



**Brian Granahan, Acting Director
Illinois Power Agency**

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Illinois and Energy Storage Policy

Presentation Agenda

- **Background on IPA and Illinois Generally**
- **Energy Picture in Illinois**
- **Climate & Equitable Jobs Act**
- **Senate Bill 1587 – Energy Storage Targets**
- **House Bill 3445 – Policy Study**
- **What Comes Next and By When?**

“Who am I? Why am I here?”



The IPA – Who Are We??



- **Independent State Agency created in 2007**
- **Agency duties include (not exhaustive)**
 - **Development and implementation of procurement plans for electricity supply for residential and small commercial utility customers**
 - Only “eligible retail customer” supply requirements
 - Annual planning & procurement processes
 - **Implementation of the Renewable Portfolio Standard**
 - Development of the strategy for incentivizing renewable energy development
 - Conduct competitive procurements for utility-scale projects
 - Manage programs for community solar and solar for homes and businesses
 - Consumer protection, equity, and labor requirements
 - **Initiatives to support the continued operation of at-risk nuclear plants**
 - Zero Emission Standard
 - Carbon Mitigation Credit Procurements
 - **Implementing comprehensive energy storage policy???**

Basics about Illinois!!!

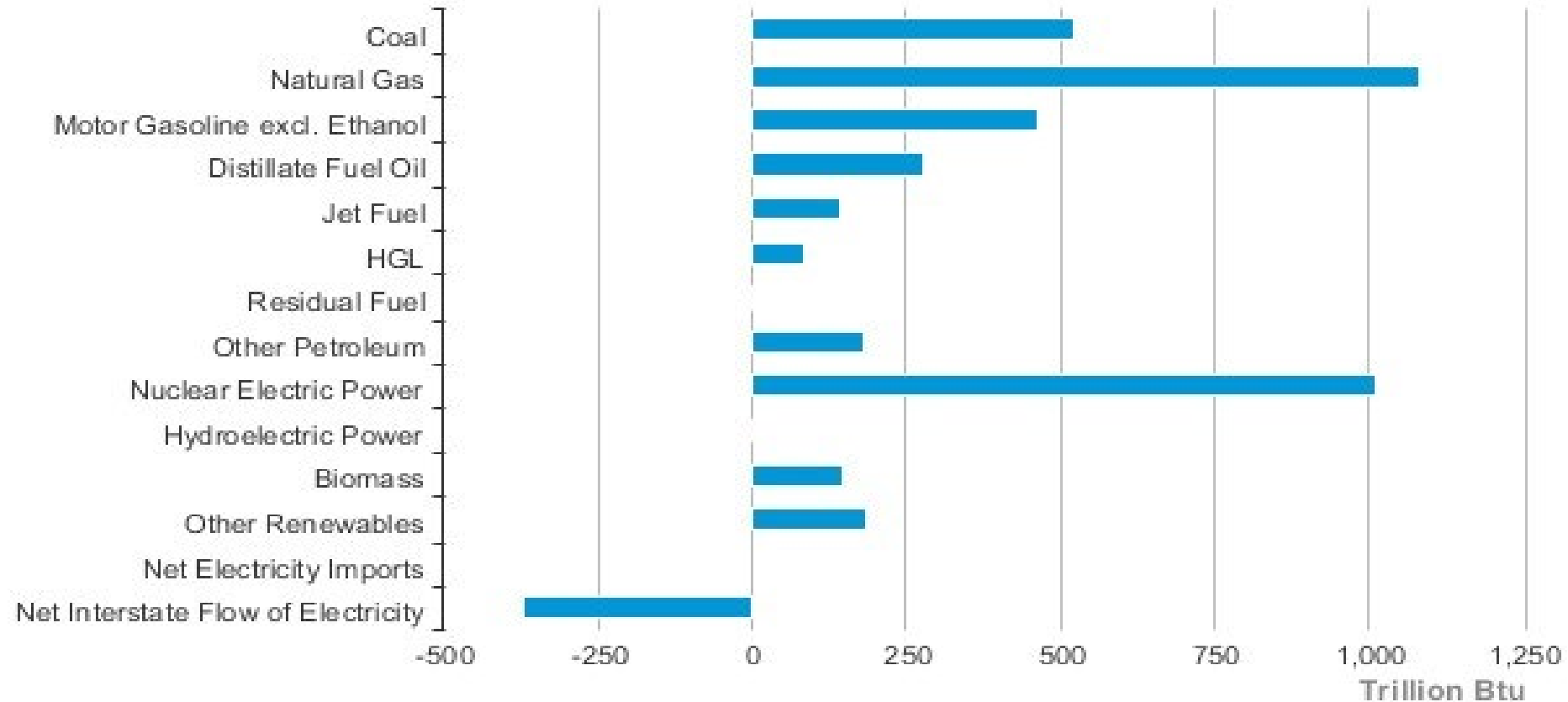
- **12.8 million residents (6th largest in country)**
- **Governor: J.B. Pritzker (D, 2nd term)**
 - **Democratic party supermajorities in IL House and Senate**
- **Over 65% of the state's residents in Chicago Metropolitan area**
 - **Chicago itself: over 2.75 million people (no other city over 200,000)**
 - **Cook County alone has 5.275 million people**
- **Strengths include world class universities, national lab (Argonne!), abundant agricultural land, crossroads of rail/expressways/transmission lines**
- **Population growth has been middling,**
- **State finances have largely stabilized (*very* different than 5-15 years ago)**

