CRA Insights:
Energy

CRA Charles River Associates

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Impact of climate change policies on the utility business model

Public concerns regarding climate change are prompting states, cities, and other entities across the US to enact new initiatives to reduce greenhouse gas (GHG) emissions. Most of these initiatives include more aggressive building energy efficiency, switching to carbon-free electricity generation, and adoption of beneficial electrification[1] – all of which could positively or negatively impact utility growth.

To date, states representing nearly 25% of the total US electricity generation capacity have passed legislation setting 100% renewable or clean (carbon free or neutral)[2] energy targets. Hawaii was the first to set a goal to achieve 100% renewable energy in 2015, with several other states following in the last year.

These states have a combined fossil fuel generation capacity of over 170 GW, or ~60% of their combined total power generation capacity (Figure 1). Additionally, ~20 other states also have renewable portfolio standard targets (most between 15% and 35%).

The shift to clean energy is driving a faster pace of change for the historically stable utility sector. As local and state agencies pass new regulations, set targets, and define implementation plans, utilities may need to consider their role in this new environment. Utilities will be an integral part of the solution to ensure emission goals are met without negatively affecting consumer costs and system reliability.

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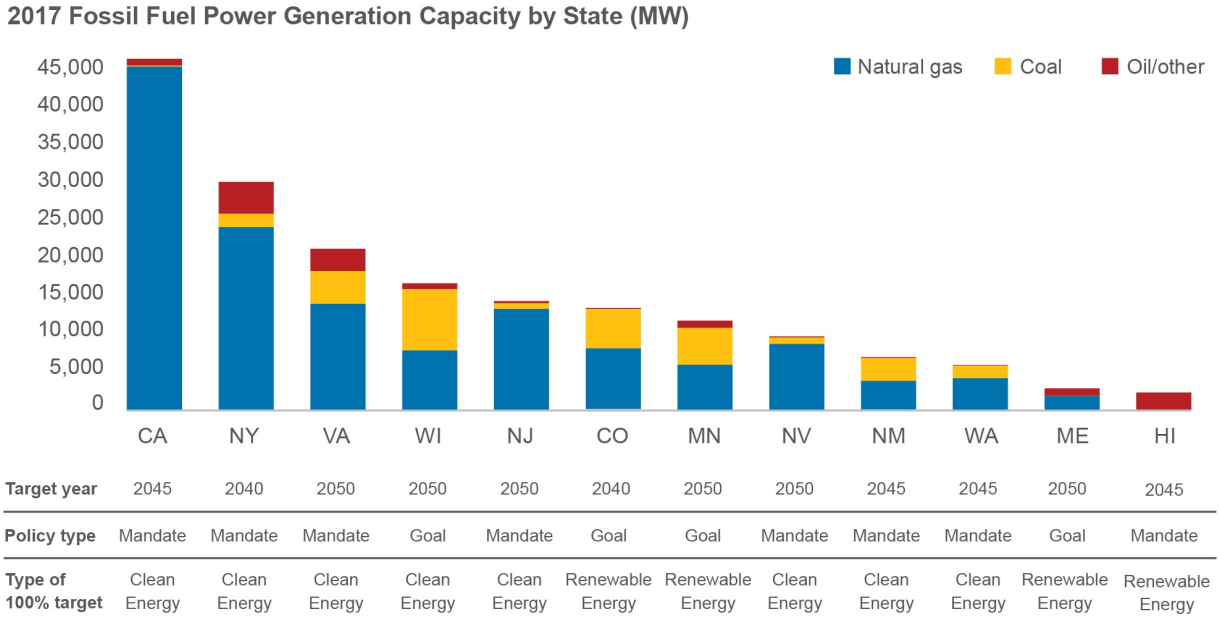
[1] Switching from fossil fuel to electricity use for transportation (e.g. EVs), buildings (e.g. heating), and industry.

[2] A 100% renewable target requires resources such as solar and wind; carbon-free allows any non-carbon emitting resource (e.g. nuclear); and carbon-neutral allows for some carbon emissions with corresponding offsets.

