

**Testimony by the Cedar Lane Ecosystems Study Group
on the Building Energy Use Benchmarking & Performance Standards (BEPS)
of Montgomery County, Maryland (Bill 16-21)**

July 15, 2021

Contact: EcosystemsStudyGroup@gmail.com

This testimony on BEPS is being submitted on behalf of the Cedar Lane Ecosystems Study Group (ESG), a collective of approximately 25 scientists, sociologists, engineers, activists, and other concerned and informed citizens, primarily residing in Montgomery County, who came together in 2017 when we noticed that many in the County, State, and some local activist groups appeared to not fully understand the scope of the climate emergency or hear the most dire warning yet by the United Nations Intergovernmental Panel on Climate Change (IPCC), that the world faces an existential threat to civilization as we know it unless we immediately implement *rapid, far reaching, and unprecedented change in all aspects of society*.¹

ESG recently signed onto the MoCo CAP Coalition testimony. ESG also agrees with the testimony of The Climate Mobilization (TCM), which highlights (1) the absence of a climate evaluation; (2) a compliance timetable that is too slow and inconsistent with meeting the greenhouse gas targets in the Emergency Climate Mobilization Resolution; and (3) that the legislation would result in an exacerbation of racial and social inequities as a result of excluding single-family homes.

Please note, however, that while ESG generally supports the legislation, it is because BEPS only represents steps in the right direction. As indicated by our comments on the draft CAP plan, attached, **BEPS and the other CAP actions are only baby steps, and only in the general right direction**. Failure to recognize and acknowledge this reality sets up a false sense of security that will be catastrophic in the coming years. We encourage you to review our attached detailed comments on the CAP that explain this position.

Thank you for this opportunity to provide comments.

¹ IPCC. (2018, Oct. 8). *Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments*. [Statement by IPCC Chair Hoesung Lee during release of IPCC, 2018]. <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>

ATTACHMENT

Comments by the Cedar Lane Ecosystems Study Group on the Draft Climate Action Plan of Montgomery County, Maryland

February 28, 2021

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These comments on the draft Climate Action Plan (CAP) of Montgomery County, Maryland are being submitted on behalf of the Cedar Lane Ecosystems Study Group (ESG), a collective of approximately 25 scientists, sociologists, engineers, activists, and other concerned and informed citizens, primarily residing in Montgomery County, who initially came together several years ago when we noticed that some local activist groups appeared to not fully understand the scope of the climate emergency or more recently hear the most dire warning yet by the UN Intergovernmental Panel on Climate Change (IPCC), that the world faces an existential threat to civilization as we know it unless we immediately implement *rapid, far reaching, and unprecedented change in all aspects of society*.^{2, 3}

Briefly, ESG recently signed onto the MoCo CAP Coalition comments, but we have several caveats. We particularly agree with the following Coalition comments:

1. It is clear that **much effort and thought went into the creation of the draft CAP**. We appreciate the many hours of hard work that staff and consultants did to bring this draft to fruition, and the far-reaching and nation-leading goals that they represent.
2. It is imperative that the County put forward a climate implementation plan for 2021 by April 22, Earth Day, and **announce a rapid shift into emergency mode**.
3. **Develop a schedule** for implementing, coordinating, funding, and measuring the specific climate actions that the County will take.
4. **Implement an aggressive outreach program** to immediately engage Black, Indigenous, and people of color communities (BIPOC), low-income, labor, youth and other groups as active partners and decision-makers in the climate implementation plan.

² IPCC. (2018, Oct. 8). *Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments*. [Statement by IPCC Chair Hoesung Lee during release of IPCC, 2018]. <https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>; Watts, Jonathan. (2018, Oct. 8). *We have 12 years to limit climate change catastrophe, warns UN*. The Guardian. <https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-land-mark-un-report>

³ Deutsche Welle (DW). (2020, July 12). *Climate Change Performance Index: How far have we come?* DW.com. [U.S. ranks last on a list of 60 countries.] <https://www.dw.com/en/climate-change-performance-index-how-far-have-we-come/a-55846406>

5. **Include a full plan to achieve the carbon reduction goals**, to address the restoration of a safe climate, join a worldwide mobilization to restore a safe climate, and remove CO2 from the atmosphere on a large scale.
6. Create a **dedicated County workforce** to address climate change.
7. Discuss **more detailed options for ongoing funding** of climate action.
8. Present a **clear and detailed vision of what life would be like in 2035**.

