

2.8 California versus New York: policy implementation via Investor-Owned Utilities or Distribution System Provider?

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2.8.1 Introduction

Energy systems are changing all over the world. In the United States of America (USA), the different states follow very different energy policies. Some are at the forefront of global energy policy thinking, including California (CA) and New York state (NYS). However, CA and NYS, whilst both progressive in terms of greenhouse gas (GHG) reduction policies, have very different principles underlying their energy system governance²⁹ and therefore implement their energy policies in very different ways. CA is one of the world's earliest movers in terms of energy system transformation and, on most metrics, outperforms NYS. However, NYS in 2014 put in place the New York Reforming the Energy Vision (NY REV), and although it is too early to judge how successful it is, it has introduced new ideas and arguments about the necessary governance constituents for energy system transformation, and is acting as a first mover in certain significant ways.

²⁸ Work undertaken as a result of the UK EPSRC IGov Research award <http://projects.exeter.ac.uk/igov/>; and thanks to Carl Linvill of RAP, and Rudi Stegemoeller, ex of RAP and now NY PSC, for their conversations.

²⁹ Governance is thought of as the combination of policies, institutions, regulations, market and network rules and incentives, and the process by which the governance design details (i.e. the details of a RE policy, or a market rule) are agreed.

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This country report endeavours to capture those differences and similarities between CA and NYS. In many ways, the heart of a comparison between CA and NY is:

- whether the more cautious governance approach of CA with respect to markets and the ways it places responsibility via regulation on its utilities to execute its policies, often through procurement, is working as well, or better, than the NYS's avowedly new 'balance' approach between regulation and markets of the Reforming the Energy Vision (REV);
- whether, at the end of the day, there is not a great deal of practical difference in outcomes between the two in terms of practical innovation and change, even if their avowed governance principles might suggest there is, and this therefore implies their differences do not really matter.

CA is far ahead of NYS in some ways in terms of renewable energy deployment. However, the changes within the global energy system are increasingly clustering around decentralisation of technologies; the move to decarbonisation; the inclusion of digitalisation within energy system operation and market/platform transactions; and the increasing preference for some degree of democratisation of the energy system via customer choice, new ownership or involvement of new stakeholders or investors. Together, these four 'Ds' are known as D4.

At this point in time, NYS's intended energy pathway might appear to be better suited to these changes (because of its efforts to encourage new entrants; and new, dynamic ways of system operation and valuation of DER; and customer choice) and therefore may – relatively – better benefit the citizens of NYS than CA in terms of energy system transformation over the longer term. On the other hand, NYS may find it just too hard to push through fundamental changes across the spectrum of energy system operation and markets. Only time will tell whether CA or NYS is the more successful governance model for energy system transformation.

Notwithstanding this, the chapter is arguing, at root, that any comparison between them has to be put in context. CA has been supporting sustainable energy since the 1970s. What NYS was able to do in 2014 was 'start afresh' and has enunciated a new approach to energy system regulation to enable a new, more dynamic system operation, with a new value proposition in keeping with D4. There are multiple documents which describe, or predict, a very different global energy system by 2030 (for example see Navigant 2017). However, there are very few country energy systems around the world which are 'walking the walk' and changing rules and incentives so that the value of D4 is available and accessible for new actors and new ways of doing things. This is why both CA and NYS are so interesting.

For any other US state or country which is trying to work out what governance system would most suit them for energy system transformation, valuable lessons can be learned from both CA and NYS.

Overall though, the chapter argues that the underlying principles of the NYS regulatory reform are potentially transformational because it is trying to create a new ‘value’ proposition within energy system governance [1] by arguing to move the ‘heart’ of the energy system to the distribution level; [2] to create distribution system providers to facilitate and coordinate markets at that level, and then to ‘nest’ up that local market up to the wholesale level enabling a dynamic valuation of distributed energy resources; and [3] to both confront, and provide solutions, to the altered and changing nature of energy system provision. The NY REV is illuminating the fundamental issues (including the difficulties) which need to be addressed when undertaking energy system transformation, and in this way the efforts of the NY REV can only be helpful to wider global energy system transformation practice.

Countries may enact this new value proposition differently from NYS, but the ideas that the NY REV have unleashed can be expected to roll out around the world. This chapter, however, also argues that the governance principles or Vision of the NY REV should be viewed distinctly from what is happening in NYS on the ground. The latter, so far, is more about getting information, processes, methodologies and value of DER sorted out rather than delivering much practical change. These are the vital building blocks for that transformational change, and even if NYS runs into difficulties – as a first mover, it is acting as a laboratory for the rest of the world. However, all countries and States have different cultures, geographies and energy system history. Simply transferring NY REV regulation to a country cannot be expected to work. What can be expected to be useful is to understand what energy system issues the NY REV principles and processes were chosen to address (and why), and then to assess whether those principles and processes could be of help in other countries.

This chapter first (very briefly) reviews the CA energy policies, regulation and ethos; then NY’s energy regulation and ethos; and then provides the comparison. This chapter is not attempting a complete overview and comparison of the CA and NYS energy policies. It is attempting to highlight the key characteristics and pieces of legislation of both places for DER governance. For those who would like to have a more detailed overview of how the United States regulates its energy industry, please see.³⁰ The United States is very different from, say, Europe because ‘utilities’ are often combined distribution and supply, and often with a default tariff and limited, or no, competitive retail at the domestic level. Notwithstanding these differences, there is still a lot that the rest of the world can learn in terms of DER governance ideas.

³⁰ <http://www.raponline.org/knowledge-center/electricity-regulation-in-the-us-a-guide-2/>.

2.8.2 California

Overview of Californian energy policy

CA has been at the forefront of global energy policy since the 1970s. Their reaction to the oil crises and energy insecurity of the early 1970s was to put in place policies to support energy efficiency measures and renewables.³¹ The Public Utility Regulatory Policies Act (PURPA) of 1978 was one of the first countries/US states in the world to legislate to support renewable energy implementation.³² CA is an example of a state/country which has had long-term, political commitment and leadership with respect to sustainable energy, via both Republican and Democrat Governors. One result of this early mover advantage has been that the air quality aspects of energy use are also an important and integrating focus of CA energy policy. Another result is that policy is driven by the CA legislature and the various agencies – of which CA has many – are then responsible for implementing the state policy. It is therefore a top-down system.

The main CA implementation agencies are the CEC (the California Energy Commission); the CPUC (the California Public Utilities Commission); CAISO (the Californian Independent System Operator); and CARB (the Californian Air Resources Board). There has been criticism in the past that those agencies do not work well together.³³ However, in November 2016, the California Public Utility Commission (CPUC) published a 7 page Distributed Energy Resources (DER) Action plan – intended to provide a Vision for the way forward for energy within CA, and as part of that a way to integrate the different energy institutions and their activities (California State 2016).

