Massachusetts Bay Transportation Authority

MBTA Renewable Electricity

MBTA Board Meeting

07/27/2023

Sean Donaghy, Manager of Energy Programs

MBTA Renewable Electricity Procurement

- Procuring 100% renewable electric power for the MBTA
  - MBTA is a leader in clean transportation, powered by renewable energy
  - 2nd largest transportation entity, 5th largest Government entity
  - More than the entire State Government of California
- Upgrading our commitment to MA renewables from last procurement
  - Meeting the MA Clean Energy Standard, EO594, and the State Global Warming Solutions Act
  - MBTA will be 50th largest purchaser of renewable energy in the nation
- Seeking Board authorization for General Manager to enter into a power purchase agreement for a period between 3-5 years for up to $120 Million

MBTA Electric Load

- MBTA is the largest electricity consumer in the Commonwealth
  - Currently 360,000 MWh (megawatt hour) annually
  - Projected to grow as we electrify buses and commuter rail
- MBTA procures electricity supply to ensure:
  - MBTA meets emissions caps and MBTA's sustainability goals
  - Budget stability and predictability
  - Best pricing for MBTA's Load – our fiscal responsibility
- Current BP contract for the supply of 70% of the MBTA's current electricity load:
  - Fixed block procurement
  - Three-year contract from 1/1/2021 expires 12/31/2023
  - Contains provisions for the purchase of renewable energy certificates (RECs)
  - Current contract REC budget $854,000 annually
    - Similar options cost $2.6 Million today