This last item—what life would be like in 2035—along with several other Coalition comments not included above, highlight the extent to which **ESG deviates from the Coalition comments and the draft CAP**. In particular, as described in more detail in our written testimony to the Montgomery County Planning Board regarding Thrive Montgomery 2050, attached (Attachment A), the earth's supply of nonrenewable natural energy sources and other materials we depend on will begin declining over the next decade, possibly much sooner. With little chance of sufficient renewable energy becoming available to meet the energy demand of our current lifestyles, **our “business-as-usual” will be significantly impacted**. Furthermore, greenhouse gas emissions and subsequent threats to human existence continue to increase. With sufficient renewable sources unlikely to come to the rescue, we will need to substantially reduce our use of energy and our use of other nonrenewable materials. This will likely cause a decline—possibly a significant one—in our economy, based on the current growth paradigm. Consequently, **energy conservation and efficiency should be the top priority** of the CAP's implementation strategy, which would need to include substantial public education and engagement. We also recommend that a citizen-government task force be established to study the implications of a future of declining energy resources, and to make recommendations about how to prepare for such a future.

Many other readily foreseeable impacts will occur that have not been mentioned in the draft CAP, let alone addressed. For example, **climate migration has already started**, including from right here at home as the loss of livable land in Maryland waterside communities becomes apparent, yet the draft CAP mentions neither this impact nor a plan to address it.

An additional and critical comment not addressed by the Coalition or in ESG's attached Thrive testimony (at least directly), is that based on the En-ROADS policy simulation model, which was developed and is freely available online by Climate Interactive, Ventana Systems, and MIT Sloan,⁴ **the draft CAP actions, even if fully implemented immediately and around the globe, are likely to be insufficient to mitigate the expected climate and other impacts** unless the root causes of climate change—basically the current paradigm of infinite growth in a finite world—are acknowledged and addressed. ESG is very familiar with En-ROADS and would be willing to meet with you to demonstrate the model. We also are holding a related forum with the Post Carbon Institute on March 10 at 7 pm that we encourage you to attend, <https://www.postcarbon.org/power-forum>.

⁴ En-ROADS, Climate Change Solutions Simulator, <https://www.climateinteractive.org/tools/en-roads/>

We recommend that the CAP, and especially the public education and engagement component, address that fact that **a very significant—possibly the largest—portion of our carbon footprint is generated outside of the County** by the production of energy, food, and goods we then import for our consumption. We have a moral responsibility and—as the first large county in the US to declare a climate emergency and develop a significant plan—a leadership responsibility to address that portion of our footprint by encouraging less consumption, fewer travel miles, local production, and closing the loop of what we do, make, consume, and waste. The County should also educate residents and businesses about opportunities for investments outside the County, state, and U.S. that accelerate carbon drawdown, especially via nature-based solutions.

Acknowledging the above likelihoods, and including a more explicit accounting for the inevitable effects of baked-in climate change (e.g., temperature extremes, droughts/flooding, climate migrants), are critically needed additions to the CAP. **Not only would it be insufficient to simply hope that the above impacts do not occur, it would be a severe dereliction of duty.**

* * *

Thank you for this opportunity to provide comments. We hope you will take us up on our offer to meet with you, whether during the upcoming forum with the Post Carbon Institute, by allowing us to demonstrate En-ROADS, and/or otherwise via discussing any of the comments noted above or in Attachment A.

