - Necessary Utility upgrade - Network option			
Discussion with PEPCO necessary to determine activation of OPTION #3A or Option #3B			
Pepco Scope of Work			
Feeder extension	$	96,627.50	
Manhole installation and associated work	$	1,667,585.00	
Installation of 2 -1000kVA Transformers 120/208V	$	408,890.00	
TOTAL - Pepco Scope of Work	**$**		**2,173,102.00**
Customer Scope of Work			
Installation of Fiberglass and PVC conduit	$	781,766.00	
Manhole installation for Transformers	$	493,549.00	
Resurface Parking lot	$	36,925.00	
TOTAL - Customer Scope of Work	**$**		**1,312,240.00**

TOTAL - OPTION #3B	**$**	**3,485,342.00**

TOTAL OPTION #3&3B	**$**	**7,456,542.80**

OPTIONAL - DATA COLLECTION		
Data Collection at the tenant level for consumption tracking. Cannot be used for sub-billing purposes.		
Meter /apartments		
Single phase meter - data collection	$ 624,000.00	1,500$/unit - total for 414 units
Total - Data collection	**$**	**624,000.00**
TOTAL - DATA COLLECTION	**$ 624,000.00**	

OPTIONAL - UNIT METERING		
10 socket Meter Stack option. (42) meter stacks installation contigent on available spacing. Cost roughly estimate meter stacks installed at every 2 building levels.		
Meter Stack		
Meter stack w/ main circuit breaker & terminal box	$ 504,000.00	(42) Meter Stack (10 branches) - 12,000$/meter stack
10 branch meters (circuit)	$ 1,470,000.00	10 branch system per meter stack
Total - Submetering	**$**	**1,974,000.00**
TOTAL -UNIT METERING	**$ 1,974,000.00**	

BUILDING ENERGY PERFORMANCE STANDARDS

AT

GROSVENOR PARK III CONDOMINIUM

Issue

The application of Building Energy Performance Standards (BEPS) to Grosvenor Park III Condominium (GP III) raises substantial questions of whether Montgomery County's goals and objectives can be achieved or impose costs that would impair other environmental projects, other policy priorities, or even the Condominium's long-term continued viability as a going concern.

Building Energy Performance Standards

The BEPS regulation before the Council for approval requires a normalized site Energy Use Intensity (EUI) for multi-family residential buildings of an arbitrary "37" by not later than December 31, 2035. The regulation requires that an owner adopt a "Building Performance Improvement Plan" if it is "economically infeasible" for a building to meet these requirements due to "circumstances outside the owner's control" – even if it is physically impossible to bring a building to that level of efficiency. Inseparable from BEPS requirements is the Climate Action Plan elimination of fossil fuels and "electrification." Montgomery County, Md., CLIMATE ACTION PLAN: BUILDING A HEALTHY, EQUITABLE, RESILIENT COMMUNITY 26 (June 2021) ("CAP"). The Climate Action Plan mandates that the emissions reductions and corresponding technological assumptions needed to meet the County's greenhouse gas reduction goals include "100% of residential units with natural gas space and water heating have converted to electric heat pumps" by 2035. CAP at 79.

GP III Basic Data

GP III is a 413-unit residential high-rise condominium, including the famous Grosvenor Market, Raphael's Hair Salon, Grosvenor Cleaners, three levels of deeded parking garage, and open outdoor parking. GP III is a moderately-priced home to more than 600 individuals with a wide range of financial capacity, including some who are well off, working families, retirees, students, veterans, and some receiving public support; GP III residents include both on-site owners and renters.[1]

GP III was built in 1966 and is typical of many Montgomery County high-rise multifamily buildings of that era – whether organized as condominiums, cooperatives, or rental apartment buildings.[2] GP III uses two 1,000 kVA transformers set in spot network from two PEPCO feeders. GP III uses two natural gas-fired high-efficiency 2018 Scotch Marine (or fire tube) boilers to provide heat and domestic hot water, and units are equipped with natural gas ranges, cooktops, and ovens.

Environmental Community

GP III is an environmentally conscientious community. In 2023, GP III reported a 2022 normalized site EUI of 52.4 and ranked in the *89th percentile for energy efficiency* among all multifamily residential buildings rated in EPA data. This data will fluctuate as GP III complies with other laws and regulations.[3] Montgomery County seeks efficiency, to be achieved by December 31, 2035, of an EUI reduction of 15.4, or ~30%.

GP III has taken nearly every step identified in publicly available American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Level II audits to reduce GP III's energy and environmental footprint, and all recommendations of in-house and consulting engineers, including:

(a) Installed 86% heat exchange efficiency natural gas-fired heating and domestic hot water system (2018), generating a system-required 25,106 MBH.[4]

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[1] Some GP III residents may receive public housing assistance but GP III is not privy to the specifics of contracts between individual landlord-owners and public housing authorities. Public records do show that a unit within GP III is owned by the United States Secretary of Veterans Affairs.

[2] As the CAP has pointed out: "[I]f landlords are required by law to make costly energy efficiency retrofits and and/or electrification conversions, this could adversely impact the availability or price of affordable housing and costs could be passed on to renters." CAP at 26. Furthermore, the CAP notes, "As the housing stock is upgraded to include high-efficiency and electric heating and cooling, the price of housing goes up, making it even more difficult for low-income community members to purchase homes and build wealth." Id. Montgomery County focuses on its most vulnerable groups, but the BEPS effects may push many in the middle class into that same vulnerability.

[3] Purchasing diesel fuel for the emergency generator (integral to fire and life safety codes and systems required by Maryland and Montgomery County), for example, for mandatory testing, exercise, and maintenance, and for use when PEPCO fails to deliver electricity, will cause EUI to fluctuate each year.

[4] GP III is required by law to provide, from its centralized gas-fired boilers, domestic hot water at a minimum of 120°F; domestic space heating sustaining 68°F or higher; and, because some units are rentals that cannot be severed from the rest of the system, space cooling sustaining 80°F or lower from June 1st to September 30th. Montgomery County Code, §§ 26-7(e)(4), (e)(3), (f).

(b) Replaced chillers and cooling tower with more modern, more efficient equipment.

(c) Resealed all windows and balcony / terrace doors as part of routine / cyclical façade re-tuckpointing and brick replacement at a cost of over $1,000,000.

(d) Bi-Annually replaced convector filters and annually cleaned coils to make the hot and cold water convectors as efficient as possible (discretionary: owner's individual responsibility); negotiates group replacement pricing to install more efficient convectors.

(e) Replaced nearly all common area interior and exterior lighting with LEDs.

(f) Provided residents with no-cost opportunities to replace incandescent lights with CFLs, and again (twice) with LEDs.

(g) Subscribing to a community solar energy project and committed to subscribe to additional projects as they become available.[5]

(h) Modernized elevators and elevator control systems (full replacement of controls) with more energy efficient system.

(i) Installed Energy Management System, installed Digital Mixing Station, and added Injector Loop System.

Additionally, GP III currently plans to further reduce energy consumption by:

(j) Rebalancing air handlers and replace in-unit vents/dampers.

(k) Replacing three 60-hp condensing, chilled/hot water, and standby pumps and a dedicated 7½-hp heating water pump with efficient "NEMA Premium" pumps.

(l) Replacing all Unit windows and doors with thermal glass over three years.

(m) Adopting internal architectural regulations requiring that all replacement appliances installed in Units be Energy Star® certified appliances.

(n) Converting common element gas clothes dryers to electric clothes dryers when the current lease agreement expires (discussed below).

BEPS Engineering Report – Basic Capacity & Environmental Preferences

As part of GP III's environmental stewardship, GP III contracted with Prime Partners Engineering and Shumate Engineering, with the much-appreciated support of the Montgomery County Greenbank, to survey GP III's electrical capacity, service equipment, and possible improvements, and provide Rough Order of Magnitude cost estimates.[6] Prime Partners Engineering, *Condominium Report: 10401 Grosvenor Pl., Rockville MD 20852* (June 2024) ("*PPE Report*"). The *PPE Report* estimates the cost of replacement of GP III's electrical service equipment that appears relatively consistent with the costs previously

[5] PPE previously advised us that on-site solar installation was impractical because mandatory roof-mounted pedestal tiebacks reduced the potential solar panel electrical generation to less than .73% of GP III's total electric consumption. Prime Partners Engineering, *Solar Feasibility Analysis Report: Grosvenor Park III* (March 2023).

[6] All costs reported must be considered Rough Order of Magnitude, i.e. an initial estimate that is often done before a project is started; ROMs may have an accuracy of -25% to +75%, or ±50%, depending on sources.

suggested by Facility Engineering Associates as part of GP III's routine mandatory quintennial replacement reserve funding study.[7] Replacement costs are premised on the existing electrical load, below the existing capacity provided by PEPCO. Replacing the switchgear, main panelboards, and related leading wiring, is tentatively scheduled for 2025 at an expected cost estimated to be $853,000. *PPE Report*, 23 – 25.[8] A more refined estimate by a major electrical contractor is underway.

The *PPE Report* suggests that each switchgear replacement is expected to require seven to 28 days and displacement from GP III from 10 days to four weeks – a period when units served by that switchgear would be without electricity. *PPE Report*, 55 – 56. As these units would not be habitable, and using the mean displacement time, lowest available hotelry costs in Montgomery County, and Montgomery County's reimbursement rates for meals and incidental expenses, GP III expects that its residents may expend $2,833,000 during this period of displacement.[9] In total, GP III expects replacement to cost $3,686,000.

The *PPE Report* concludes that GP III has *limited* capacity to expand environmentally significant programs – GP III consumes approximately 81% of the capacity provided by PEPCO. Sufficient capacity exists for us to convert the common laundry room gas dryers to electric dryers ($40,500), and step-wise install some additional Level II EV chargers

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[7] GP III has for many years routinely conducted what are now mandatory 5-year replacement reserve studies. See Md. Code Ann., Real Property Art., § 11-109.4; e.g., Facility Engineering Associates, P.C., *Final Report: Condition, Assessment and Reserve Study, Grosvenor Park III Condominium* (FEA Project #RO1.2019.009440, March 18, 2020). The Maryland Condominium Act specifically distinguishes between reserves and capital expenditures in the requirements for the preparation of an annual budget. *Id.*, § 11-109.2(b). Moreover, "the reserves provided for in the annual budget … for a residential condominium shall be the funding amount recommended in the most recent reserve study completed under § 11-109.4 of this title." *Id.* § 11.109.2(c)(1). According to the Community Association Institute (CAI), *National Reserve Study Standards* (NRSS) (Rev. Nov. 30, 2016), a "reserve study" is defined as:

> A budget planning tool which identifies the components that the association is responsible to maintain or replace, the current status of the reserve fund, and a stable and equitable funding plan to offset the anticipated future major common area expenditures. The reserve study consists of two parts: the physical analysis and the financial analysis.

NRSS at 5. It follows that a component must exist and have both a limited useful life expectancy (UL) and a predictable remaining useful life (RUL).

[8] The current replacement cost assumes that the Montgomery County Department of Permitting Services (DPS) will permit replacement (even with a larger single switchboard) to be performed on an electrician's trade permit and not require stamped design drawings, specific permits, and inspections. Further, replacement assumes that DPS will not require GP III to completely replace the internal distribution system and unit circuit breaker boxes, and bring the entire system up to full compliance with the current electrical code. *If*, based on previous related studies, full replacement and upgrade is required, GP III projects a distribution system replacement cost (*at its current electrical capacity*) of an additional $2,230,000, and an additional displacement of approximately five days per riser at an expenditure by residents of approximately $710,000. Thus, if DPS requires full replacement and currency, the total costs rise to approximately $6,626,000, plus the cost of stamped design drawings, specific permits, and inspections.

[9] For these types of calculations, GP III uses (a) the median time (19 days), (b) the minimum expectable costs of lodging in Montgomery County ($100 / day), and (c) Montgomery County's own reimbursement rate system for meals and incidental expenses (United States General Services Administration rates (September 2024): DC SMSA: $261 / day).

($90,000)[10] – actions that GP III will consider. *PPE Report*, 31 – 36. These projects will require that GP III upgrade one main switchboard rather than merely replace it, but that upgrade may not be an increased cost or may be a marginal cost for what GP III considers to be a significant benefit. Thus, GP III is already considering budgeting about $130,000 from operating funds to further environmental stewardship over the next few years with these two projects.[11] Those two changes, *PPE Report* advised, would largely consume GP III's current available power.

ROM ESE Replacement and New Projects Exhausting Capacity	
ESE Replacement "As Is"	$ 853,000
Resident Displacement Costs	$ 2,833,000
Electrification of Common Element Clothes Dryers	$ 40,500
Expanding Level II EV Chargers	$ 130,000
Total	$ 3,856,500

Mitigating Maryland Condominium Act Requirements – Extending Capacity

Providing capacity for the installation of even *Level I* EV Chargers in deeded parking spaces – as the Maryland Condominium Act grants owners the right to do consistent with the electrical code and reasonable architectural standards – would nominally more than *double* the existing electrical load. Such a distribution system can only be achieved with systemic power management that will limit – substantially – the number vehicles that could be charged at one time and the speed at which they could be charged. *PPE Report*, 40 – 43. In this instance, the costs become significant – estimated to total $603,000 to provide the distribution system and bare-bone charging stations, *without PEPCO's charges for increasing its power supply, cost of load management, or safety equipment currently being considered for inclusion in consensus electrical, fire, life safety, and parking structure codes by the National Fire Protection Association.*

Electrifying Cooking to Reduce Natural Gas Usage

Converting GP III's 416 natural gas ranges to electric would trigger a major electrical design retrofit of GP III's distribution system to distribute an additional 1,713.8 kW at a cost to GP III of more than $2,729,000 in addition to replacing the existing ESE. *PPE Report*, 45, 48. The depreciation, removal, and disposal of gas ranges, the purchase of replacement ranges, and the displacement of residents (at a minimum of five days per circuit using the same metrics discussed above) would collectively cost the individuals more than $1,723,000. In short, the base cost of converting gas ranges to electric ranges would subtotal at least $4,452,000, exclusive of stamped design drawings, over 400 permits and

[10] Assuming some continuity in costs, GP III could potentially install up to five additional Level II EV Chargers for approximately $89,000, without incentives. GP III believes that, ultimately, the expenditure would be justified and repaid by users. GP III may do so as demand warrants – the current Level II EV charger is not yet fully subscribed.

[11] GP III does not question that DPS will require stamped design drawings, permits, and inspections for these changes at some unknown cost.

inspections, and any unforeseen expense. Nor can GP III be sure – and seriously doubts – that a new distribution system for the projected load could be built into the existing busways consistent with electrical code requirements for cable separation; if not, GP III would be required to alter the legal boundaries of condominium units recorded in the land records of the Circuit Court under the Maryland Condominium Act.

Electrifying Gas-Fired Boilers for Heating and Domestic Hot Water

Converting GP III's natural gas boilers with an electric boiler system sufficient to comply with health regulations is physically impossible if for no other reason than the inability to expand the physical space of GP III's boiler room. The boilers rate 25,106,000 BTU/H or 7.357 MW. It may be possible to replace the gas boilers with a combination of electric boilers, heat pumps, storage tanks, and other devices, but GP III caution that the costs of such a system are themselves prohibitive. Decentralization would simply require gutting the building to install a completely new plumbing system with individual water heaters and electrical distribution system, and remove more than 1,400 convectors, penetrate and reseal the brick curtain and interior walls, install completely new wiring in every unit, and install nearly 1,200 through-the-wall heat pumps; this cost is simply not fathomable.

Unitizing Electric Metering

Finally, if forced to make *all of these conversions*, it may make sense to submeter electricity and require the individual residents to pay for their electrical use – a change that has been proved to reduce consumption. The cost of that conversion, however, ranges from $624,000 for unit circuit breaker box meters that PEPCO will *not* accept for billing purposes, plus the cost of software and internal GP III sub-billing, to $1,974,000 for meter stacks that PEPCO will accept as its billing point, but that will still not reflect individual usage, but only tier usage. PPE Report, 25 – 29. PPE states substantial limitations on these, and all other costs, and, despite expected lower energy use intensity, the return on investment and benefit / cost ratio are doubtful.

Utility Distribution Costs for Enhancements

If, as discussed above, BEPS implementation of the Climate Action Plan requires the conversion of gas ranges to electric ranges, the cost of upgrading PEPCO's distribution system to provide that power must be factored. As noted above, GP III benefits from two feeders set in spot network – if one feeder, for any reason, goes down, the other feeder can supply power. To continue that benefit, the *PPE Report* projects that PEPCO would seek approximately $2,173,000 for upgrades, not including GP III's onsite costs of approximately $1,312,000, or a total cost of over $3,485,000. *PPE Report*, 51.

If, on the other hand, GP III would reduce its reliability by eliminating one of PEPCO's feeders and accept a lone radial supply system, *PPE Report* suggests that PEPCO would seek approximately $92,000 from GP III and GP III's on-site costs would be approximately $749,000, or a total of $841,000. *PPE Report*, 52 – 53. The downside of this reduction to a radial system is simple: if PEPCO's single feeder goes down for any reason, GP III loses power and its emergency generator must energize limited mandatory systems.

ROM Existing Replacement and Minimal New Demands	
ESE Replacement "As Is"	$ 853,000
Resident Displacement Costs	$ 2,833,000
Electrification of Common Element Clothes Dryers	$ 40,500
Expanding Level II EV Chargers	$ 130,000
Subtotal	$ 3,856,500
Mitigating Maryland Condominium Act Rights for Level I EV Chargers in Garages (without future NFPA required safety equipment)	$ 603,000
Electric Distribution System for Cooking Appliances	$ 2,729,000
Unknown Cost of Stamped Drawings, Permits & Inspections	?
Resident Displacement Costs	$ 1,723,000
Converting Heat & Hot Water Boilers	?
Unknown Cost of Stamped Drawings, Permits & Inspections	?
Resident Displacement Costs	?
Internal Usage Meters (without cost of data, programing or accounting)	$ 624,000
Minimum PEPCO Charges for *Less Reliable Radial* Feeder Upgrade	$ 841,000
Total	$ 10,376,500????
Minimum PEPCO Charges for *More Reliable Network* Feeder Upgrade	$ 3,485,000
Total	$ 13,020,500????

GP III's Position on BEPS

To summarize: GP III has tried to be environmentally conscientious. BEPS, however, imposes requirements based solely on the environmental premise, without regard to the effect BEPS will have on equally fundamental issues such as the economy and moderately priced housing. If Montgomery County or the State of Maryland insists only that GP III replace all gas ranges with electric ranges, GP III continues expected environmental project stewardship, and GP III accepts minimal PEPCO assurance of the reliability of a single radial feeder, the *bare minimum Rough Order of Magnitude with significant unaccounted costs* would exceed $10,000,000. The known *highly subsidized* experience from the Hampshire Tower Apartments and Takoma Overlook Condominium gives us great pause in considering the accuracy of this rough order of magnitude cost – GP III expects the high end of the range at $15,000,000 to be woefully low.

Condominium Financing

GP III should note also certain financial limitations created by the Maryland Condominium Act. The MCA requires (partly because of the Champlain Towers South Condominium, Surfside, Florida, collapse that cost 98 lives) that GP III and all Maryland condominiums conduct a quintennial replacement reserve study and then fund reserves to provide a basis for major systems replacement. GP III has done so for many years and has, for example, fully funded its reserves, including setting aside funds to replace the Scotch-

Marine boilers when they reach the theoretical end of their analytical useful life in 2053. This is the normal method and risk of funding replacement.

A condominium must fund the additional costs of such requirements as BEPS in one of two ways: direct special assessment of the unit owners according to their percentage interest in ownership over a very limited period of time, or borrowing funds, with additional service costs, to be repaid over a longer period of time through regular monthly assessments. In the former instance, yearly assessments will be very high; in the latter instance the condominium must fund loan service and the replacement of those systems *at the same time* – in effect, paying twice for the same system. GP III appreciates the efforts of the Montgomery County Greenbank in securing low-cost financing, but principal repayment alone will likely be more than double the expense of mandatory reserves.

All of this must be paid according to the percentage interest of ownership, whether the individual is well-off, or getting by, working, or retired, or on disability. In some cases, special assessments or increased regular condominium fees may cause some to lose their homes. A condominium has no ability to mitigate that result.

Non-Electrifying Environmental Priorities

Electrifying for BEPS purposes may additionally hamper the timing and financing of other environmental projects. GP III tentatively plans to replace of more than 1,200 double and triple window sets and 230 glass balcony doors with, hopefully, Energy Star® triple-pane windows and doors over three years beginning in 2026. Tentatively budgeted outlays are expected to rise dramatically with the 2025 quintennial replacement reserve study accounting for inflation, which is already underway. GP III may be forced to make environmentally insensitive financial decisions without greater certainty on BEPS requirements and financing.

Other Unavoidable Issues

Nor is this the only issue pending that could cause significant dislocation in moderately priced housing. As you know, the State Fire Prevention Commission declared all non-sprinklered high-rise residential buildings to be "inimicable hazards," triggering a requirement that such buildings be retrofitted with automatic sprinkler systems, possibly by January 1, 2033. The Acting Fire Marshal, earlier this year, based on advice of counsel, determined that the Commission's action did not comply with the procedural requirements set forth in Maryland's Administrative Procedure Act, and, therefore, "will not be enforced." This does not mean that any other authority having jurisdiction cannot require sprinklers. The multiple caveats in the Acting Fire Marshal's memorandum leave much uncertainty and costly sprinkler systems remain a Damoclean sword over many high-rise residences.[12]

These are all immediate issues as GP III contemplates the steps needed to replace the existing electrical service equipment in the next few years – (a) replacement *as is* could require replacement again before BEPS takes effect, or (b) replacement in a size sufficient

[12] GP III contracted with a fire engineering firm to determine the (a) cost of determining the (b) cost of determining the (c) cost of an NFPA 13-compliant sprinkler system, or alternative acceptable to the Fire Marshal, at a cost of $18,000. Their "back of the envelope" estimate for a compliant sprinkler system is up to $12,000,000.

to carry all projected electrification loads that could be too large and waste copper, labor, and scarce funding. BEPS, like some other well-intended priorities, should not impoverish the middle class.

Partial Solutions

BEPS is clearly too stringent in its current, arbitrary, numerical form in light of other constraints. All condominiums and cooperatives need better, more refined guidance on what regulatory requirements will be imposed. Accordingly, Montgomery County should consider several, at least partial, solutions by amending BEPS to:

- Create a good faith safe harbor for those properties that have taken *reasonable* steps to reduce their energy use intensity and electrify;
- Create a clear formula for how much EUI reduction / cost / the number of individuals required to pay that cost = a financial hardship;
- Specify that existing systems need not be replaced before the expected end of their useful lives and a reasonable extension if well-maintained;
- Exempt gas ranges, ovens, and cook tops from the BEPS calculus and do not require electrification replacement of cooking appliances; and
- Provide financial support from tax resources, without means testing, to even out the burden of BEPS.

In terms of electrification and the expansion of the power distribution system, Montgomery County should support decisions by the Maryland Public Service Commission to require electric utilities to:

- Finance regulatory-mandated increases in distribution systems, such as BEPS, through the rate base, not the individual customer; and
- Calculate distribution loads on the actual expected load created by a change and eliminate arbitrary assumptions (e.g., 'every electric range is accompanied by an electric dryer').

In conclusion, BEPS inflexibility may cause the owners to terminate[13] some moderately-priced condominium regimes and sell the entirety of the property for demolition and redevelopment. GP III is well-financed because it is carefully managed in an environmentally conscientious and forward-looking manner. GP III does not wish to find the economic inflection point for termination of the condominium regime, but an arbitrary EUI or ungranular BEPS may cause its occurrence. Failure is an option, and not meeting Montgomery County's arbitrary "37" may result in simply punishing the impossible.

[13] Maryland Code Ann., Real Property Art., § 11-123.

June 27, 2024

Dear Members of the Transportation and Environment Committee,

Grosvenor Park III Condominium (GP III) strongly supports the goals and objectives of Montgomery County's Building Energy Performance Standards (BEPS). We have concluded, however, after careful study and with regret, that the proposed numerical standards are premature and could be so costly that even well-managed older condominiums may be driven into closure. We ask that the County adopt an approach to protecting our environment that does not impair other policy priorities, such as providing affordable housing, and that does not place an undue financial burden on County residents living in legacy buildings.

GP III, a high-rise condominium community of 413 units, provides moderately priced homes to more than 600 individuals with a wide range of financial capacity, including some who are well off, but also many working families, retirees, students, veterans, and some receiving public support. Built in 1966, GP III is typical of many Montgomery County high-rise multifamily buildings of that era; it has limited electrical capacity and relies on natural gas for heat, hot water, and cooking.

An environmentally conscientious community, in 2023, GP III reported a 2022 normalized site EUI of 52.4 and ranked in the 89th percentile for energy efficiency among all multifamily residential buildings rated in EPA data. Current Montgomery County targets would require GP III to achieve an EUI reduction of 15.4, for -30% by December 31, 2035. This has the unintended consequence of penalizing environmentally active communities such as ours by leaving them with only back-breakingly expensive projects remaining as possible ways to lower energy usage further. Since we have already implemented a number of recommended energy reduction measures, we recently contracted with Prime Partners Engineering to conduct studies, funded in part by Montgomery County Green Bank, to determine the feasibility of the more drastic measures needed to achieve significant further reductions in energy use. The PPE Report concludes that GP III has limited ability to take additional environmentally significant measures, given its current electrical capacity and the astronomical cost of increasing that capacity. Depending on the nature and extent of how we would reconfigure our electrical services, PPE estimates costs between $4.8 to $7.4 million *at a minimum*, and even then, the building would not be in compliance with all aspects of the County and the State's requirements. In addition, the overhaul of our electrical systems would require that residents vacate the building for an estimated period ranging from 10 days to 4 weeks. (Please see attached review of background information including a summary of the PPE report and the full report for more information.)

BEPS is clearly too stringent in its current, arbitrary, numerical form in light of other constraints buildings such as ours face. We, and many others, need better, more refined guidance on what regulatory requirements will be imposed. Accordingly, we ask you to consider several, at least partial, solutions by amending BEPS to:

- Create a good faith safe harbor for those properties that have taken reasonable steps to reduce their energy use intensity and electrify where feasible;
- Create a clear formula for how financial hardship will be calculated when determining exemptions from EUI reduction requirements;

- Specify that existing systems need not be replaced before the expected end of their useful lives and a reasonable extension if those systems have been well-maintained;
- Exempt gas ranges, ovens, and cook tops from the BEPS calculus and do not require electrification replacement of cooking appliances; and
- Provide financial support from tax resources, without means testing, to even out the burden of BEPS.

In terms of electrification and the expansion of the power distribution system, we ask you to support decisions by the Maryland Public Service Commission to require electric utilities to:

- Finance regulatory-mandated increases in distribution systems, such as BEPS, through the rate base, not the individual customer;
- Calculate distribution loads on the actual expected load created by a change and eliminate arbitrary assumptions (e.g., 'every electric range is accompanied by an electric dryer').

In conclusion, BEPS inflexibility would impose a significant financial burden on condominiums that now provide affordable housing for many Montgomery County residents and may even cause the owners to terminate moderately priced condominiums, thereby reducing the stock of affordable units in the area. GP III is well-financed because it is carefully managed in an environmentally conscientious and forward-looking manner. Still, these requirements would pose an existential threat to our survival as a condominium community.

We would appreciate the opportunity to discuss these issues with you at your earliest convenience.

Sincerely,

Jeanne Anderegg

President, Grosvenor Park III Condominium Association Board of Directors

July 15, 2024

Joseph V Bucherer
4601 N Park Ave Apt 1715
Chevy Chase, MD. 20815

Re: July 15 Transportation & Environment (T&E) Committee Meeting on Building Energy Performance Standards (BEPS) – presented summary

I am before you as the President of the Elizabeth Condominium Association. I also serve as the Chair of the Village of Friendship Heights Community Advisory Committee. My comments are both specific to my building as well as the adjoining high-rise buildings in the Village, and I suggest others. I have already submitted notes on this topic. I will not deal with legal or overly technical details – rather I prefer to talk about the reality of condominium associations. There is a benefit to our plans to update our infrastructure for efficiency.

I hope that there will be some reconsideration of the process and guidelines regarding the final form of the energy efficiency standards, as well as an understanding of the considerable cost to owners of condominiums approaching 50 years of age.

In condominiums, we do not have the ability to turn on initiatives with a few years to go, nor do we can raise large sums of money. Everything we do must follow a process based on bylaws and state and county statute. Each association is different, some just do not have the electrical capacity to fully electrify. Some use gas to fire boilers – there simply is no alternative given the size of the structures and the existing area. Some have different governing documents that restrict what can be done. In the Elizabeth, there are 362 residential doors along with a commercial zone. Under the guidelines our energy consumption would be equal to a 20-door building completed in 2020. Add to this the fact that as a condominium where electricity, heat, and hot water are common elements, the opportunity to control and sub-meter is not possible. We should also add the inconsistency between the county and state on this topic.

Consideration needs to be provided for age, construction merits, size, and our governing documents which are mandated by state and county law.

