



2018 IPPNY Annual Conference

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Energy Storage Deployment

Jason Doling

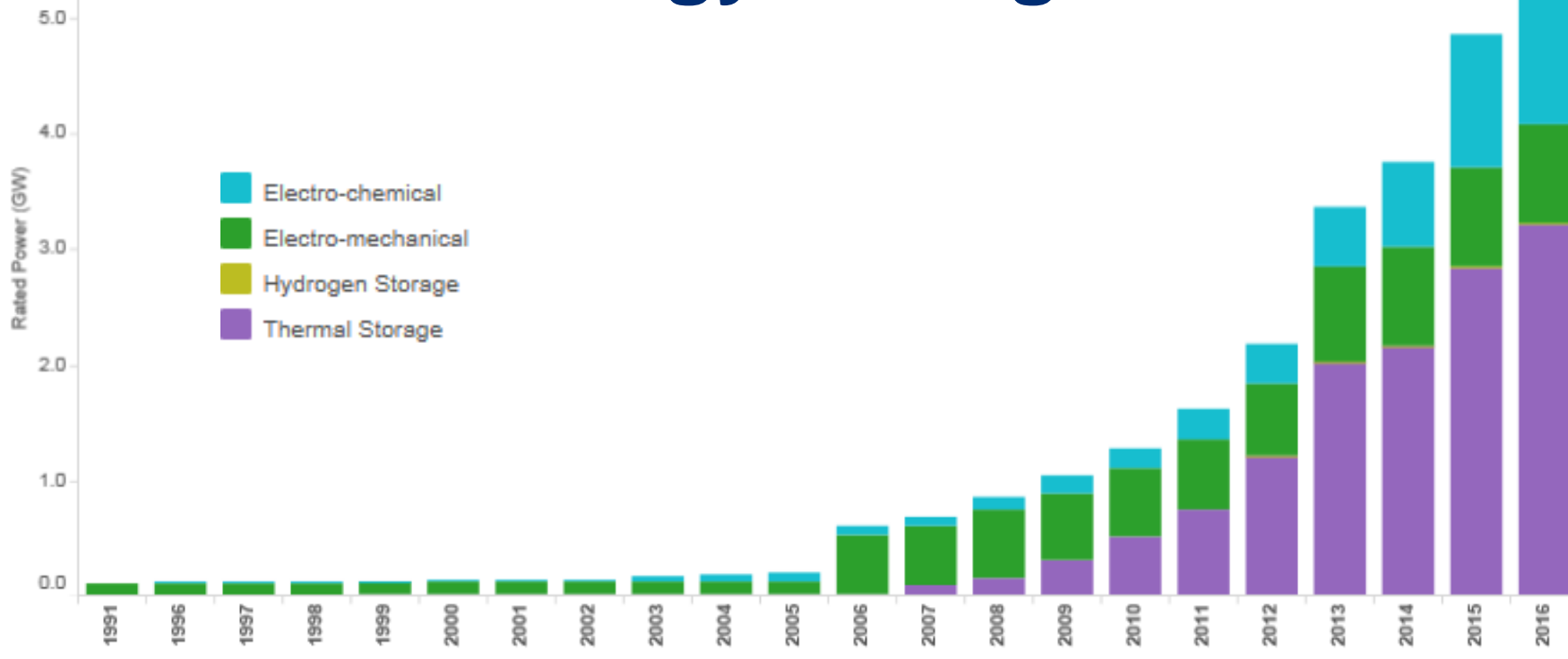
Topics

- State of storage deployment**
- Energy storage study**
- Energy Storage Roadmap (Staff Whitepaper) timeline and potential actions**

Governor Cuomo's 2025 Storage Goal

- **Deploy 1,500 MW of energy storage by 2025**
- **Employ 30,000 New Yorkers**
- **Produce \$2 billion in gross benefits**
- **Largest commitment per capita**