Energy and climate trends in California

GHG emissions in CA have been reasonably similar between 1990 and 2014. Senate Bill (SB) 32 (discussed below) is intended to bring them down significantly by 2030 (California State 2006). However, it is the transportation and electricity sectors which have managed to reduce emissions³⁴ between 2000 and 2014, whilst industrial, commercial and residential, agriculture, recycling and waste have more or less stayed the same. The provision of electricity generation capacity has increased significantly since 2001 (around 56,000 MWs) to

³¹ During the 70s, a new nuclear program was considered but once PURPA was in place this receded.

³² The other country, at that time, which reacted in a similar way to the 1970s oil crises, and which also set about supporting renewables, was Denmark. Both those countries have gone on to become world sustainable technology leaders.

³³ For a rather old analysis of this see <http://www.hoover.org/sites/default/files/research/docs/127600810-renewable-and-distributed-power-in-california.pdf>.

³⁴ http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-01/TN215418_20170118T122654_Proposed_Final_2016_Integrated_Energy_Policy_Report_Update_Clea.pdf.

around 80,000 MWs in 2014, with natural gas and renewables making up the majority of the new capacity.³⁵ Renewable electricity now provides about 30 per cent of retail electricity sales, which includes electricity imported from other states (CEC 2018). Solar has increased from 6800 MW in 2001 to 16,200 MW in 2017. Out of a total of 27,800 MW of renewables.³⁶ Moreover, California is a leader for implementation across technologies for the United States. ‘California represents 49 per cent of all the distributed solar that’s been installed; it represents 49 per cent of all the distributed storage that’s been built; and it represents 47 per cent of all the plug-in electric vehicles in the United States (Wesoff 2017).

The pillars of Californian energy policy

Within this pro-environment context, CA energy policy had a major existential crisis in 2001 which has had a profound effect on subsequent energy policy, and their attitude to markets. CA implemented a privatisation of their electricity system in 2001 – which failed (Sweeney 2002).³⁷ Since then, CA has been extremely cautious about introducing more avowedly ‘market’ based policies or institutional reforms to the CA energy system.

Broadly, CA has three main investor owned utilities (IOUs) – Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison which are joint distribution and supply companies which supply about 70 per cent of electricity. The other 30 per cent is supplied by Municipal-Owned Utilities or ‘munis’, with the biggest being Sacramento Municipal Utility District and the Los Angeles Department of Water and Power. The IOUs buy electricity from wholesale markets; and are the main executors of CA state energy policy by procuring renewables, providing contracts for energy efficiency measures, demand response, storage and so on, as they are mandated to do. They then sell to customers in what was their monopoly areas, via distribution grids that they own. This institutional set up has also meant that the problems and solutions of energy system transformation – such as working out how to pay for networks with increasing amounts of onsite generation; how to fulfil state energy policy goals, such as energy efficiency programmes; how to integrate rate design (or

³⁵ http://docketpublic.energy.ca.gov/PublicDocuments/16-IEPR-01/TN215418_20170118T122654_Proposed_Final_2016_Integrated_Energy_Policy_Report_Update_Clea.pdf.

³⁶ http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf.

³⁷ See James L Sweeney, *The California Electricity Crisis* (2002) Hoover Press, or for a condensed version: [http://web.stanford.edu/~jsweeney/paper/Lessons percent20for percent20the percent20Future.pdf](http://web.stanford.edu/~jsweeney/paper/Lessons%20for%20the%20percent20Future.pdf); or for a very quick overview <http://projects.exeter.ac.uk/igov/lessons-from-america-worrying-analogies-between-the-emr-process-and-the-california-electricity-crisis-2001/>.

tariff structures as they are often known in other jurisdictions) has been implemented via regulation and the IOUs.

Technically, there is retail competition although in a *de facto* sense competition mainly occurs in the non-domestic sectors. It is possible to have Community Choice Aggregation (CCA) which is when a community (and therefore domestic customers) is able, under certain rules, to procure energy for the community (CPUC 2012); and for Electric Service Providers (ESP, the equivalent of the European supplier concept) that offer electric services directly to retail (including domestic) customers within the main IOU service areas. Some CCAs can be large, although they are still reliant on their IOU or muni for billings and so on (Trabish 2017). In practice, ESPs do not provide energy to domestic customers. As a result, a domestic customer in CA who does not live in a CCA area can *de facto* only buy their electricity from the IOU which works in their area. CA is therefore a state with limited domestic retail competition. There is competition in the IOU take-up of resources to the extent that the utility either buys via a wholesale market or procures resources (as a result of regulatory requirements) based on competitive bidding.³⁸ The utilities have therefore become the executor of the state energy policies.

In 2003, the California Energy Commission (CEC) established the California Statutory Energy Loading Order via the CA Energy Action Plan, 2003, and then updated it in 2008 (CEC 2008). This Loading Order required IOUs to procure energy efficiency and demand response ahead of all other resources, including ahead of priority access for renewables.

In parallel to the CEC's Loading Order, 'modern' Californian energy policy was founded in State Assembly Bill (AB) 32 (California State 2018) – the Global Warming Solutions Act, 2006 – which formally brought air quality and climate change together along with security and affordability issues. The 2006 bill has been strengthened over time by Senate Bill (SB) 350³⁹ in 2013; SB 32 in 2016 (which has a target of 40 per cent reduction of GHG from 1990 levels by 2030); and AB 197 in 2016 which aims to ensure that the State's implementation of these policies is transparent and equitable, and that their benefits also flow to the disadvantaged (for an overview of state papers please see⁴⁰).

An Integrated Energy Policy Report (IEPR) is published every 2 years by the California Energy Commission (see CEC 2018). The IEPR reports attempt to provide an overview, and explain the inter-relationships, of the CPUC, CAISO, CARB and CEC policy measures. But it has been the CPUC's 7 page Distributed Energy Resources Action Plan (CPUC 2016), published in November 2016, which has set out a time plan for Actions to integrate, and take forward, all the various measures within California and its Agencies with respect to DER.

³⁸ For a rather old analysis of this see <http://www.hoover.org/sites/default/files/research/docs/127600810-renewable-and-distributed-power-in-california.pdf>.

³⁹ <http://www.energy.ca.gov/sb350/>.

⁴⁰ <http://www.cpuc.ca.gov/sb350/>.

Arguably, because of this, CA energy policy has five key pillars, and it is important to note the different agencies involved in these different pillars:

- Electricity system decarbonisation through renewables implementation and energy efficiency policies (RETI 1.0,⁴¹ RETI 2.0,⁴² and Long Term Procurement Planning) via the CEC.
- Decarbonisation through strengthening regional markets and creating a Regional Independent System Operator (RISO) and Energy Imbalance Market (EIM) via CAISO.
- Decarbonisation by building distributed energy resources (DG, EE, DR, storage, and EVs) via the CPUC.
- Optimising decarbonisation across sectors (electricity, building and transportation) via Integrated Resource Planning, coordinated by the CPUC.
- Valuing carbon, and air quality, policies (including the cap and trade scheme) via CARB.

