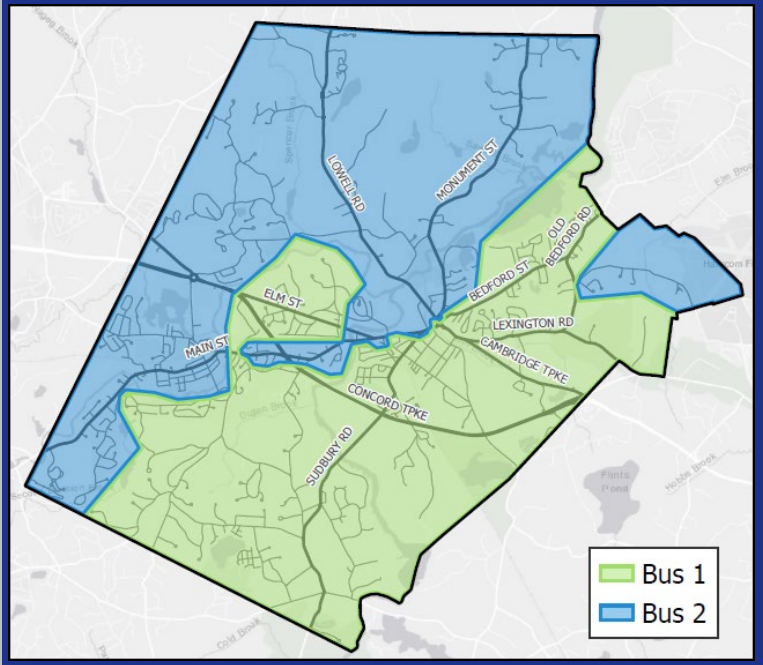
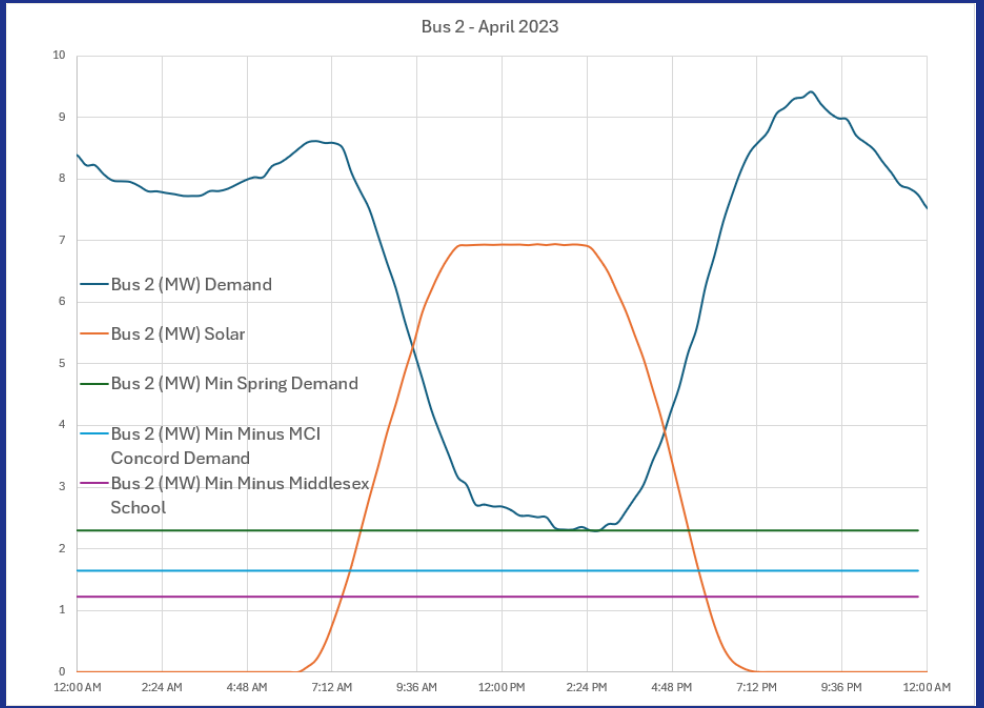
ARTICLE 1: In-town Utility Scale Battery

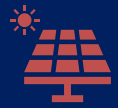
To determine whether the Town will authorize the Town Treasurer with the approval of the Select Board, to borrow by the issuance of general obligation bonds or notes under the provisions of Mass. Gen. Laws c. 44 or any other authority, a sum not to exceed $10,400,000 for the design and construction of grid-scale battery storage in the Town of Concord, the funds so borrowed to be expended for engineering design and legal services; hearings; permits and other approvals; material, construction, and installation specifications; bid preparation; materials purchase; construction and installation services; control systems; and distribution and expansions, upgrades and improvements, and to be repaid in the first instance from revenues of the Concord Municipal Light Plant, or take any other action relative thereto.

