

Proposed: The Decarbonization Act of 2022

Executive Summary

It is proposed that the U.S. pass The Decarbonization Act of 2022 (DA2022), a federal law that mathematically decarbonizes to zero CO₂ emissions over 30 years, at lowest cost, and in a manner that is likely to be accepted by both political parties. In summary, it instructs gov't economists to:

- Assemble a list of potential decarbonization construction projects. This includes solar farms, wind farms, hydroelectric dams, and carbon capture/sequestration (CCS).
- Calculate cost-to-avoid-a-ton-of-CO₂-emissions for each project (\$/tCO₂).
- Sort list in order of \$/tCO₂, with lowest cost first.
- Select group at top of list that decarbonizes 1/30th of total U.S. emissions in year #1, 1/29th in year #2, 1/28th in year #3, etc.
- Design federal renewable requirements that facilitate this construction.

DA2022 causes estimated CO₂ emissions vs. time to be a straight line that terminates at zero in 2052.

DA2022 causes construction of solar farms and wind farms to increase approximately 5-fold over the next ~10 years. Further decarbonization is likely to be costly. Subsequently, DA2022 sets up a new National Decarbonization Laboratory tasked with developing low cost green technology.

"Not in my backyard" refers to communities who object to the construction of solar farms, wind farms and power wires. DA2022 resolves this with green energy zones that consolidate construction in regions hungry for jobs, as described later in this document.

Getting the Votes

Decarbonization in the U.S. is favored by 95 percent of Democrats, and 39 percent of Republicans¹. When Republicans are in power, their majority do not want to decarbonize. And when Democrats are in power, their proposals veer from decarbonizing at lowest cost; which causes Republicans to object. For example, residential solar costs three times more than solar farms, and therefore does not sit well with conservatives. To gain broad support, liberals need to work with fiscal conservatives who also want to decarbonize.

Reduce Costs with Green Energy Zones

To maintain reasonable decarbonization costs, new laws are needed that:

- Establish a government office with the authority to quickly demand the right of way for new power transmission wires.
- Mandate that rural landowners have the right to build solar farms and wind farms, even if their neighbors object.
- Establish a government office with the authority to amend power purchase agreements between cities and carbon-based power generators.

Most communities do not favor these laws since they find them intrusive. Subsequently, DA2022 only applies them to optional green energy zones. After communities join, landowners have the right to build solar/wind, etc. Many communities would not participate; however, others would consider it an economic opportunity.

In summary, green zones use regulation to reduce decarbonization costs, they trade jobs for government intrusion, and they gain political support by being optional.

Initiate Power Transmission Upgrade Program

One still needs to transmit electricity from green zones to metropolitan areas, and obtaining the right-of-way for land is often difficult. Subsequently, DA2022 sets up a gov't office with authority to *replace* existing power wires with new wires that transmit 10 to 200 times more electricity, on a widened tract of land. A power line with three smaller cables is shown lower-left; and a larger bundle that carries 50 times more electricity is pictured to its right, for example.



Increase R&D with Goals

Global decarbonization is likely to cost tens of trillions of dollars over multiple decades. These costs can be reduced through R&D. However, if one increases R&D by billions of dollars a year, to save trillions, one needs to specify goals for scientists and engineers. Below are examples.

- Reduce the cost of solar on buildings by a factor of two using automation²

- Same as above, yet solar on land³
- Reduce the cost of power transmission lines by a factor of two using automation⁴
- Develop a green car with a cost-per-mile less than gas cars, and as convenient⁵
- Develop a website that calculates the lowest cost way for G20 nations to decarbonize, given policy options⁶
- Maintain a long term CCS strategy⁷

Set up National Decarbonization Laboratory

To manage the above R&D, DA2022 sets up a *National Decarbonization Laboratory* tasked with resolving climate change by making green energy cheaper than carbon-based sources.

How Much Does This Cost?

Currently, 40 percent of U.S. electricity is generated without emitting CO₂, and if this increased 5 percent per year over 10 years, then 90 percent would be green in year #10 (40% + (10yrs x 5%).

If today's wholesale electricity cost \$0.04/kWh, and renewables cost \$0.07/kWh, then electricity price after one year would increase by \$0.002/kWh to \$0.042/kWh [5% x \$0.07 + 95% x (\$0.04 + \$0.0005)]. This works out to \$7.5 billion more for electricity over one year for the entire U.S. (3.8e12 kWh/yr x \$0.002); which corresponds to 0.035% of GDP (\$7.5B / \$21,000B).