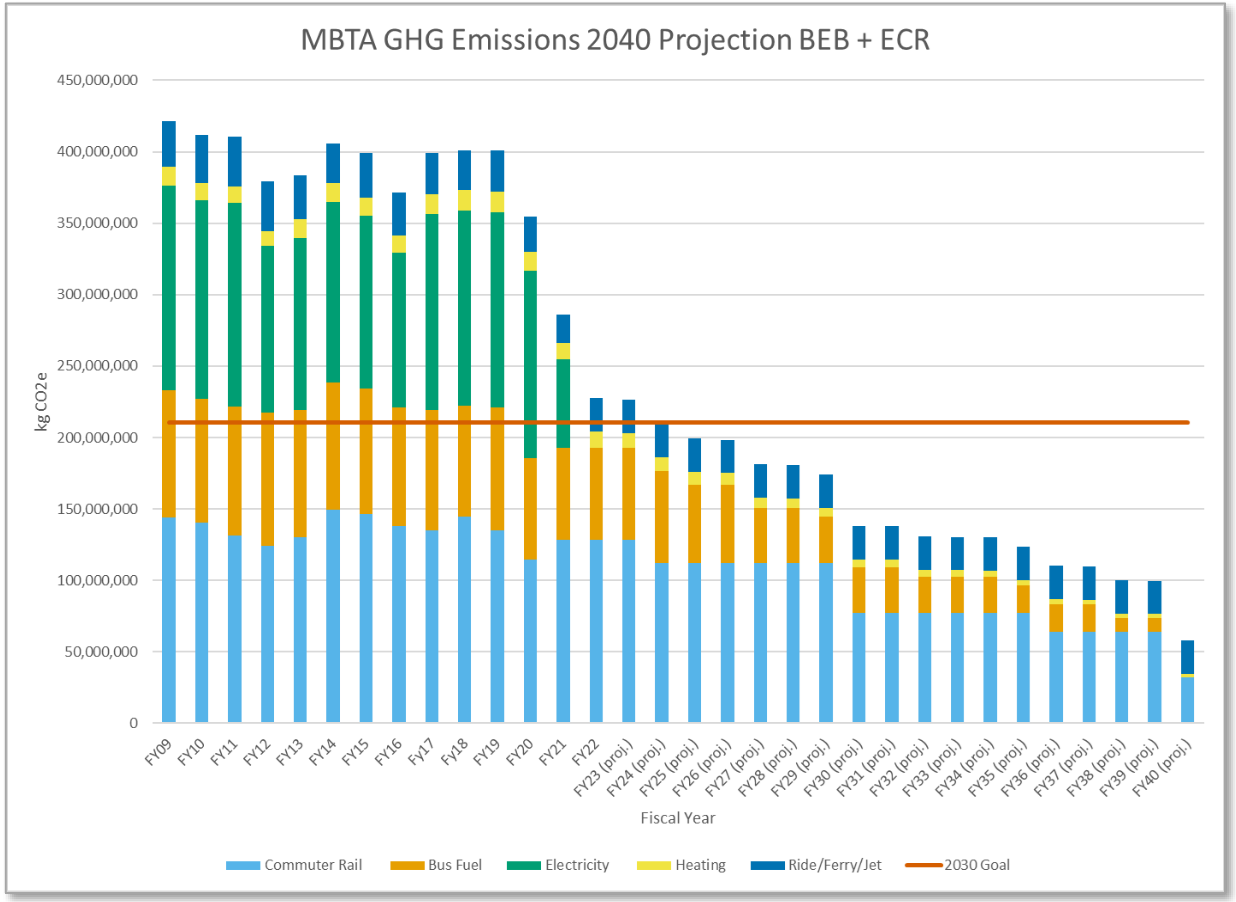
GHG Emissions and Decarbonization

The MBTA uses many forms of energy to serve our riders and we constantly seek to reduce our carbon footprint:

- The Authority remains committed to the targets set by Executive Order 594, *Leading by Example,* and is working towards reducing GHG emissions from the burning of onsite fossil fuels at buildings and vehicles
    - *By 20% in 2025, 35% in 2030, 60% in 2040, and 95% in 2050*

- Through funding for the development of the MBTA's Climate Action Plan, Bus and Rail Electrification initiatives, among other efforts, the CIP supports the Authority in progressing toward GHG and emission reduction goals

- Continued progress toward these goals will be driven by:
    - Identification of priority actions and funding needs for climate change response based on the results of the Climate Action Plan, which is in development
    - Continuous purchasing of renewable energy credits (RECs)



Graph showing actual GHG emissions (FY09-FY22) and projected GHG emissions (FY23-FY40) by mode and/or source, highlighting the MBTA's 2030 GHG emissions goal

Proposed Electricity Procurement 2024-2026

- Fixed price block power equal to 70% of the MBTA's electricity needs
- In order to have power purchase contract in place by 12/31, recommended schedule to issue RFQ on 8/4, to purchase on 9/13.
- Three-year to five-year contract duration
- Includes provision for the purchase of certified Renewable Energy Certificates (REC's)
- Bids being accepted on multiple scenarios:
  - Provide electricity blocks
  - Provide electricity blocks + RECs
  - Provide RECs only
- Shifting to Master Agreements to allow for more flexibility in power procurement (e.g., to cover new loads)

What is a REC?

- Renewable Energy Certificates (RECs) are an accounting system used by utilities to track clean energy
- RECs provide a way to measure and track the production of clean energy
- Every clean energy development, such as wind or solar, is issued a REC for each megawatt hour of electricity it produces and delivers to the power grid
- RECs are sold on the open market
  - Serves to track how companies are meeting state or corporate requirements
  - Provides a secondary source of income for clean energy developers

REC Classifications

Various shades of Green

Today

SREC – Solar RECs in Massachusetts.
The SREC II program is set to expire in 2026

Class I REC
MA Class I represents facilities in service after 1997. Technology includes solar, wind, small hydropower, landfill gas.

Maine Class II REC
Typically represents older hydroelectric facilities
Vermont Tier I
Predominately large hydro including NYPA

CES-E
Clean Energy Standard – Expansion represents some nuclear and large hydro located outside of ISO-NE that delivers its power in New England

Green-E
Wind, Solar, Geothermal, certain Hydroelectric and certain Biomass electricity-generation technologies can be used in a Green-e® Energy Certified renewable energy product. Not located in New England

Allowing flexibility to the supplier could reduce the cost of the REC

Cost of Going Non-Carbon

30% MA CLASS 1

$4,000,000

+

70% ME CLASS 2

$2,2000,000

=

100% Green Power

$6,200,000

Costs above the price of electricity

- Based on annual MWh of 360,000
- Recommending a mix of MA Class I (30%) and ME Class II (70%) in voluntary compliance with MA Clean Energy Standard
- Implementing this recommendation will take the MBTA well above existing requirement to support MA renewable energy while still delivering on our fiscal duty

