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## NEW YORK'S CLEAN ENERGY STANDARD: COSTLY AND INEFFECTIVE

紐約的清潔能源標準代價高昂且效果不佳

IER INSTITUTE FOR ENERGY RESEARCH

A recent report evaluated New York State's clean energy programs and found them costing the state's consumers and businesses over $1 trillion with no measurable impact on world climate.[i] Thus, the carbon dioxide reductions that would cost the state's residents heavily would have no value. This is nothing new; New York finds numerous ways to tax its people with little benefit to show for it.

New York's Clean Energy Programs

In 2016, the New York Public Service Commission enacted the Clean Energy Standard (CES), requiring 50 percent of all electricity sold

### 本期摘要(KEY INFORMATION)

◎2016 年，紐約公共服務委員會頒布了「清潔能源標準」（CES），要求該州公用事業在 2030 年以前，所有售出電力的 50%須來自可再生能源，且溫室氣體排放（GHG）應比 1990 年減少 40%，還設立了清潔能源基金，要求電力消費者支付費用，俾使 2030 年前在住宅、商業和工業建築方面的能源使用量減少 25%(約為 600 兆英熱單位)。然而近來有報告指出(https://www.manhattan-institute.org/sites/default/files/R-JL-0817.pdf)，紐約州的清潔能源計畫耗費消費者及企業超過 1 兆美元，且對全球氣候沒有可衡量的影響，減碳計畫造成州民龐大負擔，相較於全球溫室氣體排放，紐約在清潔能源計畫下的溫室氣體減排量很少，實際上可能毫無減排效益，溫度變化也小到無法測量，且無法排除自然氣候變化的因素，該計畫恐怕只是「象徵性環保主義的一個演練」。

◎2016 年，中國成為全球最大的電動汽車市場，佔全球電動汽車銷量的 40%以上。中國之所以能成功推動電動汽車，除了電動車的買主可獲得價值數千美元的補貼(例如免費提供車牌)，中國政府還補貼了電動汽車充電站，截至 2016 年 12 月，中國有 30 萬個充電站，國家並下令國有的中國電力公司加快安裝充電站。儘管中國推動電動汽車有其優勢，但在電池處理方面尚無正式的處理政策，到 2020 年，預計中國將有近 25 萬噸的電池需要處理，幾乎是 2016 年的 20 倍。中國電動汽車使用的磷酸鐵鋰電池的平均使用壽命約為 5 年，在 2012 年至 2014 年期間，大部分安裝在電動車上的電池將在 2018 年左右退役。由於涉及複雜的化學過程，回收電池並不容易，若處理不當，內含的重金屬可能造成環境污染問題。

by the state's utilities to come from renewable generating resources and greenhouse gas emissions (GHG) to be reduced by 40 percent below 1990 levels—both by 2030. The standard also incorporates New York's previous emissions reduction mandate, requiring that the state's greenhouse gas emissions be reduced 80 percent below 1990 levels by 2050 (the "80 by 50" mandate).

In 2016, the New York Public Service Commission established the Clean Energy Fund, which requires electric consumers to pay for programs that are designed to reduce energy use in residential, commercial, and industrial buildings by about 25 percent below current levels by 2030. That energy reduction would be about 600 trillion BTUs.

According to a report issued by New York's Department of Public Service, the 2030 Clean Energy Standard will increase New Yorkers' electric bills by $3.6 billion. The analysis claims that the Clean Energy Standard will provide about $8 billion in benefits from reducing carbon dioxide emissions, will increase gross state product and will create jobs.

As part of the CES, in January 2017, N.Y.'s Governor Cuomo issued an executive order requiring 2,400 megawatts of offshore wind by 2030. Then, in March 2017, also as part of the CES, he announced the Drive Green program, which will provide a rebate on electric vehicles of up to $2,000, depending on the vehicle. The goal is to have 700,000 electric vehicles, including hybrids on the road by 2025. Cuomo allocated $70 million for the program of which $55 million will cover the subsidies and $15 million will cover advertising, promotional activities and construction of charging stations.

Analysis Findings

Jonathan A. Lesser of Continental Economics, analyzed the feasibility and cost of New York's Clean Energy programs. Mr. Lesser calculated what the reductions would entail for both 2030 and 2050. These reductions are shown in the figure below. In 2030, New York would only be able to release 141.5 million metric tons of greenhouse gases, of which 123.46 million metric tons are carbon dioxide. In 2050, New York can only release 47.17 million tons of greenhouse gases, of which 41.15 million metric tons is carbon dioxide.