This section focuses on the decarbonisation by building distributed energy resources (DG, EE, DR, storage, and EVs) via the CPUC, since it is most analogous to the NY REV Public Service Commission work. As in NYS, the CA state is providing support and a process to deliver renewables, energy efficiency and so on. There is a clear expectation that the Regulator (the CPUC in CA and the PSC in NYS) delivers regulatory mechanisms which complement policies.

Decarbonisation by building DER

The CPUC Scoping Note (CPUC 2014) of 2014 set up Distribution Resource Plan (DRP) proceedings (CPUC 2013) (the CA equivalent of the 2015 NYS Distribution System Implementation Plans) whereby CA IOU utilities are required to produce a DRP (DRPWG 2013). The Scoping Note argued that the underlying rationale for promoting increased deployment of DERs is that they have a critical role in meeting CA's GHG reduction policy. The goals of the DRP Plans were to:

- modernise the electric distribution system to accommodate two-way flows of energy and energy services throughout the IOU networks;
- enable customer choice of new technologies and services that reduce emissions and improve reliability in a cost efficient manner, but not to the extent that domestic customers can switch suppliers if not in a CCA area;
- to animate opportunities for DER to realise benefits through the provision of grid services, and to enable a plug and play distribution grid for DER (pp. 3–5).

⁴¹ http://www.energy.ca.gov/reti/reti_1.html.

⁴² <http://www.energy.ca.gov/reti/>.

The intent of the Scoping Note was very little different in terms of outcomes from that set out in the 2014 Vision Paper of the New York Reforming the Energy Vision (NYREV 2014) and discussed below. Moreover, the DRPs were also to be aligned with *More Than Smart* (RENSWICK Institute 2015), a progressive initiative which paints a much more integrated and market-based future and puts forward ideas about how to get there (CPUC 2014). Whilst this might imply a future with more domestic customer choice, CA has not clarified the point.

The DRPs have been followed up with the November 2016 CPUC DER Action Plan, as described above CPUC (2016), which has five Actions to be undertaken in 2017; three in 2018 and one in 2019. At root, the DER Action Plan process should work out:

- How to accommodate more DERs cost effectively, and work out the value of DERs when they are procured either individually (i.e. DG PV alone) or as a portfolio (DG PV plus storage etc).
- Make the wholesale and retail markets more responsive to DERs.
- Link DER more with CAISO, including with storage (CAISA 2014a; CAISA 2014b). CAISO has long had contracts for demand response and so forth but it now beginning to develop contracts with DER providers, or DERPs, which must register to (potentially) access a new revenue stream (CAISA 2018).
- Encourage a more integrated CA energy system.

Whilst the intentions are very similar to those in NYS, the means of assessing DER resource and value – as set out through the ICA and the LNBA) were very different in CA from NYS. The CA methodology was technical, economically static and set within the conventional institutional and market structure, and therefore the outcomes are very different (Brockaway 2017).

2.8.3 *New York state*

The New York reforming the energy vision

In April 2014, Governor Cuomo of New York kicked off the New York Reforming the Energy Vision (NY REV). This encompasses multiple dimensions of regulated administrated programs (such as support for renewable energy), regulatory reform and new institutions – all of which are intended to work together to create an enabling environment for a transition to a sustainable energy future for New York state (NYS 2018).

At part of this, the New York Public Service Commission (NY PSC, the Energy Regulator) initiated a regulatory reform aspect of the Reforming the Energy Vision (NYREV 2014) with a Regulatory Order in April 2014 from the Commissioners of the PSC to ‘transform New York State’s industry with the objective of

creating market-based, sustainable products and services that drive an increasingly efficient, clean, reliable, and customer-orientated industry. A podcast (Lacy 2014), by the then-Chairperson of the NY PSC, Audrey Zibelman, described how Hurricane Sandy was a major driver in the NYS decision to articulate a new Vision for energy. Hurricane Sandy provided the appetite for change of the NYS people, as well as the PSC focus of providing customers with the services they want – which includes security, cost effectiveness and so on.

In brief the NY REV is:

- Envisaging a decentralised energy system, with a new ‘heart’ at the distribution level, which is coordinated in a new way via a distribution system provider (DSP) with more values for more services via transactive energy markets/platforms.
- Envisaging a ‘new’ regulatory framework and basis, with more performance based regulation, more suited to meeting the challenges faced by the NY energy system, and where appropriate, incentivising the solutions rather than regulating for certain outcomes.
- Envisages services aimed at fulfilling individualised customer choice, including providing value to customers when they add value to the system.
- Argues that bottom-up optimisation via decentralised energy resources is more cost effective and resilient than traditional top-down centralised operation.
- Uses administered/regulated programs (i.e. to support renewable energy, energy efficiency measures etc.) to develop the necessary building blocks for efficient market activity, and then envisages the administered programs decline in importance relative to markets as, for example, RE becomes competitive or as companies delivering EE services become more mature etc.

NY REV building on a decade of supportive policies

The REV has not come out of nowhere. NYS has had a decade of sustainable energy policies. It now has a comprehensive NYS Energy Plan (SEP) (NYS 2015) which (so far continues to) fit with the Obama US Clean Power Plan, NYS has a Greenhouse Gas (GHG) target for a 40 per cent reduction from 1990 levels by 2030 (and by 80 per cent by 2050). NYS also has multiple administered/regulated programs (NYS 2015). For example, a Clean Energy Standard (Cuomo 2016a) which has a target to generate 50 per cent of electricity from clean and renewables by 2030 (NYISO 2016); an energy efficiency program via a Clean Energy Fund (CEF, CEF Order (NYS)) and an Affordability policy (Cuomo 2016b).

However, NYS is behind CA both in terms of sustainable energy capacity implementation, and in terms of length of time that serious sustainable energy policies have been in place. For example, in 2018, solar deployment in NYS had increased by orders of magnitude from 2010 to 1.3 GW, well under the 22 GW of solar that CA had (in 2018) (SEIA 2018). In 2016, for the first time, New York

obtained more than 1 million MWh of electricity from solar generation, and 84 per cent of that power came from distributed sources such as rooftop solar panels, New York obtained 24 per cent of its electricity from renewable sources in 2016 (US EIA 2018a).

An upside of the newness of the NY REV is that it is less constrained than CA by historical developments, and the momentum /inertia developed by ‘ways of doing things.’ Transforming to a new energy system is still in the early stages in NYS, and as a result, NYS has been able to be innovative in deciding where it wants to get to; what the underlying philosophy should be; and what is the best process for delivering the Vision. The NY state government, while setting the overall goals, has been less controlling of the PSC than is the case in CA, where the state effectively sets the decisions that the CPUC (and other agencies) follow through with.

