Baseline Market Evaluation Metrics for Energy Storage

Final Appendix

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Appendix A Instrument

Dear [Name of Interviewee],

I am writing to ask you to lend your expertise to our survey on the Energy Storage activities in New York State. Our research team identified you as an expert in energy storage, and your knowledge and insight will make a valuable contribution to the results of our study.

We are assessing the amount of and type of energy storage projects that have occurred in New York State since January 2016, and major cost components. Results from this study will inform the New York State Energy Research and Development Authority, NYSERDA, and CUNY DG as they work to support energy storage expansion in New York. Your input will be very important to this effort.

Any information provided by you during the interview will be kept confidential to the extent permitted by law and our analysis will not identify any individual respondents or firms.

Please provide some options for when we might schedule a time to talk at your convenience. We are aiming to complete all interviews by the end of March. The survey will take less than thirty minutes of your time.

Should you have any questions about the interview process or the purpose of this study, please feel free to contact Jane Peters from Research Into Action at 503-287-9136 jane.peters@researchintoaction.com, or Jennifer Phelps from NYSERDA at *jennifer.phelps@nyserda.ny.gov*.

Thank you for taking the time to participate in this study, we look forward to your response. It is only from hearing from experts like you that our survey will provide meaningful results to help shape the future of energy storage for New York State.

Thank you,

[Name]

Definitions:

- Distributed energy storage refers to energy storage systems in the kW to MW range that are located behind and in-front-of a customer's meter within the distribution and transmission system such as electrochemical (batteries and ultra-capacitors), mechanical (flywheels), and thermal (ice) systems, but does not include bulk storage resources such as pumped hydro.
- Hardware costs include the battery modules, inverter, and balance of systems such as fire controls, power electronics, communication system, containerization, insulation, HVAC system, meter, control system, outdoor containerization (if necessary), etc.
- Engineering and Construction costs include design, site preparation, transportation, siting, PE approval, testing and commissioning, electrician and installation labor, wiring, fencing, other overhead, etc.
- Soft costs include permitting, customer acquisition (sales, partner commissions, load profile analysis, etc.), interconnection, and finance cost.
- Total installed cost is the sum of hardware, engineering and construction, and soft costs.

Survey Instrument:

1. Include company's name? (auto fill)

2. Include name, title, and contact information for the individual being interviewed (auto fill, corrections?)

Thank you for agreeing to participate in this interview. It will take about 30 minutes.

3. What is your company's size in terms of number of employees?

    a. What is the number in New York state?

4. Thinking of the distributed energy storage projects in New York State you completed since January 2016 or put in the pipeline since January 2016 with a firm quote to a customer, can you tell me the following:

New York State Distributed Energy Storage Overview		
	Completed in 2016	**Pipeline since January 2016**
Total number of projects		
Total kW across projects/MWh		
Average project size (kW – and kWh (duration))		
Number of storage systems using lead acid battery technology		
Number of storage systems using lithium ion battery technology		
Number of storage systems using thermal technologies (ice, cold water)		
Number using other types of storage technologies		
Number of projects paired with DG or solar		
Number of projects designed to provide emergency power		
Total average installed cost per kWh		

5. What percent of your New York customers that have received proposals since January 2016 have executed contracts?

6. (if no projects paired with DG or Solar in New York) Are you trying to sell projects that integrate distributed generation or solar with storage in any of markets where you are selling projects?

    a. If not when, if at all, do you anticipate selling these types of projects?

7. Beyond New York, in what other markets is your company active in distributed energy storage?

8. What do you expect to be your company's primary type of energy storage system in 2020?

    a. *Lithium Ion,*
    b. *Lead Acid,*
    c. *Flywheel,*
    d. *Ice,*
    e. *cold water*

9. What percentage of your company's energy storage business in North America was made possible by a utility, state, or municipal incentive program?

    a. How about in New York, what percentage of your company's energy storage business was made possible by a utility, state, or municipal incentive program?

10. What percentage of your company's distributed energy storage portfolio is in NYS?

11. What percentage of your company's NYS distributed energy storage portfolio is in NYC?

12. For energy storage projects in New York, which of the following do you most typically include in your calculation of value/costs to the customer? (check all that apply)

    a. Investment tax credit
    b. third party ownership,
    c. demand charge management,
    d. demand response payments
    e. distributed generation integration
    f. non-wires alternative services
    g. shared savings/benefits/performance contract
    h. are there any other benefits you typically include?

13. *Which of these benefits do you anticipate including in offers to customers in 2020?*

    a. Investment tax credit
    b. third party ownership,
    c. demand charge management,
    d. demand response payments
    e. distributed generation integration
    f. non-wires alternative services
    g. shared savings/benefits/performance contract
    h. are there any other benefits you include?

14. Which of these benefits make the most difference for customer conversion?

A. <u>I have some questions about the costs for your Distributed Energy Storage systems</u>

15. On average, what percentage of the total installed cost of a distributed Energy Storage System is constituted by:

    a. i) hardware costs,
    b. ii) engineering and construction costs, and
    c. iii) soft costs?

