



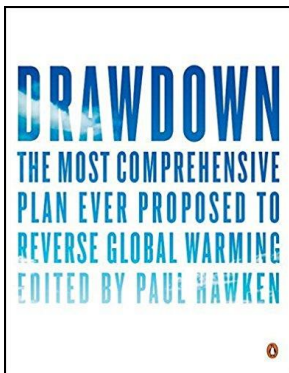
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Kenneth S. Panza, Liaison
Town of Woodstock
45 Comeau Dr.
Woodstock, NY 12498
kpanza@woodstockny.org

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Ulster County Climate Smart Committee Drawdown – The Energy Sector

Drawdown is that point in time when the concentration of greenhouse gases in the atmosphere begins to decline on a year-to-year basis.



Drawdown, a recently published survey edited by Paul Hawken of the 100 best climate-stabilization solutions comes with an ambitious subtitle: “The Most Comprehensive Plan Ever Proposed to Reverse Global Warming.” A event sponsored by Woodstock Land Conservancy and Woodstock Transition discussed *Drawdown* and showed videos with Paul Hawken explaining the project.

The Omega Center for Sustainable Living is hosting a 3-day collaborative event in October, which will begin with an in-depth overview of Project Drawdown by Paul Hawken and his team.

The Ulster County Climate Smart Committee added *Drawdown* to its 2018 agenda, and these comments are offered as a contribution to the Ulster County Climate Smart Committee’s consideration of *Drawdown*’s Energy Solutions. But there are significant obstacles that will defer full acceptance of Project Drawdown.

- Some energy solutions contained in *Drawdown* are strongly opposed by New York’s major environmental organizations, and this opposition needs to be taken into account when considering the applicability of *Drawdown*. Nuclear power, cogeneration, and grid flexibility are opposed because of the inherent nuclear or natural gas components. It is unlikely *Drawdown* will trigger a reassessment of this opposition, and it’s unlikely *Drawdown* can succeed against this opposition.
- *Drawdown* makes a strong case for detailed modeling and forecasting, but offers no prediction about future electricity requirements. No judgements are made about the impact of efficiency vs the introduction of heat pumps and electric vehicles on needed capacity, and the absence of detailed data makes it impossible to compare *Drawdown* with existing plans for adopting renewable generation.

As a community, no consensus has been reached about the generation needed in 2030 or 2050. Considering current levels of capacity, an open question is: do we need much more, much less, or about the same amount of electricity?

- 1) **Much More:** Mark Z. Jacobson in his plan for 100% renewable generation states that four to five times current generation is needed to decarbonize the economy. The emphasis on heat pumps for heating & cooling and electric vehicles suggests a need for more electricity.
- 2) **Much Less:** Riverkeeper, NRDC, and their consultant claim future requirements are much less than current supply and can be achieved with aggressive efficiency.
- 3) **About the Same:** NYISO forecasts only a minor drop (0.14%) in generation. Compared to the ‘much more’ and ‘much less’ views. NYISO’s forecast is essentially constant over the forecast period.

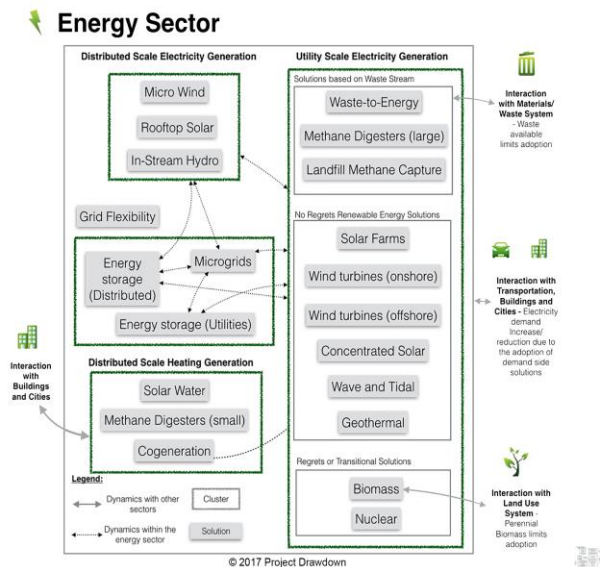
Any discussion about energy, carbon dioxide emissions, sequestration, and the build-out of renewables would benefit from a consensus about energy requirements and emissions. At this time, there is no such consensus and *Drawdown* offers no guidance.

Nothing New – A Modest Assessment

Project Drawdown asserts, “it did not make or devise the plan, but simply found a plan that already exists. Nothing new needs to be invented. The solutions are in place and in action.” This is an unnecessarily modest assessment. What *Drawdown* offers is a different way of looking at the problem and its solutions.

- *Drawdown* introduces an explicit ranking of solutions based on calculations of reductions in carbon dioxide, efficiency of energy generation, and of cost. This approach moves beyond the common ‘renewables only’ approach.
- *Drawdown* introduces an integrated model to illustrate how solutions are interrelated and interact. This is a more complex and nuanced view of energy generation than considering just single-point solutions.