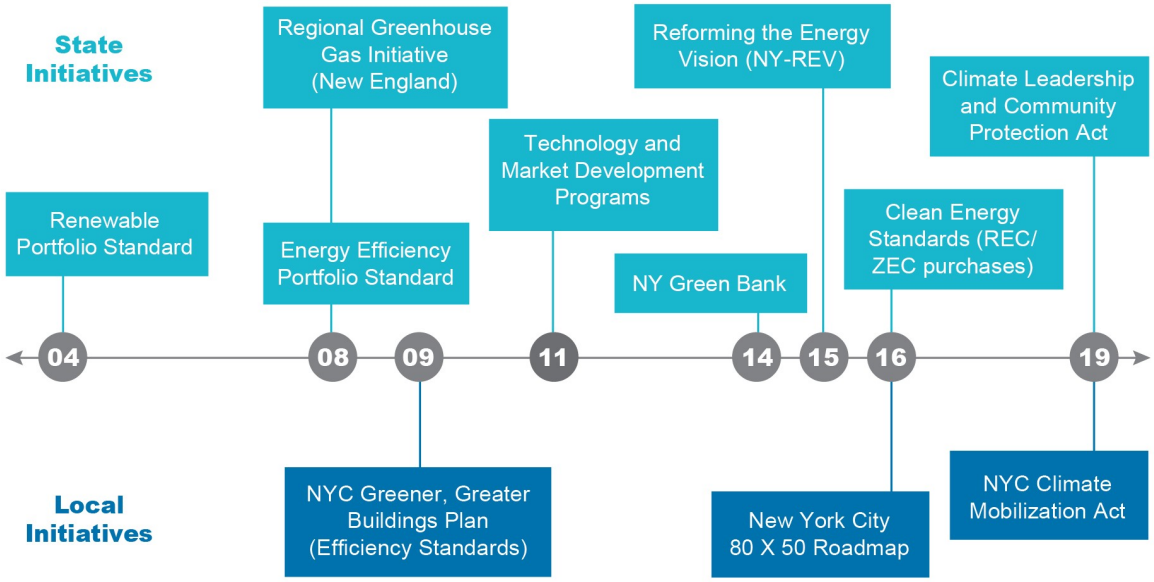
Figure 1: States with 100% clean or renewable energy commitments[3]



Mind the gap: New York's shift to a decarbonized economy

To illustrate potential impacts of this evolving landscape, we looked closer at New York. Figure 2 shows a timeline of several key initiatives transforming the state's energy market. In this article, we examine the two most recent examples of enacted legislation – both at the local and state levels.

Figure 2: New York State and local energy initiatives



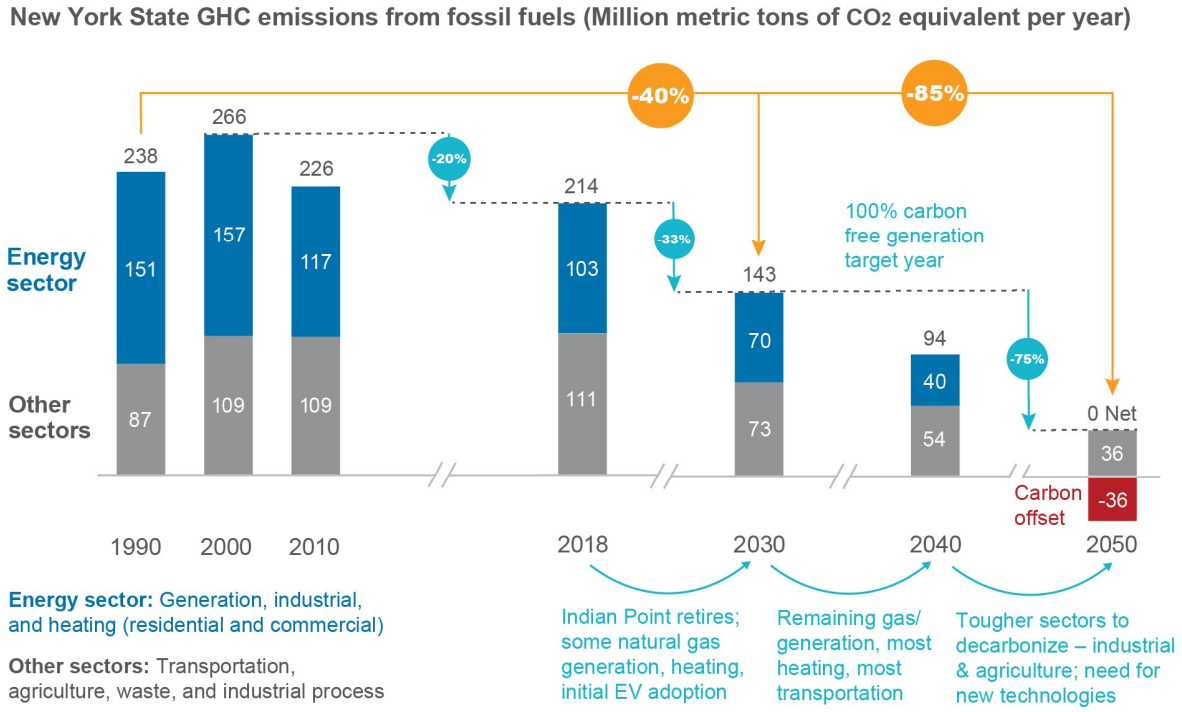
[3] Source: Electric Power Monthly – Energy Information Administration (EIA) and CRA analysis