IL Energy Policy Basics

- **Two RTOs (PJM and MISO)**
- **Main utilities = ComEd and Ameren Illinois**
 - **Only distribution companies, cannot own generation**
 - **Do not have traditional Integrated Resource Planning**
 - **Rely (somewhat) on markets for generator entries and exits**
 - But step in to get certain resources online, keep certain resources from going offline
- **Sordid history of energy policy development (heh)**
- **Low energy prices**
 - Retail electricity supply prices: 6.5 to 8.5 cents/kWh for residential and small commercial customers
 - Wholesale block energy prices: \$30 MWh to \$65 MWh from IPA block energy procurements
- **Substantial net energy exporter in PJM, not in MISO**
- **Enormous coal reserves, but high sulphur**

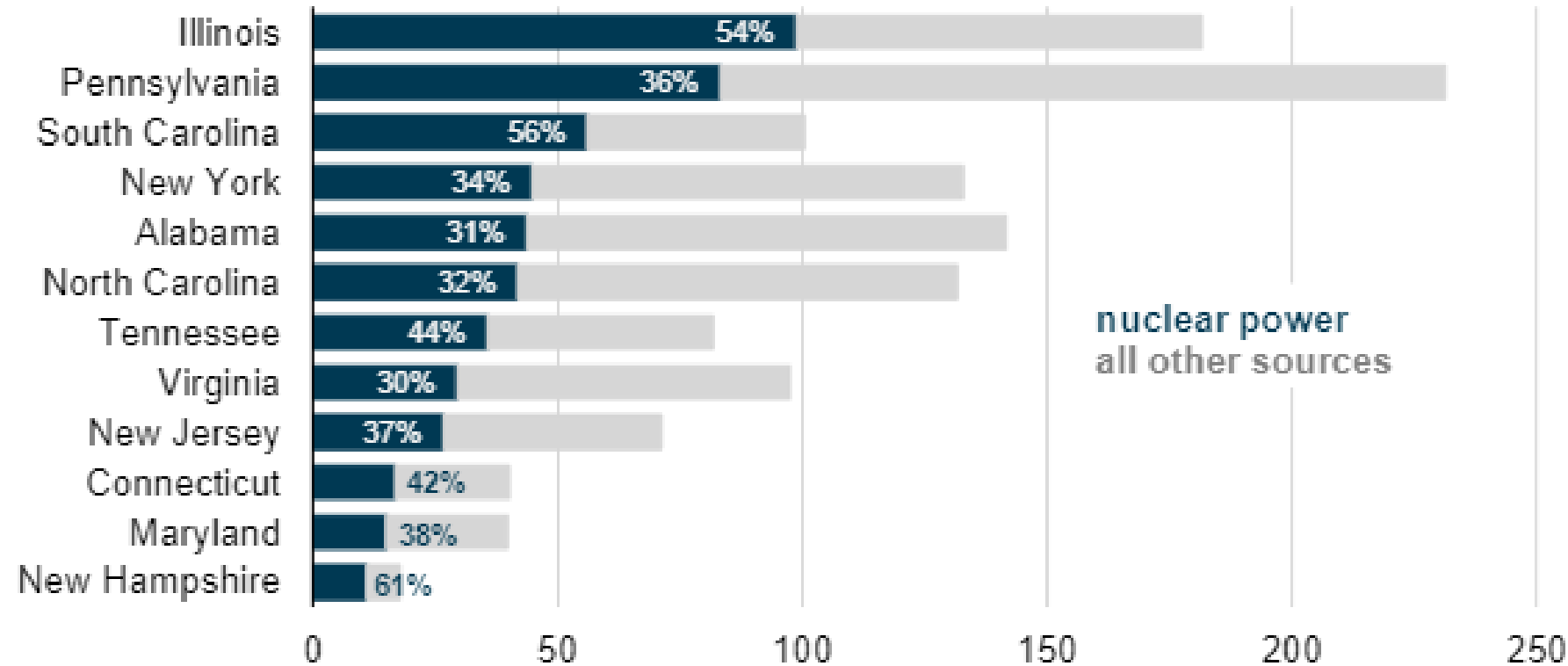
Energy Generation in Illinois

Illinois Energy Consumption Estimates, 2021



IL vs. the Nation: Nuclear Power

Nuclear electricity generation in selected states (2019)
million megawatthours



Nuclear Plants in Illinois



<u>Name</u>	<u>Location</u>	<u>Nameplate capacity (MW)</u>	<u>Generating units</u>	<u>2016 net generation (MWh)</u>	<u>Reactor type</u>	<u>Owner</u>	<u>License Start</u>	<u>License Expiration</u>
Braidwood Nuclear Generating Station	Braidwood, Will County	2,389	2	19,849,269	Pressurized water	Constellation	1987 1988	2046 (Unit 1) 2047 (Unit 2)
Byron Nuclear Generating Station	Ogle County	2,347	2	19,600,248	Pressurized water	Constellation	1985 1987	2044 (Unit 1) 2046 (Unit 2)
Clinton Nuclear Generating Station	Clinton, De Witt County	1,069	1	8,914,453	Boiling water	Constellation	1987	2026 (Unit 1)
Dresden Generating Station	Morris, Grundy County	1,845	2	15,443,893	Boiling water	Constellation	1969 1971	2029 (Unit 2) 2031 (Unit 3)