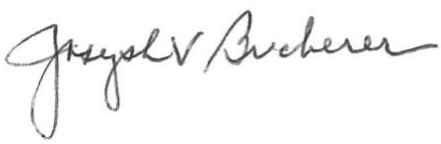
We are required by statute and our by-laws to provide for the regular maintenance and upgrade of our structure and operating systems. We currently

have a 30-year reserve study that we fund with planned upgrades for elevators, boilers, electrical panels, and other items. These are funded by fees paid by Association Members (owners). These projects, which cost in the millions of dollars, are planned for over long periods. The regulation would add in a very short period another burden on owners, and renters as higher fees or special assessment costs would be passed along. For many, this would make living in buildings like ours unaffordable.

Things like rebates, tax credits, and subsidies are offered – however, in our structure we cannot use tax credits, we rely on cash to fund vendors – hence, we still need to raise funds to pay for these mandated programs. We need discounted access to expertise and materials.

We have used the Green Bank extensively for access to engineering support for our planning needs, and have been very pleased. We received several suggestions to update our aged infrastructure inclusive of more efficient gas-powered boilers, we do not have the capacity to fully electrify, cogeneration, and solar. As part of our reserve planning, we were already evaluating options before BEPS came along. Even despite this considerable effort which will reduce our footprint and result in lower energy costs, the current plan still has us paying a fine as we will not be able to meet the generic standards. Several engineers, provided by County access have told us we will never get to the median aspirational standard. The definition of a median is that you are planning for half to fail. From a business perspective that should raise questions about the planning and coordination thus far. Every business understands that there will be variation. We must run our associations as a business. Please reconsider the proposed guidelines, recognizing the variability in building types contained in the broad classifications provided and the needed funding support.

Respectfully,



Joseph V Bucherer
President, Elizabeth Condominium Association

July 12, 2024

Joseph V Bucherer
4601 N Park Ave Apt 1715
Chevy Chase, MD. 20815

Re: July 15 Transportation & Environment (T&E) Committee Meeting on Building Energy Performance Standards (BEPS)

Today I am before you as the President of the Elizabeth Condominium Association. I also serve as the Chair of the Village of Friendship Heights Community Advisory Committee. My comments are both specific to my building as well as the adjoining high-rise buildings in the Village.

I hope that there will be some reconsideration of the process and guidelines regarding the final form of the energy efficiency standards, as well as an understanding of the considerable cost to owners of condominiums approaching 50 years of age.

I am pleased to have heard at a recent forum led by Council Member at Large Evan Glass, that there is a reconsideration of the thresholds expected of multifamily dwellings from the initial outlines for the Energy Performance Standards. The expectations are aggressive, and it is disappointing that we are being forced to plan in an uncertain environment driven by lack of clarity, access to funding, and what appears to be lack of alignment between the County and State. The Climate Solutions Now Act of 2022 (CSNA) outlines the financial harm to organizations like those I reside in, the need to consider differences in building types versus broad classifications such as “multi-family”, structural realities of buildings, and the needed funding mechanisms to meet BEPS guidelines.

The BEPS regulation represents an all-or-none proposition without regard for the type of structure for a building. For example, the Elizabeth (which opened its doors in 1975) is a multi-use facility with both residential and commercial ownership. There are 362 residential doors. Under the guidelines our energy consumption would be equal to a 20-door building completed in 2020. Based on construction materials, insulation technology and other considerations, not to mention size, this just is not feasible. Add to this the fact that as a condominium where electricity is a common element, the opportunity to control and sub-meter is not possible.

We have used the Green Bank for access to engineering support for our planning needs, and have been very pleased. We received several suggestions to update our aged infrastructure inclusive of more efficient gas-powered boilers, we do not have the capacity to fully electrify, cogeneration, and solar. Even despite this considerable effort which will reduce our footprint and result in lower energy costs, the current plan still has us paying a fine as we will not be able to meet the generic standards.

Our building is not the only one – several others in the Village of Friendship Heights do not have the capacity to fully electrify.

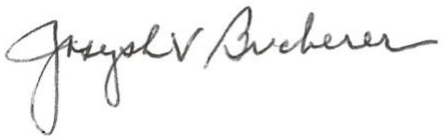
Consideration needs to be provided for age, construction merits, size, and our governing documents which are mandated by state and county law.

We are required by statute and our by-laws to provide for the regular maintenance and upgrade of our structure and operating systems. We currently have a 30-year reserve study that we fund with planned upgrades for elevators, boilers, electrical panels, and other necessary items. These are funded by fees paid by Association Members (owners). These projects, which cost in the millions of dollars, are planned for over long periods. The regulation would add in a very short period another burden on

owners, and renters as higher fees or special assessment costs would be passed along. For many, this would be unaffordable. While we have used the resources of the Green Bank, we find ourselves competing for funding in very narrow or ill-defined grant program periods. Things like rebates, tax credits, and subsidies are offered – however, in our structure we cannot use tax credits, we rely on cash to fund vendors – hence, we still need to raise funds to pay for these mandated programs.

In closing, the current guidelines are unattainable according to our consulting engineers. From a business perspective that should raise questions about the planning and coordination thus far – we have planned for failure to a degree. Please reconsider the proposed guidelines, recognizing the variability in building types contained in the broad classifications provided and the needed funding support.

Respectfully,



Joseph V Bucherer
President, Elizabeth Condominium Association

Board of Directors
Leisure World Community Corporation
3701 Rossmoor Boulevard
Silver Spring, MD 20906

7/15/24

Good morning, Chair Glass, Council members Balcombe and Council member Stewart.

I am Henry Jordan a member of the Board of Directors of the Leisure World Community Corporation. I come here today to bring to your attention several serious issues that will prevent a significant part of Leisure World from meeting the requirements of the county's proposed regulation for Building Energy Benchmarking and Performance Standards.

Leisure World is a 55+ adult private gated community in Silver Spring on 610 acres with over 5,660 individually owned residential units. These entities are governed by 29 separate associations. Each has its own bylaws, controls its own budget, and is governed by a board of directors elected by their residents.

Within Leisure World, 13 condominiums with 32 buildings with 3,432 residential units are subject to the proposed regulation. These were constructed over a fifty-year period. The average resident age in the community is 78 years old. Many are elderly and on fixed incomes. Our owners are seeking to age in place.

The community was originally built under a master meter system for electricity and gas. Currently all the recreational and the infrastructure of the community as well as 2,413 residential units are under a single Master Meter.

Leisure World supports the county's goal to address climate change, but we face several substantial impediments to meeting the proposed requirements. These challenges involve two basic issues which given the time constraints, I will briefly address.

First, nine of the 32 buildings subject to the proposed regulations are on the Master Meter system and are not sub metered. These buildings were built 46 years ago and are all electric buildings. The lack of metering prevents a determination of energy usage for each building needed for benchmarking. Installing metering in these old buildings will be expensive as the electrical infrastructure is not strait forward. The residential units and common areas in these nine buildings are all-electric. Given the design of the buildings, there is little that can be done to conserve utility utilization without major infrastructure and structural changes that will be of substantial costs to the residents.

Second, for the other 23 buildings, the age and design of the buildings result in the need for changes to upgrade their infrastructure including wiring to accommodate common area HVAC heat pumps, and purchasing equipment to replace gas furnaces, stoves, and hot water heaters. The costs will be substantial. It is not clear whether the building infrastructure wiring is

sufficiently sized to pull into the buildings the necessary increased electricity. For some of the older buildings there may be insufficient electrical supply issues.

Complicating the challenges is the fact that improvements will be necessary not only for the equipment in the common areas under the control of the condominium boards, but also for equipment in the individual units owned by the unit owners. The costs for unit owners to upgrade their heating systems and eliminate gas appliances are no different than the similar costs for single-family homes. It is an inherent unfairness to include units in high-rise buildings that are inherently more efficient due to packaging and stacking units in a single building and exempt single-unit dwellings that are exposed on all sides to the environment.

It is also noteworthy that all the 32 building condominium boards do not have the authority under current bylaws to direct individual unit owners to modify their systems and appliances. Changing bylaws require approval of unit owners who may not agree to changes that will substantially increase their costs given that unit owners are already struggling to fund reserves to meet existing obligations.

Leisure World respectively requests that the regulations be modified to provide alternatives or waivers such as:

1) Grandfathering all-electric residential buildings over 40 years old on a master meter system.

2) Limit compliance with the standards to only the common areas of condominium buildings and exempt areas owned by individual unit owners similar to stand alone residences.

3) Grandfather current HVAC and gas utilization equipment with a mandate to improve or change the equipment only when the existing units come up for replacement, assuming that the building infrastructure is able to support the new equipment.

These recommendations are more fully explained in the March 11, 2024, letter, and July 5, 2024, e-mail that Patricia Hempstead, the chair of the Leisure World Community Corporation, sent to the Committee. I thank you for your attention and would be pleased to answer your questions.

Henry Jordan
Director, Leisure World Community Corporation

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301.215.2100
info@PulseIQ.com
www.PulseIQ.com

July 15, 2024

Montgomery County Council Transportation & Environment Committee
100 Maryland Avenue, 7th Floor
Rockville, MD 20850

Re: **SUPPORT:** Bill 16-21, Environmental Sustainability - Building Energy Use Benchmarking and Performance Standards

Dear Montgomery County Council,

Councilmember Glass, members of the committee, thank you for convening this session. My name is Adam Landsman, and I am the President of PulseIQ based in Takoma Park, MD. This year, our company is providing benchmarking services to over 500 properties comprising more than 50 million square feet of real estate in both Montgomery County and Washington, DC. We are also a proud service provider with the Montgomery County Green Bank's Technical Assistance Program and we are members of the Community Associations Institute and AOBA.

Prior to leading PulseIQ I spent over ten years as a Portfolio Manager and Vice President for a leading local property management firm specializing in common ownership communities. I'm also a member of the Montgomery County Building Performance Improvement Board and the Maryland Clean Energy Center Advisory board. I have spent my entire career at the intersection of multifamily real estate and energy, and I have experienced first-hand that incentives alone are necessary but not sufficient to spur property owners to act. Mandatory, compliance-based programs like BEPS are essential.

The public policy rationale for BEPS is clear. The typical building in the US wastes one third of the energy it consumes[1]. As a nation, our buildings waste 11.4 ***quadrillion*** BTUs of energy each year[2]. To put that in perspective, if just that energy *waste* was its own country, it would be the 9th highest energy consuming nation on earth and would consume more than the bottom 128 nations on earth combined[3]. Not only can we do better, but we must.

[1] https://www.epa.gov/statelocalenergy/local-topics-energy-efficiency-non-governmental-buildings
[2] Residential and commercial buildings consume 38% of all US energy, totaling 35.6 quadrillion BTUs, https://www.eia.gov/tools/faqs/faq.php?id=86&t=1
[3] https://www.eia.gov/international/rankings/world?pa=44&u=2&f=A&v=none&y=01%2F01%2F2022

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While property owners and managers may complain about the regulatory burden of BEPS, every single property we've worked with has the potential to improve, and in the vast majority of properties, there's a cashflow positive way to do it. In other words, energy efficiency is just good business. For the rare cases of actual economic infeasibility, the County's BEPS law provides for a customized Building Performance Improvement Plan that will give even the most derelict and financially underperforming properties a workable path forward.

The journey towards energy efficiency starts with benchmarking. This exercise helps properties understand where they stand today relative to where they need to go. Having benchmarked hundreds of properties in multiple jurisdictions this year, we've found the Montgomery County DEP to be the most responsive, supportive, and, above all, reasonable regulatory agency we interact with. Our clients' data also shows that most properties are already above, or are very near to, the site EUI standards proposed by DEP. For the small percentage that are not, inaction only creates a series of negative economic and environmental externalities, but this is a problem that BEPS can solve to the benefit of the property owners, residents, and the broader community.

Lastly, I wanted to speak to the benefit of BEPS for local businesses like PulseIQ. BEPS has had a direct and positive impact on the growth of our company. We're creating local jobs and attracting smart and talented people to move to our county. We're also going to be there to support our clients for many years to come, because energy efficiency isn't a technical problem or an economic problem. It's a human problem. As we help our clients along their energy efficiency journey from benchmarking to energy audits to implementing project we expect to continue to grow for many years to come.

Thank you again for seeking input from a broad spectrum of the community. I hope that my testimony is valuable to you as policy makers and I'm always available to answer any questions you may have.

Respectfully submitted,

Adam L. Landsman, CEM, AMS, CMCA
President

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info@PulseIQ.com
www.PulseIQ.com

Testimony to the Transportation and Environment Committee Work Session on Multifamily BEPS
July 15, 2024

Good morning and thank you for this opportunity to comment. My name is Miriam Hamilton, and I'm a board member at the Promenade Towers, a 1071-unit, 51-year-old co-op in Bethesda. I am also an engineer and former professor who is perplexed by contradictory compliance goals in the regulations that complicate strategizing investments for our corporation.

Our future at the Promenade will entail significant system replacements and repairs that rely solely upon shareholder fee increases for financing, with BEPS regulations layering onto an already costly enterprise. We have adjusted our reserves planning to prioritize conserving energy as the prime factor in selecting systems for repair or replacement over time. However, to meet the 2035 and 2040 Zero Net Carbon Target, we will be compelled to replace our natural gas boiler HVAC and hot water systems with a centralized heat pump solution and our gas stoves with electric versions, and do so in a way that satisfies both current needs and future performance standards.

We observe that some county buildings have gambled on the notion that a Zero Net Carbon Target and an associated radically low site EUI standard are jointly inconsistent, and have opted instead, in the near term, to replace old boilers with new, more efficient ones. Since boilers for large buildings cost several million dollars and possess lifespans of 25 years and longer, in the event that the 2035/2040 targets hold, an even costlier investment is scheduled to appear in 11 or 16 years, at a point early in a boiler's life if purchased today. Moreover, according to AOBA's January 2024 report, HVAC replacement for an average Maryland building can cost $16/sqft, which for us would be $22M, and should we accommodate electric stoves and an electrical HVAC, we would also be required to substantially upgrade our electrical distribution system at costs that well exceed $10M with vast accompanying increases to our Site EUI. Purchasing new boilers today that must be discarded by 2035 is not a sound policy; nor is revamping a centralized HVAC today at $32M+ when the cost is currently beyond our means. We mention these contradictory BEPS regulation elements because they are simultaneously unachievable, and because unless we are willing to defy laws of physics or rely upon radical advances in technology that do not exist today, we cannot envision a clear path forward.

Note that that more reasonable Energy Efficient and the Midpoint Targets referred to on the County BEPS website exist as alternatives to a Zero Net Carbon Target. Under either of these two targets, buildings permitted to emit modest quantities of Co_2e and slightly higher EUI volumes will successfully wean themselves from natural gas while exploiting opportunities to lower EUI through commissioning and implementation of less costly ECMs such as insulating unit interiors, pipes, or windows, installing programmable thermostats and LEDs, and other measures. While we ponder this flurry of potential trajectories and options, we find ourselves engaged in games of chess with you, anticipating the next County and State moves with the faint hope that you and we have each chosen correctly.

We embrace complying with regulations to reduce GHG and overall energy consumption as the right path forward for saving the planet, and we therefore strongly urge the County to remediate inconsistencies in the law by enacting joint, workable targets that can be met by building owners. We similarly urge the Maryland Department of Energy, as part of its ongoing review process, to levy financially feasible targets with alternative compliance paths that will take the place of imposing fines, and to incorporate both into the next Maryland BEPS law.

I thank you again for the opportunity to speak this morning.

Miriam Hamilton, Ph.D.

From: JM Gingery <jmgingery@gingery.net>
Sent: Thursday, August 29, 2024 12:44 PM
Subject: Re: July 15 Transportation & Environment (T&E) Committee Meeting on Building Energy Performance Standards (BEPS)

Thursday 8/29/24

To Keith Levchenko:

For record submission please find the WSJ article of May 13th, 2024, by Deborah Acosta "New Florida Law Roils its Condo Three Years After Surfside Collapse", and please make a point of forwarding this article on to: CM Glass, Balcombe, Stewart.

WSJ is describing the collapse of sales in older condominiums and coops in Florida because of the extraordinary costs in mandated rehab due to Surfside.

While for different reasons----in Montgomery this will have the same future outcome-- for the extraordinary costs and construction chaos visited upon Condominium and Coop owners---- ALL due to County Council and Elrich signed BEPS Mandates Law.

While the circumstance is completely different and necessary in Florida for life safety, HOWEVER in Montgomery County—

This is a totally avoidable boondoggle--- which will do nothing for the environment--- save for wasteful and redundant work which is only pushing ---the now increased electrical demand back up to the Excelon/PJM Power Plants,(66% which are coal and gas burning anyway) to work overtime while competing now with extraordinary data center, EV, more heat pump and appliances, bitcoin mining, a demand not envisioned 10 years ago.

WGL Gas deconstruction and unamortized charges will still be borne by the existing ratepayers.

BEPS Mandates will COST YOUR CONSTITUENTS -MANY on fixed incomes---every bit as much in NEW special assessments--as what is happening under the Florida Mandate.

The Resale Market will have the same verdict on Montgomery Condos and Coops.

This will not be pretty.

https://www.wsj.com/real-estate/luxury-homes/florida-condo-special-assessment-law-sales-e754ab09?st=0pw4bqnu4y1bl70&reflink=article_email_share

Thank You,

Monte Gingery

September 9, 2024

Councilmember Evan Glass, Chair
Montgomery County
Transportation & Environment Committee

Dear Chair Glass,

Thank you for allowing the owners and operators of multifamily housing to present to the Council's Transportation & Environment (T&E) Committee on July 15. This letter and the companion document outline the specific changes that we are requesting to the BEPS regulations.

Key Asks:

1. Raise the multifamily housing Building Energy Performance Standard (BEPS) to a higher site energy use intensity (EUI).
2. Expand definition of under-resourced properties to include multifamily housing.
3. Modify the regulatory definition of "cost effective" to reflect owner costs and savings instead of property-level costs and savings.
4. Expand cost considerations associated with BEPS to include financing costs.
5. Modify the renewable energy allowance to allow for offsite renewables.
6. Provide additional clarification around Building Performance Improvement Plans.
7. Limit the information provided via BPIP covenants to only include essential information.
8. Expand the Energy Efficient Buildings Property Tax Credit.

Suggested language changes to existing BEPS regulations are included in Appendix I of this document, and Appendix II contains additional supplemental information.

Raise the multifamily housing Building Energy Performance Standard (BEPS) to a higher site EUI

Multifamily housing has numerous financial and logistical challenges associated with meeting BEPS. These financial and logistical challenges present a twofold challenge; not only do they need significant financial support, especially in the case of naturally occurring affordable housing, but they also need some measure of technical relief. Financial accommodations are discussed elsewhere in this document.

Another method to further ease the burden on multifamily housing is to raise the site EUI target for multifamily housing. The BEPS Technical Report produced by Department of the Environment detailed a few different, generic types of targets: Zero Net Carbon (ZNC), Energy Efficiency (EE), and a midpoint between the two (EE+ZNC). The EE+ZNC midpoint represents a compromise between the more aggressive ZNC target and less aggressive EE target. At a minimum, we believe that the site EUI target should be raised from the ZNC target (37) to the EE+ZNC midpoint (43). We note that the Building Performance Improvement Board (BPIB) also highlighted this issue, with a majority of the 15 members recommending either the EE+ZNC midpoint or the EE target for multifamily buildings. See discussions on pages 10-12 of the BPIB Recommendations on Building Energy Performance Standards Regulations for additional context.

Expand the definition of under-resourced properties to include multifamily housing

The regulations classify condominiums as "under resourced buildings," which gives them shorter timeframes to demonstrate economic infeasibility. In recognition of the impact that BEPS compliance will have on housing affordability at all levels, all housing should be classified as under resourced. Short of this, naturally occurring affordable housing (NOAH) should be designated as under resourced. NOAH properties can be defined as those where 50% or more of the rents are affordable to tenants making 80% of area median income. This would align with the state's definition of affordable housing in the state BEPS regulations and tracks with how Washington, DC treated affordable housing as part of the Affordable Housing Retrofit Accelerator program.

Changes 1 and 5 in Appendix I are related to this item.

Modify the regulatory definition of "cost effective" to reflect owner costs and savings instead of property-level costs and savings

This is a small but meaningful change that will benefit directly metered properties. Property owners are responsible for identifying, funding, managing, and successfully installing upgrades at a property to meet BEPS. When a property owner identifies cost-effective measures to implement, they look at their capital outlays compared to their potential benefits—e.g., *their* potential utility savings, which may not be the same as the *building-level* utility savings. This is particularly relevant in the case of direct metered properties. Direct metering is where specific tenants (whether residential or commercial) are directly billed for their utilities. This is very common with electricity and happens sometimes with natural gas.

Direct metering presents a scenario where owners may provide capital for projects but not realize financial benefits. Again, this is simply a function of the building metering configuration and is common across many types of building stock.

in the case of direct metered properties. modifying the cost-effectiveness component of the regulation to look at owner costs and savings aligns the regulation with how owners look at cost-effectiveness. Since property owners have either limited or no control over tenant behaviors after a measure has been installed, this change also reflects how an owner would consider measure impact as part of their bottom line.

Change 2 in Appendix I is related to this item.

Expand Cost Considerations associated with BEPS to include the impact of the availability of money

Ultimately, implementing measures to meet BEPS requires owners to perform financial analysis and spend money. While the Building Performance Improvement Plan (BPIP) method of meeting the BEPS recognizes this reality, revising some of the definitions within the legislation helps better outline financial impacts.

Modifying the definition of economic infeasibility also helps better illustrate availability of funding. In short, large projects often require building owners to pursue loans. Since loans taken out to meet BEPS would be loans a building owner wouldn't undertake otherwise, including the additional interest payments in the model used to determine BEPS economic infeasibility aligns with the financial implications of BEPS. In practice, this also aligns with how building owners would evaluate the financial outlay for the project(s) required to meet BEPS.

We recognize that because the mechanic used to evaluate economic infeasibility is a relatively simple one (simple payback, which doesn't typically include inflation or other annualized payments), the simplest method to determine the impact of interest payments on BEPS economic infeasibility is to take the total cost of interest divided by the lifespan of the loan. We're open to other methods of incorporating interest, but we'd want to discuss these changes.

Lastly, using a lifespan of 25 years for an Energy Improvement Measure Package simply exceeds the typical equipment lifespan of most new equipment. Adjusting this definition to the expected lifespan of the equipment better reflects this reality.

Change 3 in Appendix I is related to this item.

Provide additional clarifications around Building Performance Improvement Plans

The BEPS legislation helps properties out by allowing Building Performance Improvement Plans. This is a useful compliance mechanic, if not particularly well understood at this time. We understand that messaging and administrative guidance is still forthcoming from the Department of Environmental Protection (DEP). However, there are a handful of modifications to the BPIP regulatory process that would allow for additional flexibility and transparency around the BPIP process. Background is contained in Appendix II of this document.

Changes 4, 6, 8, 9, 10, 11, 12, 13, 14, and 15 in Appendix I are related to this item.

Limit the information provided via BPIP covenants to only include essential information

Current BEPS regulations require the entirety of a Building Performance Improvement Plan (BPIP), once approved, to be included in a covenant. The BPIP in its entirety is a complex, highly technical document that includes not only deep technical detail but also financial information, including potentially sensitive information like available owner capital, obtainable interest rates, and technical information on the building.

While owners will need to know that a BPIP is in effect at a property when making purchasing decisions, they do not need to know the entirety of the BPIP. Some information (like the available capital of the current owner) is not relevant. Other information (like obtainable interest rates) could potentially be used to create competitive advantages. Still other information (like technical details) would naturally be obtained during due diligence processes.

Hence, a natural midpoint between these two methods looks like providing an abbreviated version of the BPIP within the covenant. This should include basic information like the measures agreed to within the BPIP, a schedule of upgrades, and expected financial outlay. This satisfies the intent of having the BPIP stored within the covenant without exposing additional details.

One caveat to keep in mind: when transferring property ownership, schedules in the previously approved BPIP are likely to change, as the new ownership may have different schedule and capital needs and requirements. BPIPs should have flexibility to be modified according to the new owner's schedules—e.g., if the old owner has a different fiscal year than the new owner, that would naturally create a change in BPIP schedules. This also allows for owners to potentially change approaches to meeting the BEPS if they are so inclined. Depending on when this property transfer occurs (e.g., if it occurs before an interim or final deadline), this could also necessitate an extension while the new plan is developed.

Changes 8, 11, 16, and 18 in Appendix I are related to this item.

Modify the renewable energy allowance to allow for offsite renewables

The renewable energy allowance is both an innovative way to help the County reach its energy goals and a smart way for the County to directly influence the adoption of clean energy. The renewable energy allowance (REA) as written can be used by buildings that have plenty of roof space or parking lots with solar exposure. It is even flexible enough to address large solar installations in direct metered properties through the use of net energy. Unfortunately, not every building in the County can take advantage of the REA.

Some buildings do not have great solar exposure—maybe they're surrounded by larger buildings, for example. These buildings, even if they wanted to pursue the REA as a way of meeting BEPS, are effectively limited from using the REA.

Other properties, such as high-rises and properties with minimal above-ground parking, suffer from a lack of potential square footage for renewables. Simply put, a lot of buildings have equipment already on the roof. That

equipment requires access for everyday tasks like maintenance. High-rises in particular tend to have larger equipment than other types of properties—bigger buildings, bigger equipment. High-rises are *also* some of the largest absolute energy users in the County, so even if a property owner wanted to install solar to offset all their electricity use, realistically they'd have to pursue an offsite solution if they wanted to fully offset their electricity use.

Canopy-mounted PV in parking lots can help with this in some cases (for example, Case Study 9 in the BEPS Technical Analysis Report points to this as a solution). However, canopy-mounted PV in a parking lot requires a parking lot, which not all buildings have, particularly high-rises.

Expanding the REA to include offsite renewable procurement helps increase renewable demand in the region, encourages the use of renewables, and helps bring the County in line with how the federal government defines a zero-emission building.

Change 7 in Appendix I is related to this item.

Expand the Energy Efficient Buildings Property Tax Credit

As written, the Energy-Efficient Buildings Property Tax Credit (Tier 1) is based upon improvements in ENERGY STAR rating. While this metric is useful, the advent of Building Energy Performance Standards (BEPS) highlights the need to expand this credit for additional flexibility. BEPS uses net normalized site EUI as its evaluation metric, which is not the same as ENERGY STAR rating. BEPS also frequently requires properties to undertake deep energy retrofit projects that require significant financial outlay. On their own, these projects may not be financially viable for owners. One of the levers Montgomery County has to encourage these sorts of upgrades is through expanding the Energy Efficient Buildings Property Tax Credit to incentivize these sorts of deep energy retrofits.

ENERGY STAR is, unfortunately, not necessarily always the best metric for these sorts of projects. ENERGY STAR Portfolio Manager derives ENERGY STAR ratings from source energy use intensity—that is, the energy used to generate, transmit, and distribute the energy that's used at a site. Certain types of deep energy retrofit projects—namely, electrification—convert gas-fired equipment to electrically-fired equipment. These types of projects typically drastically reduce site EUI; however, they tend to have minimal impacts on source EUI and thus minimal impact on ENERGY STAR scores. This results in a somewhat counterintuitive conclusion: projects and building owners looking to lead the market with electrification projects can't realize any savings from the Energy Efficient Buildings Property Tax Credit as constructed.

Fortunately, this is easily rectified by adding a section to the Energy Efficient Buildings Property Tax Credit based on site EUI. We're also recommending adding a "booster" multiplier to encourage properties to further meet BEPS.

In addition, increasing the cap on existing building tax credits will further spur deeper retrofits, which in turn helps improve project financials at an owner level. This speaks directly to the County's desire to incentivize deep retrofit efficiency work.

AOBA will be happy to discuss specific language at a later date.

Brian Anleu, AOBA
Luke Lanciano, The Tower Companies
Gunnar Gingery, Commodore Management
Miriam Hamilton, The Promenade
Beryl Blecher, The Willoughby
Lawrence Bernard, The Willoughby

CC: County Council
Department of Environmental Protection

Appendix I: Proposed Changes to BEPS Regulation Language (see here for the current proposed regulation):

Additions in italics, changed language in strikethrough.