Attachment A

Written Testimony from the Cedar Lane Ecosystems Study Group⁵ to the Montgomery County, Maryland Planning Board, regarding Thrive Montgomery 2050

December 10, 2020

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Executive Summary

- The earth's supply of nonrenewable natural energy sources and other materials we depend on will begin declining over the next decade, possibly much sooner. With little chance of renewable energy becoming sufficiently available to meet the energy demand of our current lifestyles, our "business-as-usual" will be impacted;
- Greenhouse gas emissions and subsequent threats to human existence continue to increase. Without sufficient supply from renewable sources, we will need to substantially reduce our use of energy and our use of other nonrenewable materials. This will likely cause a decline in our economy;
- We have an opportunity to be proactive, and we can use our county's highly influential and prominent position to be a model to others;
- Therefore, we recommend that the planning board review and incorporate the systems modeling, projections, and recommendations from the experts referenced in this testimony, and implement the following:
 1. **Include two additional planning scenarios in the Thrive Plan**, in addition to the existing plan based on assumptions of "business-as-usual." These scenarios are:
 - a. A "steady state economy" scenario that assumes no economic growth and no increase in tax revenue; and
 - b. A "declining economy" scenario that models at least a 6-8% decline per year in resources and tax revenue;
 2. **Include a more explicit accounting for the effects of climate change** (e.g., temperature extremes, droughts/flooding, climate refugees).

* * *

⁵ The contributors to this document—Philip Bogdonoff, Wilfred Candler, Sam Hopkins, Jim Laurenson, Lee McNair, Louise Mitchell, and Nanci Wilkinson—are grateful for comments, assistance, and endorsements from Dr. Nate Hagens (Executive Director, Energy and Our Future; Co-Director, Systemic Economic Response Initiative; Adjunct Professor, University of Minnesota; <https://www.linkedin.com/in/nate-hagens-004810b>), Dr. Charles Hall (Professor Emeritus, SUNY College of Environmental Science and Forestry; <https://www.esf.edu/EFB/hall/>), Dr. Brian Czech (President, Center for the Advancement of the Steady State Economy; Visiting Professor, Virginia Tech; <https://steadystate.org/brian-czech/>); and numerous other unnamed individuals.

Introduction

This written testimony is being submitted on behalf of the Cedar Lane Ecosystems Study Group (ESG), a collective of approximately 25 scientists, sociologists, engineers, activists, and other concerned citizens, primarily residing in Montgomery County, who initially came together several years ago when the UN Intergovernmental Panel on Climate Change (IPCC) gave its most dire warning yet, that the world faces an existential threat to civilization as we know it unless we implement “rapid, far reaching, and unprecedented change in all aspects of society.”^{6, 7}

We recognize the huge effort that has gone into creating a plan for Montgomery County for the Year 2050. We acknowledge your recognition of the importance of addressing climate change in the plan. And, we applaud your statement of purpose in the plan, which states that Thrive Montgomery 2050 isn't about reinvention. **It's about adapting to new realities, addressing historic inequities, and shifting the way we think about how the county should grow.** We highlight this statement since it very much resonates with our group's perspective.

The Problem

After researching the work of numerous experts, as listed in the attached bibliography and other resources, we have become aware of several other realities in addition to climate change that we think are important for the planning board to account for in our county's 30-year plan.⁸ These realities include the following:

- Our society has been operating under the assumption that we have an almost endless supply of fossil fuel and other natural resources on the planet for our use. Thrive Montgomery 2050 appears to have been developed under this assumption as well.
- The supply of oil is finite and both the USA and the world have increasingly used up the highest quality and cheapest reservoirs. The USA has produced (and consumed) more oil than any country on Earth but our remaining oil is mostly in shale formations, which is the 'source rock' - there is no oil remaining after that. We technically have plenty of oil left, but what's left is more costly, environmentally damaging and, because it is in shales,

⁶ IPCC. (2018, Oct. 8). *Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments*. (Statement by IPCC Chair Hoesung Lee during release of IPCC, 2018).

<https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/>; Watts, Jonathan. (2018, Oct. 8). *We have 12 years to limit climate change catastrophe, warns UN*. The Guardian.

<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-land-mark-un-report>

⁷ Deutsche Welle (DW). (2020, July 12). *Climate Change Performance Index: How far have we come?* DW.com. [U.S. ranks last on a list of 60 countries.]