New York City recently passed the Climate Mobilization Act. The Act is a legislation package with several requirements to reduce GHG emissions and improve efficiency of buildings – one of which requires buildings over 25,000 square feet (~60% of building space in New York City)[4] to meet new stringent energy codes and reduce emissions by 40% or risk potentially severe fines.

Achieving these levels of energy savings will require building owners undertake deep energy retrofits[5] that go well beyond the typical scope of traditional utility-sponsored efficiency programs. In effect, the deep retrofits would convert a significant amount of operational costs (i.e. energy bills that are revenues for utilities) into capital investments for building owners (i.e. revenues for other service providers) and create a major new competitive risk for local electric utilities.

At the state level, the 2019 Climate Leadership and Community Protection Act (CCPA) sets ambitious carbon-emission reduction targets for the energy sector of 70% by 2030 and 100% by 2040 (based on 1990 levels). The CCPA also sets targets for other economic sectors (including transportation, agriculture, buildings, commercial, waste, and industrial processes) with overall reduction targets of 40% by 2030 and 85% by 2050, along with carbon-offset projects (that remove carbon from atmosphere) for the final 15% of emissions to reach full carbon-neutrality for the whole state economy (Figure 3).[6]

Figure 3: Estimated emissions reductions for New York State based on CCPA targets[7]



[4] New York City Council (https://council.nyc.gov/data/green/)

[5] A deep energy retrofit is a systems-integrated approach for whole-building energy reduction projects that provides energy savings above 30% which may include major equipment upgrades and structural changes.

[6] *See* The New York State Senate, "Senate Passes Historic Climate Leadership And Community Protection Act (CCPA)," news release, June 19, 2019, https://www.nysenate.gov/newsroom/press-releases/senate-passes-historic-climate-leadership-and-community-protection-act-ccpa; Bill S6599, https://legislation.nysenate.gov/pdf/bills/2019/S6599.

[7] Source: US Energy Information Administration (EIA)