An upfront and clear vision for change

The NY PSC’s Vision, as described above, has been upfront in its questioning of two central assumptions of the traditional utility paradigm: (1) that there is little or no role for customers to play in addressing system needs; and (2) that the centralised generation and bulk transmission model is invariably more cost effective than decentralised, due to economies of scale. Thus, the NY REV rhetoric argues that the current business-as-usual regulation cannot deal with the current challenges that energy systems face, nor can it capture the available opportunities. This is a very ‘upfront’ and challenging Vision.

The intention of the Vision was to find a ‘new’ energy system paradigm (and its institutions and actors) which suits the current challenges that energy systems face (and NYS in particular), and which can capture its opportunities for the benefit of NYS customers and the NYS economy. It was from the start, therefore, open to a new means of regulation; a ‘new’ balance between regulation and markets; a new role for actors within the energy system, including the regulator itself, as well as the utilities and customers.

The NY REV envisages an evolutionary rather than revolutionary transition and the 2015 Market Design and Platform Technology Report (MDPT 2015) set out ‘an end’ of where it expects the NY REV to get to after about 10 years (or the mid-2020s). This is a smart, primarily decentralised, market/platform-based transactive energy system with a new basis of regulation; new institutions; new roles of central actors; and new ways of making money.

Whether, the NY PSC would be so upfront, with hindsight after three years, about the need for change is an interesting question. On the one hand, it signposted where it wanted to go and achieved support from a wide range of stakeholders, including NYS citizens. It also encouraged new companies to come in to the market – for example, the Brooklyn micro-grid (a Peer to Peer (P2P) blockchain using platform⁴³) On the other hand, it also immediately signposted

⁴³ <http://brooklynmicrogrid.com/>.

to utilities (and utilities in the wider world) that change was coming – and therefore set them up to, at best, be wary.

The transformational institution of the 2014 NY REV, expanded on by the 2015 MDPT, was that of the role of distribution system providers (DSPs). The six main distribution utilities within NYS are expected to transform to DSPs – essentially distribution energy and system service market facilitators and coordinators – who would also be responsible for the public service obligation (PSO). The MDPT report set out the argument behind why utilities need to understand their area distribution energy resources (DER) in detail; the requirement for them to produce a distribution system implementation plan (DSIP); and an explanation of what a DSIP should consist of, what methodology to use when writing one, and how long it would take (about 2 years). The writing of the DSIPs is the process which essentially forces the utility, and other stakeholders (i.e. providers of resource, customers, new entrants, the utility itself), to understand at the most detailed level what the implications are for all stakeholders of being in a regulatory environment which is transforming the distribution utility environment into a DSP environment (NYDPS 2016). Having understood the DER resource in an area, the DSIP was to provide confidence to the wider community that DSPs would, over the 10 year period, develop into:

- DSP platform/markets to support 3rd party investment in DERs;
- benefit utility customers by reducing overall electric system costs and provide them with new services;
- ‘animate’ the distribution level markets through various mechanisms; and
- provide efficient, linked role between the DSPs and NYISO.

The 2015 Market Design and Platform Technology Report also kicked off various working groups to work out various technical and economic issues of the NY REV, which included in 2018 a Comprehensive Energy Efficiency Initiative (NYREV 2018).

On 19 May 2016, a White Paper on Ratemaking (two years after the NY REV kick-off) was published which sets out the different ways that utilities will be expected to make money in the DSP future, and the timelines for doing so. In general, the Ratemaking Order (SNYPSC 2016a) made less difference to utility revenue over the next 3 years than might have been expected from the rhetoric of the 2014 Vision.⁴⁴ However, it did show that the way of regulating utilities and the revenue base of the utility is expected to fundamentally change over

⁴⁴ The EAMs should not add more than 2 per cent of their delivered revenues to the distribution companies in the first phase (i.e. over the next 3 years). Given that current performance-based regulation is related to slightly less than 6 per cent of total delivered revenues in NY, this takes PBR up to about 8 per cent, which is a small change.

time; and provided a means for linking the utility revenue base and wider NY state energy program (Mitchell 2016).⁴⁵

A new world for utilities

The Ratemaking Order represents a new balance of regulation and markets for the distribution utilities where the respective role of regulation and markets is different, and the ways of obtaining revenue also changes. The three main ways of making money will change over the 10 or 15 years from being mainly from traditional cost of service to partly:

- A continuation of the usual: money will continue to be made through traditional cost of service
- a new bringing together of regulated performance incentives mechanisms to fulfil Government policies through Earning Adjustment Mechanisms (EAMs) – by helping to enable public policies and goals are delivered (for example, the renewable energy or energy efficiency programs); and
- a new performance-based regulation where revenues are accrued through platform service revenues (PSRs), which are linked to the developing trans-active energy markets.

Markets are central to this new REV Vision. Innovative, local markets/platforms and new ways to operate the energy system are already being stimulated in NYS. However, whilst markets are central, so is regulation. The NY REV took a philosophical choice that distribution utilities would continue with this public service requirement. The NY REV therefore is an experiment in:

- Facing the new utility challenges, including the increasingly serious issues of how to pay for networks given changing technologies and means of provision,
- traditional concerns of ensuring vulnerable customers remain able to access affordable energy; and
- trying to encourage innovation and new behaviours via markets.

Together, as shown in Figure 18, this is transforming the revenues and activities of the distribution companies. This is discussed further below.

Valuing distributed energy resources

In mid-November 2016, the methodology for valuation of DER in NYS (VDER) (SNYPSC 2016b) was published and explained (1) that the current support for DER, mostly through net energy metering (NEM), would continue for a period

⁴⁵ See Mitchell at: <http://projects.exeter.ac.uk/igov/wp-content/uploads/2016/04/Distribution-Service-Providers-Update-November-2016.pdf>.

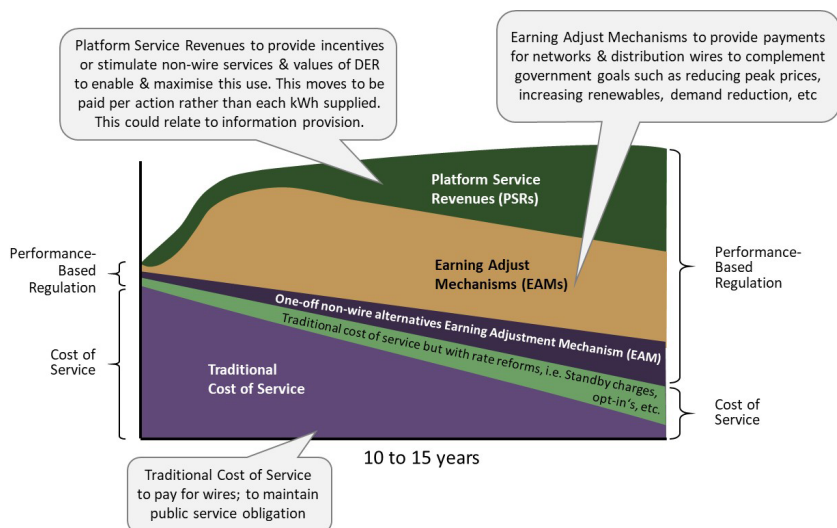


Figure 18: Sources of utility revenue (rate of return on equity) over time within NY REV.