1. Add a new section, 18A.43A.01.02.A, Affordable Housing:
    a. *Affordable Housing means multifamily housing properties of 5 or more units where at least 50% of housing units are at or below the affordability threshold for dwelling occupants making incomes of 80% or less of area median income.*
2. Revise Section 18A.43A.01.02.C to the following:
    Cost-effective energy improvement measures means a package of energy improvement measures that are economically feasible *based on owner-realized costs and savings.*
3. Revise Section 18A.43A.01.02.D to the following:
    Economic infeasibility means:
        i. circumstances in which the simple payback of the energy improvement measure package required to meet the interim or final standard is more than ~~25 years~~ *the lifespan of new equipment contained within the energy improvement measure package*, after considering all possible incentives, ~~and~~ including avoided penalties, *any projected interest payments on loans the building owner may acquire in order to implement the energy measure improvement package, converted to an estimated annual outlay, and other financial requirements* defined in program guidance at the time of building performance improvement plan submission;
        ii. for under-resourced buildings, circumstances in which the simple payback of the energy improvement measure package required to meet the interim or final standard is more than 10 years, after considering all possible incentives, ~~and~~ including avoided penalties, *any projected interest payments on loans the building owner may acquire in order to implement the energy measure improvement package, converted to an estimated annual outlay , normalized to an estimated annual outlay, and other financial requirements* defined in program guidance at the time of building performance improvement plan submission.
4. Add a new section, 18A.43A.01.02.F, Energy Improvement Measure Package:
    Energy Improvement Measure Package means a combination of energy improvement measures that a property chooses to undertake for the purposes of meeting the Building Energy Performance Standard for its building.
5. Revise Section 18A.43A.01.02.R to the following:
    a. Under resourced building means a multifamily ~~qualified affordable~~ housing building, a common-ownership community, a non-profit owned building, or a local small business owned building.
6. Revise the title of 18A.43A.01.07.
    Demonstration of Compliance – *Interim and Final Performance Standards*

7. Add the following section, Section D, to 18A.43A.01.08.

   Owners of covered buildings are allowed to purchase renewable energy generated offsite. Owners will be required to provide proof that the renewable energy provided to the property complies with renewable energy definitions from the Department of Energy's definition of a Zero Emissions Building or equivalent(s) to be determined by the Department of Environmental Protection.

8. Insert a new paragraph at 18A.43A.01.10.D:

   The building performance improvement plan must include an Executive Summary that describes the high-level goals of the BPIP, a schedule of when these goals will be reached, and the expected total financial outlay required to complete the plan.

9. Revise 18A.43A.01.10.D (or 18A.43A.01.10.E, as noted above) to the following:

   The plan must acknowledge, on a form approved by the Director, that *in order for the accepted Building Performance Improvement Plan to meet* ~~an accepted building performance improvement plan does not guarantee compliance~~ ~~with~~ County ~~or State~~ building energy performance standards*, the measures of the plan shall be executed according to the schedule. The owner must notify the Director if schedules identified within the Building Performance Improvement Plan change. Should this happen, the Director may request revisions to the Building Performance Improvement Plan, which then follows the process outlined in 18A.43A.01.11.B*.

10. Revise 18A.43A.01.11.B to the following:

    The Director may require that additional *energy improvement* measures be assessed *and added to the building improvement plan if determined to be cost-effective or* additional *financial or schedule* documentation be provided~~, or that additional energy performance improvements be included in the plan~~. The building owner may then submit an updated building performance improvement plan that addresses the Director's requirements for review. *Following the receipt of the updated building performance improvement plan, the Director may request revisions to meet the intent of the original request but may not require additional measures or documentation to be provided.*

11. Revise section 18A.43A.01.11.C to the following:

    If, after consulting with the Building Performance Improvement Board, the Director approves the building performance improvement plan, the owner must record the *Executive Summary of the* building performance improvement plan as a covenant in the County land records and deliver a certified copy of the recorded *building performance improvement* plan to the Department.

12. Revise section 18A.43A.01.11.D to the following:

    If the Director does not approve the plan, the Director must provide the applicant with a written summary of the grounds for denying the building performance improvement plan and the covered building must *either submit a new building performance improvement plan that satisfies the Director's written conditions as described in 18A.43A.01.11.B or* satisfy the applicable interim or final standard or be considered noncompliant.

13. Revise the title of 18A.43A.01.12.

    Demonstration of Compliance – *Building Performance Improvement Plans*

14. Revise section 18A.43A.01.12.A to the following:

    After the Director receives the certified copy of the recorded plan, the covered building will be deemed to be in compliance with the applicable interim or final performance standards~~.~~ as long as the owner fulfills the terms of the building performance improvement plan ~~within the timeline specified in the plan~~.

15. Revise section 18A.43A.01.12.B to the following:

    Building owners must demonstrate fulfilment of the terms of the building performance improvement plan by reporting annually on June 1 of *the progress of the building improvement plan* ~~energy improvement measures implemented~~ in the previous calendar year in a form approved by the Director.

16. Add a new section 18A.43A.01.12.F:

    If a change in building ownership occurs at a building where a building performance improvement plan is in effect, the new building ownership may notify the Director of the intent to submit a revised building performance improvement plan to the Director no later than 90 days following the change in ownership.

17. Revise Section 18A.43A.01.13.C to the following:

    affordable housing refinancing *or low-income housing tax credit availability* timelines that do not align with interim or final performance standard dates; or

18. Add a new section 18A.43A.01.13.E:

    A change in building ownership has occurred and the new building ownership has notified the Director of the intent to submit a revised building performance improvement plan.

Appendix II: Additional Supplemental Information on BPIPs and Notes on AOBA's Review of Montgomery County Multifamily Energy Data

Energy Improvement Measure Package

We want to add a definition of Energy Improvement Measure Package, which is described in the text but not defined. Energy Improvement Measure Package should be defined as a combination of energy improvement measures that a property owner chooses to undertake for the purposes of meeting the Building Energy Performance Standard for its building.

Although simple on its own, this ties into other definitions of cost-effectiveness described elsewhere in this letter and reflects the reality that often, owners combine measures with strong financial payback with measures that have less financial payback. It also offers owners the ability to remove measures that may not meet their cost-effectiveness thresholds, which in turns represents the reasonable next step from a conventional energy audit: owners select a combination of measures from the audit, representing the Energy Improvement Measure Package.

Energy Improvement Measure Packages are only applicable when considering a BPIP.

Clearer headings

Simply put, two different sections of the regulation are titled "Demonstration of Compliance". The text obviously refers to two different methods of compliance. Changing the headings better communications that there are two different ways to demonstrate compliance, including a BPIP, making messaging clearer for everyone.

BPIP development and communication

BPIP technical content is not well defined yet. We understand that defining BPIP technical content in regulation is not the correct venue; these details are needed under administrative guidance. However, we see several opportunities to clarify the regulation to provide additional clarity around the BPIP process.

The current BPIP process has two communication gaps during the BPIP revision cycle:

- Building owners don't know how many revision cycles the Director might request
- Owners cannot modify the BPIP schedules without submitting a new BPIP.

The Director will always want the right to request revisions. While these sorts of proposals may make sense for the Director to make, we ask that the Director make all of them at once. If the Director instead requests iterative what-if analysis style revisions, building owners will be reluctant to use a BPIP process that could create, in effect, infinite revision cycles. This also creates additional costs for building owners.

Additional revision cycles may still be needed to meet the intent of the Director's original asks, thus providing the Director some protection from non-responsive answers on the part of the owner. In turn, owners get certainty that BPIP revision requests will not be a moving target and create an additional risk of non-compliance.

In addition, AOBA would caution against the Director mandating that specific measures be implemented at a building. Since other potential energy conservation measures at a property are allowed to be deemed cost-effective, it only seems natural for Director-requested energy conservation measure analysis to be subject to the same cost-effectiveness tests. This mechanic, if not changed, could effectively force buildings to undertake highly cost-intensive, time-intensive, and invasive measures or risk non-compliance. While AOBA is sure this is not the intent of the Director, making this clear in the regulation provides everyone a measure of comfort.

Lastly, if a BPIP is denied, a building owner does not have the ability to submit a new BPIP according to the regulations. AOBA expects that the Director is not likely to deny BPIPs without requesting revisions (indeed, there is not a method in the regulations that allows the Director to deny a BPIP without requesting revisions), which means that every rejected BPIP in turn has a list of requested revisions from the Director. Building owners should be able to submit revised BPIPs without being prevented from using BPIPs for the entire BEPS time period. As currently written, this is what happens to building owners if a BPIP is rejected.

AOBA expects that building owners submitting BPIPs will have issues meeting performance targets. Preventing these building owners from using BPIPs in effect dooms them to non-compliance.

Post-BPIP approval communication

As written, demonstrating compliance with a BPIP entails two things that do not make a ton of sense: communicating a plan schedule twice and assuming energy conservation measures are installed annually.

Recall that one of the core components of a BPIP is the schedule by which the BPIP is executed. In effect, this automatically generates a timeline. However, the relevant language (18A.43A.01.12.B) states: “After the Director receives the certified copy of the recorded plan, the covered building will be deemed to be in compliance with the applicable interim or final performance standards as long as the owner fulfills the terms of the building performance improvement plan within the timeline specified in the plan.” In effect, this is saying that the building must meet its BPIP timeline twice. Deleting “within the timeline specified in the plan” simplifies the language without changing the requirements.

Similarly, the following section (18A.43A.01.12.B) operates under the assumption that energy conservation measures are installed each year. However, this may not actually be the case for properties following the BPIP pathway. In some cases, they may be waiting on capital. In other cases, they may be in the process of implementing a multi-year project. In both cases, the buildings are clearly progressing on the schedule outlined within the BPIP, but energy conservation measures are not installed. However, according to the language as written this isn’t an acceptable outcome.

In effect, this section is asking “are you on track with your BPIP?” Cleaning up this language to outline actions taken over the previous calendar year answers this question in a way desired by the legislation.

Additional need for outreach and guidance
While not included in the regulations, the market is looking for additional guidance from the Director and DEP to better illustrate the types of effort(s) needed to meet the intent of the BPIP. Since this document is largely intended to focus as a guide outlining the changes we would like to see in BEPS regulation, we will note the items below for follow-up and discussion at a later date.

1. Technical requirements and deliverables associated with energy audits needed to meet the intent of the BPIP
2. Need for additional clarity on what sort of best efforts around obtaining funding, including information on what sort of documentation would be needed to demonstrate best efforts
3. Generic BPIP template(s) and example(s) to draw from

Evaluation of Public Disclosure Data Compared to BEPS

Montgomery County's DEP has helpfully made their benchmarking data available online. To that end, AOBA reviewed public disclosure data for 2023 to answer a few questions:

1. Do DEP's percentage of buildings that currently meet BEPS align with the data in their disclosure?
2. Generally speaking, how close are buildings to BEPS?
3. Are there specific patterns to be seen from the data?

Based on data provided from DEP, AOBA estimates that approximately half of 2023 office building's disclosures and 40% of multifamily building's energy disclosures currently meet the BEPS. This roughly aligns with DEP's estimates, so at a basic level AOBA sees the same data patterns as DEP. However, some additional context is useful—not just knowing *if* a building meets BEPS, but *how far* it is from BEPS.

To do this, AOBA performed histogram analysis, looking at the percentage distance between how far an individual building was from the BEPS. EUI ranges were mapped onto these numbers assuming offices and multifamily buildings were purely either office or multifamily, respectively. (This is true for about 65% of offices and 60% of multifamily buildings, respectively, but makes the graphs a lot easier to parse.) Multifamily buildings are provided below; AOBA can provide similar information for offices upon request.

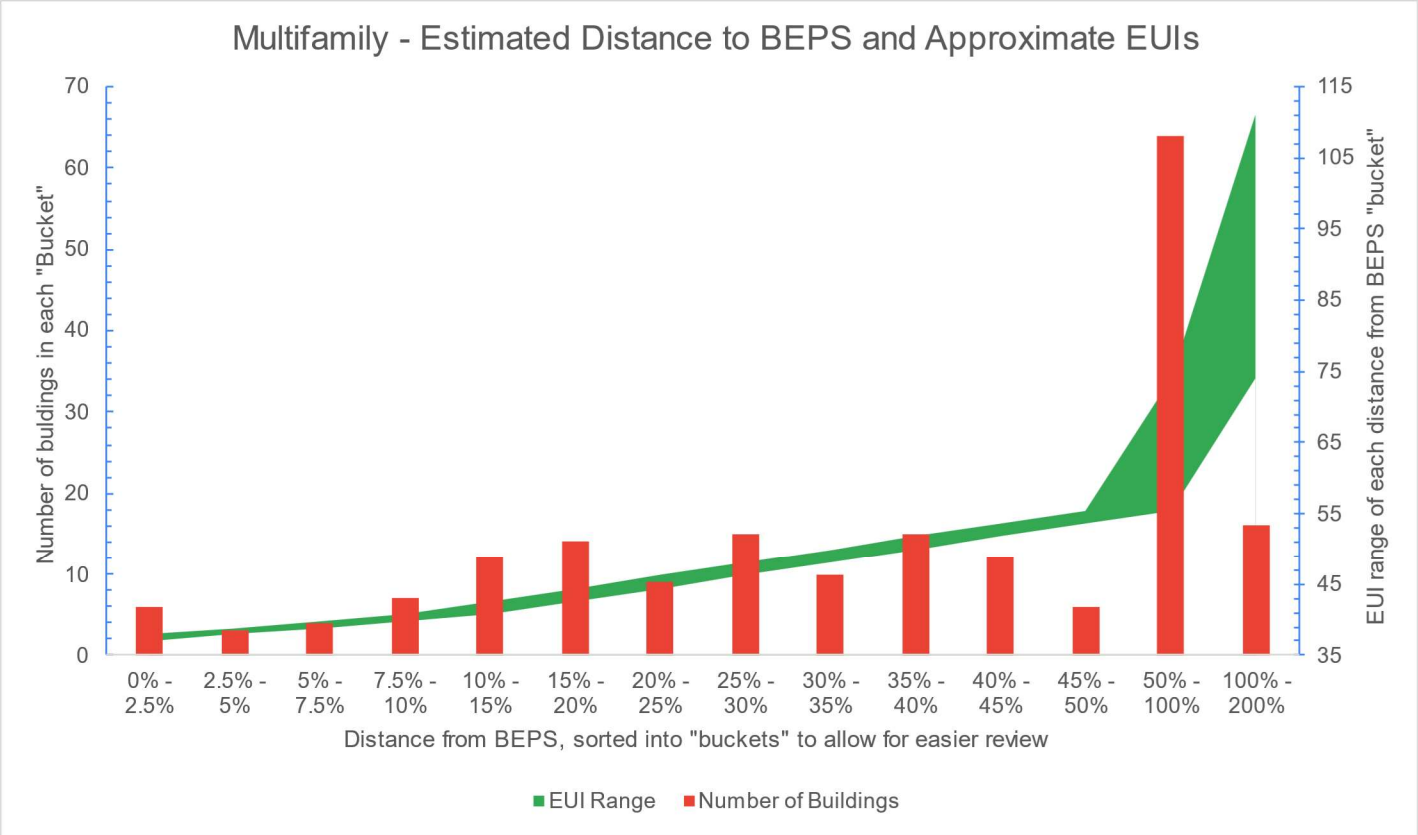
This breakdown is useful to conceptualize where multifamily buildings currently stand with BEPS:

- ~40% of buildings meet BEPS based on 2023 benchmarking data
- ~20% of buildings are within 25% of BEPS based on 2023 benchmarking data
- ~40% of buildings are *not* within 25% of BEPS based on 2023 benchmarking data

Additional information can be found on the charts on the following pages. These charts can be read as follows:

- The red bars indicate the number of buildings that fall into a particular "bucket" of EUI ranges. These "buckets" are used to sort buildings into various ranges to make it easier to conceptualize where building stock in total sits with respect to BEPS. Quantities can be read via the primary axis (on the left side of the graph).
- The X-axis contains "buckets" of EUI ranges. The range is read from low to high—for example, the bucket on the far left of the graph contains buildings 0-2.5% from the BEPS.
- The green space indicates the EUI range associated with each percentage. For example, for multifamily properties that currently need to take action to meet BEPS and are 5-7.5% away from BEPS, this corresponds to EUIs of 38.9 kBtu/SF/year to 39.8 kBtu/SF/year. These ranges are on the secondary axis (on the right side of the graph).

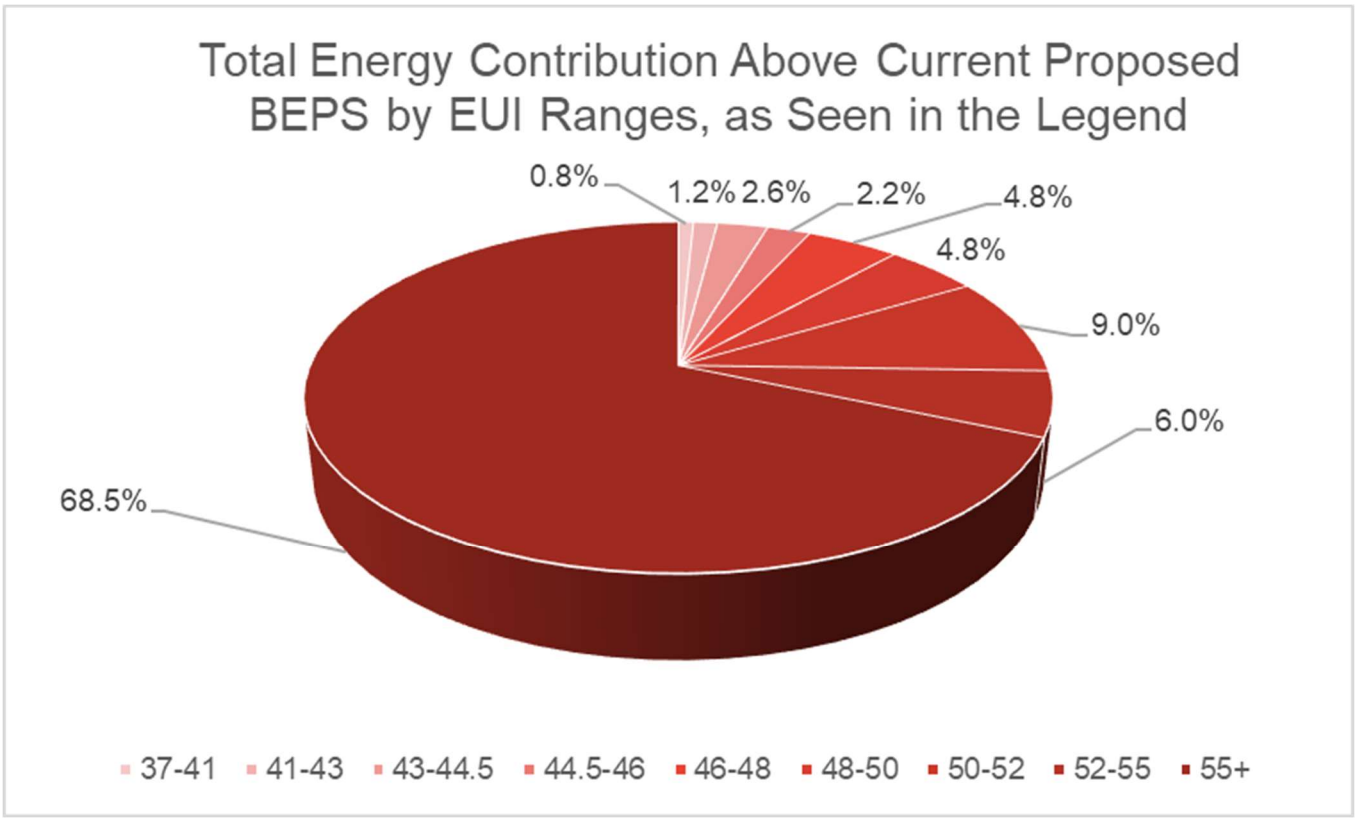
The chart below separates multifamily properties that do *not* meet BEPS based on approximately how far they are from the BEPS.



As seen above, there currently aren't *too* many multifamily buildings within 10% of the current BEPS (20 out of 346 buildings, or ~5.8% of building stock). Indeed, a lot of buildings that need to take substantial action to meet BEPS (50% or more away from the BEPS, corresponding to 80 buildings or ~23% of building stock) or significant action to meet BEPS (25% or more away from the BEPS, corresponding to 138 buildings or 40% of building stock). Buildings further away from the BEPS will likely need to do more work to meet the BEPS, which makes their potential financial outlook costlier.

The relative linearity of multifamily building stock as a function of distance from BEPS points to reconsidering the multifamily housing BEPS, although the linearity also does not point at a specific EUI. Should (for example) 120 buildings be between 15-20% from the BEPS, that would provoke a reasonable discussion over if those buildings should or should not currently meet BEPS. However, the biggest tranche of buildings is seen at EUIs above the EE target.

This can also be seen by looking at a pie chart breakdown of the total EUI for all multifamily buildings above the BEPS, then organizing it into similar "buckets" as described above. However, these "buckets" are arranged by EUI range and presented in a gradient style, where a darker red indicates a higher baseline EUI.



As seen in the chart above, buildings with an EUI below 43 do not currently meet the proposed BEPS but make up the vast minority of buildings in terms of excess energy use, at only 2% of total excess energy use. For some properties, the difference between a site EUI of 37 and a site EUI of 43 may be electrifying an end use. This sort of measure was common in the case studies produced by DEP.

The adjustments to the BEPS regulation described within this document are designed to make these significant lifts a bit easier for buildings that may struggle otherwise to meet BEPS.

We also wanted to provide some additional context behind the claim offered in the T&E meeting about the impact of changing the multifamily target on overall County goals. AOBA pulled information from DEP's BEPS Technical Report to help answer these questions, although we wanted to note that a few key differences exist between the data sets:

- At the time of the publication of DEP's report, multifamily benchmarking was not active in the County. To help set standards, DC's multifamily benchmarking was used instead. This will naturally result in contextual differences between the Montgomery County multifamily data set and the data set in this letter.
- To simplify the analysis within this letter, we assumed an equivalent annual impact on energy use. In practice, this is probably not an accurate description (more usage would be expected closer to today while less usage would be expected as we approach the end point of BEPS).
- We did not separate electricity and gas usage to simplify the analysis.

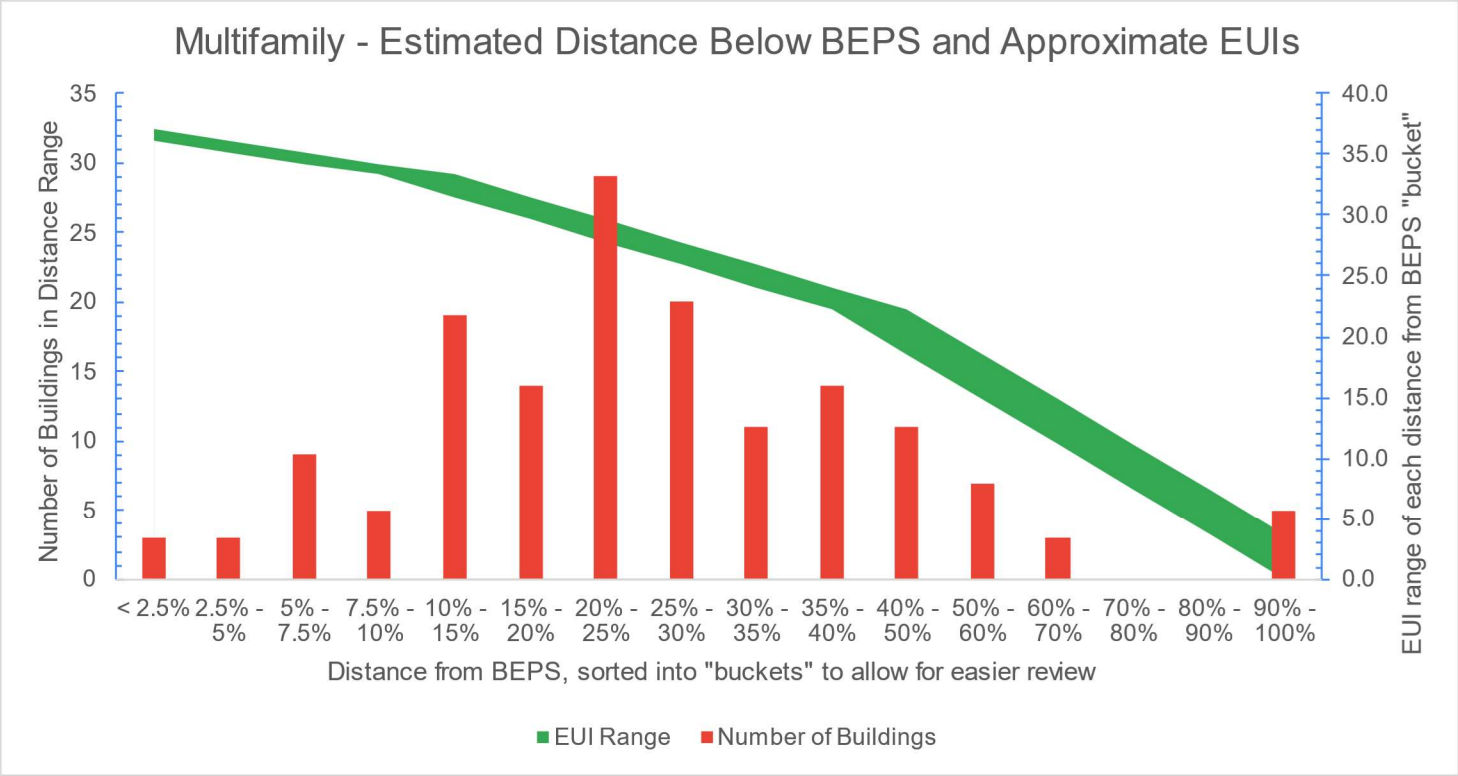
We looked at the cumulative usage (2021-2039) across Montgomery County building stock looking at both the proposed ZNE and EE-ZNC midpoints. According to the DEP report:

- The DEP report estimates a total of 325,400 billion BTU across all fuels from 2021-2039 If the EE-ZNC midpoint is used, which would in turn imply an average annual energy use of approximately 18,080 billion BTU across all fuels.
- The DEP report estimates a total of 314,100 billion BTU across all fuels from 2021-2039 If the EE-ZNC midpoint is used, which would in turn imply an average annual energy use of approximately 17,450 billion BTU across all fuels.
- This in turn implies a difference of approximately 630 billion BTU per year between the ZNC and EE-ZNC midpoints across all building types, again assuming an equal distribution annually.

Adjusting the multifamily target from 37 to 43 would result in additional 294.7 billion BTU per year, which is approximately 47% of this difference. While this seems like a large percentage, comparing it to the *total* energy usage of the ZNC target would result in an increase of 1.7% across all building typologies.

As noted above, this number is likely incorrect due to changes in the data sets between the information in this letter and the information in the DEP report, but the magnitudes are likely similar.

Zooming in on the buildings that currently meet BEPS also presents some interesting considerations, although these considerations are outside most of the scope of this letter. They are instead presented for completeness.



Somewhat surprisingly, a lot of these buildings have EUIs below 30. An EUI below 30, should it *actually* be below 30, is highly, highly efficient. However, there is a potential problem here: a lot of these buildings are direct metered. In turn, this means that benchmarking for these properties is contingent on Pepco providing correct data for these properties. Regretfully, neither the owner nor DEP has the ability to evaluate the efficacy of Pepco's data. The best that anyone who isn't the utility can do is see if Pepco provided the same meters in their aggregate data that are actually at the building. We are left to hope that Pepco provided the correct data tied to the correct meters.

AOBA has had multiple members deal with Pepco significantly changing aggregate meter data based on Pepco's internal review processes. Pepco's processes are completely opaque and represent an area of potential concern. (DEP is aware of the problem as well.) AOBA is concerned that if changes to Pepco's processes or data streams result in large changes in energy data through nothing the building owner did, this could present ongoing challenges with building owners figuring out if a building actually meets BEPS.

Requiring Pepco to provide additional transparency over the data streams, possibly by providing a separate file indicating the electricity consumption of each meter (without tying that consumption value to a specific meter

so anonymity is preserved) would help assuage concerns. As is, AOBA wants to make sure that building owners truly know their energy usage as reported from Pepco so they know what actions they may actually need to take to meet BEPS.

To be clear, this situation could happen in any building using aggregate meter data; it is just exceptionally easy to visualize with buildings that already meet BEPS.

Beyond these two trends, no other specific patterns were seen in the data at this time. AOBA is hoping to compare benchmarking data with building system details to provide more insight on specifically challenged class(es) of buildings, but as this requires additional input from building owners above and beyond publicly available data from DEP, this is a manual process. Work is ongoing but not ready for public review at this time.

Financing American Energy and Jobs

Presented by

Hans Riemer • Senior Advisor (Contractor)
LPO Outreach & Business Development

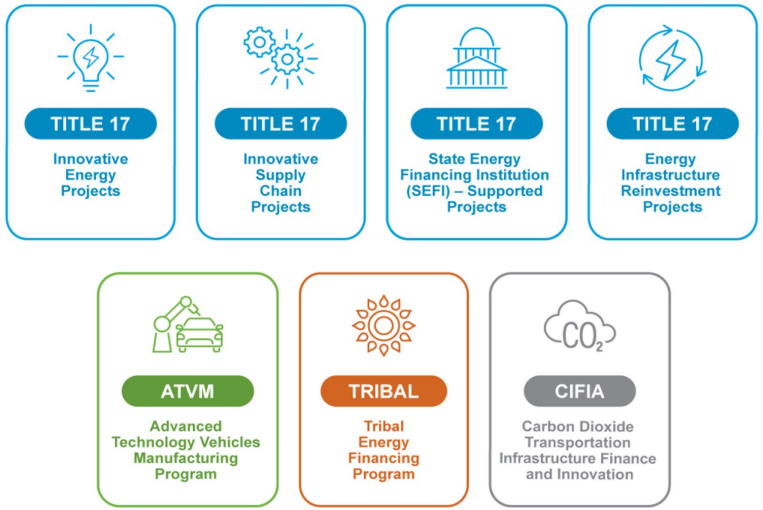
June 25, 2024

What is the Loan Programs Office (LPO)?