LaSalle County Nuclear Generating Station	LaSalle County	2,320	2	19,144,080	Boiling water	Constellation	1982 1983	2042 (Unit 1) 2043 (Unit 2)
Quad Cities Nuclear Generating Station	Cordova	1,871	2	15,655,095	Boiling water	Constellation 75%; MidAmerican 25%	1972 1972	2032 (Unit 1) 2032 (Unit 2)

Map of Illinois Nuclear Plants



Source: Nuclear Energy in the Midwest, Stanford University

Coal plants in Illinois

ILLINOIS COAL PLANTS AT A GLANCE

Here is where Illinois' coal-fired electricity generation is happening, from giant plants like Prairie State Generating Station to smaller ones at factories like Archer Daniels Midland Decatur. Most of the plants increased their output in 2021.

Plant name & parent company	Planned retirement year	Summer capacity (MW)	2021 generation (mwh)	Difference from 2020
1 Prairie State Generating Station <i>Prairie State Generating Co.</i>		1,630	12,662,396	▲ 1,396,192
2 Powerton <i>NRG</i>	2028	1,538	2,698,566	▲ 1,856,465
3 Baldwin Energy Complex <i>Vistra</i>	2025	1,157	6,871,536	▲ 2,825,623
4 Kincaid Generation LLC <i>Vistra</i>	2027	1,108	3,919,135	▲ 2,447,238
5 Joppa Steam <i>Vistra</i>	2022	948	5,001,126	▲ 1,455,626
6 Waukegan <i>NRG</i>	2022	689	2,072,575	▲ 1,462,262
7 Newton <i>Vistra</i>	2027	595	3,251,886	▲ 618,712
8 E D Edwards <i>Vistra</i>	2022	560	2,709,510	▼ 390,487
9 Will County <i>NRG</i>	2022	510	686,731	▲ 382,508
10 Dallman <i>City of Springfield</i>	2023*	355	1,215,608	▲ 467,370
11 Archer Daniels Midland Decatur <i>Archer Daniels Midland</i>		335	1,081,116	▼ 96,213
12 Marion <i>Southern Illinois Power Cooperative</i>		120	625,346	▼ 280,875
13 SIUC <i>Southern Illinois University</i>	2030	3	7,259	▲ 638