Source: Own contribution.

of time; but that (2) support for NEM would gradually move to a new valuation methodology of DER, which would take account of various aspects. The VDER 4 basic components and known as the value stack (Walton 2017), are:

- the base locational marginal price of energy (LMP);
- the capacity value;
- the credit for the environmental benefits of carbon-free, distributed energy resources;
- a market transition credit.

The VDER agreement to transition away from retail rate net metering for residential customers is largely unprecedented in the United States – it being a major source of contention in most States which have increasing proportions of solar energy. Dubbed the ‘Solar Progress Partnership (Shallenberger 2016)’, the NYS deal brought together members from both sides (Yahoo Finance 2016) of the distribution grid, including Consolidated Edison, SolarCity, SunEdison, Central Hudson Gas and Electric, New York State Electric and Gas, National Grid, Rochester Gas and Electric, Orange and Rockland Utilities, and SunPower Corp.

The VDER market transition credit in the VDER was a placeholder for the value of the distribution level benefits which DER provides. Having established the methodology in the November 2016 VDER, and taken account of

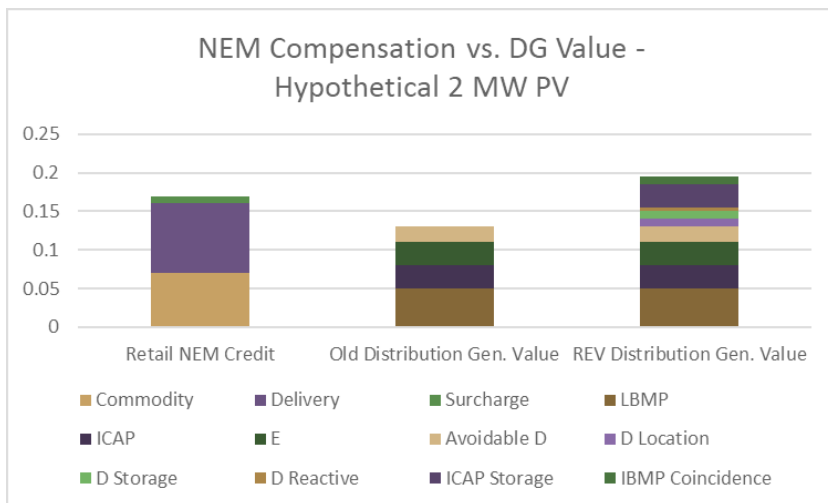


Figure 19: The Value Stack of Distributed Energy Resources in NYS.

Source: SNYDPS (2016a).

Notes:

1. The 'retail NEW Credit' column represents compensation NEW provides per kWh
2. The 'Old Distributed Gen. Value' column represents the potential value that maybe provided under NEW prices signals where the kWh and kW benefits are calculated and then expressed on a per kWh basis
3. The 'REV Distributed Gen. Value' represents the potential locational kW and kWh value that could be created if NEM prices signs are replaced with most efficient prices signals.

the various MDPT projects, practical steps valuing DER moved forward in March 2017, with three dockets from the PSC (Baldwin Auck 2017): (1) an introduction to the Value of Distributed Energy Resources,⁴⁶ (2) Distributed System Implementation Plans,⁴⁷ and (3) the Interconnection Earnings Adjustment Mechanisms.⁴⁸ All these Orders are more detailed workings of previous more generally stated agreements, and will be central to how different entities, including distribution utilities, can make money (Stein & Ucar 2018).

⁴⁶ <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-E-0751>.

⁴⁷ <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=44991>.

⁴⁸ <http://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterSeq=44991>.

The NY REV distribution system provider – the new heart of the energy system

The NY REV argued for a new value proposition, or ‘heart’ of the newly envisioned NYS energy system – a distribution system provider (DSP). The idea of a DSP is transformational in the sense that it is a new function:

- able to coordinate system operation and balance markets within their service areas;
- whilst at the same time working towards meeting state policy goals
- regulated via PBR so that incentivises new behaviours of the DSP itself, its customers and its service providers, turning the current ‘passive’ distribution utilities into ‘active’ market facilitators and system coordinators.

As Figure 19 above shows, revenue comes from three main sources (two of them new): traditional cost of service, EAMs (which help meet state goals); and PSRs (from transactions – as many as possible market based and involving new entrants and new services).

All of this depends on a detailed understanding of the value of distributed energy resources in the distribution area. Only when those values are understood can the DSP coordinate and balance the area as cost effectively as possible. This is why the DER plan was instituted; why the value stack was created; and why a placeholder for DER value was established.

The DSP is the institution which will dynamically be able to value DER. As the system operation situation changes in any one place at any one time – for example, because of EV take up; increased energy efficiency; more DSR; more DER etc. – then it, as the coordinator can promote new transactions which best suit customer/user wishes. This is unlike the CA DRP which is static and coordinated by the monopoly utility.

The DSP in NYS is envisaged as a combined energy and system services market facilitator; the combined wires and energy local system operator and balancer, and provider of last resort. It is the coordinating and balancing platform for an area – but one which coordinates other third-party providers of DER (which may also have their own platforms) which would sell those 3rd party services (of all types) to customers (of all types) via the new 3rd party markets/platforms to create value for both customers and the system.

This, in theory, allows independent DER to bypass the wholesale market and the transmission operator, thereby creating a new value proposition for decentralised energy and the distribution utilities – all the while revealing a new economics of energy provision. This is opening up potential new market possibilities which the DSP, in theory, could, and according to the NY REV philosophy, should, facilitate; and which they are not in control of.

Thus, on the whole, the DSPs in NYS are expected to be facilitators and coordinators rather than ‘doers’ themselves. If they want new services in their areas, then they are expected to provide incentives, contracts or stimulate

tariffs (and necessary data and analysis) to enable a third party to provide those new services.

But, importantly, if customers/users want to do something, then that would either occur under a ‘normal’ market situation or they can/should approach the DSP to develop a market or a new means (non-wire option) of providing the service. The idea is that the DSP would be incentivised sufficiently for each transaction it encourages to make the economic choice to do that rather than to continue with conventional wires options. This is different from CA – where CCAs are the nearest way for users to do something that they want – as opposed to being controlled by the utilities – in the system.

