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## *IPCC 1.5 degree report has a strong silver lining*

*The solutions for a 1.5 degree maximum temperature rise exist today*

[Michael Barnard](#) [Oct 10, 2018](#) · 6 min read

In 2015 in Paris, the United Nations held its Climate Change Conference, COP 21. The world united with an aspirational target of 1.5 degrees Celsius maximum warming and a harder target of 2 degrees.



But what did that half of a degree mean? It was clearly significant as it's still [10% of the warming](#) that melted most of the continental glaciers 20,000 years ago, but what would the impacts be?

The IPCC set out to gather the science and assess the variance between a 2 degree rise and a 1.5 degree rise. In October of 2018, they released their report, and the differences were startlingly large.

## GLOBAL WARMING OF 1.5 °C

**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**

*there's a missing story in the blaring headlines, one of optimism, prosperity and clean air, one of solutions which already exist, are proven and are already scaling rapidly*

Most of the headlines focused on the negatives.

- The Guardian: We have 12 years to limit climate change catastrophe, warns UN
- CNN: Planet has only until 2030 to stem catastrophic climate change, experts warn
- National Geographic: Climate change impacts worse than expected, global report warns
- BBC: Final call to save the world from 'climate catastrophe'

They aren't wrong to do so, of course. It's a global call to action in a world beset by organizations and powerful politicians who really don't want to do anything, in fact want to double down on coal, oil and gas.

But there's a missing story in the blaring headlines, one of optimism, prosperity and clean air, one of solutions which already exist, are proven and are already scaling rapidly.

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## [2017 LCOE chart from Lazard](#), annotation by author

About a third of the problem of warming comes from burning coal and gas for electricity. And that's a place where we have proven solutions.

Utility-scale wind and solar electrical generation were the cheapest form of new capacity globally a year ago, according to investment bank Lazard. Their annual report is due out in November and is expected to show the gap widening. And we have proven that it's possible to replace coal without the grid collapsing. It's been done in Ontario in just over a decade. Germany is well on its way to eliminating coal and replacing it with wind and solar, after a brief blip caused by the Fukushima-motivated reduction in nuclear early in the decade.

But new generation sources are insufficient by themselves. The electricity has to flow from where it's generated to where it's needed. And [high-voltage direct current transmission](#) has evolved to the point where it can carry twice the capacity per cable and do it underground and under water without losses that plague current

alternating current transmission. The breakeven distance is shrinking annually and it's only a few dozen kilometers underwater today. Continent-scale grids and larger are taking over the world, bring more electricity, more reliably to more places. More than any other innovator, we have [ABB Group](#), a global leader in industrial technology, whose engineers have made the HVDC revolution possible.

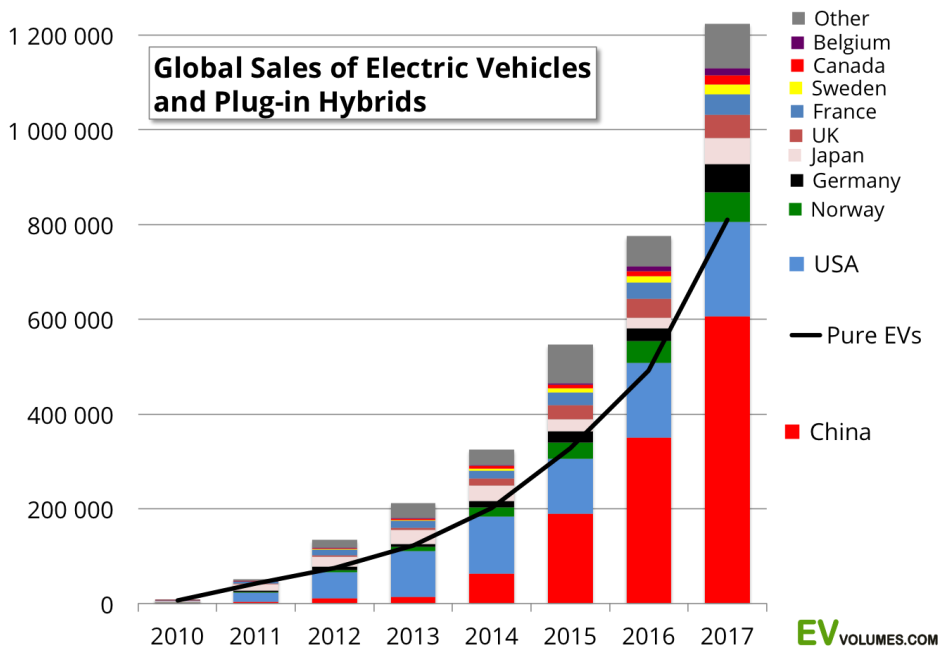
Similarly, [markets for sharing electricity and stabilizing the grid](#) have been improving over the past decades. We have examples in many geographies of successful markets for transmitting electricity with high quality across continents, not just provinces or small countries. Electricity has become borderless in most places.