*one unit will remain operating



Renewables in Illinois

- **Pre-2018**

- **Mostly just development of utility-scale wind projects**

- Some RPS supported, many merchant projects
- (now up to 7000 MW of wind in Illinois as of 2023, only 2000 MW of which are supported through state RPS)

- **Minor amount of solar DG supported through IPA initiatives**

- Still only ~80 MW solar statewide

- **2018-2021: FEJA Passage and Implementation**

- **Approximately 700 MW of new DG and community solar**

- **~700 MW of utility-scale wind, ~1300 MW of utility-scale solar**

- Post-attrition (attrition rate about 30%)

- **But funding was running dry, as funding not ambitious enough for goals**

- **2021-the Present: CEJA Passage and Implementation**

- **New budgets (~\$580 million annually) and aggressive new goals**

- **Increased focus on equity and qualitative criteria**

How do we support projects in IL?

- **Our approach in a restructured environment**
 - **How we support renewables**
 - Renewable energy credit contracts
 - Administratively established prices for DG and CS
 - Competitive procurements using Indexed RECs for utility-scale
 - Lots of wind in IL is merchant project though
 - No energy off-take – no PPAs available
 - Outside of some contracts in 2010, not used to meet default supply
 - Our strategy for default supply is different
 - Indexed REC procurement is essentially intended to reflect a PPA
 - **How we support at-risk nuclear plants**
 - ZECs and CMCs
 - Timing and process
 - Impacts – reduced rates via CMCs
 - **How these things are funded**
 - Surcharge on all retail customers' bills (non bypassable charge)
 - Pool resources together, IPA planning, utility counterparties

Sample ComEd Bill



SUPPLY

\$32.33

Electricity Supply Charge	645 kWh	\$18.94
Capacity Charge	3.72 kW X 1.03441	\$3.85
Transmission Services Charge	645 kWh X 0.00921	\$5.94
Misc Procurement Component Chg	645 kWh X 0.00064	\$0.41
Purchased Electricity Adjustment		\$3.19



DELIVERY - ComEd

\$33.13

Customer Charge		\$8.11
Standard Metering Charge		\$3.12
Distribution Facilities Charge	645 kWh X 0.03264	\$21.05
IL Electricity Distribution Charge	645 kWh X 0.00132	\$0.85

TAXES & FEES

\$23.72

Environmental Cost Recovery Adj	645 kWh X 0.00052	\$0.34
Renewable Portfolio Standard	645 kWh X 0.00502	\$3.24
Zero Emission Standard	645 kWh X 0.00195	\$1.26
Carbon-Free Energy Resource Adj	645 kWh X 0.01092	\$7.04
Energy Efficiency Programs	645 kWh X 0.00276	\$1.78
Energy Transition Assistance	645 kWh X 0.00072	\$0.46
Franchise Cost		\$3.42
State Tax		\$2.13
Municipal Tax		\$4.05

Service Period Total

\$89.18

CEJA Decarbonization Approach

- **What is CEJA? Major energy bill in Illinois**
- **100% clean energy by 2050**
 - **50% RPS by 2040**
 - **Private coal and gas plants must cease operating by 2045 and reduce emissions by 45 percent by the year 2035 (different requirements for munis/co-ops)**
 - **Most coal plants must retire by 2030**
 - **Nuclear power meets definition of “clean energy”**
- **Resource adequacy study in 2025**
 - **IPA works with IEPA and ICC on a report assessing “the current and projected status of electric resource adequacy and reliability throughout the State for the period beginning 5 years ahead, and proposed solutions for any findings”**
 - **If resource adequacy concerns are identified, then can petition ICC to relax environmental requirements**

CEJA's RPS Goals and Targets

What is CEJA? Passed in September 2021....