<https://www.dw.com/en/climate-change-performance-index-how-far-have-we-come/a-55846406>

⁸ For a more thorough understanding of the predicament humanity faces, see the following topics in the “Other Recommended Resources” below: Limits to Growth and the Big Picture, The Energy Picture, Regional Food Self-Sufficiency, Climate Refugees.

it has an extremely rapid decline rate (see **Figures 1** and **2** below).^{9, 10} For instance, the underlying annual decline rate in the five major oil producing regions (Texas, North Dakota, Gulf of Mexico, New Mexico, and Oklahoma) is approximately **42% per year**. These five regions account for 80% of U.S. production. Yet renewables show no sign of being able to fill this gap (see **Figure 3**). This significantly relevant constraint for our future is hidden (and exacerbated) by the pandemic because demand has also fallen. We are increasingly facing a situation where the market price for oil is much lower than the cost to extract it, further exacerbating future supply.

- Fossil fuel is literally what fuels our economy. Therefore, as the supply diminishes, our economy will be impacted significantly. These impacts on the economy will compound the current effects from the COVID-19 pandemic and this will impose significantly greater hardship on our communities.¹¹
- In addition to the depleting supply of fossil fuel, we are also rapidly depleting the earth's supply of other nonrenewable natural resources including metals and nonmetallic minerals. We have designed our lives to depend on these resources, which we use at almost every point in our industrialized lives.¹²
- These realities of depleting resources are in addition to the increase in greenhouse gas emissions we are producing and their subsequent threats to human existence due to climate change.¹³ As a result, we must make substantial reductions in our demand for energy and in our demand for our broader use of nonrenewable natural resources, and make adjustments in our lifestyles for the likely concomitant decline in our economy.¹⁴

Steps Toward a Solution

As a result of these and other realities, we propose that the planning board review and incorporate the systems modeling, projections, and recommendations from the experts we have

⁹ Hagens, Nate. (2020, Nov. 9). *Americans and their leaders face ten daunting challenges in the next 4 years, says Dr. Nate Hagens*. Citizen Action Monitor.

¹⁰ Weyler, Rex. (2020, March 22). *The decline of oil has already begun*. Greenpeace International. <https://www.greenpeace.org/international/story/29458/peak-oil-decline-coronavirus-economy/>

¹¹ Lawrence Livermore National Laboratory. (accessed 2020, Nov 30). *Estimated U.S. Energy Consumption in 2019: 100.2 Quads*. flowcharts.llnl.gov. https://flowcharts.llnl.gov/content/assets/images/energy/us/Energy_US_2019.png

¹² Heinberg, Richard. (2007). *Peak Everything: Waking Up to the Century of Declines*. Indiebound. <https://richardheinberg.com/bookshelf/peak-everything>

¹³ Waldron, Lucas and Lustgarten, Abrahm. (2020, Nov. 10). *Climate Change Will Make Parts of the U.S. Uninhabitable. Americans Are Still Moving There*. ProPublica <https://www.propublica.org/article/climate-change-will-make-parts-of-the-u-s-uninhabitable-americans-are-still-moving-there> [see embedded clip: *How the Climate Crisis Will Force A Massive American Migration*. YouTube. https://www.youtube.com/watch?v=pWu_duWSh8&feature=youtu.be]

¹⁴ Whyte, Caroline. (2020, November 12). *Aggregate green growth is a mirage: we need to take a more scientific approach to societal wellbeing*. Resilience. <https://www.resilience.org/stories/2020-11-12/aggregate-green-growth-is-a-mirage-we-need-to-take-a-more-scientific-approach-to-societal-wellbeing/>

been studying and then revise the plan over the next year, by adding at least two more scenarios to the plan:

1. One in which our current economy and lifestyle remains level at what it is currently - a “steady state economy” scenario, and
2. Another scenario in which our economy declines (at say, 6-8% per year) and our lifestyles and policy options become increasingly constrained.

Further, we recommend that you include a more explicit accounting for the effects of climate change (e.g., temperature extremes, droughts/flooding, climate refugees) and better coordinate with the managers of the county’s Climate Action Plan (CAP), since it will be important for these two county documents to be consistent with one another in their plans and recommendations.