LPO is...

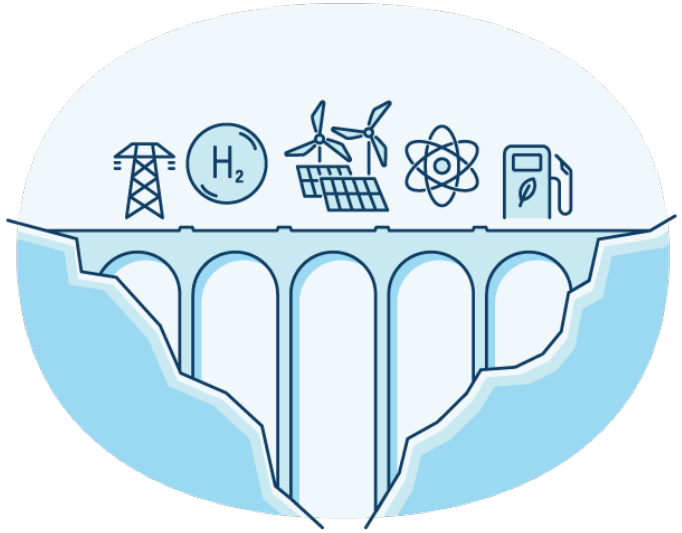
the **premier public financing partner** accelerating high-impact energy and manufacturing investments to advance America's economic future.

How do we do it?

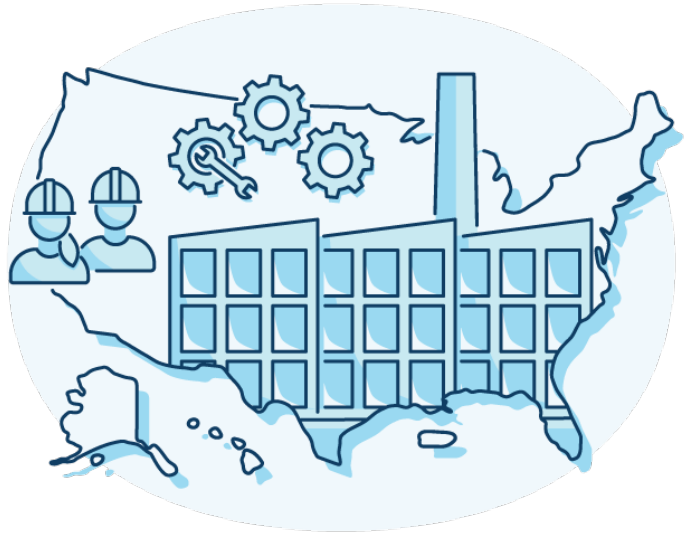


- ✓ By **providing attractive debt financing** for high-impact, large-scale ($125M+) energy infrastructure projects in the U.S.
- ✓ With **tens of billions of dollars** in available loan and loan guarantee authority.
- ✓ Via **seven loan programs & project categories** supporting both innovative and commercial technologies.

LPO Administers Loan Programs that:



Provide a bridge to bankability for emerging clean energy and decarbonization technologies on a path to commercial liftoff



Enable the expansion of domestic manufacturing and supply chains to support a cleaner and stronger energy economy

Make the clean energy transformation affordable and achievable for workers, consumers, and communities who stand to benefit from LPO support

The Next Generation of LPO Financing

LPO is working with stakeholders across innovative clean energy & advanced transportation sectors

Advanced Vehicles & Components

Vehicles • Components • Lightweighting • Manufacturing • Electric Vehicle (EV) Battery Manufacturing

Biofuels

Advanced Biofuels • Biodiesel • Cellulosic Biofuels • Renewable Diesel • Renewable Natural Gas (RNG) • Sustainable Aviation Fuel (SAF)

Critical Materials

Extraction • Manufacturing • Mining • Processing • Recovery • Recycling

EV Charging

Deployment • Manufacturing

Hydrogen

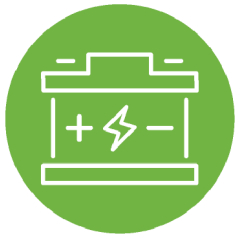
Generation • Infrastructure • Transportation

Offshore Wind

Offshore Wind Generation • Offshore Wind Supply Chain & Vessels

Renewable Energy

Electrification • Geothermal • Hydrokinetics • Hydropower • Repowering Onshore Wind • Solar Supply Chain • Waste Conversion



Storage

EV Bidirectional Storage • Newer Battery Chemistries & Flow Batteries • Compressed Air Energy Storage • Pumped Storage Hydropower • Thermal Energy Storage

Transmission

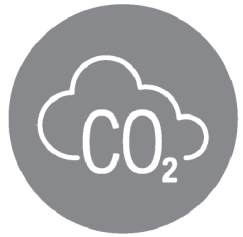
Grid Efficiency • Grid Reliability • High-Voltage Direct Current (HVDC) Systems • Offshore Wind Transmission • Systems Sited Along Rail & Highway Routes

Virtual Power Plants

Connected Distributed Energy Resources (DERs)

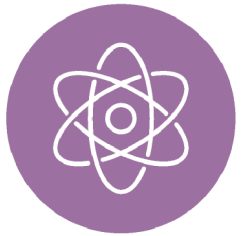
Advanced Fossil

Carbon Feedstock Waste Conversion • Fossil Infrastructure Repurposing & Reinvestment • Hybrid Generation • Hydrogen Generated From Fossil Sources • Synfuel



Carbon Management

Carbon Capture & Storage (CCS) • Carbon Dioxide Removal (CDR) • Direct Air Capture (DAC) • Industrial Decarbonization • CO_2 Transportation Infrastructure



Advanced Nuclear

Advanced Nuclear Reactors • Micro Reactors • Nuclear Fuel Cycle • Nuclear Supply Chain • Nuclear Uprates & Upgrades • Small Modular Reactors (SMRs)

Tribal Energy

Energy Development Projects • Energy Storage • Fossil Energy • Microgrids • Renewable Energy • Transmission Infrastructure • Transportation of Fuels

Monthly Application Activity Report | August 2024

Loan Programs Office

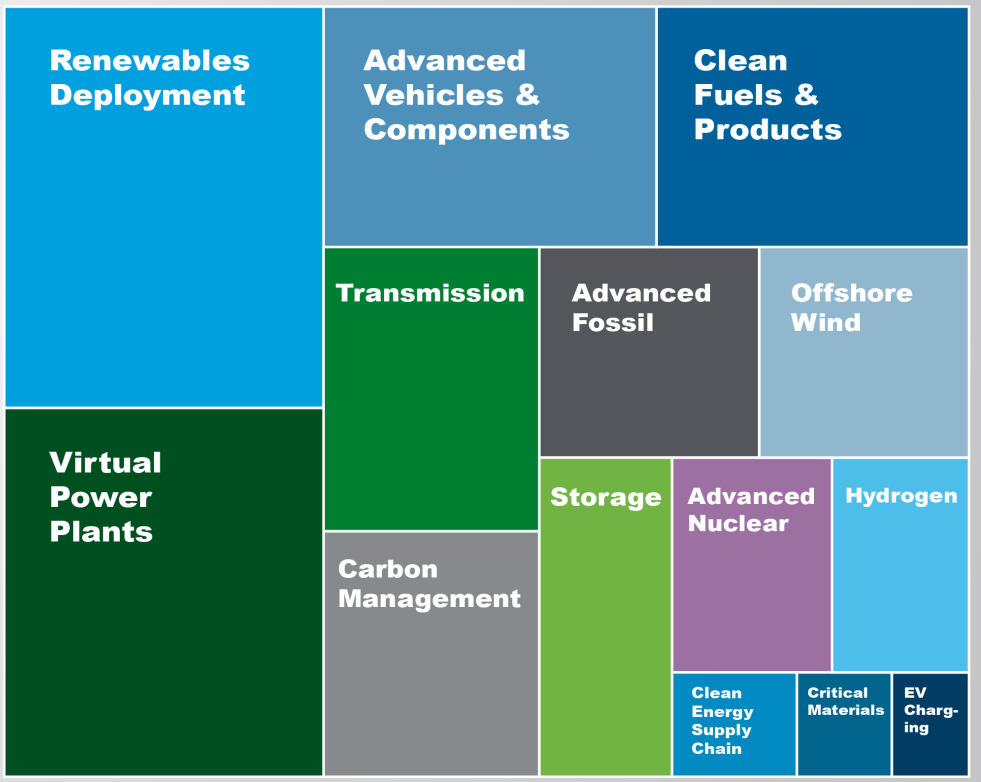
211 ACTIVE APPLICATIONS [1]

$295.8 BILLION IN LOANS REQUESTED [2]

1.2 NEW APPLICATIONS PER WEEK [3]

$295.8 BILLION

CURRENT AMOUNT OF LOANS REQUESTED BROKEN DOWN BY PROJECT TECHNOLOGY SECTORS



Notes

All data updated as of August 31, 2024. For more details and a list of technology areas of interest within each LPO tech sector, see: Energy.gov/LPO/MAAR

1) Active applications include applications that have been submitted by the project sponsor(s) through LPO's online application portal and are in different stages of active review and engagement by LPO and the applicant. Active application count does not include publicly announced conditional commitments.
2) Individual requested loan amounts are estimated and potential, subject to change, and not necessarily representative of final financing terms. **Requested loan amounts in current active applications *do not* affect available LPO loan authority.** Figure rounded down to the nearest $0.1 billion.
3) Current rolling average of new active applications per week over the previous 24 weeks. Figure rounded down to the nearest 0.1 application per week.

What LPO Offers Borrowers

LPO loans and loan guarantees are differentiated in the clean energy debt capital marketplace in **three primary ways:**

Access to Patient Capital

that private lenders cannot or will not provide.

Flexible Financing

customized for the specific needs of individual borrowers.

Committed DOE Partnership

offering specialized expertise to borrowers for the lifetime of the project.

LPO Financing Programs

Title 17 Clean Energy (Title 17)

Financing for:

- Innovative Energy & Innovative Supply Chain (1703)
- State Energy Financing Institution (SEFI)-Supported (1703)
- Energy Infrastructure Reinvestment (EIR, 1706)

Tribal Energy (TELGP)

Financing for:

- Tribal energy development projects

Advanced Transportation (ATVM)

Financing for:

- Manufacturing of advanced technology vehicles, several modes of ATVs, components, and innovative EV charging infrastructure

CO_2 Transportation Infrastructure (CIFIA)

Financing for:

- Large-capacity, common carrier CO_2 transportation projects

TITLE 17
Innovative Energy Projects (1703)

Innovative Energy Projects (1703)

Innovative Energy projects deploy qualifying New or Significantly Improved Technology that is technically proven but not widely commercialized in the United States.

1703 Projects Require at Least One Eligible Technology

Renewable energy systems

Advanced fossil energy technology

APPLIES TO:

- ✓ Innovative Energy Projects
- ✓ Innovative Supply Chain Projects
- ✓ State Energy Financing Institution (SEFI) Projects

Hydrogen fuel cell technology

Advanced nuclear energy

Carbon capture and sequestration technology

Efficient electrical generation, transmission, and distribution

Efficient end-use energy technologies

Production facilities for the manufacture of fuel-efficient vehicles or vehicle parts

Pollution control equipment

Oil refineries

Energy storage technologies

UPDATED: Industrial decarbonization technologies

NEW: Supply of critical minerals

Title 17 Program Eligibility

All Projects Must:

1. Be located in the United States, territories, or possessions.
2. Be an energy-related project.
3. Achieve significant and credible GHG or air pollution reductions.
4. Have a reasonable prospect of repayment.
5. Involve technically viable and commercially ready technology.
6. Include a Community Benefits Plan.
7. Not benefit from prohibited federal support.

Category-Specific Requirements:

Projects must also meet additional requirements specific to their category:

Innovative Energy (1703)

Innovative Supply Chain (1703)

State Energy Financing Institutions (1703)

Energy Infrastructure Reinvestment (1706)

State Energy Financing Institution (SEFI) Projects (1703)

TITLE 17

State Energy Financing Institution (SEFI)-Supported Projects (1703)

SEFI projects support deployment of a qualifying clean energy technology and receive meaningful grants, financial support or credit enhancements from a state-level entity agency or entity.

SEFI projects are not required to employ innovative technology.

SEFI Opportunity – What is a SEFI?

A "State Energy Financing Institution," or "SEFI," is an LPO designation for a State agency or State quasi-governmental entity that provides financial support to energy-related projects.

Examples of Various Types of SEFI Entities

State Energy Offices
Ex. Pennsylvania Energy Development Authority

Housing Finance Agencies
Ex. Washington State Housing Finance Commission

Green Banks
Ex. Connecticut Green Bank

Economic Development Authorities
Ex. Alaska Industrial Development and Export Authority

Energy Funds/Lending Centers
Ex. Maryland Clean Energy Center

Other State Agencies
Ex. Ohio Air Quality Development Authority

Note: A local government or independent non-profit (non-quasi government) is generally not a SEFI.

RFIs and RFPs Can Help States Spark or Find Projects

SEFI Partnership Portal

SEFIs in many states may offer financing support or credit enhancements to entities that implement programs in a state agency's various priority areas.

LPO publishes and maintains the **SEFI Partnership Portal,** a list of programs where SEFIs have identified publicly available financial support opportunities relevant for potential LPO applications. The Portal provides a public resource for potential borrowers to LPO who are interested in identifying relevant SEFI project opportunities in these states. The Portal also provides SEFIs a dedicated place to publish state opportunities that could align with LPO financing. The Portal will be updated on a rolling basis. Note that there are SEFIs that may fund projects that do not have a published funding program in this portal.

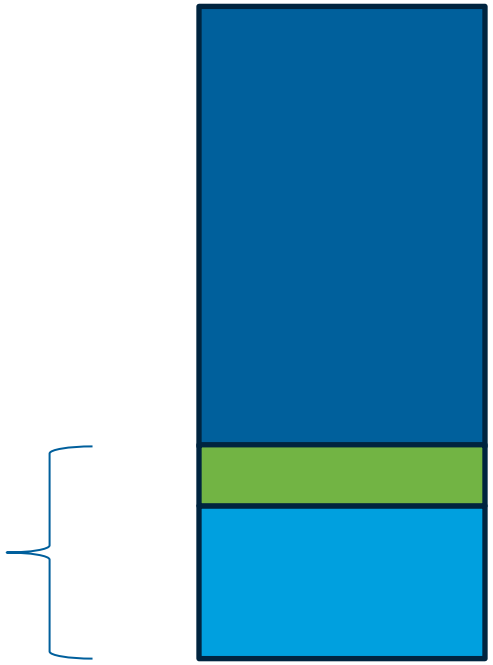
Please note that by sharing State RFIs or RFPs, LPO is not endorsing, sponsoring, or otherwise evaluating the sufficiency of the financing support that may be offered by such organizations for purposes of eligibility for LPO financing under Title 17.

SEFI Opportunity – How SEFIs Can Support Projects

Option 1: SEFI Provides Qualifying Grants / Other Support to LPO Applicants	**Option 2:** State Agency Bundles Projects into SPV; SPV Applies Directly to LPO
Enables large projects to qualify for LPO financing under the SEFI project category but does not create capital pool for smaller projects.	Creates a capital pool for smaller projects that couldn't apply to LPO on their own. (Note: an SPV is not a requirement.)
SEFI does not need to provide information about the projects.	Requires significant detail about bundled projects, including a portfolio rating.
SEFI is only responsible for providing awarded funds.	Requires the SEFI not only to contribute "meaningful support" but also ensure that the SPV will receive "significant equity" (IFR 609.5(b)(5)) from non-LPO sources.
SEFI exposure is limited to the amount of the award, with no additional requirements.	Means the SEFI would take on risk and have compliance requirements and liabilities, application costs, and upfront fees.

Capital Stack Visual: SEFI As Project Supporter

For larger projects that can apply to LPO (Approx $130M + in size)



At least 20% of project cost

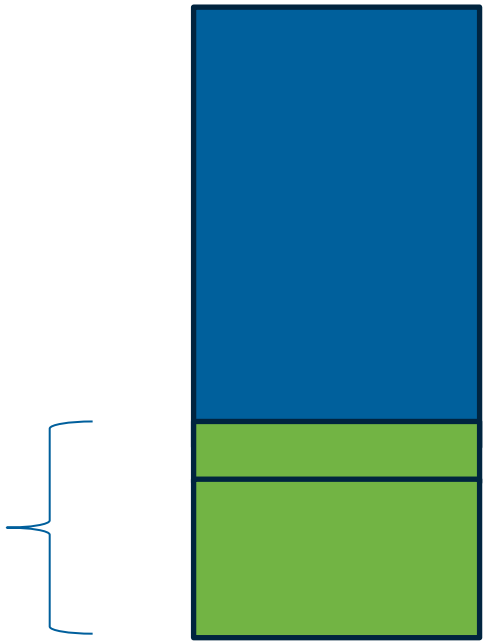
LPO loan (maximum 80% of total project cost, typically 50 – 70%)

SEFI meaningful support (grant, loan, investment or other support) to qualify under Title 17 with no technology innovation requirement

Sponsor and private equity investment, subordinated debt, philanthropic funding

Capital Stack Visual: SEFI As Borrower

Purpose is Establishing a Fund which can lend to projects that are too small to apply directly to LPO (Below $100M in project size)



LPO loan (maximum 80% of total project cost, typically 50 – 70%)

SEFI meaningful support investment to qualify under Title 17 with no technology innovation requirement

At least 20% of project cost

Equity capital organized by SEFI, could include philanthropic; SEFI/SPV is project sponsor and borrower

Title 17 Lending Overview

General Terms & Considerations

- The amount of the LPO-guaranteed obligation cannot exceed 80% of eligible project costs (as defined by statute and regulations and determined by LPO).
- LPO generally encourages applicants to consider greater than $100M loan requests due to costs.
- The tenor of the guaranteed obligation cannot exceed the lesser of (a) 30 years and (b) 90% of the projected useful life of the assets.
- LPO cannot be subordinated to any other financing.
- With limited exceptions, the project generally cannot benefit (directly or indirectly) from other Federally appropriated funds.

Lender/Guarantee Options

- Direct loan from U.S. Treasury's Federal Financing Bank (FFB) backed by 100% "full faith and credit" DOE guarantee. Note: Applicants **do not** apply directly to FFB; Title 17 loan applications are managed through LPO.
- DOE partial guarantee (up to 90%) of commercial debt from Eligible Lenders.

Interest Rates and Fees

Interest Rate

- Base cost of capital for FFB loans: Treasury + 3/8ths (0.375%)
  - Fixed at the time of each draw according to the Treasury rate for the applicable tenor as of that date
- Credit-based interest rate spread or risk-based charge

Fees & Costs

- No application fees
- Facility fee (due at or before financial close)
  - 0.6% on first $2 billion of commitment; 0.1% for portion exceeding $2 billion
- Maintenance fee annually post-closing
- Applicant pays for both its own and DOE's external advisors as incurred

Additional LPO Requirements

Please review the guidance for detailed information on federal requirements and restrictions, including:

- ❑ **Davis Bacon:** All construction (including installation) work must be paid weekly at prevailing wage.
- ❑ **Build America Buy America (BABA):** Nonprofit and government borrowers must demonstrate domestic content or obtain a waiver.
- ❑ **National Environmental Policy Act (NEPA):** The environmental impact of all projects will be reviewed. Some projects will benefit from categorical exclusion review (i.e., projects on existing buildings, small solar installations).
- ❑ **Federal Support restriction**: Projects generally cannot benefit (directly or indirectly) from other federal support.
  - ✓ Federal income tax credits generally do not constitute prohibited federal support.
- ❑ **Cargo Preference Act (CPA):** If goods must be shipped into the US for the project, a sufficient portion must be demonstrated to have arrived on US flag vessels, or non-availability must be demonstrated.

SEFI Potential Projects (1 of 3)

Virtual Power Plants

VPPs = Grid-interactive Distributed Energy Resources (i.e., solar / storage / appliances)

Following are just a few of the potential models for residential or commercial:

- Energy office provides SEFI support to VPP company as LPO applicant to implement in State.
- Green bank provides SEFI support to program manager as applicant for low-cost loans for consumers.
- On-bill financing by Utility for solar/storage; Utility provides lower rates to consumer by using LPO, State support.

Affordable Housing

- Affordable housing owner retrofits buildings to create VPPs, achieve net zero.
- Housing agency makes SEFI awards to affordable housing providers who combine as applicant.

SEFI Potential Projects (2 of 3)

District energy systems, higher ed

- District energy systems with generation potentially eligible for 1706/EIR.
- Higher ed campus energy services contracts funded in operating budget.

Industrial decarb / green jobs

- SEFI provides economic development incentive to company to make decarb investments across multiple facilities. Company applies to LPO.
- Or, SEFI borrows to create capital pool for smaller projects.
- For ports, or logistics, or other sectors with smaller businesses that operate fleets, SEFI borrows from LPO to provide low-cost financing to companies to procure EV's with storage/VPP services.

In all cases, SEFI provides grant or other meaningful support to the project.

SEFI Potential Projects (3 of 3)

Community energy projects

1. State creates SPV that applies to LPO
2. State provides equity and owns equipment, claims tax credits
3. SPV offers local agencies (schools, governments, etc) opportunity for solar/storage, geothermal, etc through leases/contracts.
4. State/contracts provide guarantee to project, reducing cost and application time

In all cases, SEFI provides grant or other meaningful support to the project.

Government building decarbonization

- Government aggregates portfolio of government buildings
- Government procures energy project anticipating LPO financing
- Project company applies to LPO

Commercial building decarbonization

- Real estate owner or energy services company applies to LPO with SEFI investment allowing non-innovative tech
- Or, SEFI borrows from LPO to make smaller awards from LPO backed capital pool.

Application Instructions on LPO website

TITLE 17 CLEAN ENERGY FINANCING

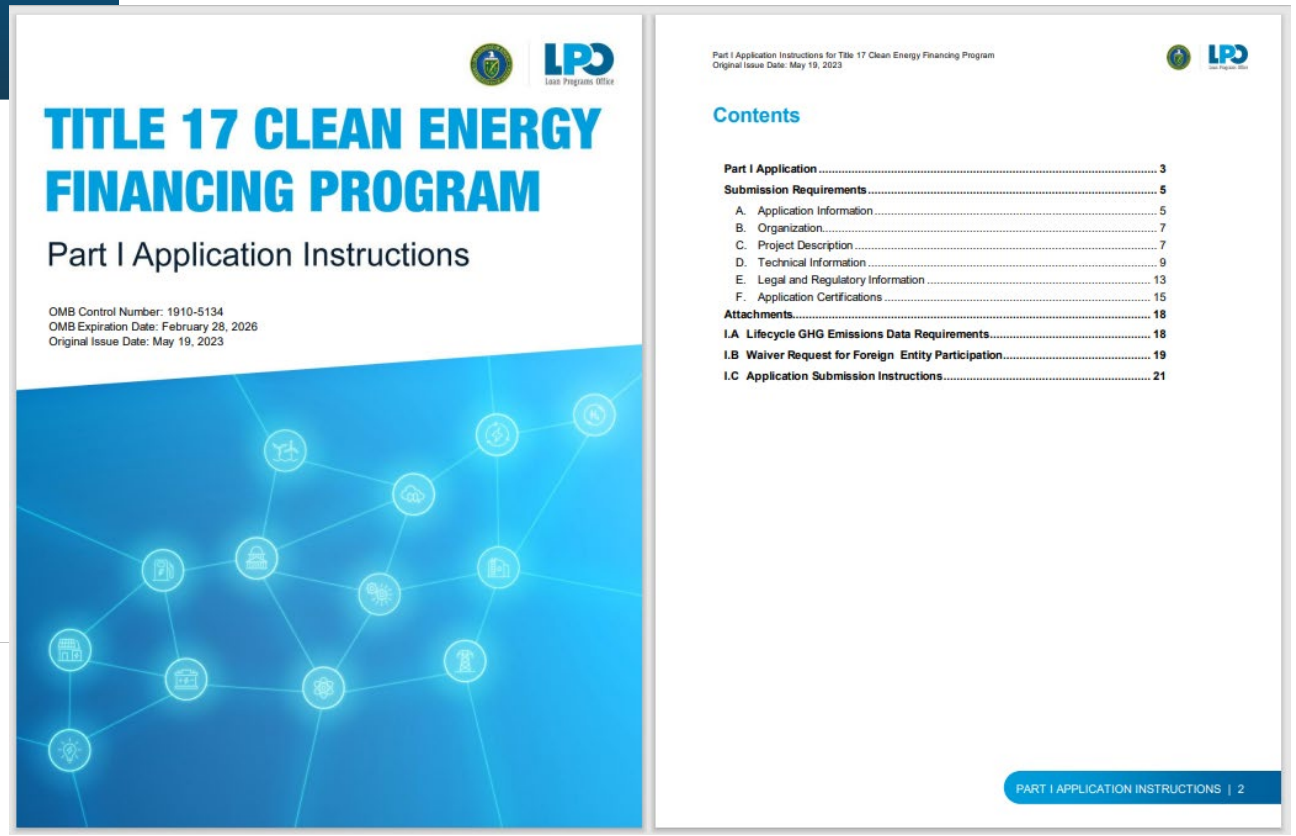
Loan Programs Office

Loan Programs Office » TITLE 17 CLEAN ENERGY FINANCING

Overview

The following overview summarizes the Title 17 Clean Energy Financing Program. For detailed information on the Clean Energy Financing Program, please refer to:

- **Title 17 Program Guidance:** This Guidance provides a comprehensive program overview.
- **Part I** and **Part II** Application Instructions
- **Title 17 Interim Final Rule** : The Rule amends Title 17 regulations to implement changes that expand or modify program authority and to revise for clarity and organization.
- **Governing Documents:** LPO's programmatic governing documents detail statutory and



TITLE 17 CLEAN ENERGY FINANCING PROGRAM

Part I Application Instructions

OMB Control Number: 1910-5134
OMB Expiration Date: February 28, 2026
Original Issue Date: May 19, 2023

Part I Application Instructions for Title 17 Clean Energy Financing Program
Original Issue Date: May 19, 2023

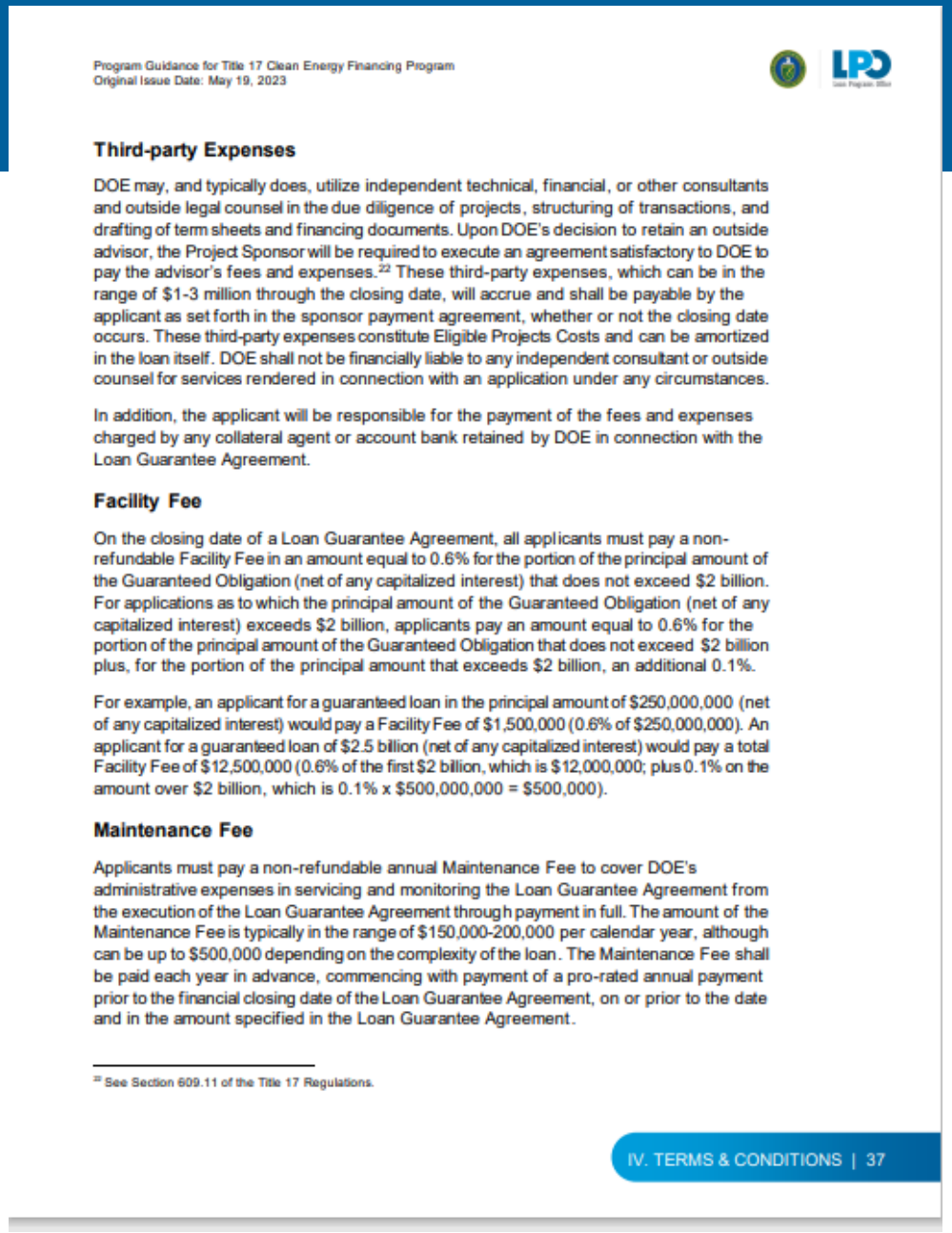
Contents

PART I APPLICATION INSTRUCTIONS | 2

Fees and Costs

See Program Guidance for details on fees and costs

- *LPO utilizes independent advisors that typically cost $1-3 million*



Third-party Expenses

DOE may, and typically does, utilize independent technical, financial, or other consultants and outside legal counsel in the due diligence of projects, structuring of transactions, and drafting of term sheets and financing documents. Upon DOE's decision to retain an outside advisor, the Project Sponsor will be required to execute an agreement satisfactory to DOE to pay the advisor's fees and expenses.[22] These third-party expenses, which can be in the range of $1-3 million through the closing date, will accrue and shall be payable by the applicant as set forth in the sponsor payment agreement, whether or not the closing date occurs. These third-party expenses constitute Eligible Projects Costs and can be amortized in the loan itself. DOE shall not be financially liable to any independent consultant or outside counsel for services rendered in connection with an application under any circumstances.