MBTA Increases Commitment to Renewable Energy

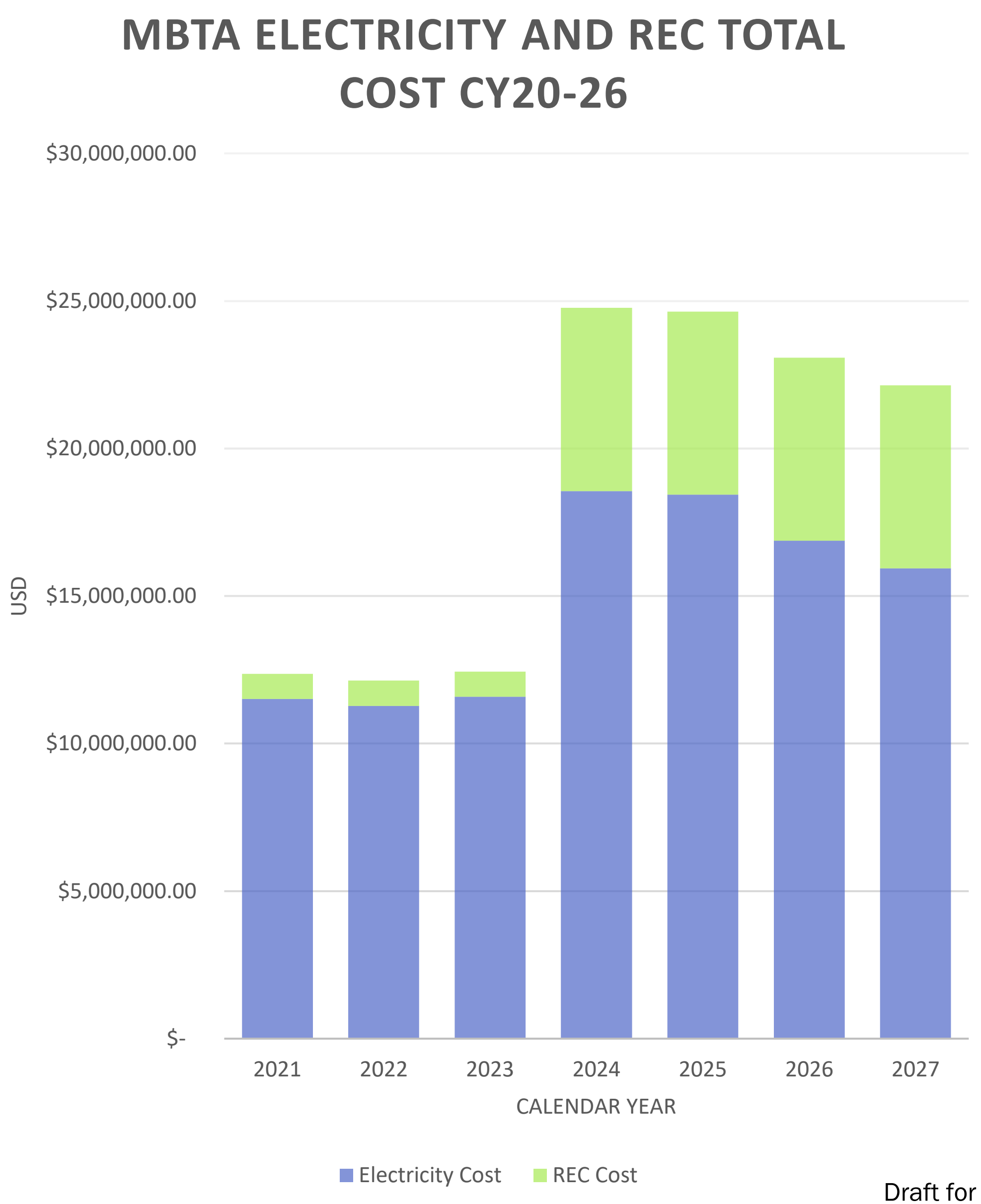
2020 Procurement

- 100% Hydropower from Maine
- Increased from 20% to 100%
- MBTA awarded Climate Change Project of the Year from the EBC
- 2021 EPA Green Power Partnership
  - 2nd largest transportation sector renewable energy purchaser
  - 16th largest entity with 100% renewable electricity
  - MBTA 32nd largest overall

2023 Procurement

- 30% Solar and wind from MA
- 70% Hydropower from Maine
- MBTA supports MA climate change efforts
- Meets MA CES requirements
- 2024 EPA Green Power Partnership
  - 2nd largest transportation sector renewable energy purchaser
  - 27th largest with 100% renewables
  - 54th largest overall

Historical & Projected Cost



ENE Estimates	CY	MWh Volume	$/MWh	$/REC	Total Cost
	2021	289,066	$39.83	$ 2.00	$ 12,367,499
	2022	289,021	$39.02	$ 2.00	$ 12,131,599
	2023	288,958	$40.10	$ 2.00	$ 12,441,216
	2024	250,452	$74.10	$17.25	$ 24,768,493
	2025	249,600	$73.86	$17.25	$ 24,645,456
	2026	249,675	$67.57	$17.25	$ 23,080,540
	2027	249,673	$63.82	$17.25	$ 22,144,131

