Appendix C:
Lessons Learned from Other Jurisdictions

To help develop the Adjustable Block Program, the Agency reviewed experiences from similar programs in other states and countries. The hallmark of the Adjustable Block Program and similar programs is that prices and incentive levels are determined administratively, rather than through a competitive process. Other program administrators have grappled with the process of setting and adjusting incentive levels in response to market dynamics. A number of elements proposed in this Plan are adapted from other regions, or designed in response to their experience.

Germany, 2010-2012

Germany was a pioneer in feed-in tariffs ("FIT"), which were based in turn on section 210 of the US Public Utility Regulatory Policy Act of 1978 ("PURPA"). Under this mechanism, a specific price (determined by regulators) is paid for the energy from a designated generation technology through a long-term commitment. German policymakers assumed that deployment of renewables could be controlled solely by adjusting the FIT price in response to market demand, without caps on volume. But between 2010 and 2012, regulators could not cut FIT rates fast enough to keep up with the plummeting cost of solar, causing an explosion of deployment.[1] German companies and citizens installed 21 Gigawatts ("GW") of photovoltaics in three years in a system with peak demand of only 80 GW. The above-market costs of FIT prices paid for renewables are recovered from residential customers only, through a line item on bills, leading to a rapid increase in residential bills in that time period.

While Germany has aggressive long-term renewable energy goals – 80% by 2050 – there was a feeling among policymakers that the rapid solar deployment seen in 2010-2012 would cause financial and technical disruptions, as well as miss out on the benefit of future price declines. In 2014, Germany ended administratively-determined prices for solar systems over 750 kW, in favor of a competitive procurement process. Smaller systems are still paid a set FIT price, but regulators now have a desired band of deployment that they use to adjust prices more frequently: If deployment is above the band, they reduce prices; if it is below the band, they raise prices. While the Illinois model of paying for RECs differs from a FIT, Germany's experience offers the cautionary tale of how incentives that are set too high by program administrators can create an unsustainable boom.

Spain, 2004-2013

Spain adopted a feed-in tariff system in 2004, and became one of the world leaders in solar as a result, with more than 4.6 GW of solar installed by 2013. Due to financial problems in the utility sector (and the broader economy), Spain began cutting back on the FIT in 2008, and ended it altogether in 2013, retroactively replacing FITs with a target rate of return of 7.4%. Projects that had achieved a higher return before the change had to accept a lower return afterwards to meet the target, reducing the ability of developers to service their debt. The new policy decimated the solar industry, which shed

[1] Bentham Paulos, "The Money Problem With Germany's Renewable Energy Law in 3 Charts," Greentech Media, June 5, 2014, https://www.greentechmedia.com/articles/read/the-money-problem-with-the-german-energiewende-in-3-charts.

78,000 jobs and deployed just 22 megawatts in 2014. At least 26 legal claims have been filed in international courts.[2] The Spanish experience also demonstrates the risks associated with unsustainable incentive levels, the detrimental impacts of rapid policy change, and the disruptions caused when commitments made must later be reduced.

California Solar Initiative, 2007-2015

Unlike the experience in Germany and Spain, the California Solar Initiative ("CSI") is seen as a major success. The CSI had a goal of installing 1,750 megawatts ("MW") of distributed solar by 2017, a goal it met at the end of 2015. Like the Illinois Adjustable Block Program, it used a program design that reduced incentives in response to the volume of deployment, rather than over time. CSI rebates varied according to utility territory, system size, customer class, and performance and installation factors. The rebates automatically declined in "steps" based on the volume of solar MW with confirmed project reservations within each utility service territory.

The amount of the rebates was based on system performance. They were paid either upfront based on expected performance (the Expected Performance-Based Buydown), or monthly based on actual performance over five years (the Performance Based Incentive), which was mandatory for systems larger than 30kW. Incentives under the CSI largely phased out in 2015, and are available now only for eligible low-income customers.[3] This is a sign of the successful maturation of the California solar market, but it should be noted that electricity prices in California are substantially higher than in Illinois so the value that systems receive from net metering is inherently higher in California than Illinois.

Massachusetts

Massachusetts is in transition between policy models for supporting distributed solar.[4]

In the previous regime, solar projects earned solar renewable energy credits ("SRECs"), in addition to the value of their energy. Project owners then sold the SRECs to utilities to help them comply with the state Renewable Portfolio Standard. While the SREC system spurred a large amount of development, policymakers were unhappy with some aspects of the program.[5] Because SRECs are a tradable commodity with a value that fluctuates based on market conditions, it was found that:

- Long-term revenue uncertainty led to higher financing costs;
- A large portion of the program costs were going to a 3rd party to pay for financing;
- Total program costs and ratepayer impacts were difficult to predict.