Advanced Energy Storage Worldwide



Source: DOE Global Storage Database – operational systems as of March 2017

NYS Energy Storage Deployment

Today: 1,400 MW pumped hydro

+

2017

60 MW of advanced storage is deployed

2025

1,500 MW Advanced Storage Goal

2030

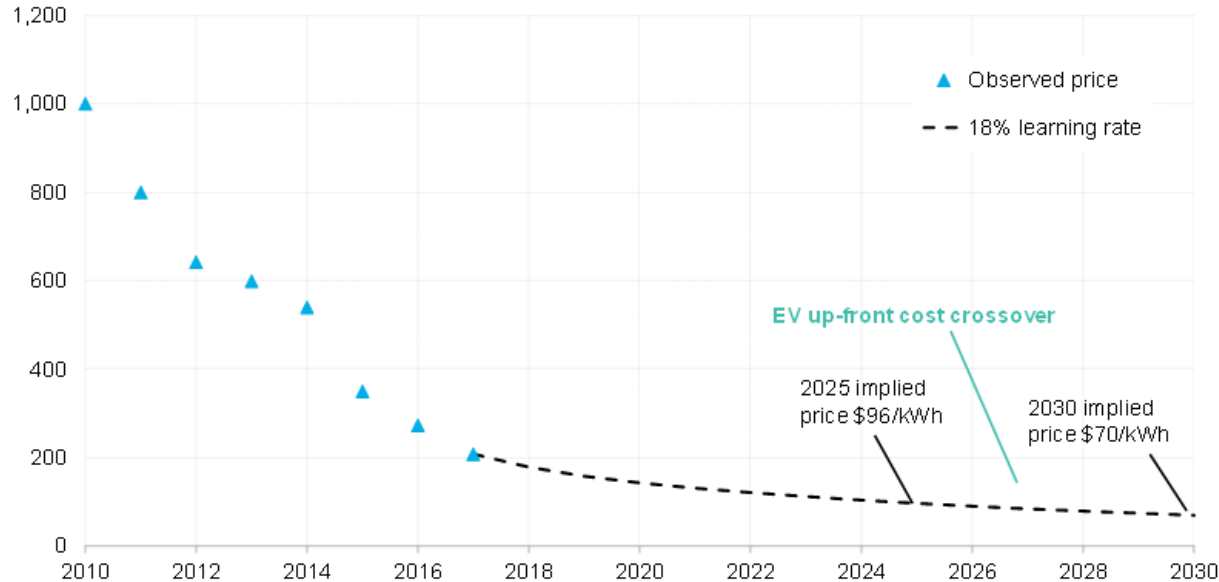
Public Service Commission to Establish Goal

Costs are declining, lead by lithium-ion

Electric vehicles

Lithium-ion battery pack prices will fall to \$70/kWh

Volume weighted average battery pack price (\$/kWh)



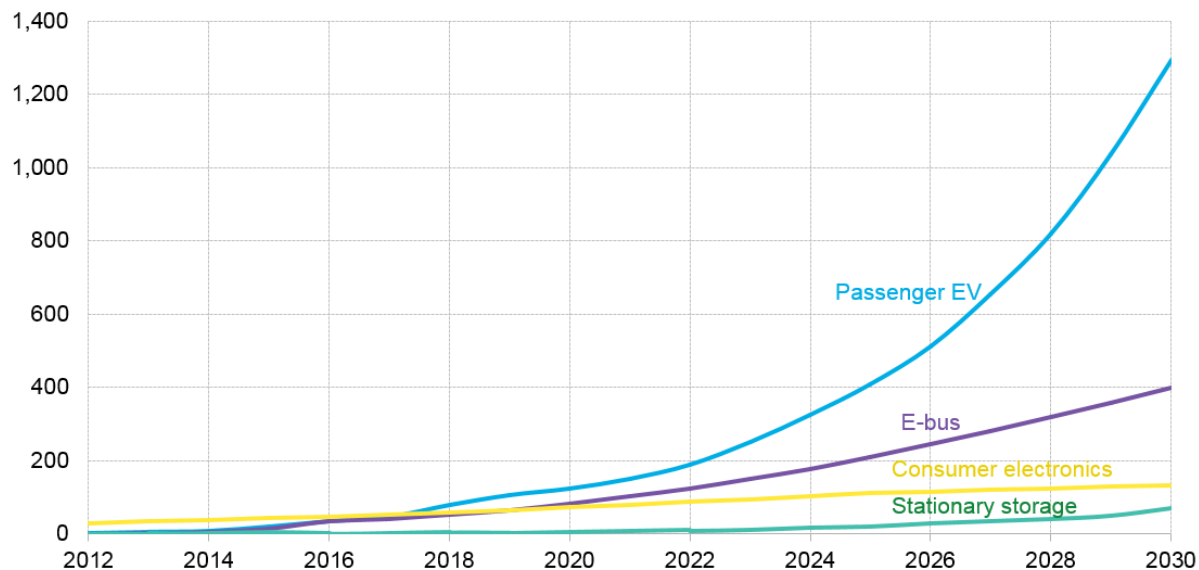
Source: Bloomberg New Energy Finance.