In addition, the applicant will be responsible for the payment of the fees and expenses charged by any collateral agent or account bank retained by DOE in connection with the Loan Guarantee Agreement.

Facility Fee

On the closing date of a Loan Guarantee Agreement, all applicants must pay a non-refundable Facility Fee in an amount equal to 0.6% for the portion of the principal amount of the Guaranteed Obligation (net of any capitalized interest) that does not exceed $2 billion. For applications as to which the principal amount of the Guaranteed Obligation (net of any capitalized interest) exceeds $2 billion, applicants pay an amount equal to 0.6% for the portion of the principal amount of the Guaranteed Obligation that does not exceed $2 billion plus, for the portion of the principal amount that exceeds $2 billion, an additional 0.1%.

For example, an applicant for a guaranteed loan in the principal amount of $250,000,000 (net of any capitalized interest) would pay a Facility Fee of $1,500,000 (0.6% of $250,000,000). An applicant for a guaranteed loan of $2.5 billion (net of any capitalized interest) would pay a total Facility Fee of $12,500,000 (0.6% of the first $2 billion, which is $12,000,000; plus 0.1% on the amount over $2 billion, which is 0.1% x $500,000,000 = $500,000).

Maintenance Fee

Applicants must pay a non-refundable annual Maintenance Fee to cover DOE's administrative expenses in servicing and monitoring the Loan Guarantee Agreement from the execution of the Loan Guarantee Agreement through payment in full. The amount of the Maintenance Fee is typically in the range of $150,000-200,000 per calendar year, although can be up to $500,000 depending on the complexity of the loan. The Maintenance Fee shall be paid each year in advance, commencing with payment of a pro-rated annual payment prior to the financial closing date of the Loan Guarantee Agreement, on or prior to the date and in the amount specified in the Loan Guarantee Agreement.

[22] See Section 609.11 of the Title 17 Regulations.

Credit-based Interest Rate Spread

Projects qualifying for Title 17 under SEFI authority are credit rated and assessed a credit-based interest rate spread.

Requests for reductions to credit-based interest rate spreads are considered based on policy elements and the availability of appropriated funds.

[Pricing for LPO Financing by Program | Department of Energy]

Credit-Based Interest Rate Spread for Title XVII

The Loan Programs Office (LPO) is announcing that a credit-based interest rate spread will be added to certain loans that are issued by the Federal Financing Bank (FFB) and backed by a 100 percent loan guarantee issued by the Department of Energy.

Loans issued by the FFB will carry an interest rate calculated by the following formula:

Interest Rate = Applicable U.S. Treasury Rate for the tenor of the loan + 37.5 basis points (bps) FFB liquidity spread (standard across all Title XVII loans) + Applicable Credit-Based Interest Rate Spread

The credit-based interest rate spread will be applied to Title XVII transactions that:

- Demonstrate the ability to predictably generate sufficient cash flow to service the borrower's debt obligations over the life of the loan guarantee, including transactions that have long-term power purchase agreements, and are not subject to unhedged market-based pricing risk; and
- Are able to provide a rating from a nationally recognized third party credit rating agency that falls within the range of ratings covered in the table below.

The credit-based interest rate spread will be determined based upon the following table. LPO will update this table periodically.

Project Credit Rating	Credit-Based Interest Rate Spread (%)	Final FFB Interest Rate Spread (%)
AAA	0.000	0.375
AAA-	0.000	0.375
AA+	0.000	0.375
AA	0.000	0.375
AA-	0.035	0.410
A+	0.075	0.450
A	0.115	0.490
A-	0.185	0.560
BBB+	0.265	0.640
BBB	0.335	0.710
BBB-	0.525	0.900
BB+	0.725	1.100
BB	0.925	1.300
BB-	1.125	1.500
B+	1.295	1.670
B	1.475	1.850
B-	1.625	2.000

The LPO Loan Transaction Process

LPO engages early with applicants and remains a partner throughout the lifetime of the loan

1 Pre-Application

LPO meets with potential applicant to discuss project eligibility, application process, and applicant questions.

2 Application & Review

LPO establishes project eligibility and readiness to proceed, followed by programmatic, technical, and financial evaluation.

3 Due Diligence

LPO and applicant engage third-party advisors and negotiate term sheet.

4 Conditional Commitment

LPO offers term sheet for loan or loan guarantee. The offer is contingent on borrower satisfying certain conditions.

5 Financial Close

LPO and borrower execute definitive financing documents, subject to additional conditions precedent to loan disbursements.

6 Monitoring

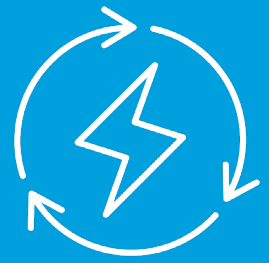
LPO monitors project and acts as trusted partner for the life of the loan, acting in the best interest of the U.S. government and taxpayers.

Before Applying for LPO Financing

Top 10 Questions

All Applicants Should Ask Before Applying to LPO

- ✓ Adequate project size?
- ✓ Offtake commitments?
- ✓ Development capital & project equity?
- ✓ Technological readiness?
- ✓ Commercial readiness?
- ✓ Environmental review?
- ✓ Site control & regulatory approval?
- ✓ Experience level of management?
- ✓ Emissions analysis?
- ✓ Projected community benefits?



TITLE 17

Energy Infrastructure Reinvestment (EIR) Projects (1706)

Energy Infrastructure Reinvestment (EIR) Projects (1706)

EIR projects retool, repower, repurpose, or replace energy infrastructure that has ceased operations or enable operating energy infrastructure to reduce air pollutants or emissions of greenhouse gases.

EIR projects are not required to employ innovative technology.

Energy Infrastructure Reinvestment 1706

Financing to leverage existing U.S. energy infrastructure for the clean energy future

Project Eligibility

In addition to meeting the common Title 17 eligibility requirements, EIR projects must:

1. Retool, repower, repurpose, or replace energy infrastructure that has ceased operations, **OR**
2. Enable operating energy infrastructure to avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases.

What is "Energy Infrastructure"?

A facility, and associated equipment, used for:

- The generation or transmission of electric energy;

OR

- The production, processing, and delivery of fossil fuels, fuels derived from petroleum, or petrochemical feedstocks.

Notes

- EIR projects **DO NOT** have an innovation requirement.
- Conditional commitments must be issued by **September 30, 2026**.
- **Environmental remediation** costs and **refinancing outstanding indebtedness directly relevant to the energy infrastructure** can be eligible for EIR financing as part of a larger reinvestment plan.

Energy Infrastructure Reinvestment 1706

Financing to leverage existing U.S. energy infrastructure for the clean energy future

Example Projects

Power plant (or associated infrastructure) retooled, repowered, repurposed or replaced with:

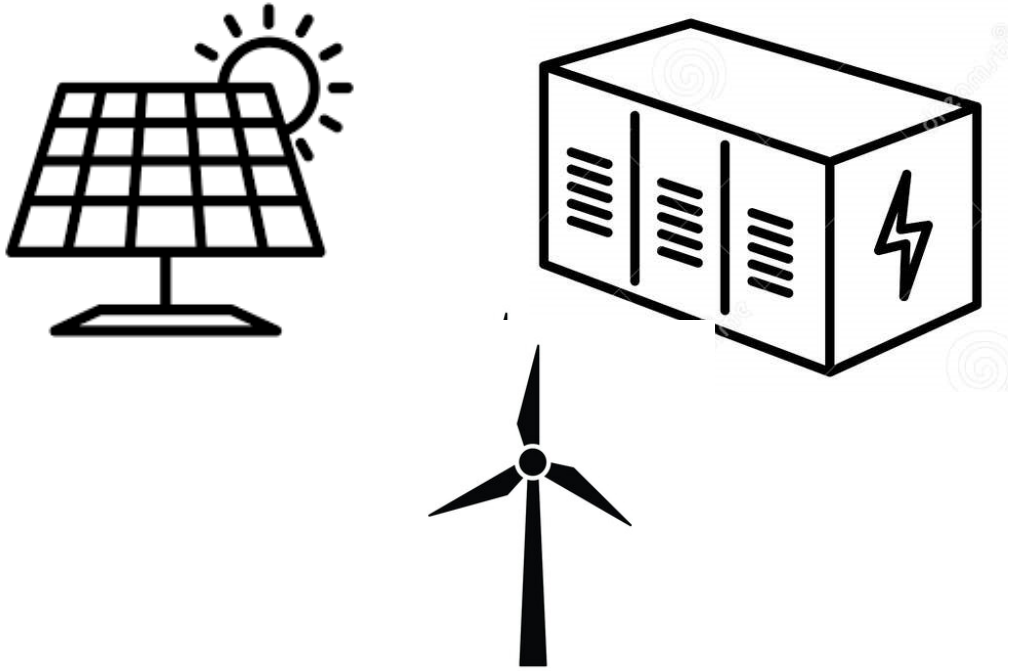
- Renewable energy (and storage)
- Distributed energy (e.g., VPPs)
- Transmission interconnection to off-site clean energy
- New manufacturing facilities for clean energy products or services
- Nuclear generation

- Reconductoring transmission lines and upgrading voltage
- Installing emissions control technologies, including carbon capture and sequestration (CCS)
- Repurposing oil and gas pipelines (e.g., for H_2, CO_2)
- Upgrading refineries for biofuels or hydrogen
- Upgrading or uprating existing generation facilities (with emissions control technologies for projects involving fossil generation)

IOU Example: Fossil to Renewable Portfolio

Project Description:

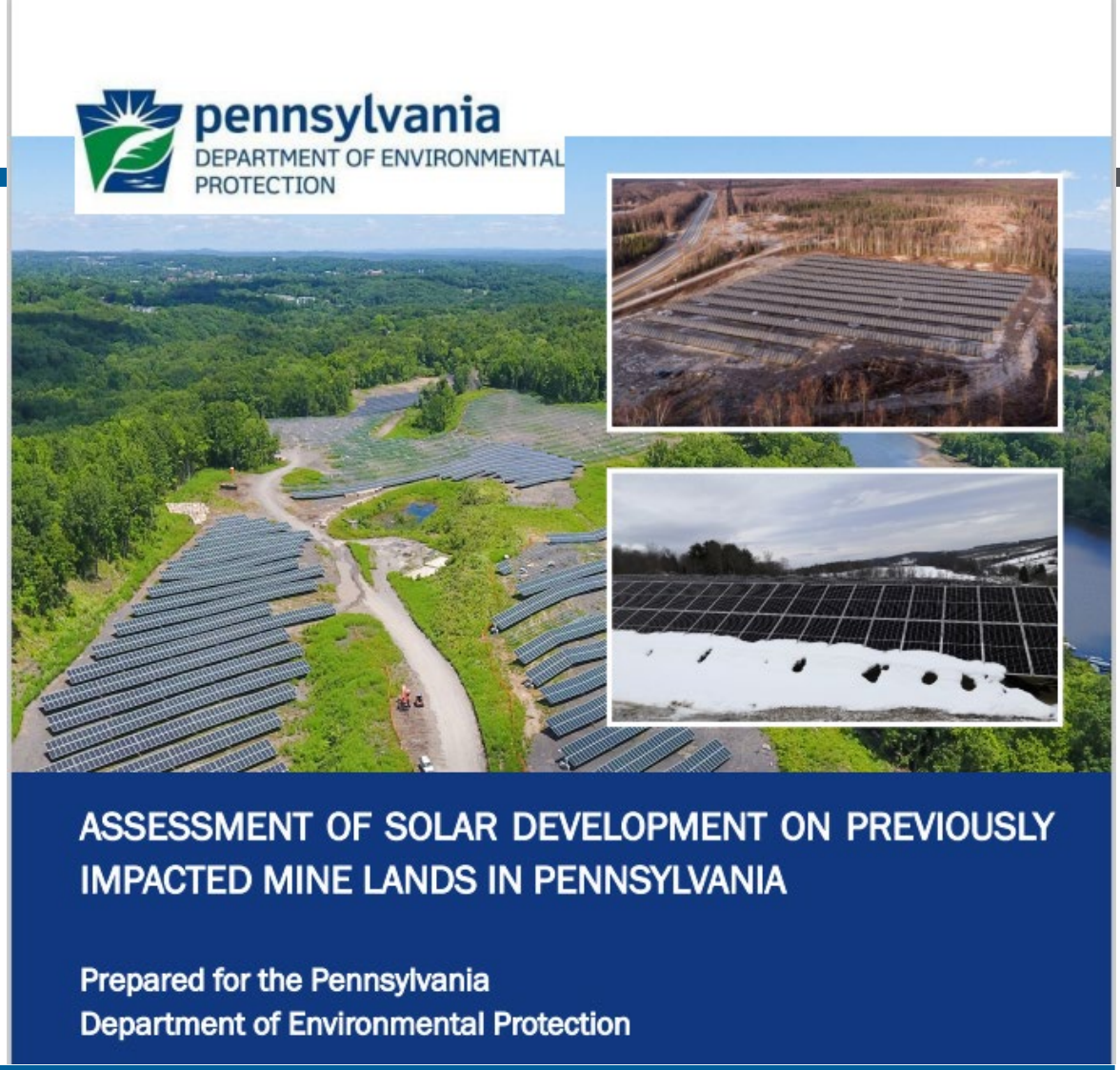
- IRP identifies 2,400 MW of new renewables and storage will replace **1,400 MW of announced coal retirements**
- **Identified near-term investments:** 2 projects, combined ~500 MW solar and ~200 MW storage
- **Planned additional investments:** ~1,000 MW solar, ~200 MW storage, and ~500 MW wind
- Rebuild or refurbish existing hydro generation (approx. 100 MW existing capacity)



EIR Qualification

1706 a(1): The project will retool, repower, repurpose or replace retiring fossil energy infrastructure.

States can lead market development



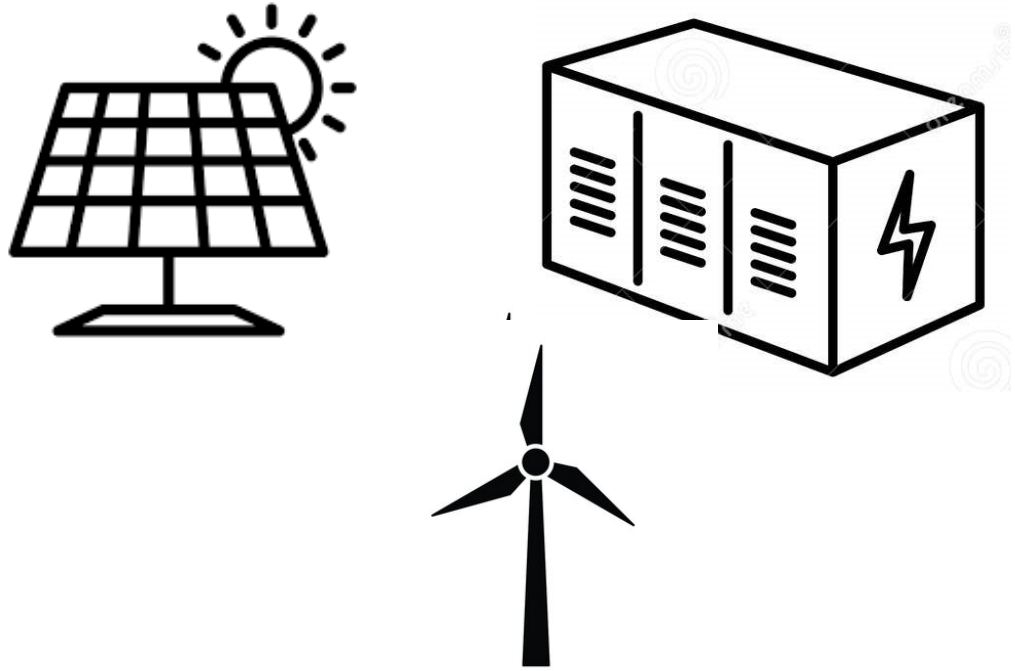
EIR Qualification

1706 a(1): The project will retool, repower, repurpose or replace retiring fossil energy infrastructure.

IPP Example: Fossil to Renewable

Project Description:

- Developer seeks to **repurpose an 800 MW** retired or low utilization fossil plant with **1200 mw of renewables + storage**
- Reuse transmission point of interconnection to gain access to the grid.
- **Community Benefits** include job retention and environmental remediation of the retired fossil facility.



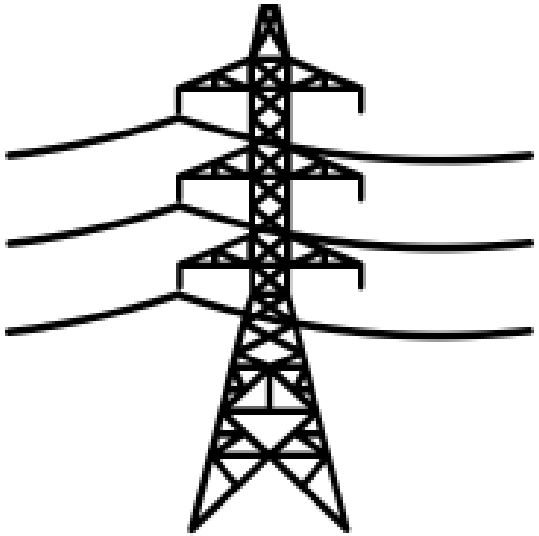
EIR Qualification

1706 a(1): The project will retool, repower, repurpose or replace retiring fossil energy infrastructure.

Example: Transmission Upgrades

Project Description:

- Multi-billion proposal for **transmission reconductoring** and grid modernization across multiple RTOs.
- Investments could improve capacity by 50%, while avoiding / limiting challenges associated with construction of new transmission.
- Projects will **enable interconnection of new clean generation**, and address safety and reliability risks associated with aging infrastructure.



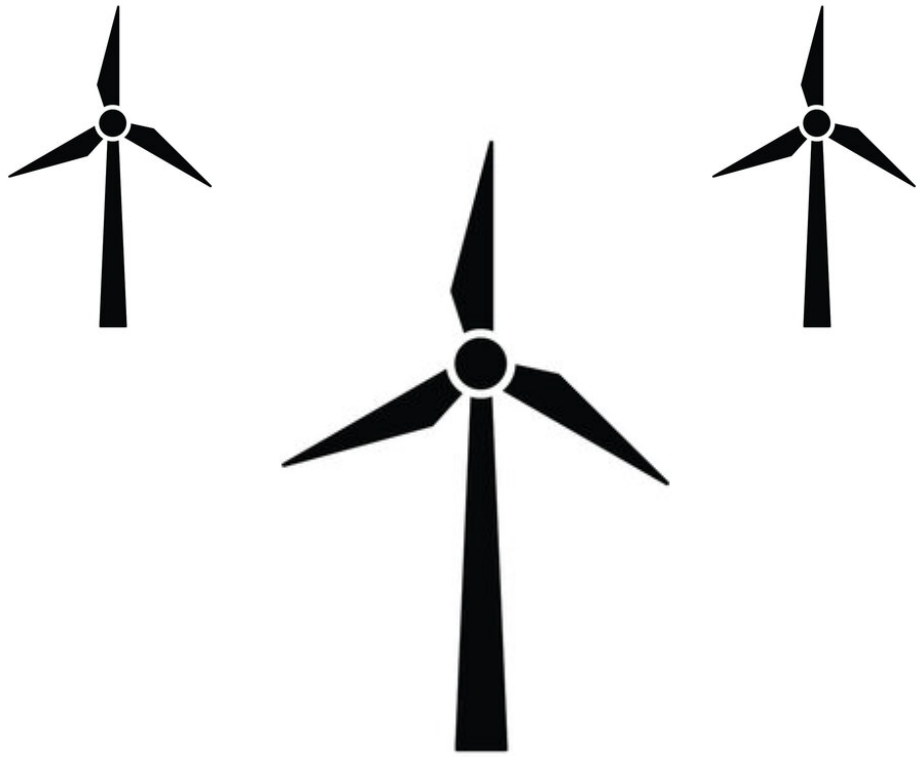
EIR Qualification

1706 a(2): The project will enable operating Energy Infrastructure to avoid and reduce GHG emissions.

Example: Wind repowering

Project Description:

- Existing onshore wind assets identified for upgrades. Improvements will be made to blades, gearboxes, hubs, generators, and other components
- Market size potentially tens-of-GW that could be vital to meeting the US's 2030 climate goals by ensuring wind projects are not shut down prematurely and existing developed land and transmission are used efficiently.
- LPO funding would make marginal projects feasible and prolong the life of assets.



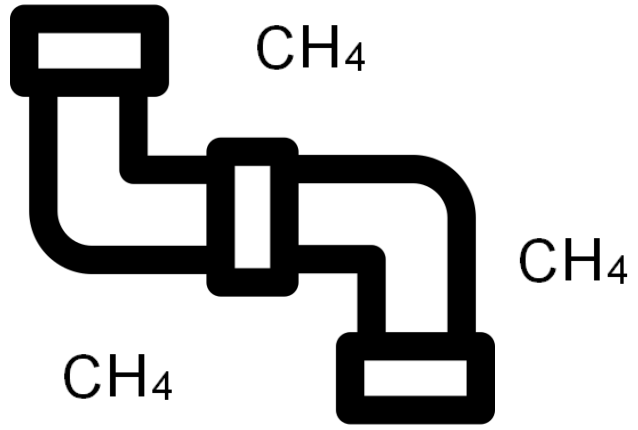
EIR Qualification

1706 a(2): The project will enable operating Energy Infrastructure to avoid and reduce GHG emissions.

Example: Gas Pipeline Replacement

Project Description:

- Program seeking to renew legacy pipeline infrastructure to reduce methane leaks.
- Over 4,000 miles needed replacement. On track to complete at a rate of ~200 miles per year.
- Investments would improve distribution system safety and reliability and remove ~1.4m metric tons of GHGs per year by 2050



EIR Qualification

1706 a(2): The project will enable operating Energy Infrastructure to avoid and reduce GHG emissions.

Let's Talk About Your Project

Contact LPO to see what financing options may be available for your project

Questions?

We are here to work with you! We meet regularly with potential applicants and provide feedback on their concepts.

Reach out to us with SEFI questions at SEFI@hq.doe.gov

Download the full Title 17 Guidance document at: **Energy.gov/LPO/Clean-Energy**

Learn more about LPO and all of its financing programs at: **Energy.gov/LPO**

Direct Pay Solar Portfolio on Schools

1. Deploys solar + energy storage on all or most schools*
2. Reduces school operating costs, creating resources for teachers and students.
3. Secures IRA tax credits to fund 30%, 50%, or more of installation costs.
4. Moves school districts towards net zero.
5. Supports thousands of clean energy jobs.
6. Leverages US DOE Loan Programs Office financing.
7. Creates a revolving fund for clean energy projects that continues after LPO financed project concludes.

** The school example is illustrative, it could be other direct pay eligible facilities*

School Project Considerations

- State organizes a “cookie cutter” portfolio / pipeline of school energy projects (e.g., solar + storage).
  - State creates Special Purpose Vehicle to be project sponsor, LPO applicant
  - $130M minimum portfolio size / $100M minimum loan size
  - LPO covers maximum 80% of project cost

- 20% of project costs minimum SPV equity/mezz requirement.
  - Appropriated State funds (green banks, schools, etc)?
  - Philanthropic capital?
  - Budget for due diligence costs during application

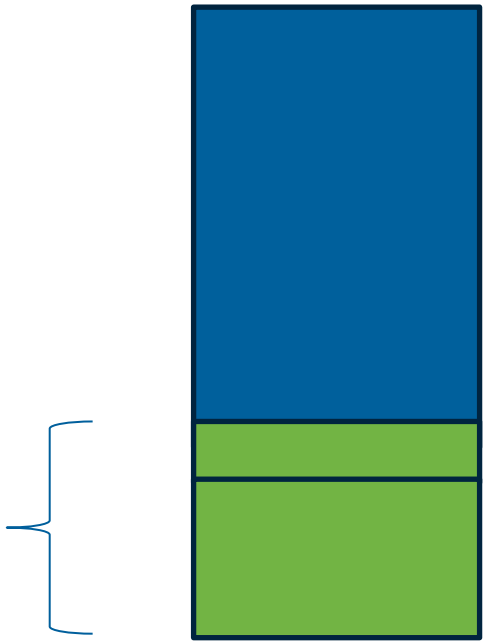
- What SEFI will provide “meaningful financial support” to the project?
  - Various State or quasi-State agencies could be SEFIs, including school construction authority.
  - Note that the “meaningful support” and equity requirements are different

Photo by Dennis Schroeder, NREL

Capital Stack Visual

The Center for Public Enterprise provides a financial model states can adapt

https://publicenterprise.org/report/cpe-elective-pay-model-2-0/



LPO loan (maximum 80% of total project cost, plan for less)

SEFI meaningful support investment to qualify under Title 17 with no technology innovation requirement

At least 20% of project cost

Equity capital organized by SEFI, could include appropriated funds, philanthropic; SEFI/SPV is project sponsor and borrower

School Project Considerations, Cont'd

- Benefit to schools can be an immediate reduction in energy costs.
- State can make projects available to schools based on leases or contracts – can be operating expense, not capital budget.
  - Project owner claims tax credits.
- State centralizes procurement and tax credits, enabling efficient replication at scale based on cookie-cutter model. Replicability provides predictable tax credit eligibility, predictable NEPA review.
- The alternative of financing with tax exempt bonds may reduce the amount of tax credits available.
- Properties could also be libraries, fire stations, other direct-pay eligible entities.