---

[2] Carmen Otero García-Castrillón, Centre for International Governance Innovation, 2016, "Spain and Investment Arbitration: The Renewable Energy Explosion," https://www.cigionline.org/sites/default/files/documents/ISA%20Paper%20No.17.pdf.

[3] California Solar Initiative, http://www.gosolarcalifornia.ca.gov/csi/rebates.php. (See also http://solarindustrymag.com/california-solar-program-reaches-goal-early and https://www.greentechmedia.com/articles/read/the-legacy-of-the-california-solar-initiative.)

[4] See: http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/ for more information.

[5] Massachusetts Department of Energy Resources, "Solar Massachusetts Renewable Target (SMART) Final Program Design," January 31, 2017, http://www.mass.gov/eea/docs/doer/rps-aps/final-program-design-1-31-17.pdf.

Massachusetts has had some of the highest SREC prices in the country, which helped spur over 1,400 MW of projects between 2013 and 2017, making it one of the most active markets in the country.

Pursuant to an April 2016 act[6] of the Massachusetts Legislature, the Massachusetts Department of Energy Resources began the process of updating its photovoltaic programs. The new Solar Massachusetts Renewable Target ("SMART") program is a declining block program design, where a solar facility receives a single compensation rate that accounts for both the energy and the incentive (rather than a separate SREC price). The resulting value of the incentive is the net difference between the all-in rate and the value of the energy.

It is intended to provide long-term revenue certainty that can reduce financing risks and in turn lower soft costs. The goal is to reduce overall costs to the public, allow program costs to be predicted with certainty, and match incentives to the declining cost of solar.

The SMART program has the target of the procurement of 1,600 MW of new solar capacity (to start commercial operation no earlier than January 1, 2018), which will be procured through eight 200 MW blocks. It applies to all electric distribution companies and has the same compensation rate across the state. The program allows a maximum project size of 5 MW per land parcel.

Rates will be set based on an initial competitive procurement for projects larger than 1 MW, with a bid cap of 17 cents per kWh and winners awarded the clearing price (rather than their bid price). The results will be used to create an index for smaller projects of 110% to 230% of the clearing price, with adders of 2 to 6 cents per kWh for certain project types and other policy goals. The adders, shown in Table C-1, can be combined.

Table C-1: Adders from the Massachusetts SMART Program

• Rates set based on size (AC) o Less than 25 kW (Low Income) o Less than 25 kW o 25 – 250 kW o 250 – 500 kW o 500 kW AC – 1,000 kW o 1,000 – 2,000 kW o 2,000 – 5,000 kW	• Location Based: o Brownfields o Building Mounted o Landfills o Solar Canopies o A "subtractor" for greenfield sites • Off-taker Based: o Community Shared Solar (CSS) o Low Income CSS o Low Income Property o Public • Solar + Storage

The program offers 10-year fixed price term for small projects (≤ 25 kW) and a 20-year term for large projects (> 25 kW).

[6] Mass. Leg., 2016 Acts 75 (amending, *inter alia*, M.G.L. ch. 164, § 139), https://malegislature.gov/Laws/SessionLaws/Acts/2016/Chapter75.

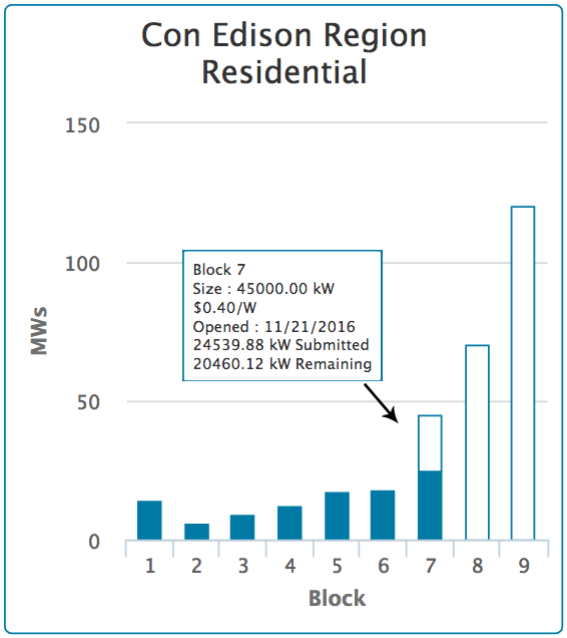
Other than the initial competitive procurement for projects larger than 1 MW, block reservations will be provided on a first-come, first-served basis. Compensation rates decline by 4% as the program moves from one block to the next, in step with the anticipated declining cost of solar systems.