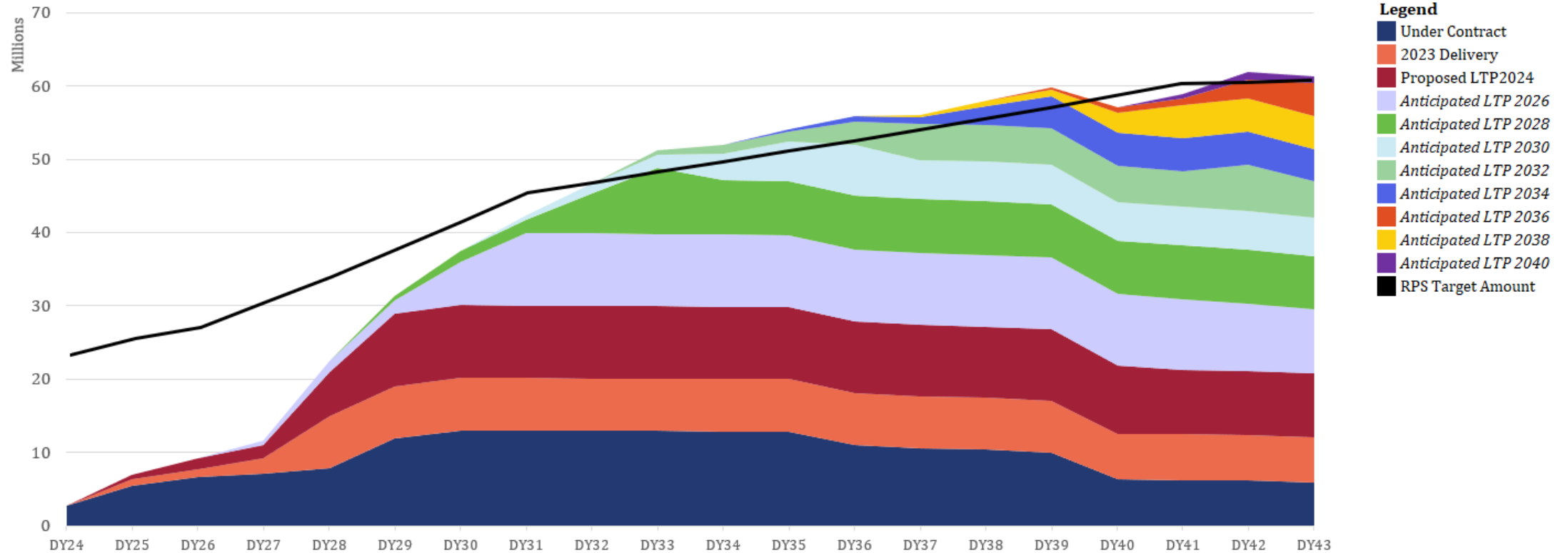
RPS goal now increased to 40% by 2030 with a further target to reach 50% by 2040

- **Retail customer load in Illinois is ~120 million MWH annually**
 - 40% would be 48 million MWH/RECs

Specific targets include:

- **45 million RECs annually by 2030 from new wind or solar**
 - 45% from wind, 55% from solar
 - **By 2030: 20+ million RECs delivered annually from new utility-scale wind**
 - ~7000 MW of new utility-scale wind by 2030
 - **By 2030: 11.6 million RECs delivered annually from new utility-scale solar**
 - ~7500 MW of new utility-scale solar by 2030
 - Have achieved approximately 1800 MW already
 - **By 2030: 12.4 million RECs delivered annual through programs**
 - ~8000 MW of new DG and community solar
 - Have achieved approximately 1700 MW already