Photo by Dennis Schroeder, NREL

School Project Considerations, Cont'd

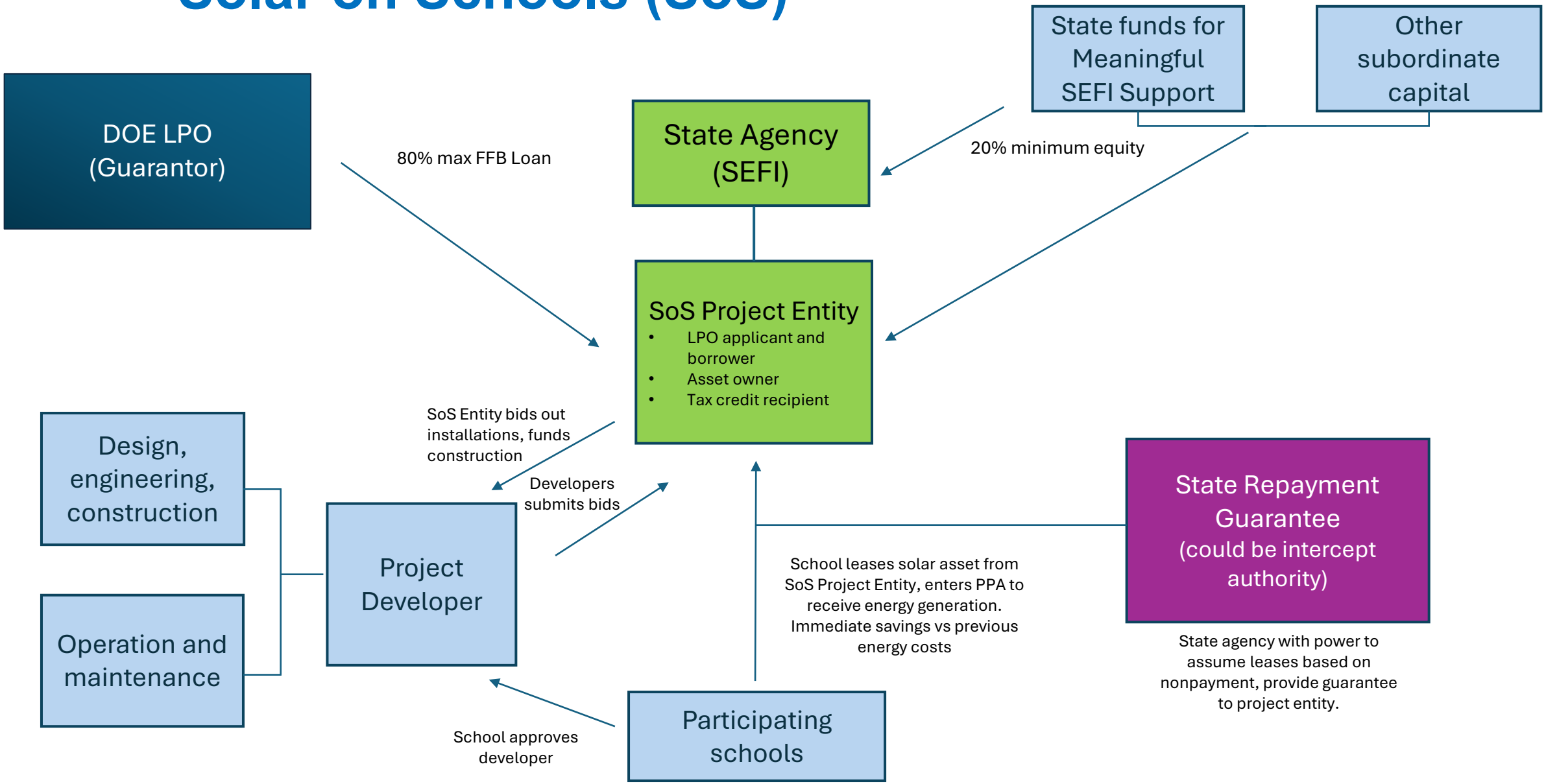
- If State or highly rated agency guarantees repayment, or school contracts have a strong rating, project may have improved risk profile, interest rate premium may be reduced, diligence may be simplified, application costs may be reduced.

- LPO finances energy technology projects: Solar, storage, HVAC equipment, etc.
  - Limited efficiency expenses may be eligible based on how they contribute to the operation of the efficient end-use technology, but some costs such as roof replacement may not be eligible costs for LPO.

- Additional possibilities for solar/storage revenue generation and EV school buses.

Photo by Dennis Schroeder, NREL

Solar on Schools (SoS)



This is one model proposed by a State. There are other approaches that can also work, including where the borrower is a project company rather than a State sponsored entity.

Campus / District Energy Projects

Matching campus energy uses to LPO financing options

Electrification of CHP / Campus Boilers

1706 Energy Infrastructure Reinvestment Program

Campus Wide Energy Efficiency Upgrades

SEFI Program (State Energy Financing Institutions)

Microgrid

SEFI Program
1706 Energy Infrastructure Reinvestment Program
1703 Innovative Energy Program

On-site Solar / Storage

SEFI Program
1706 Energy Infrastructure Reinvestment Program (replacing gensets, etc.)

LPO & Building Sector Projects

- LPO can be used to support building sector projects that are achieving targeted goals such as Building Performance Standards or other targets such as the forthcoming National Definition for a Zero Emissions Building.

- For building sector projects, LPO will most likely be used to support energy work on a portfolio of buildings, rather than single projects.

- All projects must reduce greenhouse gas emissions (GHGs).

- All projects must have a reasonable prospect of repayment.

- Projects must utilize an innovative technology or secure “meaningful financial support” from a SEFI

Building Performance Standard (BPS) Projects

To be eligible, a project must fall under a category set forth in section 1703(b) of Title XVII.

- Relevant categories may include “Renewable energy systems”, “Efficient end-use energy technologies,” and “Energy storage technologies.”

Certain costs to improve building efficiency may be eligible costs if those costs contribute to meeting the applicable BPS and to the functioning of the relevant technology for the eligible project category.

- Costs must be "necessary, reasonable, customary and directly related" (IFR 609.10(a)) to an eligible project category.
- Independent Engineer (IE) report should present evidence for this determination.

Factory Built Housing

Factory Built Housing manufacturing projects can potentially qualify for LPO financing under energy generation, energy storage, or efficient end use technologies categories. LPO can potentially finance the debt required to construct one or more manufacturing facilities.

- LPO encourages loan requests of greater than $100M
- LPO will lend to 80% of a project cost, maximum; for manufacturing facilities it is typically 40-60%
- Therefore, the facility project should be in the $200M range, which might require multiple facilities
- LPO will evaluate prospect of repayment based on company track record, customer pipeline, equity raised, and various other project finance elements
- Projects could utilize innovative energy technology, or apply under the SEFI loan authority without innovative technology

Note: The California Strategic Growth Council, a quasi-public agency in California, has a grant program for CA based factory-built housing projects that apply for LPO financing under the SEFI loan authority

Community Benefits Plans

A New Title 17 Project Application Requirement

- ✓ **A Community Benefits Plan (CBP) is now considered in the evaluation of Title 17 project applications.**
  - LPO can discuss and provide feedback during pre-application consultations.
  - CBPs will be preliminarily evaluated during the Part II evaluation.
  - Applications with inadequate CBPs may not be invited to proceed to due diligence.
- ✓ **LPO considers the quality of a CBP among the factors that indicate the prospect of loan repayment.**
- ✓ **LPO is leveraging commitments made for state and city incentives, and IRA Incentives**
- ✓ **Borrowers will report on their fulfillment of goals and activities included in the CBP.**

The Four Priorities

1) **Justice 40**
2) **Diversity, Equity, Inclusion, and Accessibility**
3) **Quality Jobs**
4) **Community & Labor Engagement**

Community Benefits Plans

More About the Four Priorities

1. Justice40

Contribute to the goal that 40 percent of the overall benefits of clean energy investment flow to disadvantaged communities.

2. Diversity, Equity, Inclusion, and Accessibility

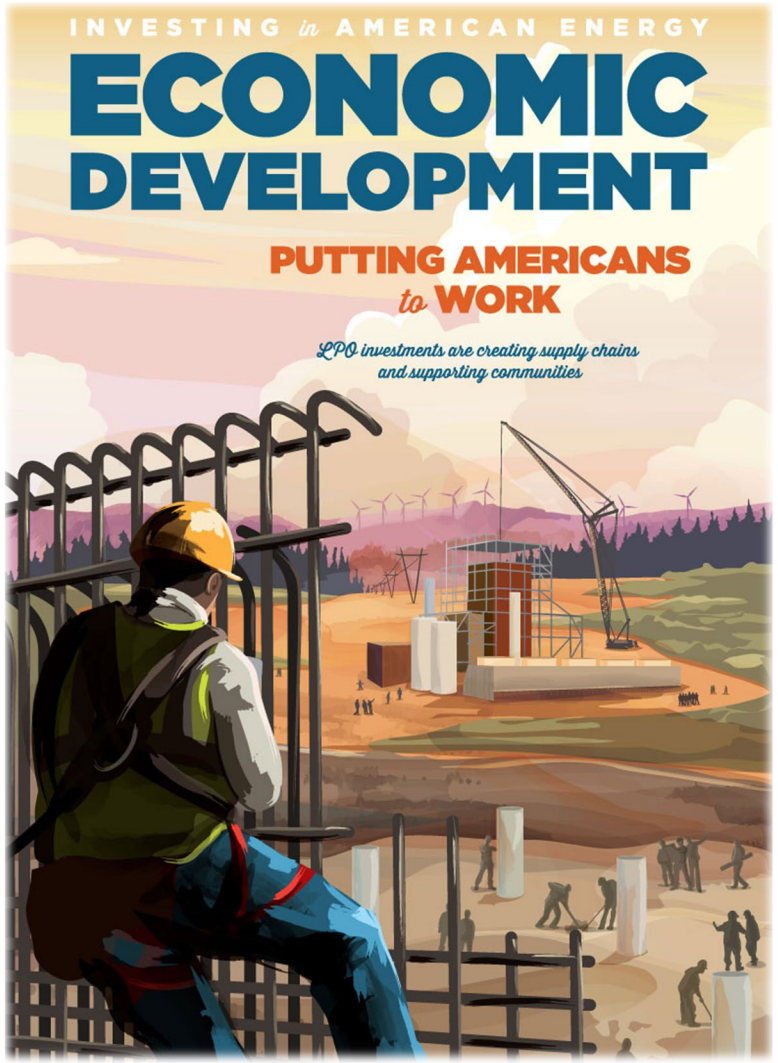
Equitable access to wealth building opportunities, strengthening ties with the community, diversifying supply chains, and contributing to the health and robustness of the surrounding community.

3. Quality Jobs

Ensuring jobs are of sufficient quality to attract and retain skilled workers in the industry with wages and benefits and worker supports, investing in workforce education and training, and supporting strong labor standards with the free and fair choice to join a union.

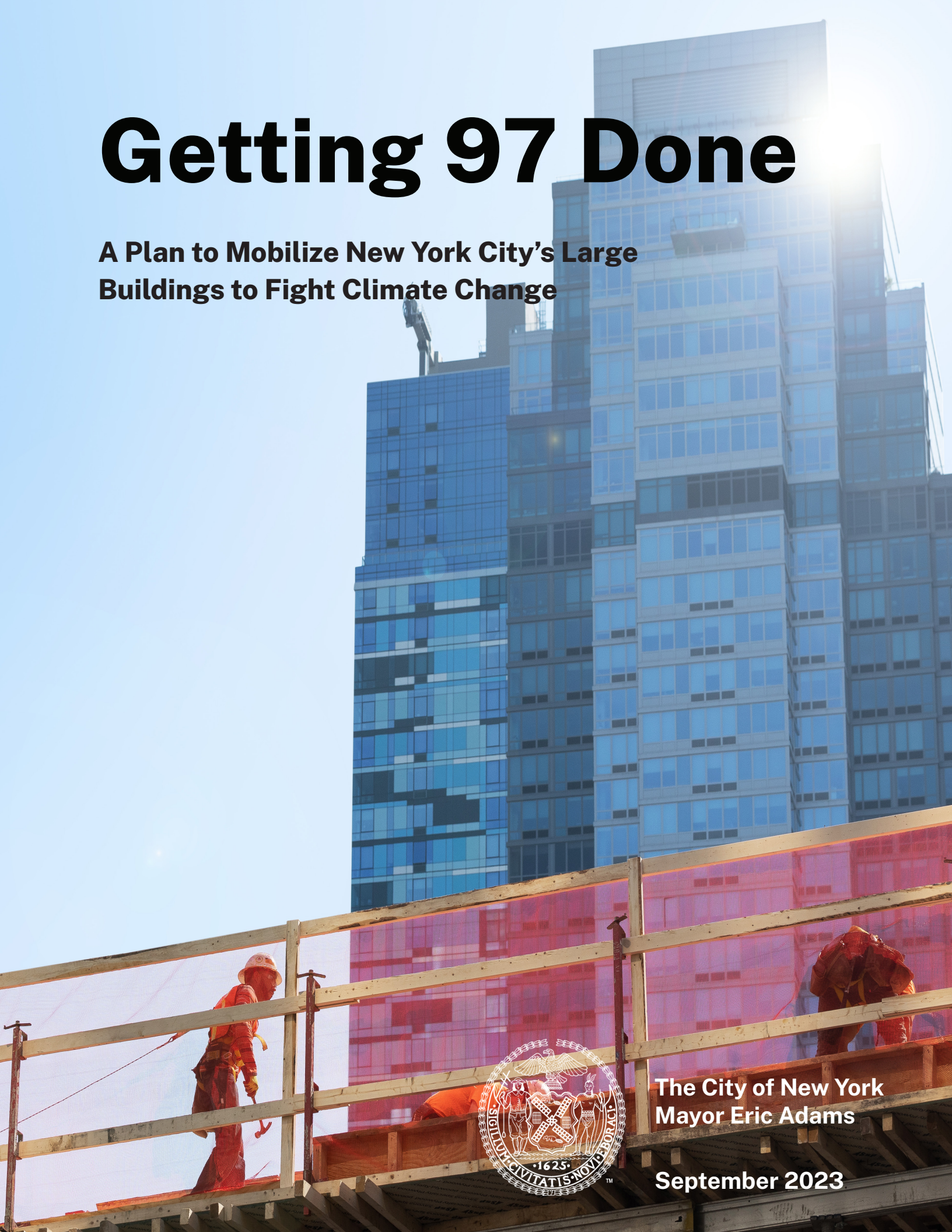
4. Community & Labor Engagement

Support meaningful engagement with labor unions and community stakeholders, such as local governments, Tribal governments, and community-based organizations, leading to formal agreements.



Getting 97 Done

A Plan to Mobilize New York City's Large Buildings to Fight Climate Change



The City of New York
Mayor Eric Adams

September 2023

Executive Summary

The most important thing New York City can do to reduce our impact on climate change is reduce citywide greenhouse gas (GHG) emissions. Because buildings account for 70% of NYC emissions, in 2019 the City enacted the Climate Mobilization Act, whose centerpiece, Local Law 97 (LL97), requires about 50,000 large buildings to cut emissions 40% by 2030 and 100% by 2050. The State has similar goals of achieving 70% clean energy by 2030 and 100% by 2040, goals that are strongly supported by LL97 mobilization in New York City. NYC government operations are also subject to LL97, with even stricter emission reduction targets than those for private-sector buildings. This plan describes the City's current and future actions and the ways that coordinated action among City, State, and Federal officials could achieve LL97's goals by helping building owners secure financing, access incentives, and reduce expenses.

Analysis by the City demonstrates that buildings are coming into compliance with LL97 but that the path to compliance is not easy for all buildings. The Department of Buildings (DOB) used building energy benchmarking data to examine how many buildings that were over their emissions limits in 2019 moved into compliance by 2022. These data revealed that about half of non-compliant buildings in 2019 have since moved into compliance, for a total of 89% compliance with 2024 targets. However, a majority (63%) of large buildings are currently over 2030 targets. Buildings that moved into compliance were generally in relatively advantaged communities (i.e., outside State-defined disadvantaged communities, or DACs), suggesting that building owners, especially those in DACs, may need additional support to achieve compliance.

New financial analysis conducted by the City reveals that roughly 15,000 buildings will need an investment of $12-15 billion to comply with 2030 LL97 emissions limits at current costs and with current technology. Of that, only $5-6 billion would pay for itself through energy savings. Roughly 25% of buildings that have to make investments will find their costs fully covered by energy savings. If undertaken, this work would generate up to 140,000 jobs.

The City's analysis suggests that with a combination of State and utility company energy efficiency (EE) incentive programs and reasonable investments from building owners, virtually all multifamily buildings and most commercial buildings could achieve their 2030 targets. This will require the City, State and Federal governments to align various programs to target assistance towards buildings needing significant upgrades to comply with LL97.

Buildings that have to do work to comply with LL97 could receive $625 million in Federal tax refunds and subsidies from the Inflation Reduction Act. Further, the opportunity exists to use the J-51 tax abatement approved by the New York State Legislature to help low-and moderate-income rental buildings, coops, and condos comply with the law. Close to 1,300 coops and

condos across the City currently over their 2030 limits could be eligible to receive the J-51 tax abatement. Finally, the New York State Public Service Commission (PSC) recently directed utilities and the New York State Energy Research and Development Authority (NYSERDA) to propose plans for offering $5 billion in EE programs for 2026-2030. A reasonable share of this funding should be directed towards LL97 compliance in multifamily buildings that must undertake deep retrofits to comply with LL97.

Achieving LL97 will require a comprehensive mobilization involving decarbonization of central systems; financing and funding; technical advice and innovation; and enforcement. To accomplish it, the City is working as follows:

Decarbonization of Central Systems:

- **Supporting** the on-time achievement of the State's historic Climate Leadership and Community Protection Act (CLCPA) targets for renewable electricity, which would lower New York City's GHG emissions and make compliance easier for all buildings;
- **Collaborating** with Con Edison on the decarbonization of its steam system, including exploring the potential use of biogas produced within the City from sewage and food waste;

Financing and Funding:

- **Asking** the PSC to ensure that a large share of the $5 billion that will be invested statewide in EE directly support LL97 compliance for buildings that will not be able to cover costs with energy savings;
- **Ensuring** that City property tax programs, most notably J-51 tax abatements, the Industrial & Commercial Abatement Program, and the NYC Industrial Development Agency's Manhattan Commercial Revitalization Program, can be fully leveraged to assist with deep retrofits;
- **Ensuring** that building owners know how to access the $625 million in Inflation Reduction Act (IRA) tax credits that this analysis shows can be claimed as part of LL97 compliance work;
- **Working** with the US Department of Energy to create a loan program dedicated to those buildings that must comply with LL97, especially buildings that might have difficulty accessing market-rate loans in the current interest rate environment.

Technical Advice and Innovation:

- **LL97 Mobilization Council:** Creating an ongoing LL97 Mobilization Council to monitor how mobilization is proceeding, and to foster collaboration among building owners and managers, financing sources, retrofit companies, and the city's workforce.
- **Enhanced Technical Assistance:** Enhancing NYC Accelerator, the City's LL97 technical assistance program, to be a one-stop-shop to help building owners understand retrofit and financing options and navigate program requirements. This work will include partnering with City Council members to bring technical assistance in their districts directly to building owners who need to do work to comply with LL97.

Enforcement:

- **Rules:** Publishing the next LL97 rule package, which maintains strong compliance incentives while providing out-of-compliance buildings with a clear and enforceable path to achieve compliance and avoid penalties.
- **Streamlined Compliance and Reporting:** Collaborating with City Council to bring other City energy-related regulations into alignment with LL97, reducing paperwork and streamlining compliance timelines.

Mobilizing New York City's large buildings to reduce their emissions and fight climate change requires an all-hands-on-deck approach. The City, State (NYSERDA, PSC), Federal government, utilities, financing institutions, advocates, labor, nonprofit partners, design and engineering firms, building owners, and communities can work together to meet the ambitious and essential goals of LL97.

Introduction

Climate change is the greatest challenge facing our planet this century. Most of us can remember when we needed to read the science pages to learn about climate change; today, we see it in the daily weather report. Canadian wildfires, heat waves, and record-setting storms have all affected New York City directly.

The most important thing New York City can do to reduce our impact on climate change is reduce GHG emissions. Buildings account for 70% of GHG emissions in New York City and 40% of GHG emissions in New York State.

To take bold action on buildings' role in emissions, in April 2019 the City Council passed the Climate Mobilization Act, the single largest emissions reduction policy in any city in the world and one of New York City's most important sustainability initiatives. Its centerpiece, LL97, requires most privately-owned buildings over 25,000 square feet ("large buildings" hereafter) to meet new GHG emissions limits by 2024, with stricter limits in 2030 and subsequent compliance periods. Approximately 50,000 buildings are subject to LL97. Most of these buildings must cut emissions 40% by 2030 and be carbon neutral by 2050.

If we work together to meet all public-and private-sector LL97 targets, we can expect to reduce GHG emissions by 6 million tons of carbon dioxide, the equivalent of taking more than 1 million cars off the road by 2030. We can avoid 150 hospitalizations per year and prevent 50-130 deaths. We can create up to 140,000 jobs,[i] expand the retrofit market to $20 billion (thirteen times its current size), and drive energy cost savings to buildings.

New York State's CLCPA, passed shortly after LL97, mandates 70% clean energy by 2030 and 100% by 2040. LL97 is critical to achieving not only the City's climate goals, but also New York State's.

This plan begins with a brief review of much of the work the City has done to date to implement LL97 and mobilize private-sector buildings to reduce emissions. It explains the Adams Administration's approach to LL97 mobilization and proposes specific achievable actions that the City will take, and that State and Federal partners can take, to enable buildings to achieve ambitious emissions reductions while we minimize financial burden and create local jobs. It provides key findings from a City-led analysis of the actual costs, energy savings, and incentive programs for LL97 compliance. This financial analysis reveals that the right combination of City, State, Federal and private action would make it possible for most multifamily residential buildings to comply with the law's ambitious 2030 emissions reduction targets and recoup their investments through available tax credits, incentives, and energy cost savings. Furthermore, commercial buildings leveraging available resources could be expected to incur manageable levels of expense to come into compliance.

This plan focuses on residential and commercial buildings. There are also more than 1,000 other buildings with industrial, manufacturing, or hospital uses that will need to reduce emissions to comply with LL97. The City has undertaken several studies, including an energy use needs study

in partnership with NYSERDA, convening a working group on co-generation, and participating in a task force on hospitals. Although not the focus of this plan, the City continues to work with these owners and to develop policy and implementation options aligned with their specific characteristics.

The Adams Administration Approach to LL97 Implementation

The Adams Administration's approach is grounded in its core values, including addressing the climate crisis with urgency, creating pathways to good jobs for New Yorkers, growing and supporting businesses of all sizes, and focusing on equity and support for disadvantaged communities. To that end, there are several principles driving our mobilization approach:

- **The City is leading by example.** NYC government operations are also subject to LL97 — in fact, City government buildings are required to meet stricter limits than private-sector buildings: a 50% reduction in GHG emissions from all City government operations by 2030 with an interim reduction of 40% by 2025. City-owned buildings have been on the forefront of decarbonization. The NYC Department of Citywide Administrative Services (DCAS) leads city government emissions reduction efforts, and in partnership with other agencies, has completed more than 13,000 energy conservation measures across 2,300 buildings over the past decade. This includes the installation of 22 megawatts (MW) of solar photovoltaics (PV) on City properties. These projects have enabled the City to reduce annual energy usage by 4.4 million British thermal units (MMBTus) and between FY2006 and FY2021 the City has reduced GHG emissions 26%, equivalent to removing 83,000 cars from city streets.[ii]

A contractor commissions the solar panels at NYPL's Charleston Branch Library in Staten Island, the first library in New York City designed for net-zero energy. Source: DCAS

- **Building owners must recognize that reducing GHG emissions is now a responsibility of property ownership.** Property ownership brings with it a set of rights and responsibilities. Just as building owners have long been responsible for compliance with regulations that ensure their occupants' health and safety, they now must also comply with regulations that protect everyone from the impacts of climate change. Building owners have a long history of stepping up to the plate to comply with City regulations to protect New Yorkers — ranging from sprinkler installations to façade safety programs — and, with support, they are doing so again to comply with LL97.

- **Penalties provide a necessary motivation for buildings to reduce their emissions; however, they are only one piece of overall mobilization.** Mobilization requires not only motivation in the form of penalties, but also funding, financing, and technical support. The City's mobilization effort is designed to ensure that owners know what they need to do, know how to achieve it, and have access to the resources they will need. Beyond penalty avoidance, there are benefits to better building performance, which include healthier and more comfortable buildings, increased market value, and lower future operating costs.
- **Compliance will be easy for some, difficult for others.** This plan recognizes that some building owners will have far more difficulty than others in complying with the law, either because their building requires more work, or because they have less access to funding, or because they have less technical and managerial capacity.
- **Given the disruptions from the COVID-19 pandemic and the scope of work required in some buildings, some flexibility is warranted for buildings that will not meet the 2024-2029 emissions limits.** This is reflected in the draft rules recently released by DOB. Demonstrated action toward compliance will be required for owners seeking penalty mitigation in advance of the 2030 emissions targets.
- **City policy must continue to be grounded in what's happening on the ground.** The City must continue to be in constant dialogue with stakeholders, including building owners and managers, retrofit providers, labor, technology companies, and financing institutions, to ensure we are working together to share best practices and troubleshoot challenges.

The Adams Administration Mobilization to Date

The Adams Administration is fully committed to implementing LL97. Since Mayor Adams took office in January 2022, the Adams Administration has been deeply invested in implementing LL97 and mobilizing building owners and has done so in the following ways:

- **Stakeholder Input.** The City has continuously engaged with stakeholders to advance LL97 implementation. Key aspects of this engagement include working with the LL97 Advisory Board to issue findings and recommendations in December 2022 and meeting with stakeholders to discuss implementation progress.
- **Rulemaking.** DOB published and finalized the first major LL97 rule in early 2023. This rule included establishing GHG coefficients and other technical aspects of compliance, such as the conversion of building occupancy types to Energy Star Portfolio Manager property types (pursuant to Section 28-320.3.1 of the law) and giving building owners the information they need to calculate emissions under the law.
- **Compliance Financial Analysis.** The City has conducted a detailed analysis of the current costs of compliance with the 2030 emissions targets, accounting for energy cost savings and available incentive programs.
- **Supporting New York State's Implementation of the CLCPA.** A cleaner grid and a cleaner Con Edison steam system are key components of the LL97 mobilization effort. The State and the City are investing in renewable energy projects and infrastructure to supply New York City with clean electricity in order to meet the State's CLCPA goals of 70% clean energy by 2030 and 100% by 2040. As part of this partnership, New York City committed to procuring its yearly electric load (after its proportional share of offshore wind renewable energy credits) in Tier 4 RECs[iii] generated from the Clean Path NY and Champlain Hudson Power Express projects, which will help fund these projects that will deliver clean, renewable solar, wind and hydroelectric power from upstate New York and Canada to New York City's grid. Tier 4 represents the largest transmission projects contracted for in New York State in 50 years and will allow the City to meet its goal of having 100% renewable power for City government operations. Many buildings in New York City, especially those that rely more heavily on electricity for total energy consumption, will benefit from New York State's electricity grid and Con Edison's steam system becoming cleaner over time. Additionally, the City is investing $191 million to grow the offshore wind industry locally, with the City's first offshore wind hub coming to the City-owned South Brooklyn Marine Terminal.
- **Technical Assistance.** Since March 2021, NYC Accelerator, a free, one-on-one program that provides resources, training, and expert guidance, has completed compliance assistance for about 5,000 buildings. This includes explaining potential compliance pathways with LL97, identifying appropriate energy conservation measures, and connecting buildings with service providers, utility and state incentive programs, and additional financing options.

DOB and NYC Accelerator have been offering information sessions on LL97 compliance in collaboration with other stakeholders, including City Council members. Fifty-five percent of active NYC Accelerator buildings subject to LL97 are affordable.

- **Renewable Energy Credits Market Research.** In partnership with NYSERDA, the City reviewed research on the future market for RECs, including the costs and availability of Tier 4 RECs from the Champlain Hudson Power Express and Clean Path NY renewable energy projects. This research indicated that the price of RECs is expected to be close to or higher than the costs of paying LL97 penalties. When the likely alternative course of action would be paying penalties, building owners' purchase of RECs, as authorized in LL97, is the outcome that is most supportive of LL97 and CLCPA goals because it generates funding for important renewal energy projects.
- **Data Acquisition.** The City has been working with other City and State partner agencies to obtain building-level data about rent-regulation and income-restriction programs. This will enable the City to determine each building's compliance path under the law, including which buildings are subject to Article 321 of LL97, which creates a distinctive set of compliance pathways for affordable housing and houses of worship.
- **Biogas.** The City has been exploring the use of locally-generated biogas from sewage and food waste to decarbonize difficult-to-electrify buildings and the Con Edison steam system. If fully captured and digested, and targeted appropriately, the City estimates that sewage and food waste could generate enough renewable biogas to replace 7-20% of the current Con Edison steam system's methane consumption.

This work, along with other efforts, has been essential to providing clarity to building owners, ensuring the City has the data and processes in place to assess compliance with the law, and the clean generation infrastructure in place to translate building investments into GHG emissions reductions. Stakeholder input and financial analysis directly informed this mobilization plan.

Key Analytical Findings

Using data from building energy benchmarking and data on retrofit costs from two previous studies, Pathways to Carbon-Neutral NYC (2021) and One City Built to Last Technical Working Group Report (2016), the City conducted a new detailed financial analysis of costs for the retrofits and upgrades buildings would likely need to complete to meet 2030 limits. The analysis examined emissions target overages and the necessary types of work to reduce energy and emissions enough to bring those buildings into compliance. The types of retrofits range from low-effort EE measures, such as lighting and control upgrades, to comprehensive building system upgrades and heat-pump equipment. Costs for these retrofits range from $2 per square foot to over $45 per square foot and were verified to be within the range of current estimates based on feedback provided by industry stakeholders.

The analysis primarily focused on multifamily and commercial buildings, which make up nearly 90% of buildings projected to be out of compliance in 2030. Multifamily and commercial buildings covered by Article 321 were included in the analysis to understand their costs if they chose to pursue compliance under Article 320. This scenario would provide greater emissions reduction and energy savings than those achieved by the prescriptive energy conservation measures required for compliance with Article 321.

In addition to retrofit costs, this new analysis takes into account energy cost savings resulting from EE work and available incentives from utility, State, and federal programs. The combination of these inputs provides a high-level overview of the total cost of compliance for 2030 and reveals both the opportunities and limitations of existing incentives.