Draft for Discussion & Policy Purposes Only

Procurement Schedule

- 7/27/23 - Board to Authorize GM
- 8/4/23 - RFQ Released
- 8/21/23 - RFQ responses due
- 9/11/23 - T&C finalized and Master Agreements Signed
- 9/13/23 - Final RFP issued to qualified vendors
- 9/13/23 - Final Pricing Due; Sign transaction agreement

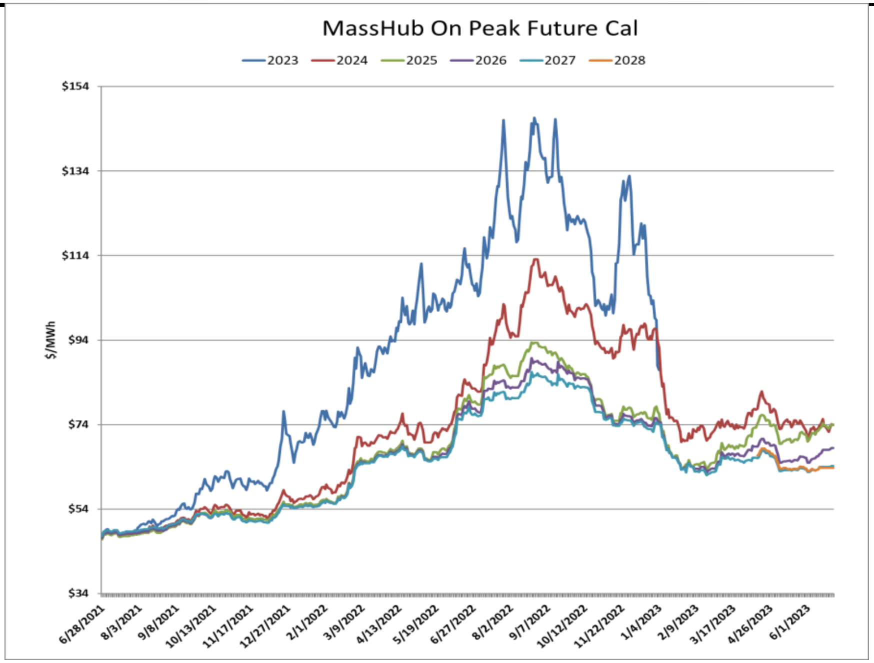
Request for Board Authorization

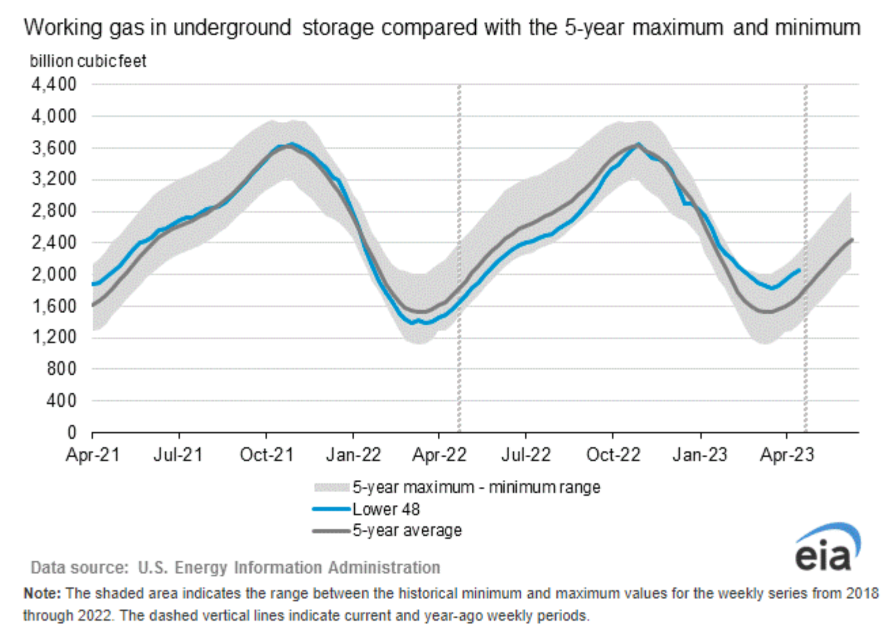
- As Electricity Suppliers have a very short window to lock in prices, usually less than an hour, seeking Board authorization for the MBTA GM to sign the transaction agreement to lock in pricing

Proposed Vote: Following the completion of a competitive procurement, the General Manager is hereby authorized to execute a formal contract, in a form approved by the General Counsel, with the designated bidder, in accordance with the specifications laid out in the Request for Proposal, at a value not to exceed One Hundred and Twenty Million dollars ($120,000,000) for a up to a five-year term.