Transforms and Bus bars





Solar growth



Concord went from 3.8MW of rooftop solar in 2020 to 4.95MW in 2023 – a 1.15MW increase.

The IRA is likely to increase the requests we get for residential and commercial solar development.

Concord wishes to continue to add more solar, as outlined in the Climate Action Plan.

Goals

1. Protect the distribution system to ensure there is no downtime or damage.
2. Allow for continued expansion of in-town solar.
3. Save emissions and money by shaving the peak.

Solutions

Can we curtail solar?

- Not possible with current contracts and is contrary to the Town's goals

Metering domain

- Two years away; costs/hurdles unknown

Battery storage

- Capital intensive initially but has a big payback

Why now?

- MCI-Concord is closing on 6/30/2024
  - Steadily uses 0.65-1.0MW
  - Shares wastewater treatment with NCC
  - Likely will be redeveloped using heavy electrification plus solar
  - Next year will be too late

Battery Characteristics

- Power (MW)
  - The maximum amount the battery can charge or discharge at any given time
- Energy (MWh)
  - The length of time over which the MW can be stored

Battery size

A bigger battery:

- Better manages solar saturation.
- Allows rate payers to invest in more solar capacity
- More progress towards Town's 60MWh storage goal
- Lower capital cost per MW due to economies of scale
- Larger IRA credit in dollars
- Higher cashflow in dollars; more savings to ratepayers

Recommended size:
4.9MW / 14.97MWh

Battery Financials

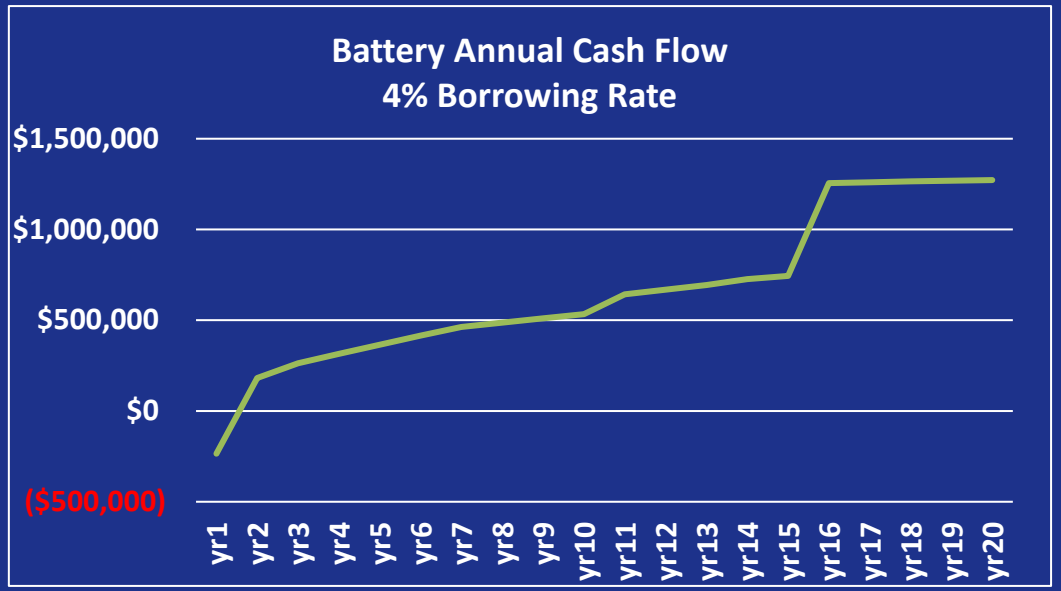
Capacity	4.99MW
Storage	14.97MWh

Assumptions

Energy Storage System	$9.0M
Engineering	$0.2M
Managed services	$0.03M
Insurance	$0.04M
Shipping + Duties	$0.4M
Installation & BoP	$0.8M
RNS forecast accuracy	83%
ICAP forecast accuracy	90%
BESS cost	$603/kW