Expected REC deliveries by Plan



RECs delivered under *existing* contracts



Delivery Year	2010 LTPAs	ABP Under Contract	FEJA Forward Procurements	Coal to Solar	CEJA Indexed REC Procurements	ILSFA	Total RECs Under Contract	Overall RPS Target	REC Shortfall	% of Target Currently Met
DY23	1,861,725	1,156,913	4,061,149	0	0	64,531	7,144,318	25,480,828	18,336,510	28%
DY24	1,861,725	1,885,102	4,061,149	0	0	64,209	7,872,184	27,600,406	19,728,221	29%
DY25	1,861,725	3,076,226	4,061,149	464,564	2,409,391	63,888	11,936,942	29,002,290	17,065,348	41%
DY26	1,861,725	3,066,527	4,061,149	464,564	3,541,214	63,568	13,058,747	32,271,367	19,212,620	40%
DY27	1,861,725	3,057,107	4,061,149	464,564	3,525,808	63,250	13,033,603	35,668,466	22,634,863	37%
DY28	1,861,725	3,047,772	4,061,149	464,564	3,510,479	62,934	13,008,623	39,219,697	26,211,074	33%
DY29	1,861,725	3,038,413	4,061,149	464,564	3,495,227	62,619	12,983,697	42,714,577	29,730,880	30%
DY30	1,861,725	3,029,040	4,061,149	464,564	3,480,050	62,306	12,958,834	46,451,376	33,492,542	28%
DY31	1,861,725	3,019,887	4,061,149	464,564	3,464,950	61,995	12,934,270	47,763,046	34,828,777	27%
DY32	0	3,010,421	4,061,149	464,564	3,449,925	61,685	11,047,744	49,157,149	38,109,406	22%
DY33	0	3,001,250	3,631,149	464,564	3,434,976	61,376	10,593,315	50,422,454	39,829,139	21%
DY34	0	2,851,999	3,631,149	464,564	3,420,101	61,070	10,428,882	51,819,399	41,390,517	20%
DY35	0	2,832,281	3,324,562	464,564	3,405,300	60,764	10,087,472	53,183,158	43,095,686	19%
DY36	0	2,497,855	0	464,564	3,390,574	60,460	6,413,453	54,619,816	48,206,363	12%
DY37	0	2,407,085	0	464,564	3,375,921	60,158	6,307,728	55,968,808	49,661,080	11%
DY38	0	2,347,323	0	464,564	3,361,341	59,857	6,233,086	57,495,270	51,262,184	11%
DY39	0	2,095,422	0	464,564	3,346,835	59,558	5,966,379	59,011,627	53,045,249	10%
DY40	0	1,972,602	0	464,564	3,332,401	59,260	5,828,827	60,610,591	54,781,764	10%
DY41	0	1,936,522	0	464,564	3,318,039	58,964	5,778,088	60,794,608	55,016,520	10%
DY42	0	1,504,728	0	464,564	3,303,748	58,669	5,331,709	60,982,051	55,650,341	9%

CEJA Equity Initiatives (IPA)

- **Labor**

- **Prevailing wage requirements for most distributed generation and community solar projects**
- **Project-labor agreements for utility-scale projects**

- **Equity Initiatives**

- **Equity Eligible Contractor Category**
 - Group A oversubscribed on Day 1 of CS applications in 2022
- **Minimum Equity Standard Beginning June 1, 2023**
 - 10% MES for first year
 - 10% of project workforce must come from Equity Eligible Persons and Equity Eligible Contractors
- **EEC/EEP Certification**
- **EnergyEquity.Illinois.gov**
 - Certifying EEPs and posting job opportunities in portal
 - EIEC map for areas where EEPs qualify on the basis of residency
- **Expansion of Illinois Solar for All Program funding**
 - (from \$31 million annually to (\$70 million)
- **Workforce training programs and other initiatives at other state agencies**

CEJA Storage-Related Initiatives



- **Coal to Solar (April 2023, 6 projects selected, 228 MW of solar, 13.4 MW of storage)**
 - **REC price set by statute (\$30/REC)**
 - **Separate funding mechanism than RPS**
 - Three selected projects will end up defaulting
- **DCEO Coal to Solar + Storage Grants – \$280M, 255 MW**

Grantee	Energy Storage Site County	Amount Awarded Over 10 Years	Project Size MW
NRG Midwest Storage, LLC (NRG) - Waukegan Energy Storage Center	Lake	\$79,200,000	72MW
NRG Midwest Storage, LLC (NRG) - Will County Energy Storage Center	Will	\$79,200,000	72MW
Dynegy Midwest Generation, LLC (Vistra) - Havana Battery Energy Storage System	Mason	\$40,700,000	37MW
Electric Energy, Inc. (Vistra) - Joppa Battery Energy Storage System	Massac	\$40,700,000	37MW
Illinois Power Resources Generating, LLC (Vistra) - Edwards Battery Energy Storage System	Peoria	\$40,700,000	37MW