That means in 2030, New York would have to reduce carbon dioxide emissions by 57.52 million metric tons from 2014 levels—50 percent more than the state's electric generating sector and its imported electricity released in 2014. Thus, other sectors would need to reduce its carbon dioxide emissions in 2030 to reach the target.

In 2050, New York's carbon dioxide emissions would need to be reduced by about 140 million metric tons from 2014 levels—almost twice what its transportation sector released in 2014. That probably would require massive reductions in all energy-consuming sectors, meaning that New York would need to electrify its energy consuming sectors.

**New York State GHG Emissions Levels and Sources**

| | | 1990 | | 2014 | | 2030 Reqt | 2050 Reqt |
|---|---|---|---|---|---|---|---|
| | | $MMtCO_2e$ | Pct of Total | $MMtCO_2e$ | Pct of Total | 40% Decrease | 80% Decrease |
| GHG Emissions by Sector | Transportation | 60.40 | 25.6% | 74.01 | 34.0% | | |
| | In-State Electric Generation | 62.99 | 26.7% | 30.41 | 14.0% | | |
| | Electricity Imports | 1.63 | 0.7% | 7.99 | 3.7% | | |
| | Residential | 34.22 | 14.5% | 35.50 | 16.3% | | |
| | Commercial | 26.53 | 11.2% | 22.03 | 10.1% | | |
| | Industrial | 19.99 | 8.5% | 11.04 | 5.1% | | |
| | SUBTOTAL, FUEL COMBUSTION | 205.76 | 87.2% | 180.98 | 83.1% | 123.46 | 41.15 |
| Other GHGs | Methane | 23.52 | 10.0% | 20.15 | 9.3% | | |
| | Fluorocarbons | 0.02 | 0.0% | 10.03 | 4.6% | | |
| | Nitrous Oxide | 5.93 | 2.5% | 3.31 | 1.5% | | |
| | Other | 0.61 | 0.3% | 3.26 | 1.5% | | |
| | SUBTOTAL, OTHER GHGs | 30.08 | 12.8% | 36.75 | 16.9% | | |
| Total GHG Emissions | | 235.84 | 100.0% | 217.73 | 100.0% | 141.50 | 47.17 |
| Energy-Related GHG Emissions [1] | | 212.87 | 90.3% | 186.12 | 85.5% | 127.72 | 42.57 |
| Required GHG Reductions ($MMtCO_2e$) | | | | | | | |
| Below 1990 Levels | | | | | | 94.34 | 188.67 |
| Below 2014 Levels | | | | | | 76.23 | 170.56 |

[1]NYSERDA 2017, Table S-2, note a.
Source: NYSERDA 2017, Table S-2

The requirements would result in renewables replacing existing fossil fuel generating technologies, increasing the electrical cost to consumers. According to Mr. Lesser, constructing 2,400 megawatts of offshore wind capacity and 7,300 megawatts of solar photovoltaic capacity by 2030 could result in New Yorkers paying over $18 billion in above-market costs for their electricity. By 2050, the above-market costs could increase to $93 billion. The construction of at least 1,000 miles of new high-voltage transmission facilities to move electricity from upstate wind and solar farms to downstate consumers would also be required.

New York has yet to analyze the feasibility of its 80 by 50 mandate. But, as noted above, it would require the electrification of New York in all or most of its energy-consuming sectors. New York's transportation sector releases about half of the carbon dioxide emissions needed for the reductions. But, since total electrification of the transportation sector is infeasible with existing technology, the mandate will require reducing residential, commercial, and industrial carbon dioxide emissions and constructing new renewable generating capacity to replace existing generation that must be retired and to meet new electrical demand coming from the other sectors.

According to the Mr. Lesser, the 80 by 50 mandate would require 400 terawatt hours of renewable electricity. That is, the construction of at least 100,000 megawatts of offshore wind, or 150,000 megawatts of onshore wind, or 300,000 megawatts of solar photovoltaic capacity by 2050. That new capacity will need to deal with issues such as fishing rights in the Atlantic off Long Island, "not in my backyard" problems in upstate New York where onshore wind and solar capacity would be located and large land mass requirements.

For example, utility scale solar PV requires about 8 acres per megawatt. Meeting the CES mandate with utility scale solar would require an area of between 2.4 million and 3.0 million acres—between 3,800 and 4,600 square miles. By comparison, Manhattan is 22 square miles. So enough solar PV to meet the CES mandate would require 172 Manhattan islands.

Due to the intermittency of wind and solar power, at least 200,000 megawatts of battery storage would be required as well. To meet the mandate, it would cost New York consumers and businesses over $1 trillion by 2050.

Because New York's greenhouse gas emission reductions under the Clean Energy Program would be small compared to total worldwide greenhouse gas emissions, the benefits of the reductions would effectively be zero. That is, the temperature changes would be too small to measure and not able to be separated from natural climate variability.