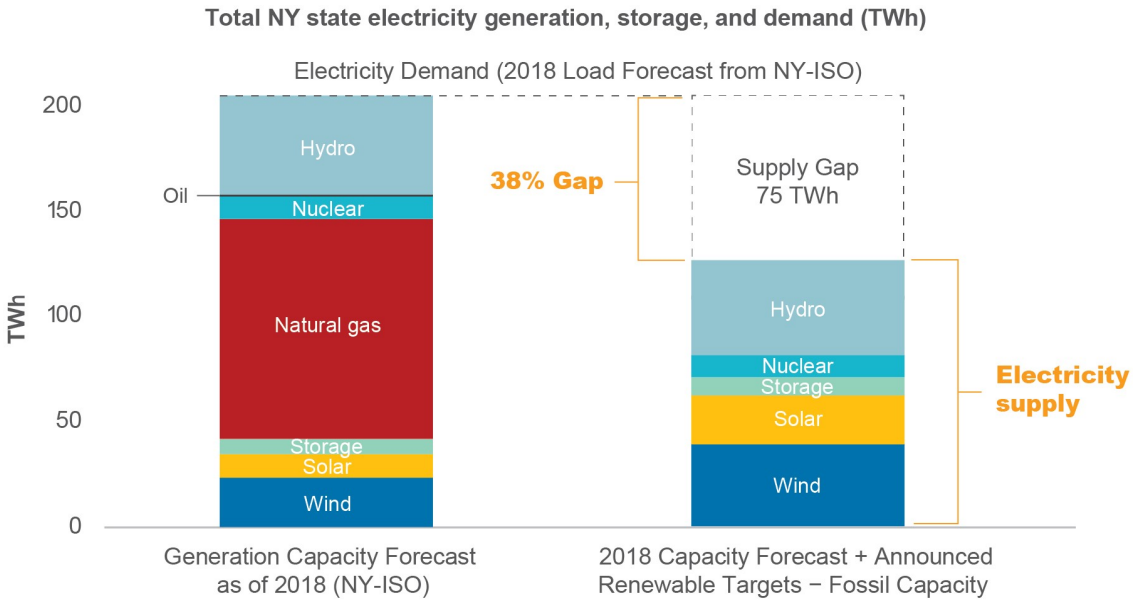
New York State will need to make major investments in energy efficiency, renewables, storage, and grid modernization to achieve the overall energy sector emission targets. However, the 2030 target will be more difficult to achieve due to the retirement of the Indian Point Energy Center (nuclear power station) in 2021 and the subsequent loss of that carbon-free generation. Emissions from other sectors (e.g. agriculture, industrial processes, etc.) may prove to be even more challenging to address. Unlike the energy sector, emissions from these other sectors have been rising since 2000 (Figure 3).

Governor Andrew Cuomo recently announced initial renewable generation capacity investment goals of 9,000 MW of offshore wind, 6,000 MW of solar, and 3,000 MW of energy storage.[8] With these investment targets as a starting point, (assuming replacement of fossil fuel generation capacity and applying the 2018 load forecast from NY-ISO),[9] we can show a representation of what the generation mix could look like in 2040.

Based on this directional analysis, we estimate a potential electricity supply/demand gap of close to 40%. This gap will need to be filled by a combination of additional load reduction via efficiency measures, higher distributed energy penetration, out-of-state carbon-free electricity imports, and/or additional renewable power generation (e.g. offshore wind, utility scale solar, and grid energy storage).

However, this estimate excludes increases in electrification needed to achieve carbon-neutral emissions by 2050 (e.g. space heating, transportation, etc.) that are likely to significantly add to the electricity supply requirements. This gap presents a major potential opportunity or risk for utilities (Figure 4).

Figure 4: Estimated electricity generation supply and demand for New York in 2040[10]



8 "Governor Cuomo Announces Green New Deal Included in 2019 Executive Budget," news release, 01/17/2019, https://www.governor.ny.gov/news/governor-cuomo-announces-green-new-deal-included-2019-executive-budget.

9 NY-ISO, 2018 Power Trends Report, https://www.nyiso.com/documents/20142/2223020/2018-Power-Trends.pdf/4cd3a2a6-838a-bb54-f631-8982a7bdfa7a.