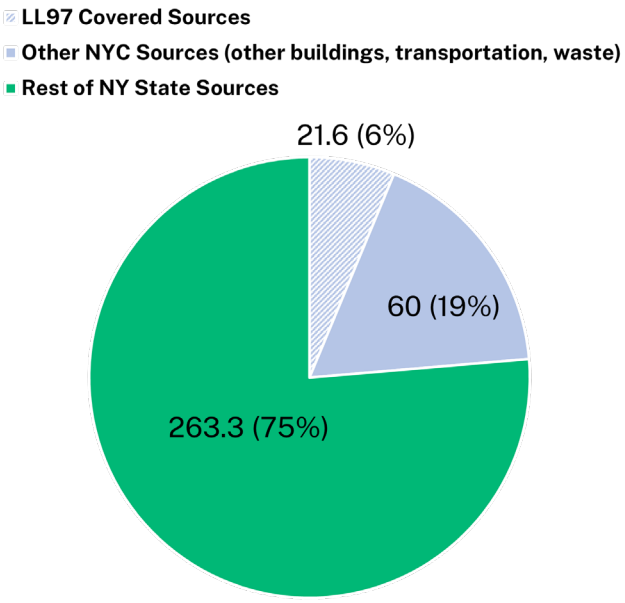
The City also conducted this financial analysis segmented by buildings located within and outside DACs This layer of analysis enables the City and other stakeholders to target resources to communities who may need particular support achieving compliance.

The new financial analysis, combined with other LL97 analyses, generated the following key findings:

Climate Impacts and Progress to Date

- **LL97's success matters far beyond New York City.** As of 2020, the most recent year for which we have complete data, NYC citywide emissions made up 25% of State emissions. (See Figure 1.) NYC's large buildings account for 6% of state emissions. That means that LL97 mobilization would accomplish 6% of the State's entire GHG goals. LL97 is also a model for other cities who are making policy on building performance standards.

Figure 1: Emissions as Share of NY State Emissions, 2020 (Million Metric Tons C02e)



- **Many buildings that would have been non-compliant with 2024 limits when LL97 became law have since made reductions that put them into compliance.** In 2019, 20% of buildings were projected to be out of compliance with limits for 2024-2029. Since then, nearly half of them have moved into compliance. This demonstrates that many buildings are already mobilizing. It should be noted that these buildings were generally (a) over their limits by smaller amounts (20% or less), and (b) in relatively advantaged communities (i.e., outside of DACs). Only 39% of newly compliant buildings are in DACs. This suggests there may be structural challenges to compliance and that many buildings, especially those in DACs, need greater support to achieve compliance.
- **Achieving the broader, deeper 2030 reductions is both more difficult and more important than the 2024 reductions, both in terms of environmental benefits and job creation.** The 2024 limits are a first step toward emissions reductions. Based on 2022 data, 89% of properties are already below their 2024 limits. In a sense, 2024 is a "warm-up period" ahead of the more ambitious and important reductions that are required by 2030. (See Figures 2 and 3.) Only a minority (37%) of large buildings are below the 2030 limits, while 63% are currently over them. Mobilizing these buildings to make significant reductions as soon as possible is essential to combating climate change.

Figure 2: Projected Compliance for LL97-Covered Buildings

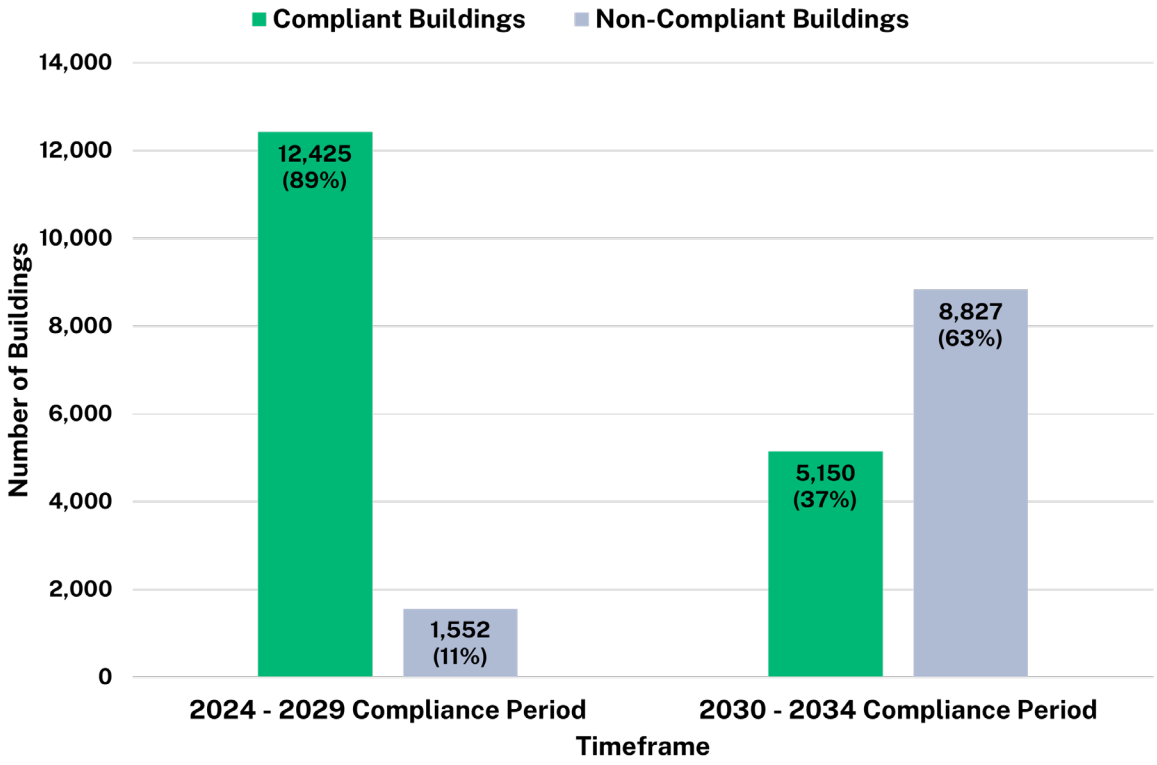
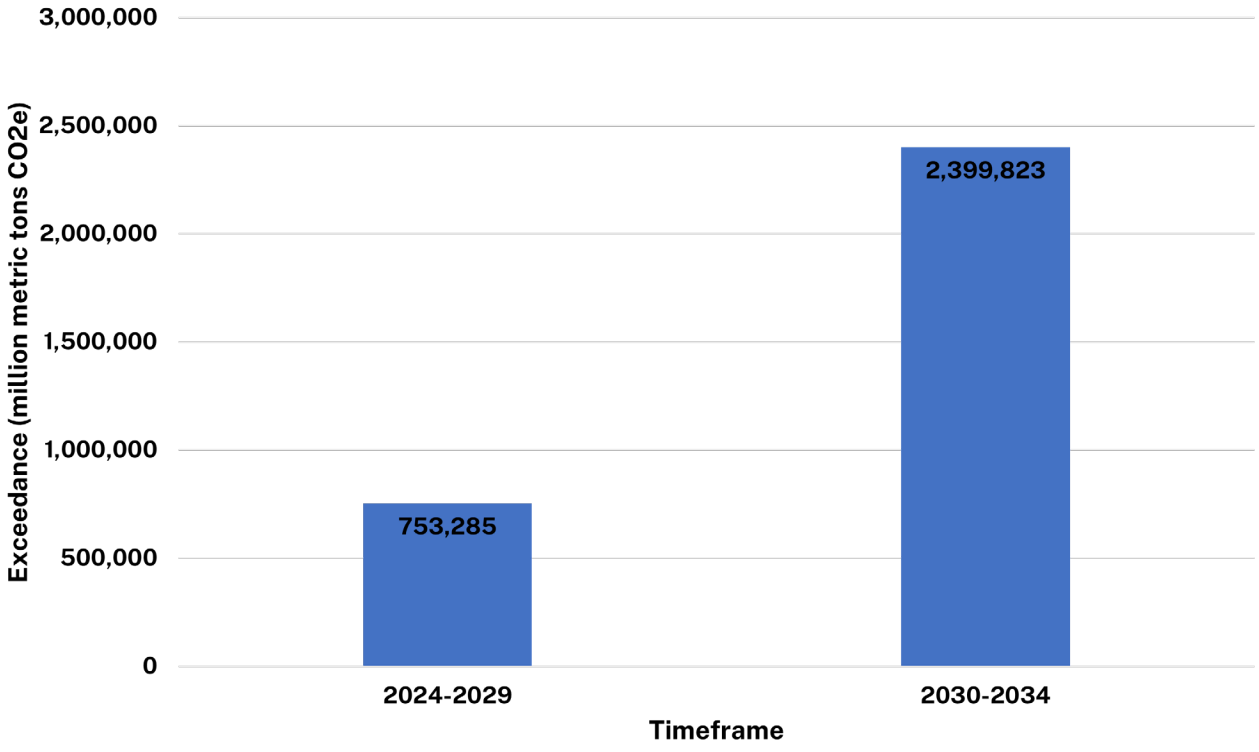


Figure 3: Emissions Reduced through Full Compliance



Financial Costs and Benefits of Compliance

- **Roughly 15,000 buildings will need investment to comply with LL97 by 2030.** This work will require an estimated investment of $12-15 billion, potentially creating up to 140,000 jobs. LL97 investments can be significant and are worthwhile. Some costs will be recouped in energy savings. Critically, mitigating climate change slows the trend toward more extreme weather, which in turns saves lives and reduces the financial and human costs of disaster mitigation and response.

- **The transition to lower carbon buildings will be easy and cost-effective for some buildings, but difficult and expensive for others.** About 25% of buildings currently projected to be over their 2030 limits would only need to complete a package of relatively low-difficulty EE measures, such as weatherization and lighting and controls upgrades to achieve compliance. The cost for this type of work is relatively low and can be recovered by energy cost savings. Approximately 40% of buildings projected to be over their 2030 limits will require much more comprehensive retrofits, including extensive EE measures in conjunction with electrification of heating and hot water systems, to come into compliance. Costs can be significant for this combination of work, and existing incentives are not sufficient to make it cost-effective for all building owners. The remaining 35% of buildings are somewhere in between. They will need to do a mix of high-and low-cost EE work to meet their limits. For these buildings, the combination of incentives and resulting energy savings make doing the work worthwhile from an economic standpoint. (See Figure 4.)

- **There are many buildings — both residential and commercial — where the cost of compliance is likely to be entirely recovered by energy savings.** A total of 529 commercial and 2,946 multifamily buildings — including 1,345 buildings covered by Article 321 — fall into this category. For these owners, the primary barrier to compliance is the availability of capital. Property-Assessed Clean Energy (PACE) financing — low-cost financing for commercial buildings that is paid back through property tax bills — can provide an effective solution for commercial buildings. However, work must be done to ensure that multifamily building owners — especially those in DACs — can access financing.

- **Some funding gaps exist today, and many of them can be addressed through targeted programs.** In reviewing funding and financing resources to support compliance, the City identified gaps between costs of compliance and cost savings from energy savings and identified which existing programs can fill those gaps. The analysis identified various cases in which existing programs are not yet filling those gaps. This finding informed this plan's recommendations (discussed in "Our Plan") for action the City, State and other stakeholders can take to help fill those gaps.

- **With current costs and today's technology, there are hundreds of commercial buildings where the cost of compliance, even after accounting for energy savings, is particularly high.** These buildings generally have on-site energy cogeneration or are powered by the steam system. In the near term, these building owners may purchase RECs to comply with LL97. Going forward, the City will (1) work with the LL97 Mobilization Council and other stakeholders to support development of technological innovations to enable emissions reductions at lower costs, (2) work to identify funding and financing options to support

Figure 4: Costs, Savings, and Credits for Different Buildings Types by Percentage Over Limit

Many multifamily buildings could be eligible for the J-51 tax abatement to cover a portion of compliance costs.

Buildings in DACs will need targeted programs for incentives, low-cost financing, and technical assistance.

Type of Work Needed to Meet Compliance	Description	Multifamily (Not DAC)	Multifamily (DAC)	Commercial (Not DAC)	Commercial (DAC)	Total
0-20% > 2030 limits Low-Effort EE	# Buildings	1,824	1,122	366	163	3,475
	# Residential Units	171,335	87,582	1,342	543	260,802
	Square Footage	200,418,465	91,064,775	95,852,193	28,147,082	415,482,515
	Compliance Costs ($M)	380 - 470	170 - 210	290 - 350	80 - 100	920 - 1,130
	Energy Cost Savings ($M) (15-yr. PV)	350 - 430	160 - 200	390 - 470	110 - 140	1,010 - 1,240
	Potential Fed IRA Tax Credits ($M)	23 - 29	11 - 13	43 - 53	13 - 15	90 - 110
	Remaining Balance ($M)	-7 - -11	1 - 3	143 - 173	43 - 55	180 - 220
	Present Value of Penalties for 2030-2050 ($M)	240 - 290	110 - 140	60 - 70	20 - 30	430 - 530
20-50% > 2030 limits Low-Effort + High-Effort EE	# Buildings	2,245	1,971	449	171	4,836
	# Residential Units	235,205	127,836	1,560	65	364,666
	Square Footage	222,314,030	151,697,479	102,134,060	22,591,988	498,737,557
	Compliance Costs ($M)	1,600 - 2,000	1,100 - 1,400	1,800 - 2,200	400 - 480	4,900 - 6,100
	Energy Cost Savings ($M) (15-yr. PV)	620 - 760	430 - 510	510 - 620	110 - 140	1,700 - 2,000
	Potential Fed IRA Tax Credits ($M)	130 - 150	86 - 110	92 - 110	20 - 25	330 - 400
	Remaining Balance ($M)	-850 - -1,090	-580 - -780	-1,200 - -1,470	-270 - -320	-2,900 - -3,700
	Present Value of Penalties for 2030-2050 ($M)	580 - 700	410 - 500	180 - 210	47 - 57	1,200 - 1,500
More than 50% > 2030 limits Low-Effort + High-Effort EE + Electrification for Multifamily Low-Effort + High-Effort EE Only for Commercial and Art. 321	# Buildings	1,844	2,619	615	281	5,359
	# Residential Units	173,154	182,845	2,482	622	359,103
	Square Footage	172,949,430	174,395,435	90,496,406	35,574,014	473,415,285
	Compliance Costs ($M)	2,300 - 2,800	2,200 - 2,600	1,600 - 1,900	600 - 800	6,700 - 8,100
	Energy Cost Savings ($M) (15-yr. PV)	1,150 - 1,410	780 - 940	450 - 560	170 - 210	2,600 - 3,100
	Potential Fed IRA Tax Credits ($M)	130 - 160	100 - 120	80 - 100	30 - 40	340 - 420
	Remaining Balance ($M)	-1,020 - -1,230	-1,320 - -1,540	-1,070 - -1,240	-400 - -550	-3,760 - -4,580
	Present Value of Penalties for 2030-2050 ($M)	2,900 - 3,600	1,300 - 1,600	470 - 570	380 - 460	5,050 - 6,230

Energy cost savings and IRA tax credits will cover the cost of compliance. Only financing of upfront costs is needed.

Incentives could support more costly, deep energy retrofits, along with financing of upfront costs.

Significant incentives could support more expensive electrification work and financing of upfront costs.

The cost of paying penalties is far less than the cost of compliance. These commercial buildings might decide to only do low-effort energy efficiency work, which would pay for itself over time.

these buildings' emissions reductions, and 3) seek opportunities to collaborate with Con Edison on the decarbonization of the steam system.

The City will continue to update the analysis as new data are generated, new programs are created, and we receive additional information from stakeholders including building owners, financing organizations, and retrofit companies.

Our Plan to Get LL97 Done

Mobilizing New York City's large buildings to reduce their emissions and reduce the impacts of climate change requires an all-hands-on-deck approach. The City, State (NYSERDA, PSC), Federal government, utilities, financing institutions, advocates, labor, nonprofit partners, design and engineering firms, building owners, and communities need to work together and contribute to meeting the ambitious and essential goals of LL97.

The City will leverage its rulemaking and enforcement authority and use outreach, technical assistance, benchmarking, and policymaking tools to support compliance. Existing funding and financing resources, along with new resources that could be strategically targeted, from Con Edison, NYSERDA, NY Green Bank, New York City Energy Efficiency Corporation (NYCEEC), and programs like the Solar Tax Abatement, J-51 and ICAP, could support LL97 compliance.

The following actions will be key to LL97 Mobilization:

Financing and Funding Action

To ensure that LL97 is a success, the City will work with the State, utilities, Federal government, and other stakeholders to fill gaps in funding needs in the following ways:

- **Partner with New York State.** The City is working to craft responses to the PSC's Order Directing Energy Efficiency and Building Electrification Proposals issued on July 20, 2023. Per the order, Con Edison, NYSERDA, and National Grid must develop proposals for EE programs out of $5 billion in statewide funding for the years 2026-2030. The July PSC order puts a focus on disadvantaged communities and low-income populations with a goal of 40% of program benefits accruing therein. The City will advocate to the PSC that Con Edison and NYSERDA programs be designed to prioritize assisting buildings that are far out of compliance with their LL97 targets;
- **Implement the J-51 tax abatement.** The New York State Assembly and Senate recently passed a renewed J-51 tax abatement. If signed by the Governor and adopted with City Council legislation, it could be used by the City to offer eligible multifamily buildings property tax breaks to cover a portion of their LL97 compliance costs. If the Governor signs the legislation, the Administration would work with City Council to introduce legislation to enact the J-51 tax abatement, after which the New York City Department of Housing, Preservation and Development (HPD) would update the Certified Reasonable Cost (CRC) schedule to ensure that retrofits for LL97 compliance are eligible. These steps could devote significant City resources to help low-and-moderate income multifamily buildings, including close to 1,300 condos and coops projected to be over 2030 limits, comply with the law;
- **Help building owners leverage Inflation Reduction Act (IRA) funding.** The IRA includes tax credits that could account for roughly $625 million in value for buildings doing LL97 compliance work;

- **Collaborate with NYSERDA, NY Green Bank, NYCEEC, and other local nonprofit lenders** to utilize a portion of $20 billion in funding available from the federal Greenhouse Gas Reduction Fund (GGRF) to offer low-cost financing and credit enhancement for multifamily buildings, especially in DACs;
- **Promote PACE financing,** a mechanism that allows owners to finance the up-front costs of retrofits to their property and repay them through their property tax bill. This program would be most helpful for commercial buildings that are within 50% of their emissions limits and buildings in which owners' equity, alongside cost savings, can achieve compliance at a reasonable cost. It could also be used in major renovations, in conjunction with other financing, to cover the added cost of installing more expensive, low-carbon technologies;
- **Help building owners leverage the Industrial & Commercial Abatement Program** (ICAP), which can be used by eligible building owners to help cover retrofit costs required for LL97 compliance. The program provides abatements for property taxes for periods of up to 25 years for projects that are built, modernized, expanded, or otherwise physically improved. For eligible commercial and industrial buildings that need to complete substantial work to reduce emissions, such as modernization of HVAC systems and conversion of heating systems to heat pump equipment, ICAP can provide tax relief that helps cover these items within a large-scale renovation project;
- **Help building owners access the New York City Industrial Development Agency's (NYCIDA) Manhattan Commercial Revitalization Program (M-CORE) program.** This program will provide tax incentives to support transformative renovations of aging commercial office buildings in Manhattan south of 59th Street. It will help building owners decrease vacancy and attract world-class tenant companies. Tax incentives will apply to investments that support compliance with LL97, along with other transformative investments;
- **Work with NYSERDA and its NY Green Bank division** to encourage private-sector companies to submit proposals to the U.S. Department of Energy's Loan Programs Office's (LPO) Title 1703 Clean Energy Financing Program, and support those proposals by offering State Energy Financing Institutions support under NYSERDA's new State Energy Financing Fund. The Bipartisan Infrastructure Law and the Inflation Reduction Act (IRA) provided an additional $40 billion of funding for the new State Energy Financing Institution (SEFI) program. SEFIs can provide financing support or credit enhancements for eligible clean energy projects and take steps to reduce financial barriers to deploying them. A loan guarantee or direct funding from the LPO could provide multiple financing options for buildings to comply with LL97 and fill gaps in the financing market, specifically for borrowers with low credit.

These actions, especially if undertaken in combination, would yield dramatic results. If the State and utilities target their incentive programs toward multifamily buildings that must comply with LL97, and these buildings combine IRA and (if eligible) J-51 programs, most of these buildings would wind up recouping LL97 compliance investments through available tax credits, incentives, and energy cost savings. The City's analysis suggests that with a combination of State and utility

company EE incentive programs and reasonable investments from building owners, virtually all multifamily buildings and most commercial buildings could achieve their 2030 targets. This will require the City, State and Federal governments to align various programs to target assistance towards buildings needing significant upgrades to comply with LL97.

DOB Rules

In September 2023, DOB released a package of rules outlining compliance options for private-sector buildings. This includes guidance for what would be required for buildings to use LL97's Good Faith Effort clause to receive penalty mitigation. The proposed rules indicate that buildings with emissions over their limits in the first compliance period (2024-2029) would potentially have four options:

- **Prove that work to meet the emissions limits is underway**
- **Demonstrate that the building is engaged in long-term decarbonization planning** and will achieve near-term compliance with the 2024 and 2030 emissions limits (without purchasing RECs for the 2024-2029 period)
- **Purchase RECs to deduct from GHG emissions up to the amount of their electrical load**
- **Pay penalties**

The proposed rules also set forth a framework for the issuance of mediated resolutions, which will include pathways to compliance.

The Statement of Basis and Purpose of the proposed rules indicates the Administration's intention to support a Good Faith Effort pathway for 2030 that demonstrates owners must be doing work well in advance of the 2030 deadline, with appropriate time allowed to reasonably achieve compliance with the new limits.

As noted above, for the 2024-2030 compliance period, the proposed rules would not allow the purchase of RECs for buildings choosing the decarbonization plan pathway as part of good faith efforts. Buildings not pursuing this option are permitted to use RECs to cover their electricity emissions, pursuant to LL97. These proposed rules do not cover the 2030-2034 compliance period.

The proposed rules would also reward owners who do early beneficial electrification, that is, replacing fossil fuel equipment with high-efficiency electric-based equipment prior to 2030. This will expand the market for heat pumps and other electric equipment, another form of emissions reduction mobilization.

LL97 Mobilization Council

The City will create an ongoing LL97 Mobilization Council to monitor how mobilization is proceeding and foster collaboration among building owners and managers, financing sources, companies that perform retrofits, and the workforce development community. Insights and intelligence from those closest to the implementation work is essential to ensuring the City and

other partners can support owners, remain up to date on the latest developments, and work together to address challenges.

The LL97 Mobilization Council builds on the important work accomplished by the LL97 Advisory Board. It will share information with the City regarding how buildings are complying with the law and provide on-the-ground intelligence to inform policy, outreach, and partnerships.

The Council will have three key working groups:

- **Workforce and buildings retrofitters.** This group will keep the City and other stakeholders up-to-date on which sectors and professions are experiencing high demand and whether there are constraints in the labor supply, technical solutions, or investment capital. It will help identify training opportunities and service providers to connect trained workers with the firms that need them. Building retrofit companies will share insights, including those about what types of retrofits are most attractive to building owners and other insights.
- **Building owners and managers.** This group will provide feedback on City services such as NYC Accelerator. This group will also ensure the City is aware of building owners' concerns, hurdles, and successes implementing retrofits so the City and partners can address obstacles and share best practices and resources.
- **Financing organizations.** This group will be the City's pulse on who is seeking and providing

Mackenzie Kinard, Senior Manager of Energy and Sustainability at NYPL, performs a walk-through during envelope commissioning at NYPL's Charleston Branch Library in Staten Island. | Source: DCAS

financing for LL97 projects. It will illuminate opportunities for and obstacles to lenders to identifying and deploying capital for the projects and provide information on how lenders, the City, and other partners can support building owners' raising sufficient project funds.

These groups will include engineering and architecture professionals; building owners and managers; energy and utility experts; labor leaders; advocates; and firms involved in real estate, construction and technology development. They will ensure the City has up-to-date information on the state of implementation on the ground. They will troubleshoot challenges that arise, share best practices, and provide feedback on how we can continually support building owners' efforts to reduce their emissions and upgrade their facilities.

Enhanced Technical Assistance and Outreach

LL97 compliance requires long-term planning and implementation of EE measures with the end goal of reducing the city's carbon emissions, and NYC Accelerator will provide support throughout every stage of the process. The City is streamlining NYC Accelerator to be a comprehensive resource to guide building owners through necessary steps and options to achieve LL97 compliance. It will empower stakeholders to better understand retrofit and financing options, navigate program requirements, and access technical guidelines.

NYC Accelerator experts support building stakeholders by educating them on the upgrades, retrofits, financing, and financial incentives available to their specific building. They also help building decision-makers determine which options work best for their buildings' needs and connect them to available resources in the marketplace of engineers, contractors, and lenders.

The Administration and City Council have partnered on a new program offering called "Climate-Friendly Buildings: Local Law 97 in Your Neighborhood." This offering will create invitation-based one-on-one consultations hosted by City Council members at which NYC Accelerator account managers will help owners develop a plan to comply with the law by 2025, 2030, and beyond. Building off continued DOB outreach and engagement with LL97 building owners, the agency will offer "NYC Accelerator Days at DOB." These events will provide building stakeholders a hands-on opportunity to meet with their dedicated NYC Accelerator account manager for an in-person session to map out plans for LL97 compliance.

In addition to in-person events, the City is doing other targeted outreach. Recently, the City analyzed the results of the 2022 energy benchmarking data reported under Local Law 84 of 2009 and projected which buildings may be in violation of their emissions limits in 2024 and 2030. In the coming weeks, NYC Accelerator will reach out individually to buildings projected to be out of compliance, offering technical assistance and identifying funding, financing, and retrofit providers.

Streamlined Legislation

The Administration will work with City Council to bring other City energy-related mandates into alignment with LL97 to reduce the cost of compliance to building owners and managers. This is informed by a recommendation from the LL97 Advisory Board to harmonize LL97 with existing City and State laws and regulations, align City and State decarbonization and EE goals, limit confusion where multiple regulations and timelines overlap, and reduce costs for building owners who must hire third parties to prepare and submit compliance reports.

Under Mayor Adams' leadership, the Administration introduced a zoning text amendment, City of Yes for Carbon Neutrality. This is an important aspect of our LL97 strategy and addresses challenges that have prevented, slowed, or increased the costs of LL97 compliance. Building EE and decarbonization measures that will become easier under City of Yes include insulation, building electrification, rooftop solar and wind, community solar, and onsite energy storage.

Conclusion

LL97 mobilization will require a collaborative effort of building owners, the State, the City, the Federal government, the private sector, utilities, and other stakeholders. One of the boldest pieces of climate legislation ever passed requires that stakeholders work together to help building owners comply with the law and achieve climate mobilization. This report, the first of its kind from the City, has revealed that 1) it is possible for most multifamily residential buildings to comply with LL97's 2030 emissions reductions targets while recouping investments through available tax credits, incentives and energy cost savings, and 2) commercial buildings can also comply, by leveraging incentive and financing opportunities and making investments that are within reach for that sector.

The City is driving mobilization by enlisting partners to create a set of funding and financing opportunities for owners, ensuring owners know what is available to them and have support accessing it, and creating rules that maintain compliance incentives while putting buildings on a workable path to emissions reductions. As state and federal partners play their own part, building owners will be able to achieve GHG emissions reductions that will create a cleaner and more climate-ready city. New York City's successful mobilization will also serve as a model to other global cities as they set out to decarbonize their buildings.

Spotlights

Since LL97 was passed, a variety of building owners across all five boroughs have reached out to NYC Accelerator for assistance with decarbonization – both to comply with the law and to improve building and resident health. These spotlights show the many pathways available to building stakeholders.

Residencia Esperanza
616 West 137th Street (Hamilton Heights)

Built in 1906, this Housing Development Fund Corporation building is about 41,000 square feet and has 25 units. It currently runs on an old, inefficient. #2 fuel oil boiler with a steam distribution system. Residencia Esperanza is located in a DAC and most residents are artists, teachers, journalists, and filmmakers. The residents are interested in EE, tenant comfort, and water reuse, and feel that moving off oil to full electrification is a top priority.

After completing a NYSERDA Flex Tech Study, the board opted to postpone full electrification. There are currently no rebates associated with the $300,000 cost of upgrading existing electrical infrastructure. The board decided to pursue the Scalable Affordable Financeable Electrification (SAFE) pilot, a NYSERDA Demo Program, and partially electrify their domestic hot water supply. They will consider full building electrification when alternative funding options become available. The board is obtaining bids for rooftop solar panels and planning to take advantage of tax credits and the Solar Property Tax Abatement, which has been passed by the New York State Legislature and is awaiting Executive action. Based on its planned partial electrification, Residencia Esperanza is expected to be LL97-compliant through 2030.

Residents in front of their building
Source: misanthropictures

8-Unit Condo (Upper West Side)

Address anonymized at owners' request

The property was built in 1885, renovated in the 1960s, and converted to its current configuration in 1988. The owners, a couple, have been sharing an inefficient #2 fuel oil boiler with the adjacent building for their space and domestic hot water heating. Because the building is under 25,000 square feet, the building is not subject to LL97. The owners were nevertheless motivated to make their building more energy efficient and comfortable for their renters and to stop relying on the neighboring property to supply fossil fuel heating.