Conclusion

The report found New York's Clean Energy Standard to be "an exercise in symbolic environmentalism. It will provide almost no measurable benefits, while imposing huge costs, including disproportionate costs on lower-income residents."

原始連結：
http://instituteforenergyresearch.org/analysis/new-yorks-costly-clean-energy-programs/

## CHINA'S NEW ENVIRONMENTAL PROBLEM: BATTERY DISPOSAL

中國面臨電池回收的新環境問題

IER INSTITUTE FOR ENERGY RESEARCH

In 2016, China became the world's largest electric vehicle market accounting for over 40 percent of the electric vehicles sold worldwide. China passed the United States which had the highest electric vehicle sales in 2015. In 2016, China had over 1 million electric vehicles, which was an 87 percent increase over the previous year. They added 336,000 new electric car registrations; this included battery only and hybrid models. Electric vehicles range in price from $6,000 to $200,000 (for the most expensive Tesla model).[i] Like several European countries, China is planning to ban the sale of gasoline and diesel vehicles in favor of electric vehicles at an unannounced date.

China's success in promoting electric vehicles is due to lucrative subsidies—thousands of dollars worth of subsidies—provided to buyers of these vehicles. For example, in Shanghai, a license plate costs about $15,000 if one is lucky enough to win the right to it in the lottery. However, if you choose to buy a plug-in hybrid, Shanghai will provide the license plate without cost.

China has decided to switch from subsidizing buyers to enforcing a quota system on manufacturers. Under the proposed quotas, most local and foreign automakers must earn points equivalent to 10 percent of vehicles they produce in China and import into the country in 2019 and 12 percent in 2020. By 2025, 20 percent of new car sales must be New Energy Vehicles.[ii] The plan applies to carmakers that produce or import 30,000 cars or more annually.[iii] Automakers that fail to meet the target will have to purchase credits from competitors that have a surplus.[iv]

The government has also subsidized charging stations for electric vehicles. As of December 2016, China had 300,000 charging stations. The country has ordered state-owned Chinese power companies to speed up installation of charging stations.

Electric cars make sense in China because of its dense and crowded cities that often mean shorter driving distances. China has an extensive high-speed rail system that reduces the need for long-distance road trips. In 2016, China had the largest electric car stock in the world with about a third of the global total.

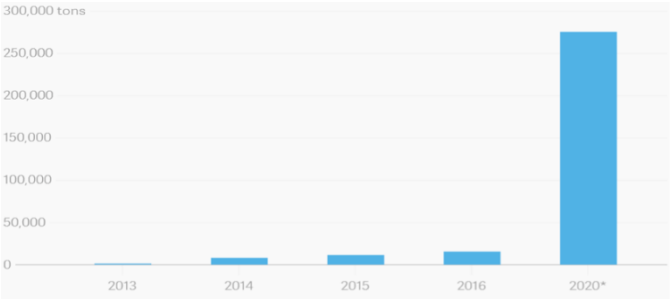
China is also the global leader in the electrification of other transport modes with over 200 million electric two-wheelers, 3 to 4 million low-speed electric vehicles and over 300 thousand electric buses.[v]

Battery Recycling and Disposal

But despite all the pros for electric vehicles in China, the country has a big problem with battery disposal. Electric car batteries are toxic if not disposed of properly and China does not have an official policy regarding their disposal. The problem will begin to escalate next year, and by 2020 China is expected to have almost 250,000 metric tons (276,000 tons) of batteries that need disposal—nearly 20 times those in 2016.[vi] (See graph below.)

The average lifespan of a lithium-iron phosphate battery, which is the primary type used in China's electric vehicles, is around five years. Most batteries installed on electric vehicles during the 2012 to 2014 period will be retired around 2018.

Unusable electric vehicle batteries in China




Batteries can be recycled, but recycling them is not easy due to the sophisticated chemical procedures involved. If not handled properly, the heavy metal contained in the battery can lead to contamination of the soil and water.

In China, car manufacturers are responsible for recycling their batteries, but many of them expect battery suppliers to handle the recycling. China's battery recycling industry is relatively small and scattered, and recycling operating costs are high. Even in the European Union, only 5 percent of lithium-ion batteries, another common type of battery power used in electric vehicles, are recycled.

Conclusion

China is now the largest market for electric vehicles and it is growing due to lucrative subsidies and a future quota system. Its dense and crowded cities are conducive to the use of electric vehicles. However, China will soon be confronted with another environmental problem in the disposal and recycling of batteries.

原始連結：

http://instituteforenergyresearch.org/analysis/chinas-new-environmental-problem-battery-disposal/