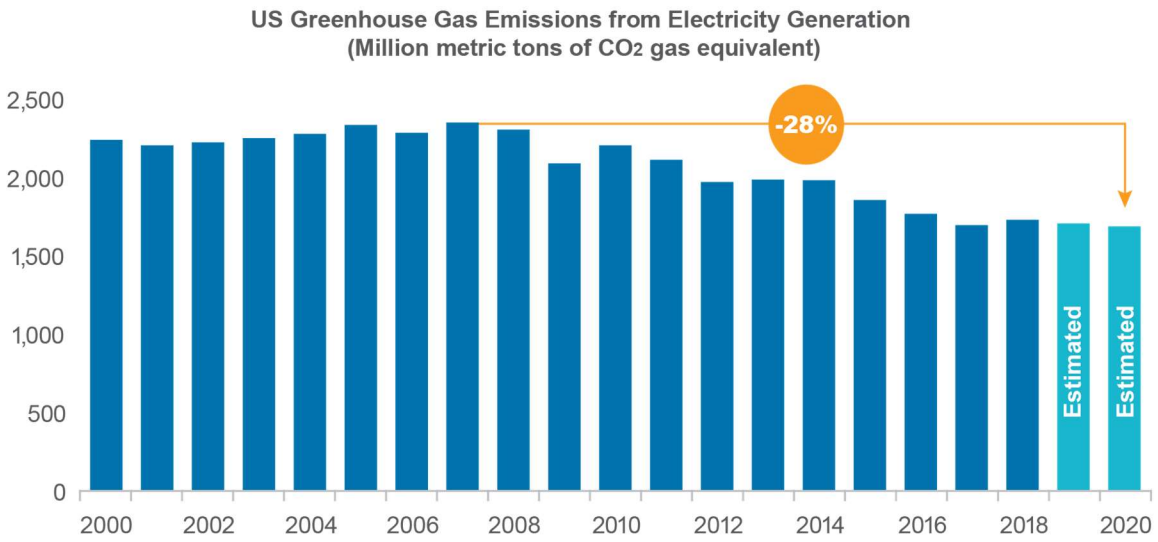
10 Source: EIA, NY-ISO, and CRA analysis

The CCPA also established a Climate Action Council, with 22 appointed members, to make recommendations on how to meet the targets in the next two years.[11] Since the timing and scope of implementation plans are not yet clear, utilities are facing significant new uncertainties. The proposed targets will bring the industry into uncharted territory in terms of renewable penetration and demand reduction – which are likely to present opportunities outside the traditional regulated scope of utilities.

Potential impact on utility business models

Since 2008, utilities have made sizable reductions in carbon emissions (Figure 5) while keeping costs and reliability relatively stable.[12] However, going forward, emission reductions will need to significantly increase to achieve new targets while the overall impact on costs and reliability has yet to be determined.

Figure 5: US carbon dioxide emissions from electricity generation according to EIA[13]



New climate regulations and energy transition initiatives have the potential to create significant 'gaps' for utilities such as generation capacity, cost, reliability, and demand. Since energy directives are often at the state and local levels, utilities have to develop more granular solutions that meet specific localized needs as well as cost and reliability requirements.

As a result, utilities may need to adapt their business models, which could turn out to be very different from their historical role. Are regulators and utilities aligned on the utility role in this evolving market? How will regulators' views change as decarbonization implementation plans are developed across the US?

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[11] The Council is expected to produce an initial scoping plan in 2021 and updates at least every five years thereafter.

[12] See CO_2 data (EIA), Today in Energy, Costs and Reliability: Average US retail electric rates 10 Yr CAGR of 0.8%; Average power outages stable in 2017 excluding major weather events, https://www.eia.gov/todayinenergy/detail.php?id=37652.

[13] Source: EIA and CRA analysis

Utilities need to establish a clear vision of their future role in the energy transition and make a compelling case to society and regulators of their value in structuring, designing, and implementing new offers that meet climate, cost, and reliability concerns. The current scope and magnitude of change require a more proactive approach by the utilities.

Improving technology and changing consumer engagement

Concurrently, consumers are becoming more 'hands-on' about energy. Utilities have responded by developing new interfaces for customers to manage their energy usage. We expect this trend to continue as technology costs fall, user benefits grow, and more demanding local energy codes accelerate the adoption of 'smart' customer devices, components, and systems. Smart capabilities and IoT (Internet of Things) devices allow customers to engage in demand response and dynamic pricing programs and connect disparate systems (e.g. lighting, heating, cooling, etc.). Additionally, the ongoing growth of distributed energy (e.g. rooftop solar) will further impact electricity demand growth for utilities.

As a result, utilities will need new strategies to invest in behind-the-meter products and services to compete with new entrants. Utilities will also need to develop capabilities that complement core competencies and leverage established customer relationships to support growth in this new environment.