These costs are led by EVs

Demand will be driven mainly by
EVs and E-buses

Annual battery demand by sector

GWh/year



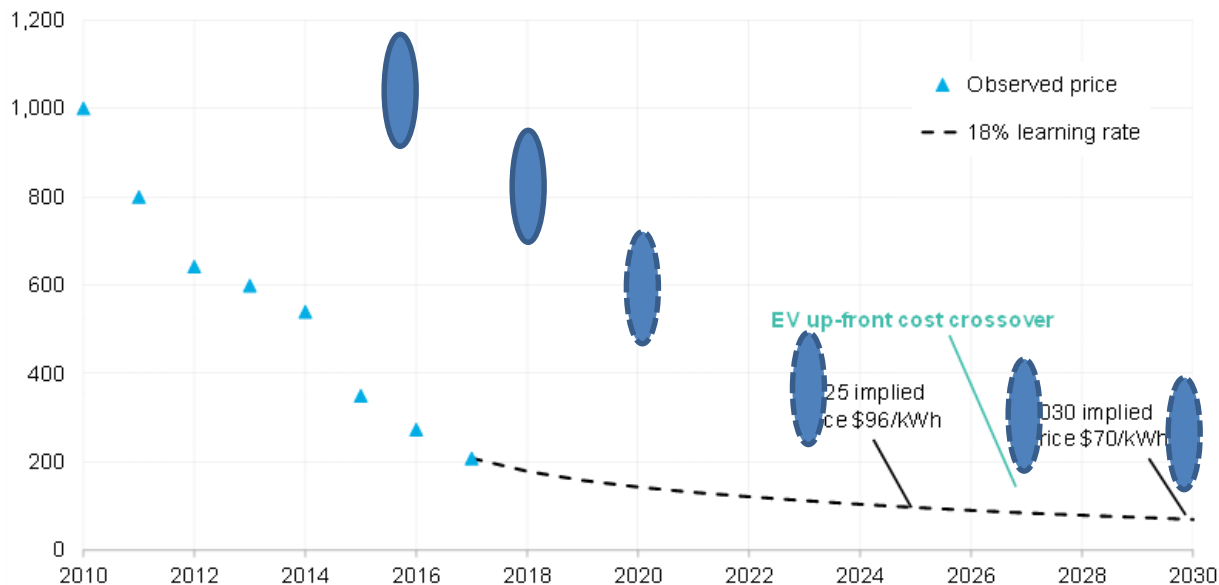
Source: Bloomberg New Energy Finance

Installed cost and projections

Electric vehicles

Lithium-ion battery pack prices will fall to \$70/kWh

Volume weighted average battery pack price (\$/kWh)



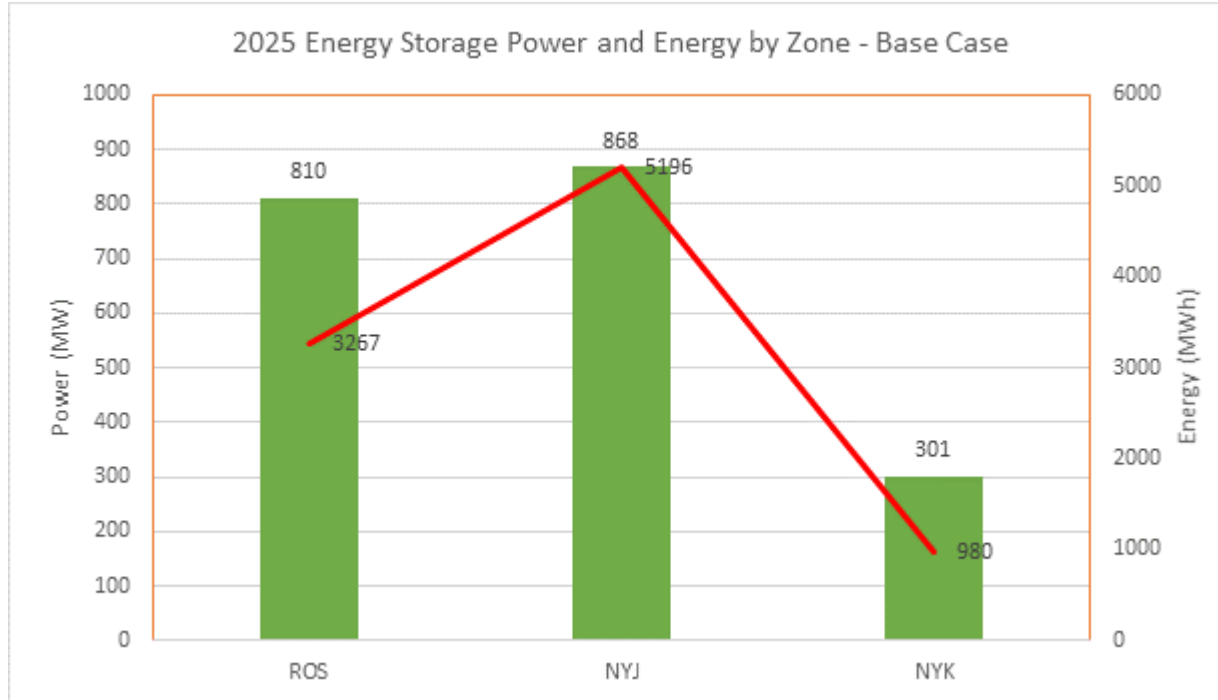
○ = approx. range of NYS installed costs (dashes are ES study forecast cost)