An updated version of the proposed rules was filed on August 11, 2017.[7] The Department of Energy Resources will open a docket at the Department of Public Utilities for the program's filing by the respective utilities later in 2017.

New York

New York State's NY-Sun Incentive Program sets a goal of installing 3,000 MW of solar capacity in the state by 2023.[8] The program, which is administered by the New York State Energy Research and Development Authority ("NYSERDA"), pays incentives based on a Megawatt Block Program allocated to specific regions of the state in a declining block structure. The goal of the MW Block Program is to (i) provide certainty and transparency regarding incentive levels, (ii) account for regional market differences, (iii) provide a clear signal to industry that New York intends to ramp down and eliminate cash incentives in a reasonable timeframe, and (iv) allow for the elimination of those incentives sooner in regions where the market conditions can support it, based on market penetration, demand, and cost-effectiveness. "The ultimate goal of the MW Block Program, in combination with other components of NY-Sun, is to facilitate a self-sustaining PV industry in New York," according to NYSERDA.[9]

Figure C-1: Block Dynamics for NY-Sun Program



Incentives in the MW Block Program are awarded first come, first serve, to applications based on the block in effect at the time of submission. Incentives step down to the next block when the current block has reached its MW target. Commercial and industrial projects receive 25% of the payments upfront with the remainder paid over a period of three years. Residential projects receive the full incentive upfront.

The Program is administered as a single, coordinated statewide program, but is divided into three geographic regions: Long Island, Con Edison (which covers most of New York City), and the Rest of the State. Block sizes and prices as well as the rate of decline in incentives varies across the blocks. Sectors are defined as:

---

[7] http://www.mass.gov/eea/docs/doer/rps-aps/225-cmr-20-draft-clean-081117.pdf (225 C.M.R. § 20.00 *et seq.*).

[8] See: https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun for more information.

[9] NYSERDA, NY-Sun 2016 - 2023 Operating Plan, August 1, 2016, http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BA45D17E2-DF06-4CFB-8B1C-813526E335FB%7D.

- Residential systems up to 25 kW
- Small non-residential systems (small commercial) up to 200 kW
- Large non-residential systems (commercial/industrial) larger than 200 kW

Incentive rates, based on $/Watt of installed capacity, decline from block to block. Residential incentives decline at the same rate across all regions ($0.10/W) while Commercial/Industrial incentives vary within a region and across the three regions.

An example of the dynamics of the NY-Sun block structure is shown in Figure C-1, taken from NY-Sun's online MW Block Dashboard. As of late August 2017, ConEd's residential solar incentives were in block #7, a 45 MW block paying an incentive of 40 cents per Watt. Block #7 was opened in November 2016, and as of August 30, 2017, it was just over half depleted. When it is fully spent, incentive levels will move to block #8, paying 30 cents per Watt for 70 MW. The final step will be block #9, paying 20 cents per Watt for 120 MW of installations.

It is important to note that blocks are not set for a specific time duration, but for a quantity of installations (measured in MW). As shown in Table C-2, individual blocks in the ConEd residential program have been in effect from 63 days to over 280 days in length. Other segments have moved more quickly, like commercial and industrial systems in the Rest of State region, which moved through nine blocks in 18 months, supporting the deployment of 1300 MW of solar.

The size of blocks in MW was purposely varied, as NYSERDA assumed a large initial demand by "early adopters" followed by a period of slow growth, leading to larger volumes in later blocks.

Overall, the MW Block Program will spend $117 million to incentivize 311 MW of residential solar in the ConEd region, an average incentive of 38 cents per Watt.

Table C-2: NY-SUN Data for ConEd Residential Sector

	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8	Block 9
Size (MW)	14	6	9	12	17	18	45	70	120
Incentive ($ per Watt)	$1.00	$0.90	$0.80	$0.70	$0.60	$0.50	$0.40	$0.30	$0.20
Time (days)	274	63	139	181	199	199	282 +	TBD	TBD
Total budget for incentives (million $)	$14	$5	$7	$8	$10	$9	$18	$21	$24

Source: IPA analysis of NYSERDA data, from MW Block Dashboard, accessed August 30, 2017. See https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Megawatt-Block-Dashboards/Residential-Small-Commercial-MW-Block.

Incentives for commercial/industrial projects are based on three years of estimated production using a designated capacity factor. Additional incentives are paid for other factors: a project sited in a strategic location will get a 20% bonus incentive, while projects integrating energy storage or energy efficiency will get an additional $50,000.