After making contact with NYC Accelerator, they completed a NYSERDA Flex Tech Study to provide recommendations on building electrification and electrification-readiness measures. Based on the results of this study, and coordination with various contractors, electricians, and engineers, they are working to replace the building heating system with air-source heat pumps and install instantaneous electric tankless domestic water heaters. They plan to enroll in the New York State Clean Heat and Low Carbon Pathways Programs to obtain incentives for the heat pump equipment. They are also coordinating with the NYC CoolRoofs program to install energy-saving reflective rooftops to reduce roof temperatures, internal building temperatures, and carbon emissions.

While the incentives through existing utility and state programs will help pay for a portion of the overall cost, the electrical upgrades required for this work, approximately $200,000, comprise a huge portion of the total project cost of approximately $500,000. High costs for electrical upgrades are not currently covered by any existing incentive programs. Because of this, the owners are seeking a loan that can cover the high cost of these electrical infrastructure upgrades. They also hope they will be able to obtain additional rebates and grants to decrease the total loan amount.

Building exterior

111 4th Avenue (Greenwich Village)

This 156,000-square-foot structure was built as a garment factory in 1921 and converted to a coop in 1980. In 2017, two years before LL97 was enacted, the board began researching ways to improve aging infrastructure and resident comfort. The aging two-pipe hydronic switchover system required around-the-clock maintenance. In addition, massive steel-framed windows allow direct sun to come into some units, while others remain shaded. The board's idea was to modernize the system with equipment that would allow residents the choice to heat or cool their unit independent of other units.

NYC Accelerator connected the building's board with a reliable service provider and offered incentive information. The coop participated in the New York State Clean Heat and Low Carbon Pathways Programs and chose to install a hybrid heating plant that combined air-to-water heat pumps and a condensing boiler system to increase comfort and efficiency while reducing carbon emissions. Individual unit owners will have smart thermostats to regulate temperature. The new equipment requires less maintenance and the building is LL97-compliant through 2050.

Air-to-water heat pumps on roof of 111 4th Avenue

Costs and Savings

- $7.7 million gross cost
- $97,000 in estimated energy and cost savings/year (38%/year)
- $1.65 million incentives received (22% of cost)

We wanted to allow people to control their own destiny regarding comfort. When LL97 came about, we pivoted the pieces of the puzzle to align with the law's objectives more closely.

-Eric Einstein, co-op board president

Multi-Family Mixed-Use Affordable Housing (Manhattan)

Address Anonymized at owner's request

This complex of seven pre-war buildings lacked sufficient building envelope insulation, which led to inconsistent building temperatures and occupant discomfort. In addition, several properties were facing LL97 penalties. The owner initiated contact with two trusted service providers within the NYC Accelerator program. This collaboration enabled them to access free technical assistance and financial incentives for implementing energy-saving upgrades. The owner opted to improve roof insulation, which lowered gas consumption, improved occupant comfort, and will allow for downsized heating and cooling equipment in the future. As a result, the properties have successfully reduced operational costs and are now on the path to achieving compliance with LL97.

Costs and Savings

- Total project cost: $555,826
- Utility incentives received: $470,752
- Net cost: $83,074

Endnotes

[i] "Retrofit Market Analysis." Urban Green Council. 2019. Jobs analysis provided by Dr. David Hsu of MIT. https://www.urbangreencouncil.org/wp-content/uploads/2022/11/2019.06.18-Urban-Green-Retrofit-Market-Analysis.pdf

[ii] NYC Department of Citywide Administrative Services LL97 Implementation Action Plan. https://www.nyc.gov/assets/dcas/downloads/pdf/energy/reportsandpublication/local_law_97_implementation_action_plan_2021_report.pdf

[iii] A renewable energy certificate, or REC, is a market-based instrument that represents the property rights to the environmental, social and other non-power attributes of renewable electricity generation. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy source.

Comments for consideration to the Montgomery County Council
Transportation and Environmental Committee Hearing on
Building Energy Performance Standards (BEPS) Financing: September 16, 2024

My name is Joe Bucherer, the President of the Board at the Elizabeth at 4601 N Park Ave and Chair of the Community Advisory Committee for the Village of Friendship Heights. I had the opportunity to address the Committee in July, and a group of State Delegates and Senators in August.

When I spoke before the Committee in July, I did not have the engineering financials in hand. We now do, and per the topic for the meeting on September 16th, I think these financial facts will be valuable.

My comments can be applied to the other buildings of the same age to a degree, especially those in the Village of Friendship Heights. The Elizabeth was opened in 1975, so with a 50-year-old building, maintenance, updating of infrastructure, and space limitations are factors that we consider when we modernize our facility.

Our reserve plan provides guidance for repair and replacement based on usable life of building components. From an environment and cost perspective, we take upgrading to gain efficiency very important. In the last 6-years we have spent over $15MM in efficiency upgrades (to accomplish, among other things, a full renovation of our garage, our corridors with conversion to efficient LED lighting in all our common areas, added EV charging, a full modernization of our 6 elevators, and have converted our pool to a more efficient heating and filtration system). Additionally, in our building, all stoves, laundry, and heat / AC systems are electrical.

We do have gas fired boilers. This was the technology used in 1975, and today remains the most efficient means of heating large quantities of water. Planned for next year is the upgrade and replacement of our 50-year-old gas boilers – this will add efficiency in gas usage and costs to our membership.

Each building component has a recognized utility and life – and this is not acknowledged in the standards issued by either Montgomery County or the

State. Due to their age and the fact that they leak, we must replace the boilers per our plan. If we do that, we cannot easily pull them and replace them again to meet shifting standards set by the county and state – hence useful life needs to be a consideration.

We have been working with ERA Building Solutions and using the Greenbank to evaluate our energy program. To achieve the best balance between cost and emissions savings, converting our existing boiler system to a combination of high efficiency natural gas, an air to water heat pump for domestic hot water, a combined heat and power station, and solar panels will come at a cost of $3.4MM. Existing grants and rebates are estimated to only provide $187K. We cannot take advantage of an estimated tax savings of $475K. So, we are left with needing to fund $3.2MM. Our current reserve study estimate for replacement of our boilers alone is only $1MM…we are $2.2MM over budget without much time to reach the standards placed by the County for 2030 and the state by 2040. We need to make decisions now because of our need to replace – and we are doing so without much guidance from the State, and changing guidelines by the County. Complete funding will require delaying other necessary work, or placing a special assessment on our owners, many on fixed incomes.

The sad reality is that despite this spend and higher efficiency, we will only realize energy savings of $215K…but because we will not be able to meet the standards set for carbon, the estimate is that we will need to pay an annual fine of $229K – despite reducing our emissions by 30 – 40%. For information, full electrification will cost $13MM and will provide little to no energy cost savings. The plan suggests that a 50 year old building, that is the residence of 362 families and has several commercial owners active in the community and serving the Village at large, is expected to reach the same standards of a building constructed in 2020. Not only does the plan never pay out, but it is also just not feasible.

We need relief via more realistic targets, better coordination including funding sources, elimination of penalties, and an understanding of the art and science of the possible with existing structures. We have done everything possible to reduce our footprint, and I suggest that because of our upgrades, use of electricity for appliances, and the fact that people walk to retail or take the

METRO to work, school, and other events, we are more efficient than many other types of residences and structures.

We now need serious consideration from the county and state. The financial business case does not work and places an immediate and long-term burden. Reasonableness and the ability to achieve what we can based on our building's merits should be the goal – don't let aspiration get in the way of reasonable progress.

Respectfully,

Joe Bucherer
President, Elizabeth Condominium Association

Chair, Community Advisory Committee – Village of Friendship Heights

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Bloomenergy®

September 17, 2024

Montgomery County Council
ATTN: Montgomery County Council Members
Stella Werner County Office Building
100 Maryland Ave
Rockville, Maryland 20850

Re: Executive Regulation #17-23 (Building Energy Performance Standards)

Dear Members of the Montgomery County Council,

Thank you for the opportunity to provide input on the proposed Building Energy Performance Standards regulations, as proposed by Executive Regulation 17-23.

We commend Montgomery County for pursuing action to combat climate change and promote building decarbonization. Bloom Energy supports well-designed building decarbonization initiatives that avoid unintended consequences. At the same time, we believe it is critically important for policymakers to acknowledge that building electrification will unavoidably increase loads on the electric system which in turn will increase the amount of electric generation required to serve load. Far too often the legacy fossil generators that are already being called upon to meet growing electric demand are located in or near disadvantaged communities. As the State of Maryland's proposed Building Energy Performance Standards face similar unintended consequences to that of Executive Regulation 17-23, we have also submitted comments to the State on the Maryland BEPS draft regulations.

Bloom Energy is a manufacturer of solid oxide fuel cell technology that utilizes an efficient non-combustion process to generate power and/or thermal energy on-site at customer locations, which has the effect of displacing the dirtiest "marginal" power plants that supply the grid. Bloom Energy has installed over 1000 non-combustion solid oxide fuel cell systems for customers in thirteen U.S. states as well as in Japan, South Korea, Italy, India and elsewhere around the world. Bloom Energy systems are often deployed in a microgrid format and have proven resilient through outages caused by hurricanes, winter storms, earthquakes, forest fires, and other extreme weather and natural disasters.

A non-combustion fuel cell system in Montgomery County would immediately reduce greenhouse gas emissions by 40%-65% and smog forming air pollution by over 99% in comparison to the grid power it would displace, while simultaneously increasing reliability and avoiding the use of diesel back-up generators[1]. Distributed energy projects are typically deployed at customer locations in commercial and industrial areas rather than in the underserved and disadvantaged communities that too often host the legacy fossil generators that continue to supply the grid. However, by not accounting for emissions from the grid power that serves buildings but only including emissions from on-site power generation, the current draft BEPS regulations would appear to preclude this option and instead leave customers in Montgomery County, including hospitals, with only one option – grid power backed up by diesel

[1] GHG emission reductions reflect all-electric and combined heat and power (CHP) project designs.

generators. This approach will, as recent events now demonstrate in both New York[2] and California,[3] drive emissions into underserved and disadvantaged communities and drive the continued expansion of harmful diesel back-up generators.[4]

Simply put, the proposed Montgomery County BEPS rule would *penalize smaller and cleaner generators that **do not** generate local air pollution in disadvantaged communities while exempting larger and dirtier power plants that **are** located in disadvantaged communities.* As a result, the proposed rule is fundamentally flawed and should be revised before it is finalized. There are, however, ways to mitigate the risk of this type of unintended consequence and achieve the intended objectives of the BEPS.

Montgomery County officials can mitigate these unintended consequences by recognizing that on-site power generators interact with the electric grid and compete against the central station power plants that power the grid; because of this, on-site power generation should not be included within the scope of the building sector but should instead be thought of as part of the electricity sector. We recommend that Montgomery County ensures that building emissions caps focus only on emissions from end uses of energy in buildings (heating, cooking, lighting, etc) and are not extended outside the building sector in ways that distort the electric generating sector in favor of higher emitting plants. Additionally, we ask that you please consider accounting for the unique needs of critical healthcare facilities. Hospitals and other healthcare facilities have a crucial need for resilient, reliable emissions-reducing power generation options. Please note the current exemptions[5] within the proposed draft Regulation (Executive Regulation #17-23), and please also see the special provisions for healthcare facilities[6] noted in Senate Bill 528: State of Maryland Climate Solutions Now Act of 2022.

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[2] Walton, Robert. 2023. "Nyiso to Keep 4 NYC Peakers Running Past Planned 2025 Retirement to Maintain Reliability." Utility Dive. November 21, 2023. https://www.utilitydive.com/news/nyc-peakers-planned-2025-retirement-remain-online-reliability-must-run-nyiso/700417/.

[3] "Politico pro: Newsom Embraces Dirty Energy in Bid to Stave off Blackouts." n.d. Subscriber.Politicopro.Com. Accessed July 18, 2024a. https://subscriber.politicopro.com/article/2023/08/newsom-embraces-dirty-energy-in-bid-to-stave-off-blackouts-00113534.

[4] N.d. Diesel Back-up Generator Population Grows Rapidly in The Bay Area and Southern California. Accessed July 18, 2024a. https://www.bloomenergy.com/wp-content/uploads/diesel-back-up-generator-population-grows-rapidly.pdf.

[5] Montgomery County Executive Regulation 17-23. 18A.43A.01.03 Applicability. This regulation does not apply to a covered building for which more than 50% of the total gross floor area is used for a public assembly in a building without walls; industrial uses where the majority of energy is consumed for manufacturing, the generation of electric power or district thermal energy to be consumed offsite, or for other process loads; or transportation, communications, or utility infrastructure. https://www.montgomerycountymd.gov/DEP/Resources/Files/energy/commercial/BEPS%20Exec%20Reg_Cln%201_8.pdf

[6] SB528. Climate Solutions Now Act of 2022. (2) Regulations adopted under this section shall: (II) As necessary, include special provisions or exceptions to account for: 3. The unique needs of particular building or occupancy typed, including health care facilities, laboratories, assisted living and nursing facilities, military buildings, critical infrastructure, and buildings used in life sciences as defined in *§ 3–201 of the economic development article* *https://mgaleg.maryland.gov/mgawebsite/Legislation/Details/sb0528?ys=2022RS*

Thank you for taking the time to consider these important issues. We remain available throughout this process as a resource regarding building decarbonization and distributed energy resources.

Best regards,

Brian P. Noonan
Sr. Manager, Government Affairs & Policy

Sept 23 T and E

Hello. My name is Walter Weiss and I am delighted to talk to this committee about my congregation and BEPS.

I belong to the River Road Unitarian Universalist Congregation in Bethesda. Our congregation has 400 members, who understand about global warming and the importance of reducing fossil fuels. We are financially stable with a yearly budget of a million dollars. We have a very active environmental committee, of which I am a co-chair.

Our main building was constructed in 1965 and a smaller wing was added in two thousand. The total is 28 thousand square feet so we are covered by the MC Energy Benchmarking and BEPS. However, because we feel strongly about reducing our carbon footprint we have already started making changes.

In 2010 we had an energy audit and our Energy Star score was 25, so we were in the bottom quarter of church's for energy efficiency.

In 2015 a 50 year old gas boiler in our main building needed to be replaced, and we now have a highly efficient electric HVAC system with gas backup. This was done without financial help because we were not aware of energy efficiency subsidies. This new system dropped our gas use by 90 percent.

In 2020 we needed a new roof on our main building. It was discovered that there was no insulation, so this was added. However, because we did not know about any subsidies for insulation we paid for this work ourselves. We then put on solar panels with the assistance of the MC Green Bank and Interfaith Power and Light. However, this required a large amount of work by our environmental committee and our Board. We installed the panels using a Power Purchase Agreement with no cost to us. In the first year of use, we saved 10 thousand dollars on our electric bill and supplied about 50 percent of our electricity from solar panels.

In 2022 we should have started Energy Benchmarking, but our Building Manager was not aware of the requirements and had not used the Portfolio Manager app. With the help of the River Road environmental committee and MC DEP, she was able to learn how to enter our energy use and we are now incompliance with Energy Benchmarking.

Our current Energy Star score is 67, much improved from where we started at 25 but short of what is required.

In 2024, The MC Green Bank is paying for an energy assessment and plan by Spectrum Energy, which will guide us in our remaining energy saving tasks: replacing our gas water heaters with heatpumps, replacing our gas kitchen stove with an induction electric stove, replacing the HVAC system in our new wing, and putting solar panels on the roof of our new wing at the time of re-roofing.

The major challenges River Road faced were lack of knowledge about MC Energy Benchmarking and BEPS, and lack of knowledge of Green Bank, Maryland and Federal financing programs.

The critical assets we brought to bear were a very active and knowledgeable environmental committee, a Board that understands global warming and wants to act, and a Building Manager who was able to learn the Portfolio Manager program. Since we are financially stable, we could also pay upfront costs for insulation and HVAC replacement. I think if any of these assets were missing we would not have been successful. Hopefully, with continued help from the MC Green Bank and MC DEP, and access to County, State and Federal funding, we will be able to meet our BEPS energy target.

Good afternoon council members,

My name is Maria Lucia Vasquez, I am a resident of Westchester West and I am part of the Action testing team in Montgomery on Aspen Hill Nitrogen Dioxide testing

I am here to join the voice of my colleagues and those who do not have it and ask them to apply the Building Energy Performance Standards Act to our communities. The high levels of pollution force us to insist that the competent authorities comply with their obligations, emphasizing the seriousness of the matter.

We have done tests in homes where the levels reached are alarming to the point that the families who live there have children who are always sick, where the cause is unknown to the doctors since they always diagnose it as a virus; when doing the tests and seeing that the levels of nitrogen dioxide reach 600, we realize that the pollution inside the homes is very high and therefore alarming.

Recognizing the impact of the COVID-19 pandemic on student attendance, MCPS is also addressing the cultural and climate issues identified in the Systemwide Anti-Racist Audit, further emphasizing its commitment to equity and inclusion.

The percentage of absences from school due to respiratory illnesses is high. Chronic absenteeism data is defined as 18 or more days absent without permission during a school year (10%) Chronic absenteeism data for the 2018-2019 and 2022-2023 school years School year 2018-2019 – 30,349 students chronically absent (19.55%) School year 2022-2023 – 42,863 students chronically absent (27%) During home visits to conduct testing, we have encountered families who shared with us that their children were not sent to school when they were sick, usually due to respiratory illnesses.

Dear members of the council, this is not just a climate problem, which is a very important issue, but also a public health issue that concerns us all. Each one of us should commit to doing what needs to be done so that in our homes, and in those homes that cannot decide for a change, it can be made. I speak for families that cannot choose a healthy and safe home.
Thank you.

Montgomery County Council
Transportation and Environment Committee

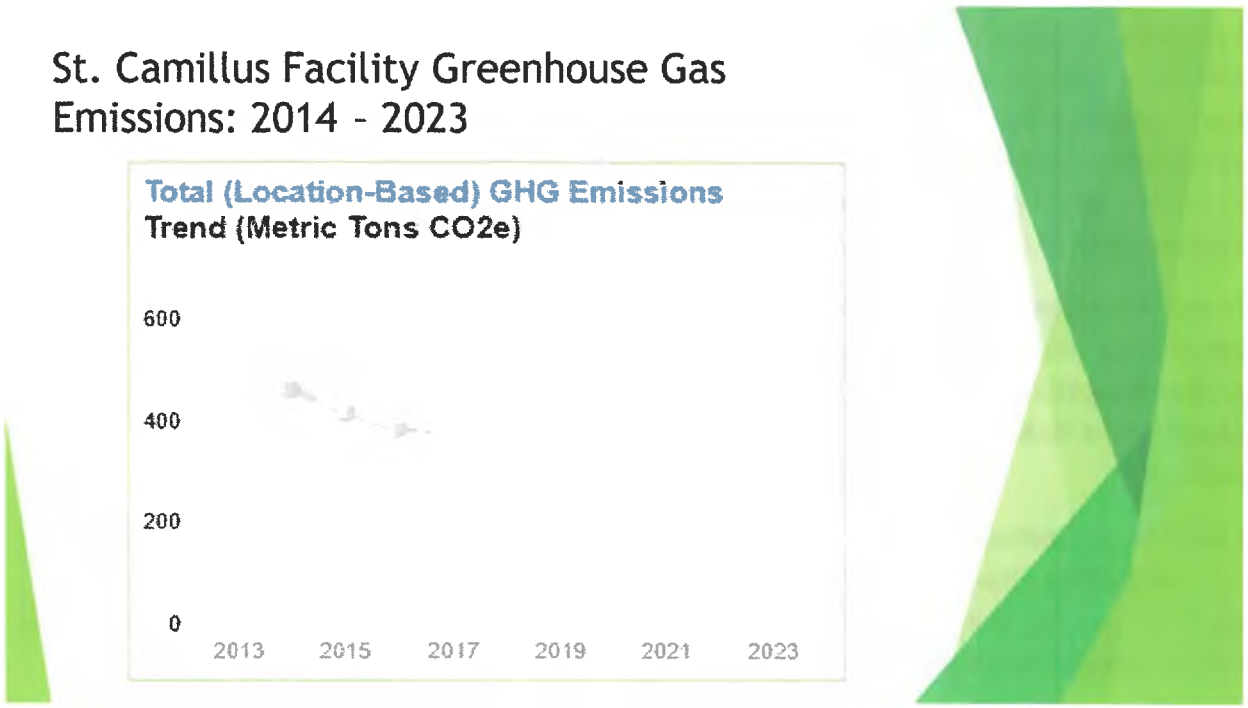
Worksession #6: Executive Regulation 17-23: Building Energy Performance Standards (BEPS) September 23, 2024

Joint Statements of Robert M. Simon and Ana Argueta Parishioners at St. Camillus Catholic Church, Silver Spring

Statement of Robert M. Simon

We are Robert Simon and Ana Argueta, parishioners at St. Camillus Catholic Church in Silver Spring. My professional background is in energy policy and for the last seven years, I have benchmarked the parish's energy performance to comply with County regulations. I am appearing here today, though, in my personal capacity. I am not speaking officially on behalf of the parish or the Roman Catholic Archdiocese of Washington to which St. Camillus belongs.

As shown in this slide, St. Camillus has reduced the greenhouse gas emissions associated with our facilities by 43 percent since 2014 – through implementation of energy efficiency measures and careful maintenance of our HVAC equipment.



This progress, though, is not enough. My analysis of the draft BEPS regulation, shown in this next slide, is that the two main building clusters at St. Camillus are still far from meeting the proposed standard – one building cluster that would have to meet a composite EUI standard of 33.72 is currently at an EUI of 50 and the other building cluster with a composite EUI standard of 41.32 is currently at an EUI of 53.7.

How Current St. Camillus Building Performance Compares to the Proposed BEPS Regulation

Building Cluster	Building and Use	Gross Floor Area (square feet)	Performance Standard
Church and Friary Cluster	Main Church *(Worship Facility)*	19,607	32
	Friary *(Residence Hall)*	5,296	38
	Meeting Space in Friary *(Social/Meeting Hall)*	2,106	39
	Composite Performance Standard for EUI		**33.72**
	Current Weather-Normalized Site EUI		**50**
School and Parish Office Cluster	St. Francis International School *(K-12 School)*	41,876	36
	St. Francis International Pre-School Program *(Pre-School/Daycare)*	10,649	48
	Parish Offices *(Office)*	12,428	55
	Fr. Grace Chapel *(Worship Facility)*	1,968	32
	Composite Performance Standard for EUI		**41.32**
	Current Weather-Normalized Site EUI		**53.7**

I strongly support the current proposed regulation, and St. Camillus parish is taking it seriously. We are already working to replace the HVAC system serving our main church building with a flexible set of heat pumps that will be powered by our purchase of renewable electricity, thus eliminating all use of natural gas. The parish is also undertaking engineering studies to see if we can replace the gas-fired HVAC system for our school with a geothermal system. Both of these projects would likely bring us into compliance with the BEPS standard.

In our efforts, we have received invaluable help from the Montgomery County Green Bank, which has provided our engineering consultants with grants that made the needed engineering studies affordable to the parish. We are in active discussion with the Green Bank about other financial assistance we may be able to use, to push both of these projects forward.

I don't think Catholic parishes in the county sufficiently appreciate the breadth of programs offered by thee Green Bank, so I encourage continued outreach efforts. Congregations are, by their nature, thinly staffed on the facilities side, and very dependent on member-volunteers such as myself to navigate their facilities management. They need help!

The proposed BEPS regulation mandates that non-compliant congregations complete audits and facility compliance plans. For these, technical support from the DEP and the Green Bank will be vital. St. Camillus was approached by one firm a few years back that promised to do a Level 2 ASHRAE audit "for free" if we would subsequently contract with them for the installation of energy efficiency measures. While this sounded attractive, the firm ultimately presented us with a $7 million facilities plan that we could not afford and when we balked at proceeding, refused to share any of the details of its ASHRAE audit and analysis. Having technical experts at the Green Bank who can steer congregations to more reputable energy efficiency consultants will be necessary when the BEPS regulation goes final.

St. Camillus parishioners care not only about parish buildings but also about our homes. For more on that perspective, I will turn to Ana – she'll be speaking in Spanish, but please read the English translation that you have in front of you.

Statement of Ana Argueta

I'm Ana Argueta, and I have lived in Northwest Park Apartments near St. Camillus for 15 years.

In our meetings with Kay Management, we have requested to replace gas-burning stoves which are harming our health, and they are willing to participate in this process.

I have been measuring the levels of nitrogen dioxide and methane leaks in our apartments. NO_2 levels in many homes are two, three, or even four times the safe limit. We use gas heating in the winter, which increases humidity and leads to black mold. If any of you lived in these conditions, you would also be demanding change.

Families choose to live in Northwest Park so their children can attend JoAnn Leleck Elementary School. And it is our children who suffer the most from burning gas. They get sick, they miss school, they don't learn properly.

Are we condemned to live like this just because we live in apartments? We deserve the right to a healthy home, just like you do. Help our apartments have electric stoves, solar panels, and heat pumps, so that our families can breathe clean air, help the environment, and pay less in energy bills.

Montgomery County needs strong energy performance standards for multifamily apartment housing, like Northwest Park, so our children can grow up healthy.

Good afternoon, council members.

My name is Ana Argueta, and I have lived in the Northwest Park Apartments in Silver Spring for over 15 years. Today, I am here not only as the president of the JoAnn Leleck Elementary School PTA, but also as a representative of my neighbors at Northwest Park Apartments.

We are here to ask for something crucial for our families.

In our meetings with K Management, the owners of our community, we have requested to replace the gas stoves with electric stoves because we are aware of the harmful effects gas has on our health. They have shown willingness to participate in this process.

For the past year, I have been measuring the levels of nitrogen dioxide and methane gas in our apartments, and the results are alarming. NO2 levels in many homes exceed 200 and 400, when the safe limit is 100. These gasses are invisible, but they are there, harming everyone's health day after day.

This is not just a technical issue; it's a public health crisis. We cook with gas daily and use gas heating in the winter, which increases humidity and leads to black mold. And I know that if any of you lived in these conditions, you would also be here demanding change.

Northwest Park has always been a place where families choose to live because they want their children to attend JoAnn Leleck Elementary School. And it is our children who suffer the most from the use of natural gas. They get sick, they miss school, they don't learn properly. Are we condemned to live like this just because we live in apartments? No. We live in Montgomery County and in the State of Maryland, and we also deserve the right to a clean and safe home, just like you are working towards in your own homes.

The renovation of our school is a positive step, and we are very happy about that, but we can't stop there. We want Northwest Park to be a model of a clean and healthy community. It's up to you to ensure that our apartments have electric stoves, solar panels, and heat pumps, so that our families can breathe clean air, help the environment, and pay less in energy bills.

Montgomery County needs energy standards for multifamily apartment housing, like Northwest Park. Only then will we have access to a safe environment where our children can grow up healthy.

You have the power to change our lives.

Thank you.

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September 23, 2024

I'm Joelle Novey from Silver Spring, with Interfaith Power & Light, through which County congregations of many faith traditions are working together to respond to climate change. The voices you're hearing today are only a few of the thousands of people of faith we're working with in Montgomery County who understand that we need to shift away from fossil fuels and are eager to do our part.

I want to say three things today:

1. **Faith facilities want BEPS, and we want to be covered by BEPS. Opt us in!**

Our houses of worship are beacons in our communities, setting an example for others – and we want to be held to a systematic standard as we strive to green our facilities. In Annapolis, when the Climate Solutions Now Act came to the floor, a legislator introduced an amendment at the last minute to exempt houses of worship from the state BEPS, and we spoke out loudly to defeat that amendment. We want to be covered by these laws, and we want to be held to the same standard as all the other buildings in our communities.

2. **Montgomery County's resources are going to make it easy for faith facilities to comply**

Interfaith Power & Light is devoting significant staff capacity to coaching congregations through the process of energy benchmarking and BEPS compliance in both Montgomery County and in DC. I don't want to speak ill of any other jurisdictions, but because of our experiences in the field this year coaching 60 DC congregations through the BEPS process, I can speak directly to how the tangible resources available to Montgomery County congregations are going to smooth the way to compliance for County congregations:

- Montgomery County Green Bank is providing technical assistance dollars that in many cases entirely cover the cost for congregations to benchmark, and will also finance the upgrades necessary to comply. I know you heard from Steve last week, but I want to tell you from the community side: These funds from the Green Bank are a huge deal. The Green Bank is our superpower and secret weapon here in the County. They are why I'm not worried that our faith facilities can meet the challenge of BEPS.

- Also: congregations love solar panels! We get inquiries every few days from congregations looking to go solar, and meet with our colleagues at the Green Bank weekly to move a pipeline of congregations through the process of financing no-money-down Power Purchase Agreement solar projects. I predict many County congregations will be excited to go solar as their pathway to comply with BEPS.

Big picture, our faith communities affirm that everyone has the right to breathe clean air, at prayer *and* at home.