Opportunities and challenges for utilities

Utilities need to evaluate how climate regulations and initiatives will affect the overall delivered cost of energy for generation and delivery. Operational efficiencies or bundling of services could replace pass-through regulated costs with behind-the-meter commercial solutions and investments. Climate-driven initiatives have the potential to create both major opportunities and challenges for utilities (Table 1).

Table 1: Examples of potential opportunities and challenges for utilities

	Opportunities	Challenges
Energy efficiency Changing technology and customer needs	• Higher consumer engagement • Leverage customer relationships • Demand response and EE programs • Alternative rate structures	• Long-term flat or declining load growth • Customer or 3rd party owned DERs • Non-utility sponsored energy efficiency • Sustainability and societal impact issues
Renewables Decarbonizing power generation	• Utility renewable generation growth • Transmission investments • Distribution grid modernization • Utility behind-the-meter offers	• New market entrants/competitors • Regulatory lag in changing market • Grid reliability and resiliency issues • Local permitting difficulties
Electrification Decarbonizing other sectors	• New infrastructure for electrification • Increased load from electrification • Further grid modernization needs • Renewables power-to-gas (Hydrogen)	• Loss of gas sales revenues • Stranded gas infrastructure assets • Non-regulated new market entrants • Further impact on peak capacity needs

Meeting investor expectations

In addition to the challenges highlighted, investor owned utilities (IOUs) need to manage their capital market performance and grow returns over time. However, IOUs may find it difficult to deliver on investor expectations in a transforming energy sector and will need to also address several major obstacles to achieve earnings growth at announced rates, including:

- Underlying flat to declining load growth, e.g. energy efficiency, distributed energy resources
- Financial performance challenges associated with the energy transition, e.g. stranded assets
- Increased competition, e.g. new entrants, improved technology, changing customer needs

These challenges may have already started to impact financial performance. On average, EBIT growth for the 20 largest IOUs has been relatively flat for the last two years compared to recent past (~4% average annual EBIT growth per year between 2009 and 2015).[14]

Setting a new course for investor owned utilities

Utilities face enormous challenges: meeting climate regulations, addressing new consumer needs, finding opportunities for proactive collaboration with regulators, and achieving ambitious financial performance goals. New strategies need to mitigate negative impacts to core regulated businesses while providing access to new opportunities.

Utilities can start to reduce risks to their regulated businesses by leveraging their core capabilities, long-standing customer relationships, local knowledge, and operational scale to respond to new market entrants, drive growth, and provide ongoing strong cash flow in the near-term. It will be critical for utilities to reconsider their business models, adapt current strategies, and build the organizational capabilities needed to stay ahead of sector trends.

Additionally, utilities will need to accelerate the growth of adjacent business platforms (e.g. renewables, microgrids, etc.) that can raise the trajectory of the overall company in the medium-term, increase growth optionality, and offset risks associated with their regulated businesses to keep pace with new, non-traditional competitors.

Finally, utilities should make early bets in emerging business opportunities that could represent longer-term growth platforms with potential to evolve their business models over time (e.g. new technology based on behind-the-meter service offerings, etc.). We will cover these opportunities in subsequent articles.

Utilities are at a major crossroads. Utility executives may have a once-in-a-lifetime opportunity to redefine their business models in a way that can dramatically improve long-term growth prospects or risk becoming obsolete in the face of rapid and unprecedented change that is unlikely to reverse course.

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[14] Capital IQ and CRA analysis

About CRA's Energy Practice

Charles River Associates is a leading global consulting firm that offers strategic, economic, and financial expertise to major corporations and other businesses around the world. CRA's Energy Practice provides services to a wide range of industry clients, including utilities, ISOs, RTOs, large customers, and investors. The Energy Practice has offices in Boston, New York City, Washington, DC, Toronto, and London. Learn more at **www.crai.com/energy**.

Contacts

Enrique Glotzer
Principal
New York
+1-212-520-7148
eglotzer@crai.com

Herbert Rakebrand
Principal
Boston
+1-617-425-3758
hrakebrand@crai.com

CRA Charles River Associates