Storage Study Scope

Determine ranges of energy storage that could result in net positive benefit to ratepayers in meeting electric system needs including installed capacity, distribution and sub-transmission needs, that arise under various scenarios, sensitivities, and time horizons (2020, 2025, 2030)

Preliminary Base Case Results

Energy Storage Sizing Analysis for 2025

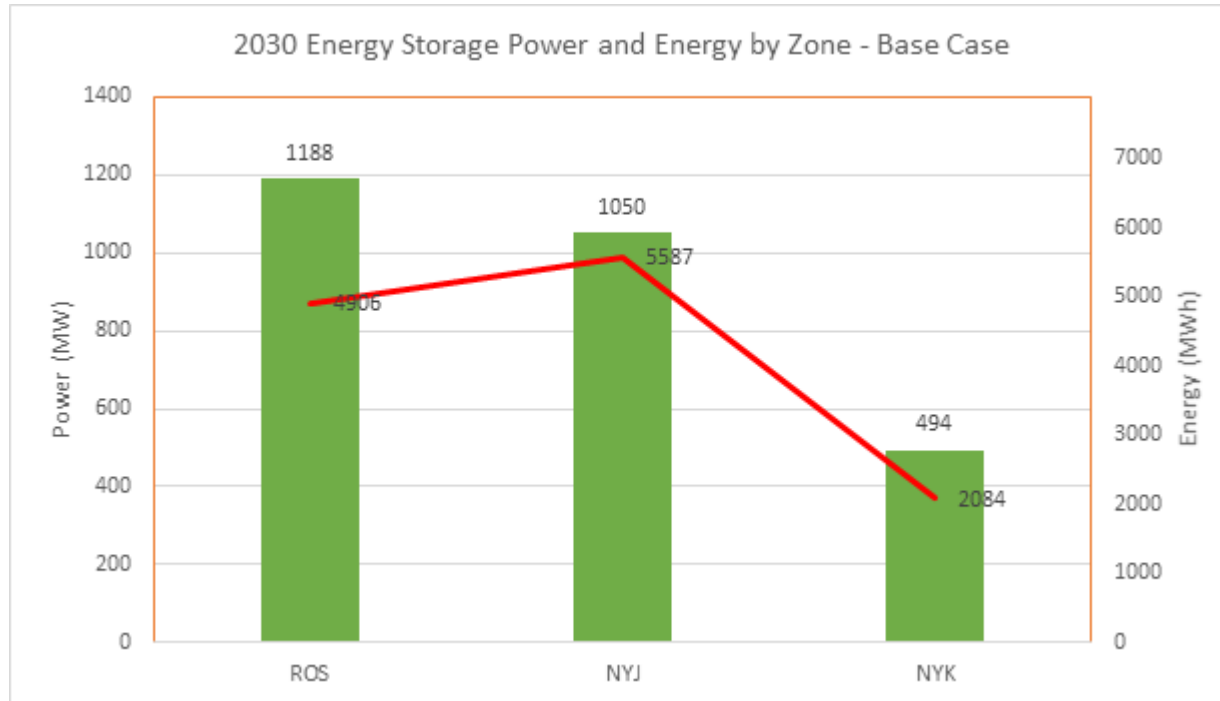


Energy Storage Buckets

Duration	MW	MWh
Long (4+hrs)	1,178	7,068
Medium Long (2-4hr)	455	1,820
Medium Short (1-2hr)	248	496
Short (<hr)	99	50
Total	1,988	9,578