Storage is increasingly understood to be a smaller part of the overall solution than we had assumed. With cheap renewable generation connected at continent scale, it will simply be overbuilt as every other form of generation

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except nuclear has been in the past 100 years, and run under highest possible capacity at a profit. But even in storage we are seeing success stories with [Tesla's grid storage](#) in both California and Australia providing grid balancing capabilities at a profit.

[Multiple researchers](#) such as Mark Jacobson of Stanford and Mark Diesendorf of Australia have produced multiple studies showing the path to 100% renewables over the next few years. Jacobson's work covers 140 countries, showing the mix that's available to them to achieve carbon-neutrality electrical generation.



Courtesy [EVvolumes.com](#)

Transportation is about another third of the warming problem. and the story about solutions there is equally bright. Globally, the automobile and trucking industry is retooling for an electric future. China is leading the way, with 200,000 electric buses on the roads and roughly half of global electric vehicle sales. We are seeing electric cars hit the steep part of the S-curve of adoption, with the latest million plug-in cars only taking six months to sell versus a year versus five years in the not-so-distant past.

Tesla is at the forefront of this as well. Their Model 3 is now the [#1 selling](#) American-made car in the USA, the #1 car by revenue sold in the USA, the #4 car sold in the USA overall and they are still filling over 400,000 backorders.

And that's at the \$53,000 USD price point of the current Model 3, with only the Long Range version available. In 2019, Tesla will be making in the range of 400,000 of them, and many of those, especially in the latter half of the year will be the long-awaited \$35,000 version.

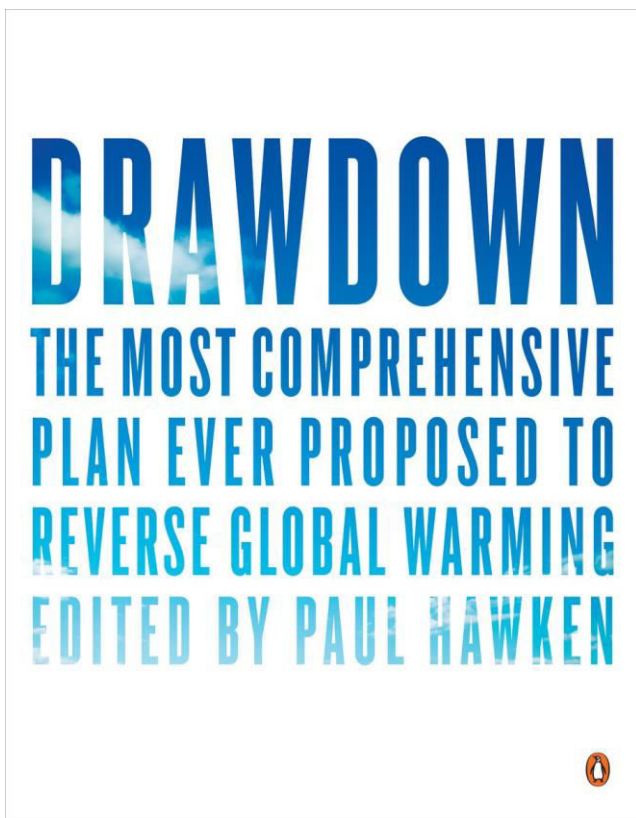
Why is Tesla selling so well? In part because the [total cost of ownership](#) of the very desirable Model 3 is equivalent to a fully loaded Toyota Camry, the quintessential boring family sedan. Electric cars are much, much cheaper to operate, more fun to drive, have more room and don't pollute the neighborhoods where people's kids and parents live.

The Chevy Bolt is doing well globally too, and GM is promising many more EVs. Similarly,

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VW, Mercedes, BMW and most other car manufacturers are promising dozens of pure-EV choices between them in the next three to five years.

Multiple manufacturers including Tesla are working on fully electric freight and pickup trucks. Clean battery and hydrogen freight trains are in operation. Clean electric and hybrid airplanes are emerging. Overall, transportation is experiencing a fuel renaissance, with smaller vehicles leading the way.



But what about the other third of the problem? Well, [Project Drawdown](#) has done an excellent job bringing together an evidence-based, global group of researchers, industry experts and academics to highlight the solutions to not only get to zero emissions, but to start reducing the overall CO2 in our atmosphere.

Unsurprisingly, wind and solar generation occupy three of the top ten spots on the list. Surprisingly, #1 with a bullet is refrigeration management. The chemicals we use to keep

things cool are often much worse greenhouse gases than CO2 and a lot of them leak annually. Just getting a handle on that is relatively straightforward, as reducing CFCs in aerosols was related to the ozone layer.

The problem we have created for ourselves is a large one. But over the past few decades, global researchers, engineers, public servants and industry experts have been building solutions and making them economical.

We have the solutions. All we have to do is put them in place.