CEJA: ICC, Energy Storage, Sandia Labs



- **ICC, in consultation with the IPA, “initiate a proceeding to examine specific programs, mechanisms, and policies that could support the deployment of energy storage systems” and submit to the General Assembly and the Governor any “recommendations....based on the findings of the proceeding”**
- **Workshops and first paper**
 - **Series of webinars from late 2021 through early 2022**
 - **Report release May 25, 2022**
 - **Policy recommendations included energy storage targets**
 - **<https://www.icc.illinois.gov/informal-processes/energy-storage-program>**
- **Second paper and analysis**
 - **Assessment of MISO Zone 4, just published**
 - **Aims to evaluate the minimum energy storage requirements for Illinois MISO Zone 4 for serving electricity demand in the state reliably, based on the present generating resources and the planned retirements and additions over the next two decades.**
 - **When could MISO Zone 4 experience unserved electricity demand within the next two decades and how can the use of energy storage address the gap in generation and demand?**
 - **How can delays for planned projects and the addition of new unplanned projects impact the gap between electricity generation and demand over the next two decades?**
- **Answer – Will could speak more authoritatively on this: It depends.**

SB 1587: Introduced in Spring 2023

- **Post-CEJA: no comprehensive storage policy in CEJA, ICC report in May, Zone 4 doesn't clear in MISO PRA, wholesale energy prices go crazy, additional fossil retirements on the horizon, new renewables take time....**
- **Recognition of need to move forward toward comprehensive storage policy**
 - **Mostly driven by solar companies and their advocates**
 - **Introduced in February 2023**
 - **Legislative hearings across March**
 - **Amendment to include BTM support in April**
 - **Then wrapped up into policy study bill in May (so now we're studying it)**

SB 1587: What is it? Targets & Technology



- **Based loosely off NYSERDA work**
 - IPA procures “energy storage credits” reflecting the “flexibility value” of a new storage project (IL electric utility as counterparty)
 - Develop a Long-Term Plan within 180 days after effective date of Act for determining exactly when/how/under what terms
 - Plan litigated before ICC, competitive procurements thereafter
 - Leverages ratepayer funds, similar to RPS, ZECs, CMCs, etc.
- **Largely technologically agnostic: “commercially available technology that is capable of absorbing energy and storing it for use at a later time, including, but not limited to, electrochemical and electromechanical technologies”**
 - Doesn’t have to be “clean” energy storage
 - Likely to be lithium-ion batteries from discussions with industry, but doesn’t need to be
 - Start with 4 hour duration devices, can change later
- **Progressively greater targets in law reaching 7.5 GW of storage under contract by 2030**
- **Post-hoc analysis can be made in 2026 as to how much storage we actually need and why, but....**

SB 1587: What is it? Support Mechanism



- **How do we determine compensation back to storage developer?**
- **Similar to Indexed REC procurements: bidder bids in a Strike Price, and we subtract out assumed wholesale market revenues (energy and capacity)**
 - Here, price calculation is X highest-priced hours (avg) and X lowest-priced hours (avg) in day ahead markets, and arbitrage differential assumed as revenues
 - Would seem to inherently favor longer duration (up to 10 hour eventually eligible)
- **Daily calculation of this value, monthly settlement**
 - So \$80/MWh strike price: say \$50/MWh (4 highest price) - \$30/MWh (4 lowest price) = \$20; subtracting another \$5 (capacity) = \$55
 - \$55 per (rated megawatt capacity x rated duration) that day
 - 60 MW, 4 hour duration: \$55 x 240 = \$13,200 that day
- **Can pricing go negative? Not under this draft**
- **Funds pulled together through non-bypassable charges**

SB 1587: Long-Duration Storage

- **Bill parses between “long-duration” (greater than 10 hours) and “multi-day” (um...multiple days) duration storage**
 - Has IPA develop a “firm energy resource plan,” but no targets for longer-duration projects
 - Develop plan in the next year (365 days after effective date)
- **Only requirement**
 - Minimum of 2 new long-duration or multi-day energy storage resources
 - Each with a rated capacity greater than 20 megawatts
 - Procured (under contract) by the end of 2026