Preliminary Base Case Results

Energy Storage Sizing Analysis for 2030



Energy Storage Buckets

Duration	MW	MWh
Long (4+hrs)	1,447	8,682
Medium Long (2-4hr)	714	2,856
Medium Short (1-2hr)	467	934
Short (<hr)	154	77
Total	2,795	12,557

Initial Base Case Benefits and Costs under a Resource Cost-Style Lifetime BCA

2025 (1,500 MW, 7,267 MWh)	
Model Benefits	NPV in 2017 M\$
Ancillary Services	\$75
Capacity Value	\$516
Distribution Savings	\$735
FOM	\$81
Gen Cost Savings	\$310
Avoided CO2	\$24 (1.02 MMT)
Benefits	\$1,740
Costs	\$1,189
Net Benefits	\$551

2025 (1,988 MW, 9,578 MWh)	
Model Benefits	NPV in 2017 M\$
Ancillary Services	\$99
Capacity Value	\$588
Distribution Savings	\$1,052
FOM	\$125
Gen Cost Savings	\$411
Avoided CO2	\$31 (1.36 MMT)
Benefit	\$2,306
Costs	\$1,576
Net Benefits	\$730

2030 (2,795 MW, 12,557 MWh)	
Model Benefits	NPV in 2017 M\$
Ancillary Services	\$140
Capacity Value	\$732
Distribution Savings	\$1,410
FOM	\$214
Gen Cost Savings	\$550
Avoided CO2	\$44 (1.97 MMT)
Benefit	\$3,090
Costs	\$1,902
Net Benefits	\$1,188

Note: Does not include quantification of other emissions benefits including SO_x, NO_x, and health impacts. Transmission benefits from congestion relief are included in lower LBMPs within “Generation Cost Savings.” The model was not designed to examine potential for avoided transmission infrastructure. 7% discount rate was used.



NYSDERDA

NYS Energy Storage Roadmap Development

Engage industry, utility, and other stakeholders to **identify state policy, regulatory, and programmatic actions** to be considered to enable the energy storage systems for the future electric grid.

NYS Energy Storage Roadmap Timeline

1Q18+

- **Energy Storage Study** completed
 - Voice of customer/stakeholder meetings to seek input on potential policy, regulatory and programmatic actions
-

2Q18

- **Energy Storage Roadmap** released for formal public input
-

3Q18

- Technical conference(s), outreach, review and evaluation of formal public comments
-

4Q18

- PSC establishes 2030 Energy Storage Goal and actions
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For more information, please visit:

www.nyserda.ny.gov/All-Programs/Programs/Energy-Storage-Program/Energy-Storage-Roadmap



NY-Sun

Potential Roadmap Recommendations Under Discussion

- Retail rate design (sub-daily demand charge pilot)
- VDER retail value stack (expand to storage, examine DRV term, differentiate E value based on time of day)
- Expand utility demand response timeframe to multi-year terms
- Utility role (maintain existing limitations on utility ownership of storage established under REV Track One Order, improve effectiveness of Non-Wire Solution competitive procurements and pursue third party revenue sharing models, consider Earnings Adjustment Mechanisms that encourage third party deployment of DERs including storage)
- Continue NYSERDA LSR procurement for pairing with storage (point adder considered in review of LSR bids)

Potential Roadmap Recommendations Under Discussion

- Continue reducing soft costs (permitting, customer acquisition, data access, heat maps to target areas needing relief, interconnection)
- Leverage NY Green Bank in scaling project finance
- NYS leading by example by incorporating energy storage (peak load reduction, renewable pairing, resiliency) into energy efficiency and renewable energy procurement bids (SUNY, CUNY, NYPA, MTA)
- In conjunction with NYISO's DER Roadmap and to be submitted FERC tariffs, consider impact of changes to wholesale market products and requirements
- Market acceleration bridge incentive where economics are justified based on cost declines in customer sited storage and distribution load relief use cases

Thank you!

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For more information, please visit:

www.nyserderda.ny.gov/All-Programs/Programs/Energy-Storage-Program/Energy-Storage-Roadmap