The explicit calculation of a solution’s impact on carbon dioxide emissions and consideration of the interrelated essence of solutions within the energy sector introduces unfamiliar concepts that are worth serious consideration.



Controversial Solutions

Below are listed three *Drawdown* energy solutions that are, at best, controversial and opposed.

Nuclear Energy	Ranking and Results by 2050	#20
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Drawdown: too expensive, too dangerous, but “no credible path to climate stabilization that does not include a substantial role for nuclear power.”

New York currently gets over 30% of its electrical energy from nuclear power. Indian Point nuclear point, which is scheduled to close in 2020, will be replaced by natural gas fired power plants emitting an estimated 6 million metric tons of CO₂.

Indian Point accounts for 34% and natural gas for 38% of Central Hudson’s electric supply. After the closure of Indian Point, it’s expected that natural gas generation will account for over 70% of Central Hudson’s supply.

Closure of the upstate nuclear reactors would add an estimated 15 million metric tons CO₂ per year from additional natural gas generation.

Drawdown doesn’t seem to consider the implications of nuclear power policy in its scenarios. There are three approaches advocated in debates about nuclear power.

- 1) **Shut down immediately:** There’s a strong movement dedicated to immediate deactivation and retirement of all existing nuclear power plants and replacing lost generation with renewables and natural gas.
- 2) **Continued operation** of nuclear plants until end of useful life and allowing for a phased in replacement of nuclear generation with renewables. This is the strategy adopted by New York’s Clean Energy Standard (CES).
- 3) **Aggressive build out** of more nuclear facilities. Climate scientist Jim Hansen claims there is, “no credible path to climate stabilization that does not include a substantial role for nuclear power.”

Cogeneration	Ranking and Results by 2050	#50
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Drawdown: on-site CHP (combined heat & power) from natural gas in commercial, industrial, and transportation sectors that replaces grid-based electricity and on-site heat generation with more efficient and less costly technology.

CHP systems recover the heat created during power generation and use it as an energy source. That energy can then fuel industrial processes, heat domestic hot water, and provide space heating and cooling. CHP systems are generally designed to run on a daily basis to save energy and money and to run during grid outages to power a site’s priority loads.

The New York Power Authority and the Office of General Services want to create a microgrid to power and heat the Empire State Plaza complex, where about 11,000 state government employees work. Two new 7.9 megawatt natural gas turbines would generate electricity to supply about 91 percent of the power needs of the complex and 70 percent of

the steam needed for heating and cooling needs. The new turbines would supplement existing steam boilers.

Environmental advocates have criticized the project's reliance on natural gas, questioning why the state would invest in fossil fuels when Governor Cuomo is pushing to reduce emissions and boost renewable energy. They want to see the state invest in a renewable energy microgrid powered with wind, solar or geothermal.

Grid Flexibility	Ranking and Results by 2050	#77
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Drawdown: an enabling technology for exploiting renewables that is required to grow renewable energy resources beyond a 25 percent share of generation. The emission reductions from this solution are counted in the variable renewable solutions.

Transmission Lines: wind and solar power are intermittent sources of energy, and a combination of wind and solar is needed to smooth supply. If the wind isn't blowing strong enough or there are too many clouds, the supply of electricity might not meet the demand. Or if there are strong winds or persistent sunlight, the supply could exceed the capacity to capture and use it.

"We can make do with the transmission infrastructure we have for now, but the existing infrastructure was not built considering the changing energy landscape," says 2017 study on wind curtailment from the National Renewable Energy Laboratory. "But without expanded transmission capacity, we observed high amounts of wind curtailment." That means that the wind energy produced isn't really going anywhere it can be used. It's essentially "wasted renewable energy," since that energy has to come from fossil fuels instead.

Transmission lines to deliver surplus electric power from western New York to the Hudson Valley have been vigorously opposed.

One reviewer wrote, "Because of the vagaries of renewable energy (the sun doesn't shine all day or every day; wind doesn't blow consistently; water doesn't flow evenly year-round), capitalizing on the potential of renewables requires building a more flexible grid and improving energy storage. Given my environmental background, I feel like I should have understood this concept a long time ago, but I never did. Until now."

Auxiliary Services: supports the integration of intermittent wind and solar by helping to smooth the variable output of renewables and by providing voltage and frequency regulation.

The Lincoln Park Grid Support Center, a hybrid generator and battery combination proposed for the Town of Ulster, would provide these services, but is strongly opposed.

Microgrids: localized electricity sources and loads that normally operate connected to electrical grid, but can also disconnect to "island mode" and function autonomously as conditions dictate. Microgrids are generally dependent on fossil fuel back-up generators.

Smart Meters: would allow utilities to adjust customer demand under the changing conditions of intermittent renewables. The most obvious candidates for customer demand management are air conditioning and swimming pool recirculating pumps. Because of EMF radiation, some strongly oppose these meters.