There are various on-going discussions within the NY REV evolution about the extent to which the traditional utilities are able to maintain their incumbent competitive advantage over the new entrants and new services which the Vision says it wants to encourage. It is clear that the distribution utilities are going to undergo significant threat to their conventional means of operation. It is too soon to be able to say that the way that the NY REV has been undertaken is the ‘right’ way for energy system transformation. It can be said, however, that it is illuminating issues which have to be addressed if energy systems are to reduce GHG and become resilient; and it seems right in this very technologically fluid time that system operation and economic regulation is designed to be dynamic and flexible.

2.8.4 Comparison of California and New York energy policies

Similarities

Both CA and NYS are major US states in economic and population terms. They both have very high total energy demand by state ranking (2nd and 4th respectively) and they both have low per capita consumption (49, 3rd lowest) and 51 (the lowest) (US EIA 2018b). They are both trying to ensure vibrant economies whilst at the same time meeting their progressive energy policies. CA has had a longer-term, supportive policy for sustainable energy than NY, but both have a reasonably environmentally literate public that has been slowly built over time. Moreover, NYS is very proud of its energy history – being the home of the first Edison power plant. They both take an enabling environment approach to their policies where legislated policies, such as support for renewable energy, energy efficiency etc., intertwine with pro-environmental transport, security and affordability issues. They are both moving towards a greater importance of the distribution level within their energy systems, in part due to the decentralising opportunities of energy technologies; they both support integration between electricity, buildings and transport; and they both support a move to a flexible, smart future. Both have political buy-in for their governance changes.

In their different ways, both CA and NYS have had events which have shaped the development of their energy policies. In CA, the failure of the electricity

privatisation has led to wariness of, and difficulty in moving towards, markets – and therefore a reluctance of moving away from the traditional regulatory model. The CA State Legislature continues, effectively, to mandate change and the various CA agencies then implement it. In NYS, Hurricane Sandy has led to openness for change, and a questioning of the ‘old’ way of doing things. CA was an early mover with respect to energy system transformation and has therefore got various institutions and ways of doing things in place. Hurricane Sandy effectively allowed the past to be reinvented in NYS.

Differences

CA and NYS do, however, have very different approaches to how they communicate and execute those policies. NYS was upfront in the PSC 2014 Vision arguing that traditional energy regulation is no longer fit for purpose, and that new roles for utilities, customers, and the Regulator are required. Moreover, NYS has been clear that it sees a rebalancing between Regulation and Markets as necessary – with both regulation and markets as having important roles: Regulation ensures direction and maintains a public service obligation whilst more markets enable innovation, cost effectiveness, and customer choice.

CA has not been as strident in its public pronouncements. CA still effectively delegates executive responsibility for its sustainable policies to its IOUs, which then generally procure renewables etc. for sale to their customers. Regulation remains the more important aspect of the alternative tools of regulation or markets. The role of the different actors in energy system transformation have not been so openly questioned in CA. Whilst CCAs are making some inroads in CA, most domestic customers remain served by the incumbent IOUs, and even CCAs are reliant on the IOUs for billing and so forth.

Whilst NYS utilities remain at the centre of the energy system transformation, the basis of their future revenues is set to alter fundamentally, and part of that revenue is related to transforming institutions (the DSP) and enabling new players and new transactions. So far, whilst it is clear to all concerned that energy systems are having to grapple with all sorts of change, including the roles and business models of those involved, the CA Regulator has not added details of how the basis of the utilities revenue will change over the next decade or so. In this sense, the environment for the CA IOUs is far less threatening than in NYS.

NYS has also been clear that utilities can earn more if they change – so there is a strong carrot and stick element within the NY REV, which in theory should be attractive to utilities. At the same time, in theory, new entrants and new ways of doing things should be more attractive in the NY REV world of DSPs and markets and, certainly, it seems that the ideas are squarely positioning NYS to complement D4 and transactive energy. However, CA continues to be the major market for DER in the USA, and whilst it may be a utility which procures, for example, DSR or solar from new entrants because of regulation rather than from via a market in NYS, CA is still providing greater amounts of value

to DER than NYS. From a practical perspective therefore, whilst new entrants may like the NYS philosophy, it is still CA which is coming through with value which can be captured.

Nevertheless, while utilities may prosper in the new world, systems are also moving quickly and forcing issues upon all system stakeholders. CA has had negative prices in electricity markets for the first time – a sign that the system has moved to a new existential phase (US EIA 2017).

The NY REV has engendered a much more an in-depth, transparent discussion than CA about what the role of the energy system should be in the 21st century energy system, and what would be appropriate regulation. NYS has tried to open up the debate about what energy policy is good for the NYS economy, as well as what customers want from the energy system and the ways in which it could connect customers, including domestic customers, to their energy use. This has shifted the debate from the interests of companies to one of public interest and resilience. Moreover, at its very roots, the NY REV is de facto arguing that an energy policy built around public interest is likely to be more successful in meeting its public policy goals than the old ‘private’ interest model – this is both radical but also very different from CA.

NYS is also arguing that customers will still need protection in this new world whilst placing them and their customer propositions at the centre of the energy system service. This is exploring new ground. Whilst it is the same century old mandate, it is a new compact with customers. The NY PSC has opted, at this time, to say that the utilities have to continue with this public service obligation. New entrants, and new ways of providing services, currently do not offer an alternative to the regulated route of public service provision. The rapid changes of the energy system are exciting but the NY PSC has said, much as they support and want to encourage new markets and new roles, customers, particularly vulnerable customers, have to be looked after. In this way, the NY PSC is marrying a traditional regulatory role with the opening up of markets and new forms of performance based regulation via EAMS and PSRs. It is this triad approach, which together is unique and interesting.

NYS has been able to capture the position of regulatory innovator because it is the first state to put forward – and take steps to execute – such innovative ideas, centring on the Distribution System Providers for DER. CA has implemented much of the same actions around distribution development – for example, DRPs, Action plans, and ways to value DERs – but it is implementing them a very traditional way.

Nevertheless, both CA agencies and the NY PSC are cautious when it comes to dealing with the distribution utilities in their respective states. There are concerns on the part of the distribution companies about the impacts of the transformations on their businesses and neither CA nor NYS are pushing the utilities too hard, as yet, for change. Moreover, whilst the NY PSC continues to see the utilities as providing the public service of final resort, the utility future still seems reasonably assured.

The transformational nature of ideas

NYS appears to be trying to create a process where either regulation or markets can be chosen as the tool to reach a desired outcome, depending on which is best for each desired outcome. Their arguments in support of local balancing markets, platforms, DSPs as coordinators, performance incentives and so on are new institutions and new regulations coming together in new ways. The idea is that this will lead to a more cost effective regulation which provides the services and propositions that customers actually want.