20-Year Net Present Value of Annual Cash Flows (Rev. minus Cost) MM$

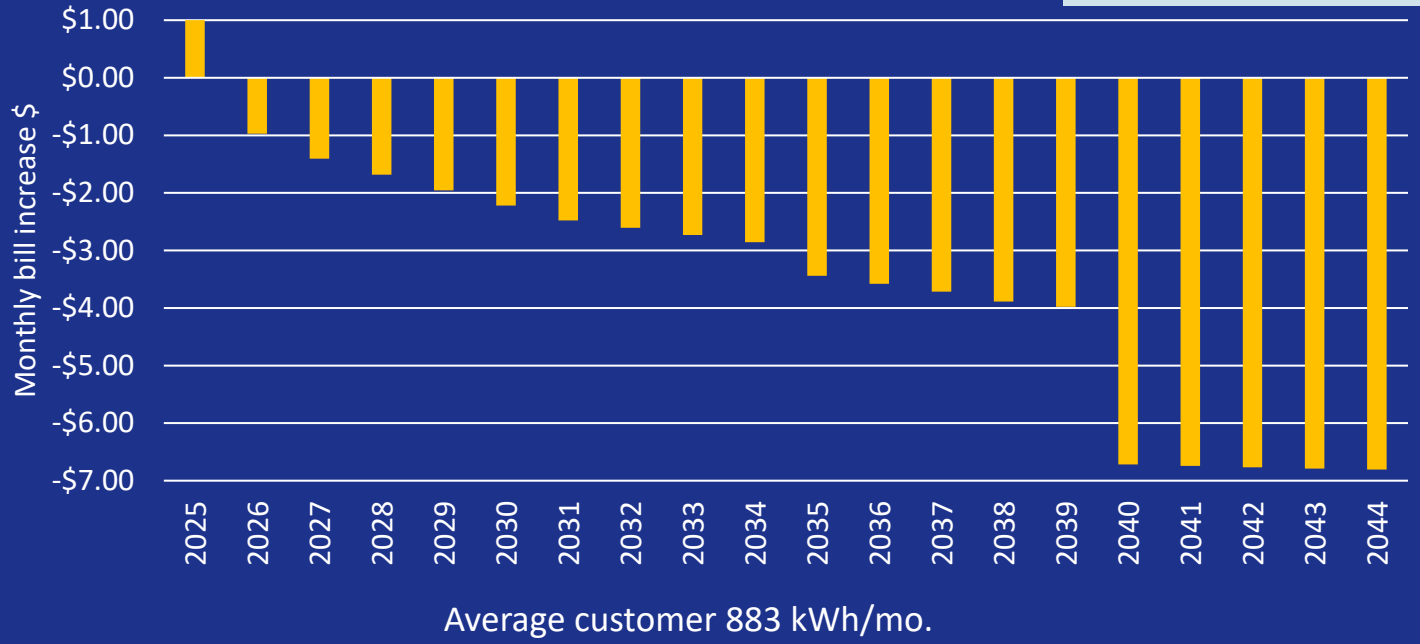
		WACC				
		5%	7%	9%	10%	12%
loan rate	3.40%	$7.1	$5.6	$4.5	$4.1	$3.3
	3.60%	$7.0	$5.5	$4.5	$4.0	$3.3
	3.80%	$6.9	$5.5	$4.4	$3.9	$3.2
	4.00%	$6.8	$5.4	$4.3	$3.9	$3.1



Rate Impact

	Million $
Capital Cost	$10.4
IRA Credit	$2.6
20-yr NPV	$3.1

4.99MW / 14.97MWh



Average customer 883 kWh/mo.

Assumptions

- 15-year loan; 4% borrowing rate
- IRA credit is used in year 2 to reduce the loan balance
- One inverter replacement in year 10
- Battery is dispatched by a third party for an annual fee
- O&M escalation: 2.5%
- Electricity market price escalation: 1.5%
- Annual battery degradation: 1.5%
- Discount rate for net present value: 12%

Alternatives we have explored:

- Curtailment
  - Illegal or unsafe
- Tying bus bars together
  - Short-term emergency only; you lose power protection and resilience
- Third-party battery construction
  - Their priority on peak shaving does not solve our resilience issue or future solar expansion.
- Adding load
  - Early stages; requires capital investment dependent on certainty

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