A family of four people would pay \$91 more for goods and services over one year (\$7.5B x 4 people / 330M population). Residential electricity is 20 percent of total electricity; therefore, they would pay \$18 more for home electricity over one year (\$91 x 20%).

One might consider the above calculations misleading since they mix 5 percent of costly green with 95 percent of traditional electricity. However, this is the mathematics of decarbonization. Also, one might consider the \$0.07/kWh cost of green electricity high since some sources are lower. We use a higher value since communities seldom decarbonize at lowest cost. Also, we increase carbon-based electricity \$0.0005/kWh/yr since its fixed expenses, such as a mortgage, are being spread out over less electricity output, as carbon-based electricity is replaced with green.

Tolerance of Decarbonization Costs Increase Each Year

An astute observer might notice the \$91-per-family cost goes up by approximately \$91 each year as one mixes in additional more-costly green electricity. For example, cost is \$91 higher than today after year #1, \$180 higher than today after year #2, and \$806

higher after 10 years. Voters are likely to tolerate \$91 today; however, might be uncomfortable with \$806 in year #10.

Evidence of climate harm also increases each year, meaning voters' tolerance of decarbonization costs are also likely to increase. To keep tolerance ahead of costs, DA2022 tackles lowest cost projects first. In other words, it begins with projects that have the lowest cost-per-ton-of-CO₂-avoided. This translates into increasing the rate at which solar farms and land-based wind farms are constructed. Alternatively, *residential* solar and *ocean*-based windmills are relatively expensive, and are therefore less helpful when decarbonizing at lowest cost.

In summary, DA2022 tackles lowest cost first, and tackles the more difficult later when evidence of climate harm is greater, and voters' tolerance of decarbonization costs is higher.

Government Requires Decarbonization, yet Does Not Pay For It

Most communities are not inclined to decarbonize, especially at the rate required to get to zero within a few decades. This is due to several reasons, one of which is economics. If a company incurs more costs, it becomes less competitive. To decarbonize, one needs federal law that requires communities to increasingly obtain electricity from sources that do not emit CO₂. This is referred to as a "renewable requirement". DA2022 requires government economists to size renewable requirements to decarbonize 1/30th of emissions in year #1, followed by 1/29th in year #2, and so on. This is how one mathematically gets to zero in 30 years, at lowest cost.

One might consider subsidizing decarbonization projects with tax credits. However, these often expire after a period of time, and they increase the federal budget deficit. Alternatively, passing costs onto consumers is sustainable and facilitates support from fiscally conservative lawmakers.

DA2022 adds solar/wind farms to already-paid-for carbon-based power plants. The carbon plants provide electricity when not windy and not sunny. Government does not pay for the new solar/wind farms since companies fund construction with borrowed money, and repay loans with revenue from electricity sales.

Hence, DA2022 decarbonizes without taxpayer money, without subsidies and without reduced tax revenue.

Bipartisan Panel Drafts Law

A blue-ribbon bipartisan panel is assembled to draft DA2022 over several weeks. This panel consists of economists, energy experts, Republican lawmakers who want to decarbonize, decarbonization experts, and innovators. Below are possible candidates:

- Former U.S. Energy Secretaries Ernie Moniz and Steven Chu
- Former U.S. Treasury Secretaries Larry Summers (D) and Hank Paulson (R)
- Conservative lawmakers Mitt Romney (R) and Lamar Alexander (R)
- Decarbonization book authors Bill Gates and John Doerr
- Innovators Elon Musk and Jeff Bezos

Conclusion

DA2022 mathematically decarbonizes to zero CO₂ emissions over 30 years, at lowest cost, and in a way that elicits broad political support. Also, it reduces decarbonization costs with green energy zones, and with a new national decarbonization R&D laboratory.

Footnotes

- ¹ [The strong winds of climate change have failed to move...](#), Washington Post, Nov 12, 2021
- ² [Why Spend \\$1B on Solar Installation R&D?](#), Power Electronics, Nov 3, 2021
- ³ [Mechanizing PV Solar on Land](#), Power Electronics, Aug 31, 2021
- ⁴ [How to Reduce the Cost of Electrical Power Transmission](#), Power Electronics, Sept 2, 2021
- ⁵ [How to Decarbonize Transportation](#), Power Electronics, Oct 25, 2021
- ⁶ [Develop Your Own Decarbonization Plan](#), Power Electronics, Oct 4, 2021
- ⁷ [What is our Long Term CCS Strategy?](#), Power Electronics, Jan 24, 2022