Conclusion

Many communities around the world are suffering from extreme financial strain and resource scarcity due to the impacts of our lifestyle choices here in the U.S. Most of us in Montgomery County, however, are not currently experiencing these consequences of our lifestyle choices, which blinds us to the above realities. We are facing some tough decisions about how to allocate our remaining resources wisely as we transition to a much lower level of living. We can further awaken to these realities, make the changes that are needed, and use our highly influential and prominent positions to be a model to others.

We encourage the planning board to also confront these realities and update the plan so that it engages our residents and communities into taking action and becoming as prepared as we can be for the possibility, perhaps likelihood, of these outcomes. Instead of one business-as-usual plan, we believe it would be prudent for the planning team to include a series of scenarios and action plans for an increasingly uncertain future.

* * *

FIGURES

Figures 1 and 2 are both of “U.S. Crude Oil and Condensate Production and Forecast.”

Figure 1 spans the 120 years from 1901 through 2021, and **Figure 2** spans two decades from January 2001 through July 2021. Both show that absent the exploitation of “tight oil” (largely sourced from fracked shale formations), U.S. oil production would have been in steady decline since 1970. The ramp up in production of tight oil beginning in 2008 gave the U.S. a reprieve and enabled us to reduce the amount of imported oil (although we never came anywhere close to becoming energy independent, despite some misleading headlines to the contrary). That reprieve will soon come to an end, exacerbated in part by the impact of COVID-19 on the economy, which has affected investment in the fracked oil plays. Even before COVID-19, those plays were already becoming uneconomic to produce.

U.S. Crude Oil and Condensate Production and Forecast

The chart displays the following data points and trends:

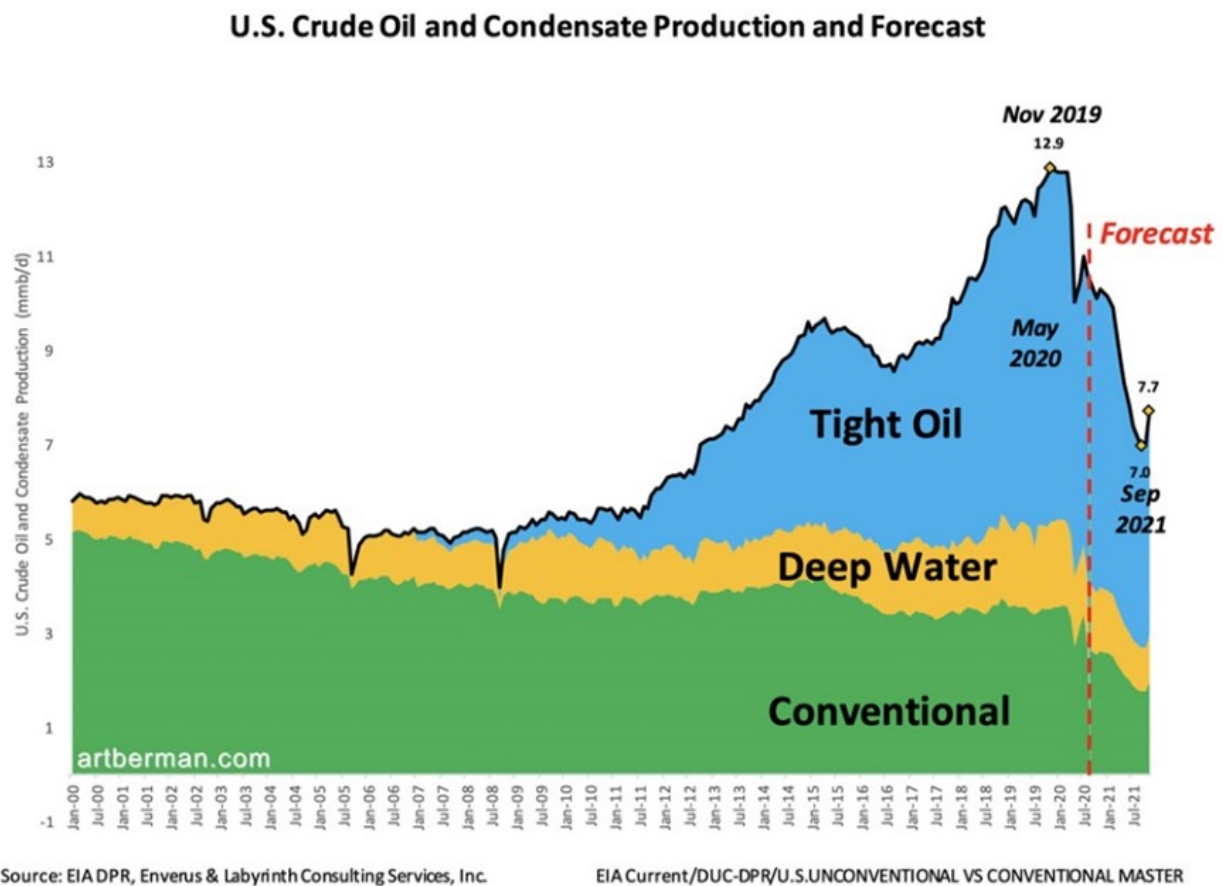
- Peak Oil 1970:** 9.6 mmb/d
- Prudhoe Bay 1985:** 9.0 mmb/d
- 2008:** 5.0 mmb/d
- 2019:** 12.2 mmb/d
- 2017:** 7.7 mmb/d