SB 1587: BTM and CS Proposals

- **VPP proposal allowing for aggregated dispatch of BTM storage**
 - Compensation back to aggregators of projects at a tariffed rate to be determined by the ICC
 - Conditions predicate defined by the utility (peak shaving type events)
 - “Events” are less than 2 hours duration, require 24 hours of notice, and must be between 30-60 per year
 - Would need to be default supply customer of electric utilities (as that peak shaving is against utility’s supply requirements)
- **Parallel VPP proposal for Large DG and community solar projects (separate tariffs filed and eligibility requirements though)**
- **And then another parallel program providing compensation for production during peak hours for CS + storage projects**
 - 4 p.m. through 8 p.m. on days during June, July, August, and September
 - Compensation rate determined by ICC
 - Almost like a TOU feed-in tariff

SB 1587: Challenges (Main part of bill)

- **Super ambitious targets**
 - Wait, how much?? By when????
- **Rate impact cap/means for reducing rate impacts & costs**
 - Benchmark, negative pricing, no cap
- **Regional considerations**
 - Preference for MISO at start, but not over time
- **Equity provisions**
 - Shorthand thinking re: equity: Customer, Worker, Community, Company Owner
 - Provisions only seem to get at workforce
- **Post hoc 2026 analysis can only adjust targets up**
 - What if there's less need?
- **Bill doesn't move forward . . . So then what???**

HB 3445: Policy Study

- **Not signed into law – AV for entirely different reasons – but we’ve decided to move forward with the policy study nevertheless**
- **What we’ve been asked to study under HB 3445**
 - **HVDC line from Iowa to Illinois (Soo Green project)**
 - **Offshore wind project build in Lake Michigan**
 - **Battery storage proposal (SB 1587 outlined in prior slides)**
- **How we’ve been asked to study them**
- **Look at impacts of each policy proposal on the following attributes:**
 - **support for Illinois’ decarbonization goals; the environment;**
 - **carbon and other pollutant emissions;**
 - **grid reliability; resource adequacy; long-term and short-term electric rates;**
 - **environmental justice communities; jobs; and the economy.**
- **Release final study by March 1, 2024**

Policy Study: Where We Are Now

- **What we're doing now**
 - Working with Procurement Planning Consultant & subcontractors
- **Gathering information from bill proponents and other stakeholders; exemplary questions**
 - For proponents – what should we assume in terms of technology, duration, cost, locations, size, development timeline, etc. for modeling purposes?
 - For stakeholders – is this the right procurement design? what have we seen work within other states?
- **Can always fold additional information into the narrative of the policy study, even if it's not something we're directly modeling**
 - Comparative analyses across states, for example
 - Trying to make sure proposals are understood by legislators
- **How we're approaching the modeling**
 - GE MARS to evaluate the impacts on generation reliability and resource adequacy;
 - PSS/E and TARA to evaluate the impacts on transmission reliability and grid resilience;
 - Aurora production cost simulation to evaluate the impacts on electricity prices and generation related emissions; and
 - IMPLAN to evaluate the impacts on the State's economy

Where do we go from here in IL??

- **Draft policy study in Jan, public comments, March 1 release**
- **Possible bill passage timeline**
 - ILGA meetings Feb to May
 - Also veto session dates, lame duck session dates
- **If/when bill passes....storage plan development**
 - 180 days after the effective date of the Act for big plan
 - For the LDES/MDES plan, that's within one year after effective date
- **Plan approval**
 - Likely a public comment period first
 - No timeline by law, 120 days for Long-Term Renewables Plan
- **Timeline from procurement plan approval to procurement event**
 - Unknown, depends on complexity
 - Let's say 3 to 9 months just to give a nice safe range
- **So actual procurement events may not be until toward the end of CY 2025**
 - Assumes a May 2024 bill passage (is this realistic?)
 - Basically then May 2025 Plan approval, December 2025 procurement events
- **Timeline from procurement event to energization**
 - Maturity level at time of application, working through RTO interconnection issues
 - Maybe 1-5 years?



Brian Granahan
Acting Director, Illinois Power Agency
Brian.Granahan@Illinois.gov

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