16. What is the average total <u>hardware cost</u> ($/kW) for your primary systems?

    a. <u>Skip if no installations outside NYC:</u> Do the total hardware cost vary depending on New York jurisdiction or utility territory? *I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.* If so, please explain.
    b. Does the total hardware cost vary depending on outdoor vs. indoor installations in New York? If so, please explain.
    c. Does the total hardware cost vary depending on the type of customer (say utility as compared to industrial or commercial) in New York? If so, please explain.
    d. <u>skip if not integrating with DG:</u> By whether solar or distributed generation is included?

17. What is the current average total hardware cost ($/kWh) for [feed in answer to Q8], the system you anticipate will be your primary system in 2020?

18. What is the total average engineering and construction cost for a distributed energy storage system per kW or per kWh?

    a. Skip if no installations outside NYC: Do the average costs for engineering and construction vary by jurisdiction, *I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.*
    b. by the type of customer (utility, commercial, industrial)?
    c. By the technology,
    d. By system size or usage?
    e. skip if not integrating with DG: By whether solar or distributed generation is included

B. Now thinking about the Soft Costs of your company's projects In New York State:

19. You said that soft costs accounted for …fill from Q15c ..% of total costs. Soft costs include customer acquisition, permitting and interconnection, and financing.

    a. what percent of your soft costs are customer acquisition?
    b. what percent are permitting
    c. what percent are interconnection
    d. what percent are financing
    e. skip if not integrating with DG: Do these costs increase, decrease, or stay the same when an energy storage system is integrated with solar or other distributed generation?

20. Within customer acquisition, what comprises the most extensive portion of your staff's time? (check only 1)

    a. customer identification,
    b. closing the deal,
    c. contracting,
    d. audit/site assessment/data logging
    e. some other activity?

21. On average, how long is your company's customer acquisition timeline for distributed ESS, from initial engagement to proposal to contract execution?

    a. Skip if no installations outside NYC: Does the timeline vary by jurisdiction, i. Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.
    b. by the type of customer (utility, commercial, industrial)?
    c. By the technology,
    d. By system size or usage?
    e. Skip if not integrating with DG: Does the time to acquire a customer vary if the system is integrated with solar or other DG?

22. Does your company offer financing?

    a. What percent of your New York customers use financing?
    b. Does financing reduce upfront costs for the customer
    c. Does it increase, decrease, or have no effect on the time required for customer acquisition
    d. What type of customers need financing?

23. What is the average length of time it takes your company to prepare the necessary building and fire department permits? (days or weeks)

    a. Skip if no installations outside NYC Does this vary by jurisdiction I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.
    b. Does this vary by customer class?
    c. Does this vary by energy storage technology?
    d. Does this vary by size of the energy storage system?
    e. Does this vary by planned usage of the energy storage system?
    f. Skip if not integrating DG: Does this vary if solar or other DG is integrated into the project?

24. What is the average length of time it takes your company to receive approved permits to site an energy storage system from time of permit submission?

    a. How many resubmissions do you usually have to make before gaining a final approval?

        1) Skip if no installations outside NYC Does this vary by jurisdiction I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.
        2) Does this vary by customer class?
        3) Does this vary by the technology utilized (lithium ion, lead acid, flow, etc.)?
        4) Does this vary by the size of the system?
        5) Does this vary by planned of the system?
        6) Skip if not integrating DG: Does this vary if solar or other DG is integrated into the project?
        7) Does this vary with other onsite considerations such as proximity to occupants, or interior vs. exterior, etc.?

25. What is the average length of time it takes your company to gain an approval to interconnect a distributed system from utility interconnection application to approval? (days or weeks))

    a. Skip if no installations outside NYC Does this vary by jurisdiction I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.
    b. Does this vary depending on the customer class (tariff, metering configuration, etc.)?
    c. Does this vary depending on the technology utilized?
    d. Does this vary depending on the size of the ESS?
    e. Does this vary depending on the planned usage of the ESS?
    f. Skip if not integrating DG: Does this vary if solar or other DG is integrated into the project?

26. What is the total cycle time in months from site contract execution to system commissioning? (months)

    a. Skip if no installations outside NYC: Does this vary by jurisdiction *I) Con Edison's territory outside of NYC, ii) Long Island, and iii) Rest-of-State.*
    b. Does this vary by customer class?
    c. Does this vary by the technology utilized?
    d. Does this vary by the size of the system?

e. Does this vary by the planned usage of the system?
f. Skip if not integrating DG: Does this vary if solar or other DG is integrated into the project?
g. Does this vary with other onsite considerations such as proximity to occupants, or interior vs. exterior, etc.?

27. What are the specific issues that most slow down the time to obtain a permit?

28. What aspects of the permitting or interconnection processes are the most challenging and costly?