The production is categorized into four main sources:

- Conventional Lower 48 States:** Represented by the green area at the base of the chart.
- Alaska:** Represented by the yellow area, showing a significant contribution in the late 1970s and early 1980s.
- Offshore:** Represented by the blue area, showing a steady increase in production over time.
- Tight Oil:** Represented by the red area, showing a sharp increase starting around 2008, becoming the dominant source of production by 2019.

Source: EIA, Enverus & Labyrinth Consulting Services, Inc.

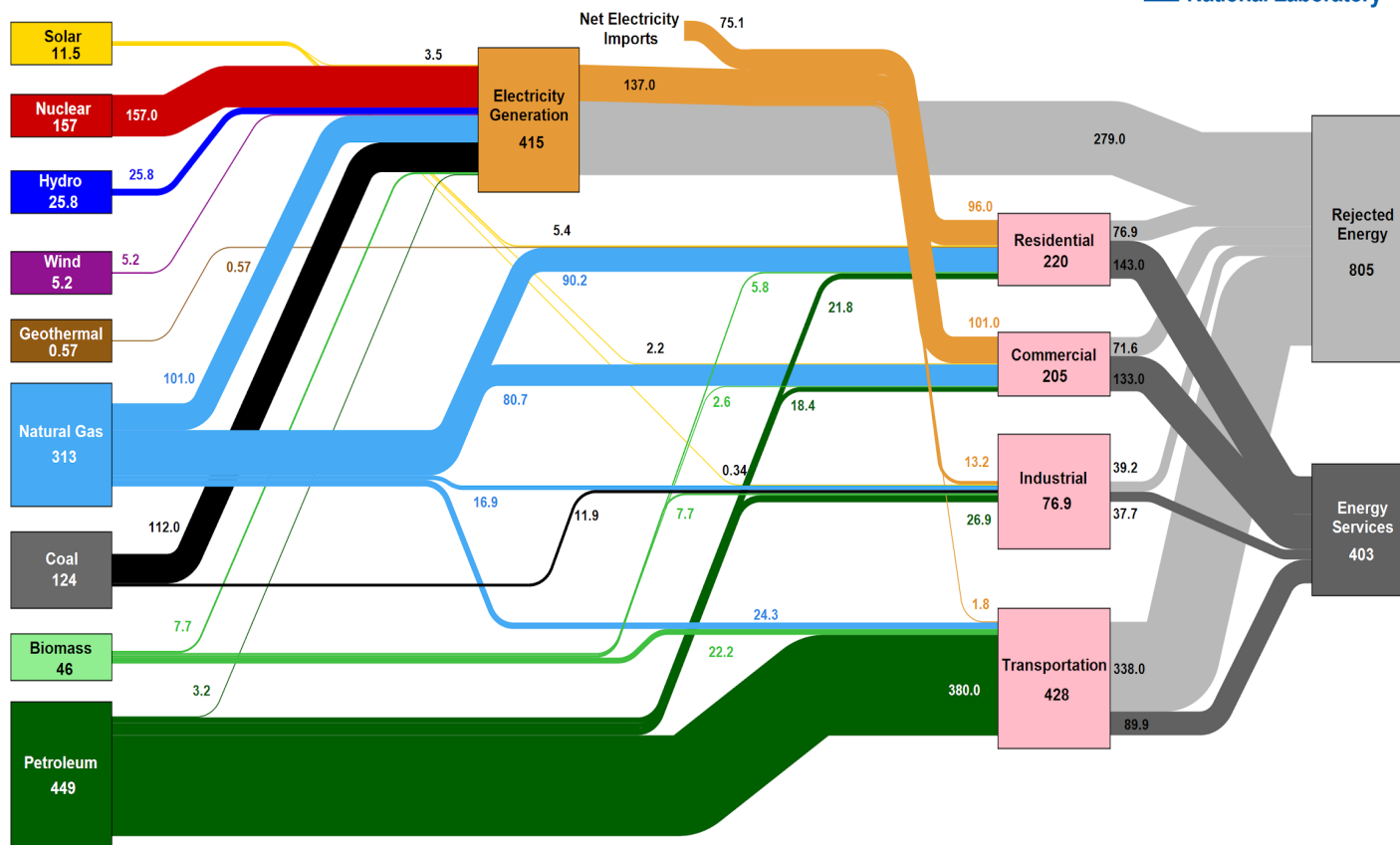
Figure 1. U.S. Crude Oil and Condensate Production and Forecast - Crude Oil Production Annual and Forecast (1901 - 2021)