The unknowable issue, and in a sense the most important question, for States or Countries which are thinking about transforming their energy systems, is whether the more regulated approach of CA is preferable, cheaper, quicker, easier in moving those States or countries towards GHG reduction than the NYS model. Whilst NYS is arguing that innovation and a customer focus is necessary in order to achieve a cost effective energy system transformation – and that markets, the decentralised value proposition of DSPs, and performance based regulation is integral to that – we cannot as yet know if that is the case. NYS is placing customers at the centre of the energy system, and wants the services that they want to be provided – and incentivised via performance based regulation. In other words, NYS is attempting to move beyond a narrow cost effective service for individual anonymised customers towards enabling individual customer choice – of any type – to buy and sell to and from whomever they wish to.

This is a fundamentally different approach. From a theoretical point of view, this chapter prefers the NY REV model to avowedly free up innovation to develop in ways ‘it’ (the innovation) wishes to and which ‘we’ (the regulator/industry) cannot know about now. The chapter also in theory agrees that a DSP like value proposition is best able to work with, and coordinate, with D4 and the developing transactive energy platforms, and other changes. Moreover, the NYS DSIP and its valuation methodology, being dynamic, seems to be preferable.

This chapter is impressed that NYS has attempted the NY REV. It recognises that NYS has undertaken a major program in trying to deliver new regulatory approaches across a number of fronts. This may prove to be too big a step, in which case the CA approach may turn out to be preferable in terms of on the ground, GHG reducing, practice change. On the other hand, the NY REV may all come together in a few years to meet the challenges of D4 and to take up its opportunities in a way that CA may find itself unable, or constrained, to do because of its lack of customer choice.

It also seems that some of the lessons learnt from Europe could also be beneficially incorporated into the NY REV – and that includes separating out distribution utilities from ‘supply’: in other words, turning DSPs into energy and wires companies but removing their supply base.

Data, and its availability as a public good versus a source of revenue is also being hotly debated in Europe, as it already is in NYS. This chapter takes the

view that data should be freely available and seen as a public good. Another similar debate in Europe and NYS, is whether DSPs should own or not own DER. This chapter takes the view that it should not.

It is true that the changes on the ground in NYS itself have not occurred as fast as some would hope. However, if the 2014 Vision and principles are separated from the on-the-ground change in NYS, the NY REV is offering a new answer to the challenges of the 21st Century. In this sense, it is inspirational. If the goal is energy system change – then it is a case of ‘watch this space’ to see just how fast NYS is able to alter, and what the problems and difficulties have been so that lessons can be learned.

This is not to in anyway undervalue CAs history to date – which is clearly the most successful in the USA, and one of the most successful in the world in terms of RE deployment and decarbonisation of mobility.

Finally, in conclusion, this chapter argues that a combination of steady public policy targets and support (as has occurred in CA for 40 or so years, and for a shorter period in NYS) combined with the new institutions, centrality of customers; balance between regulation and markets; and new regulatory incentive mechanisms in NYS are, at this time, the ‘best practice’ lessons coming out of both CA and NYS governance for DER.

Author's note

A small amount of the above chapter was previously published by the author on the IGov New Thinking for Energy blog, found at <http://projects.exeter.ac.uk/igov/comparing-nys-with-ca-blog-4-a-comparison-of-the-fundamental-regulatory-principles/>

2.8.5 References

- Baldwin Auck, S.** (2017), *New York regulators issue three milestone REV orders, but more work remains. GTM, 15 March 2017.* Retrieved from https://www.greentechmedia.com/articles/read/New-York-Utility-Reformation-Is-Hard?utm_source=twitter&utm_medium=social&utm_campaign=gtnsocial#gs.Tmjll_I
- Brockway, A.M.** (2017), *Distributed generation planning: a case study comparison of California and New York proceedings.* Center for Sustainable Energy. Retrieved from https://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/Distributed_Generation_Planning.pdf
- CAISA.** (2018), *Distributed energy resource provider, Californian independent system operator.* Retrieved July 2, 2018, from <https://www.caiso.com/participate/Pages/DistributedEnergyResourceProvider/Default.aspx>

- CAISA.** (2014a), *Advancing and maximizing the value of energy storage technology – a Californian roadmap*, Californian independent system operator, December 2014. Retrieved from https://www.caiso.com/Documents/Advancing-MaximizingValueofEnergyStorageTechnology_CaliforniaRoadmap.pdf
- CAISA.** (2014b), *Relevant CPUC, energy commission, and ISO proceedings and initiatives, – California Energy storage roadmap companion document December 2014*. Retrieved from http://www.caiso.com/Documents/CompanionDocument_CaliforniaEnergyStorageRoadmap.pdf
- California State.** (2006), *SB-32 California global warming solutions act of 2006: emissions limit*. Retrieved from https://leginfo.legislature.ca.gov/faces/bill-NavClient.xhtml?bill_id=201520160SB32
- California State.** (2018) *Assembly Bill 32 overview*. Retrieved July 2, 2018, from <https://www.arb.ca.gov/cc/ab32/ab32.htm>
- California State.** (2016), *California's distributed energy resources action plan: aligning vision and action*, November 2016. Retrieved from [http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Commissioners/Michael_J._Picker/2016 percent20DER percent20Action percent20Plan percent20FINAL.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Commissioners/Michael_J._Picker/2016%20DER%20Action%20Plan%20FINAL.pdf)
- CEC.** (2008), *Energy action plan, 2008 update*, Californian Energy Commission. Retrieved from <http://www.energy.ca.gov/2008publications/CEC-100-2008-001/CEC-100-2008-001.PDF>
- CEC.** (2018), *Tracking progress*. Californian energy commission. Retrieved from http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf
- CEC.** (2018), *Final 2017, integrated energy policy report*. Californian Energy Commission, April 2018. Retrieved from [see http://www.energy.ca.gov/2017_energypolicy/](http://www.energy.ca.gov/2017_energypolicy/)
- CPUC.** (2012), *Community choice aggregation allows communities to offer procurement service to electric customers within their boundaries – Code of Conduct D12-12-036*. California Public Utilities Commission 20 December 2012. Retrieved from <http://www.cpuc.ca.gov/general.aspx?id=2567>
- CPUC.** (2013), *Distribution resources plan (R.14-08-013)*, California Public Utilities Commission. Retrieved from <http://www.cpuc.ca.gov/General.aspx?id=5071>
- CPUC.** (2014), *Order instituting rulemaking regarding policies, procedures and rules for development of distribution resources plans pursuant to public utilities code section 769*. California Public Utilities Commission. Retrieved from <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M103/K223/103223470.pdf>
- CPUC.** (2016), *California's distributed energy resources action plan: aligning vision and action*, 10 November 2016. Retrieved from [http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Commissioners/Michael_J._Picker/2016 percent20DER percent20Action percent20Plan percent20FINAL.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/About_Us/Organization/Commissioners/Michael_J._Picker/2016%20DER%20Action%20Plan%20FINAL.pdf)