Source: <https://www.energyandourfuture.org/2020/11/02/no-matter-who-wins/>

Figure 2. U.S. Crude Oil and Condensate Production and Forecast - U.S. Unconventional vs. Conventional (2001 - 2021)

Estimated Maryland Energy Consumption in 2018: 1,208 Trillion BTU



Source: LLNL June, 2020. Data is based on DOE/EIA SEDS (2019). If this information or a reproduction of it is used, credit must be given to the Lawrence Livermore National Laboratory and the Department of Energy, under whose auspices the work was performed. Distributed electricity represents only retail electricity sales and does not include self-generation. EIA reports consumption of renewable resources (i.e., hydro, wind, geothermal and solar) for electricity in BTU-equivalent values by assuming a typical fossil fuel plant heat rate. The efficiency of electricity production is calculated as the total retail electricity delivered divided by the primary energy input into electricity generation. End use efficiency is estimated as 65% for the residential sector, 65% for the commercial sector, 49% for the industrial sector, and 21% for the transportation sector. Totals may not equal sum of components due to independent Rounding. LLNL-MI-410527

Source:

https://flowcharts.llnl.gov/content/assets/images/charts/Energy/Energy_2018_United-States_MD.png

Figure 3. Estimated Maryland Energy Consumption in 2018

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POSSIBLE WAYS FORWARD

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RESTORING ECOSYSTEMS & REGENERATIVE AGRICULTURE TO COOL THE PLANET

Biodiversity for a Livable Climate. *Compendium of Scientific and Practical Findings Supporting Eco-Restoration to Address Global Warming*, Vol. 2., No. 1. (2018, July). Biodiversity for a Livable Climate (<https://bio4climate.org/>). See p. 400, Appendix A: Scenario 300.
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Laurie, Jim. (2017, April 30). *Back to 300: Nature Wants To Be Wet and Cool*. YouTube. [32m34s] <https://www.youtube.com/watch?v=N44wdxFwsc8> [presentation at Biodiversity for a Livable Climate's conference, "Scenario 300, Making Climate Cool! How We Can Bring Atmospheric Carbon Down from 400 ppm to 300 ppm in the nick of time!" April 30, 2017, Washington, DC.]

OTHER RECOMMENDED RESOURCES

ORGANIZATIONS & BLOGS

Center for the Advancement of the Steady State Economy (CASSE)
<https://steadystate.org/>

Collapse of Industrial Civilization
<https://collapseofindustrialcivilization.com/>

Four Urgent Global Crises
<https://www.porchlightbooks.com/blog/changethis/2020/four-urgent-global-crises>

Institute for the Study of Energy and Our Future
<https://www.energyandourfuture.org/>

Our Finite World - Gail Tverberg
<https://ourfiniteworld.com/>

Peak Prosperity - Crash Course - by Chris Martenson and Adam Taggart
<https://www.peakprosperity.com/crashcourse/>

Peak Prosperity - What Should I Do?
<https://www.peakprosperity.com/video/crash-course-chapter-26-what-should-i-do/>

Post Carbon Institute
<https://www.postcarbon.org/>

Post Carbon Institute's Home Study Course on Community Resilience
<https://www.postcarbon.org/program/resilience/>

Resilience Hubs - Urban Sustainability Directors Network
<https://www.usdn.org/resilience-hubs.html>

ECONOMIC STIMULUS

Maxton, G., & Randers, J. (2016). *Reinventing prosperity: managing economic growth to reduce unemployment, inequality and climate change*. Greystone books.

Systemic Economic Response Initiative by the Millennium Alliance for Humanity and the Biosphere (MAHB) at Stanford University

<https://mahb.stanford.edu/library-item/systemic-economic-response-initiative/>

LOCAL FOOD SELF-RELIANCE

Chesapeake Foodshed Network

<http://www.chesapeakefoodshed.net/>

Future Harvest - Chesapeake Alliance for Sustainable Agriculture (CASA)

<https://www.futureharvestcasa.org/>

Montgomery County Food Council

<https://mocofoodcouncil.org/>

IPCC & CLIMATE-RELATED RESOURCES

Intergovernmental Panel on Climate Change (IPCC). (2020). Worlds Apart: A Story of Three Possible Warmer Worlds. Infographic.

https://www.ipcc.ch/site/assets/uploads/sites/2/2020/10/IPCC_SR15_Worlds_Apart.pdf

Zhai, P., Pörtner, H. O., Roberts, D., Skea, J., Shukla, P. R., Pirani, A., ... & Connors, S. (2018). Global Warming of 1.5 OC: An IPCC Special Report on the Impacts of Global Warming of 1.5° C Above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty (p. 32). V. Masson-Delmotte (Ed.). Geneva, Switzerland: World Meteorological Organization.

https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf

Climate 21 Project, <https://climate21.org/>. The Climate 21 Project taps the expertise of more than 150 experts with high-level government experience, including nine former cabinet appointees, to deliver actionable advice for a rapid-start, whole-of-government climate response coordinated by the White House and accountable to the President.

'Collapse of Civilisation is the Most Likely Outcome': Top Climate Scientists.

<https://www.resilience.org/stories/2020-06-08/collapse-of-civilisation-is-the-most-likely-outcome-top-climate-scientists/>

The great unravelling: 'I never thought I'd live to see the horror of planetary collapse' | Climate change | The Guardian

<https://www.theguardian.com/australia-news/2020/oct/15/the-great-unravelling-i-never-thought-id-live-to-see-the-horror-of-planetary-collapse>

Beautiful Yet Unnerving Photos of the Arctic Getting Greener, 2020-11-30 Wired.

<https://www.wired.com/story/beautiful-yet-unnerving-photos-of-the-arctic-getting-greener/>

OTHER RESOURCES

Tour of the Human Predicament and What To Do About It. Stanford Knowledge Integration Laboratory.
http://www.skil.org//position_papers_folder/TourlectureSKILconcepts.html

Unwinding the Human Predicament. Stanford Knowledge Integration Laboratory.
http://www.skil.org/position_papers_folder/PlanForUnwindingThePredicament.html

UnDenial, <https://un-denial.com/about/>. A blog about human overshoot, attempting to integrate evolution, behavior, thermodynamics, ecology, history, and economics into an understanding of what is going on and what might be ahead.

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