- Cuomo.** (2016a), Governor Cuomo announces establishment of clean energy standard that mandates 50 percent renewables by 2030. New York State, 1 August 2016. Retrieved from <https://www.governor.ny.gov/news/governor-cuomo-announces-establishment-clean-energy-standard-mandates-50-percent-renewables>
- Cuomo.** (2016b), *Governor Cuomo announces new energy affordability policy to deliver relief to nearly 2 million low-income New Yorkers.* New York State, 19 May 2016. Retrieved from <https://www.governor.ny.gov/news/governor-cuomo-announces-new-energy-affordability-policy-deliver-relief-nearly-2-million-low>
- DRPWG.** (2013), *California's distribution resources plan.* Distribution Resources Plan Working Group. Retrieved from <https://drpwg.org/sample-page/drpf/>
- Lacy, S.** (2014), *Watch the energy gang's live podcast on utility 2.0.* GTM, 21 September 2014. Retrieved from <https://www.greentechmedia.com/articles/read/join-the-energy-gang-for-a-live-podcast-in-new-york-on-utility-2-0#gs.vJtV3Bg>
- MDPT.** (2015), *Report of the market design and platform technology working group.* NY Smart Grid, 17 August 2015. Retrieved from http://nyssmartgrid.com/wp-content/uploads/MDPT-Report_150817_Final.pdf
- Mitchell, C.** (2016), *US regulatory reform series – what, and how, the New York utilities are expected to transform to over the next decade – the New York REV's Ratemaking May 2016 Order.* Energy Policy Group, University of Exeter, 13 June 2016. Retrieved from <http://projects.exeter.ac.uk/igov/us-regulatory-reform-ny-utility-transformation/>
- Navigant Research.** (2017), *Navigating the energy transformation.* Retrieved from <https://www.navigantresearch.com/research/defining-the-digital-future-of-utilities>
- NYDPS.** (2016), *Staff report and recommendations in the value of distributed energy resources proceeding 15 E-0751 NY Department of Public Service,* 27 October 2016. Retrieved from [https://s3.amazonaws.com/dive_static/editorial/Staff+Report+and+Recommendations+10-27+\(1\).pdf](https://s3.amazonaws.com/dive_static/editorial/Staff+Report+and+Recommendations+10-27+(1).pdf)
- NYISO.** (2016), *NYISO issues power trends 2016, report surveys the changing energy landscape, NY independent system operator,* 5 July 2016. Retrieved from http://www.nyiso.com/public/webdocs/media_room/press_releases/2016/NYISO_percent20Issues_percent20Power_percent20Trends_percent202016_7-05-2016.pdf
- NYREV.** (2014), *Reforming the energy vision NYS Department of Public Service staff report and proposal,* 24 April 2014, NYS Department of Public Service. Retrieved from <http://www3.dps.ny.gov/W/PSCWeb.nsf/PFPage/C12C0A18F55877E785257E6F005D533E?OpenDocument>
- NYREV.** (2018), *DPS- reforming the energy vision.* Retrieved July 2, 2018, from <http://www3.dps.ny.gov/W/PSCWeb.nsf/All/C12C0A18F55877E785257E6F005D533E?OpenDocument>

- NYS.** (2018) Clean energy fund, New York State. Retrieved July 2, 2018, from <https://www.nysed.gov/About/Clean-Energy-Fund>
- NYS.** (2015), *The energy to lead, 2015 New York state energy plan*. New York State. Retrieved from <https://energyplan.ny.gov/Plans/2015>
- RENSWICK Institute.** (2015, June), More than smart, a framework to make the distribution grid more open, efficient and resilient. *Gridworks*. Retrieved from <http://gridworks.org/wp-content/uploads/2015/06/More-Than-Smart-Report-by-GTLG-and-Caltech-08.11.14.pdf>
- SEIA.** (2018), *Solar state by state*, Solar Energy Industry Association, 2018. Retrieved from <https://www.seia.org/states-map>
- Shallenberger, K.** (2016, May 26), Strange bedfellows: how solar and utilities struck a net metering compromise in New York. *Utility Dive*. Retrieved from <https://www.utilitydive.com/news/strange-bedfellows-how-solar-and-utilities-struck-a-net-metering-compromis/419367/>
- SNYPSC.** (2016a), *Order adopting a ratemaking and utility revenue model policy framework*, State of New York Public Service Commission, May 2016. Retrieved from <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=percent7BD6EC8F0B-6141-4A82-A857-B79CF0A71BF0percent7D>
- SNYPSC.** (2016b), *Staff report and recommendations in the value of distributed energy resources proceeding*, State of New York Public Service Commission, October 2016. Retrieved from [https://s3.amazonaws.com/dive_static/editorial/Staff+Report+and+Recommendations+10-27+\(1\).pdf](https://s3.amazonaws.com/dive_static/editorial/Staff+Report+and+Recommendations+10-27+(1).pdf)
- Stein, E. & Ucar, F.** (2018), *Driving environmental outcomes through utility reform: lessons from the NY REV*. Environmental Defense Fund, January 2018. Retrieved from <https://www.edf.org/sites/default/files/documents/driving-environmental-outcomes.pdf>
- Sweeney, J.L.** (2002), California electricity crisis. Stanford, CA: Hoover Institution Press.
- Trabish, H.K.** (2017, May 9), Choice in la l: LA county community aggregation has California utilities on full alert. *Utility Dive*. Retrieved from <https://www.utilitydive.com/news/choice-in-la-la-land-la-county-community-aggregation-has-california-utilit/442131/>
- US EIA.** (2017), *Rising solar generation in California coincides with negative wholesale electricity prices*. US Energy Information Administration, 7 April 2017. Retrieved from <https://www.eia.gov/todayinenergy/detail.php?id=30692#>
- US EIA.** (2018a), *New York state profile and energy estimates*, US Energy Information Administration 2018. Retrieved July 2, 2018, from <https://www.eia.gov/state/?sid=NY#tabs-4>
- US EIA.** (2018b), *US energy mapping system*, US Energy Information Administration 2018. Retrieved July 2, 2018, from <https://www.eia.gov/state/maps.php?src=home-f3>

- Walton, R.** (2017, March 15), New York REV orders promise growth for diverse set of distributed resources. *Utility Dive*. Retrieved from <https://www.utilitydive.com/news/new-york-rev-orders-promise-growth-for-diverse-set-of-distributed-resources/438044/>
- Wesoff, E.** (2017, March 15), California's energy future: the revolution (might) be distributed. *GTM*. Retrieved from https://www.greentechmedia.com/articles/read/Californias-Energy-Future-The-Revolution-Might-Be-Distributed?utm_source=twitter&utm_medium=social&utm_campaign=gtmsocial#gs.jWNvr5M
- Yahoo Finance.** (2016), *NY energy utilities and solar providers file joint proposal to encourage more renewables*, 19 April 2016. Retrieved from <https://finance.yahoo.com/news/ny-energy-utilities-solar-providers-195725145.html?guccounter=1>