Addendum

New England Market Outlook

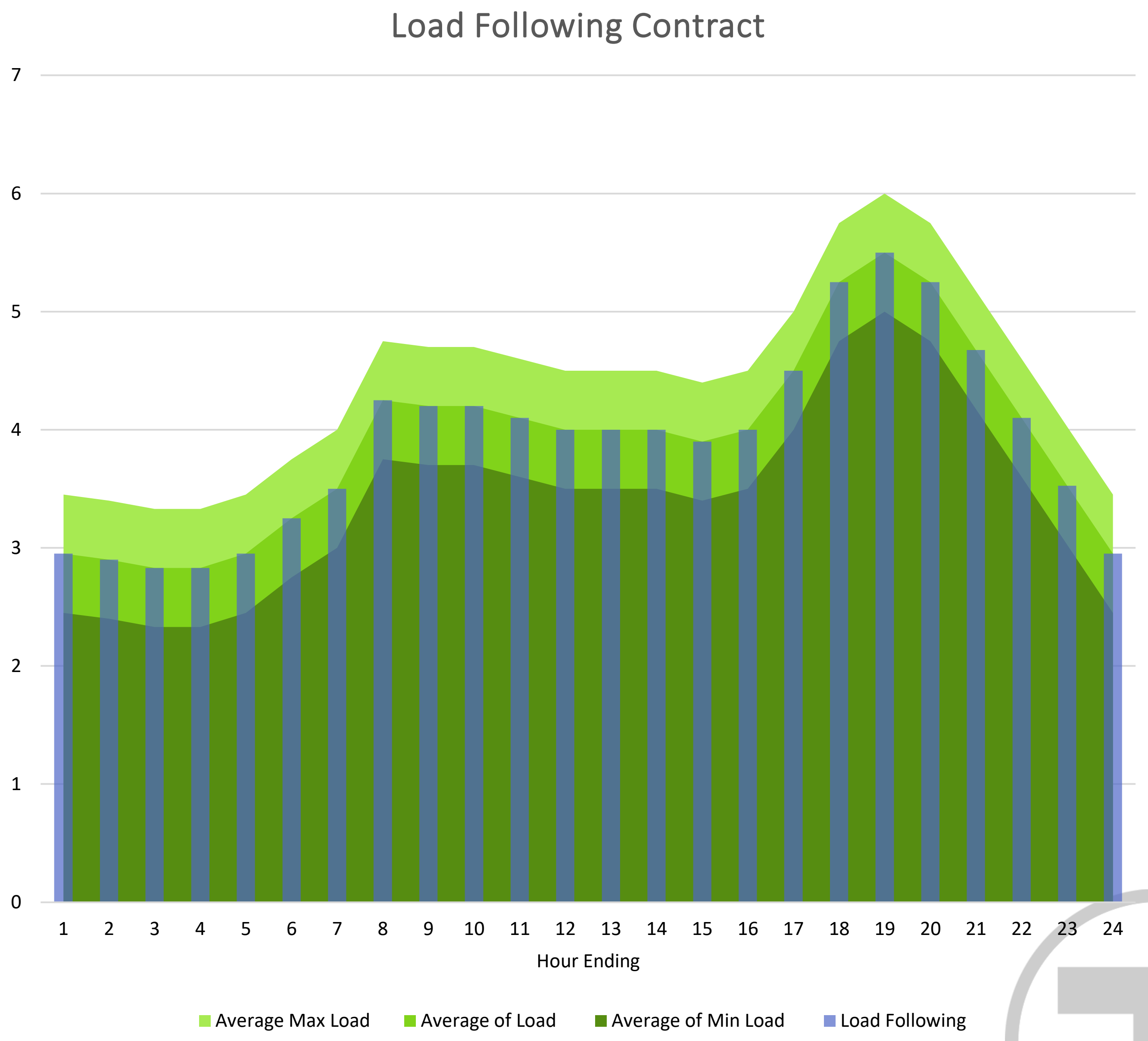




- Following the 2022 Commodity Supercycle forward prices are down significantly due to a warm winter in the USA/ Europe. CY24 On-Peak prices are down $114-$75 (35%) since prewinter highs. US Natural Gas Inventories are currently 21% above the 5-year average, so we are well supplied heading into the summer.
- Henry Hub natural gas prices have moved down from $10.00/MMBtu high in August 2022 to below $3.00.US natural gas storage inventories are close to the 5-year maximum reducing fear of winter shortages.
- Although down from 2022, forward pricing is still much higher than what MBTA paid in its last procurement.

Load Following Contract

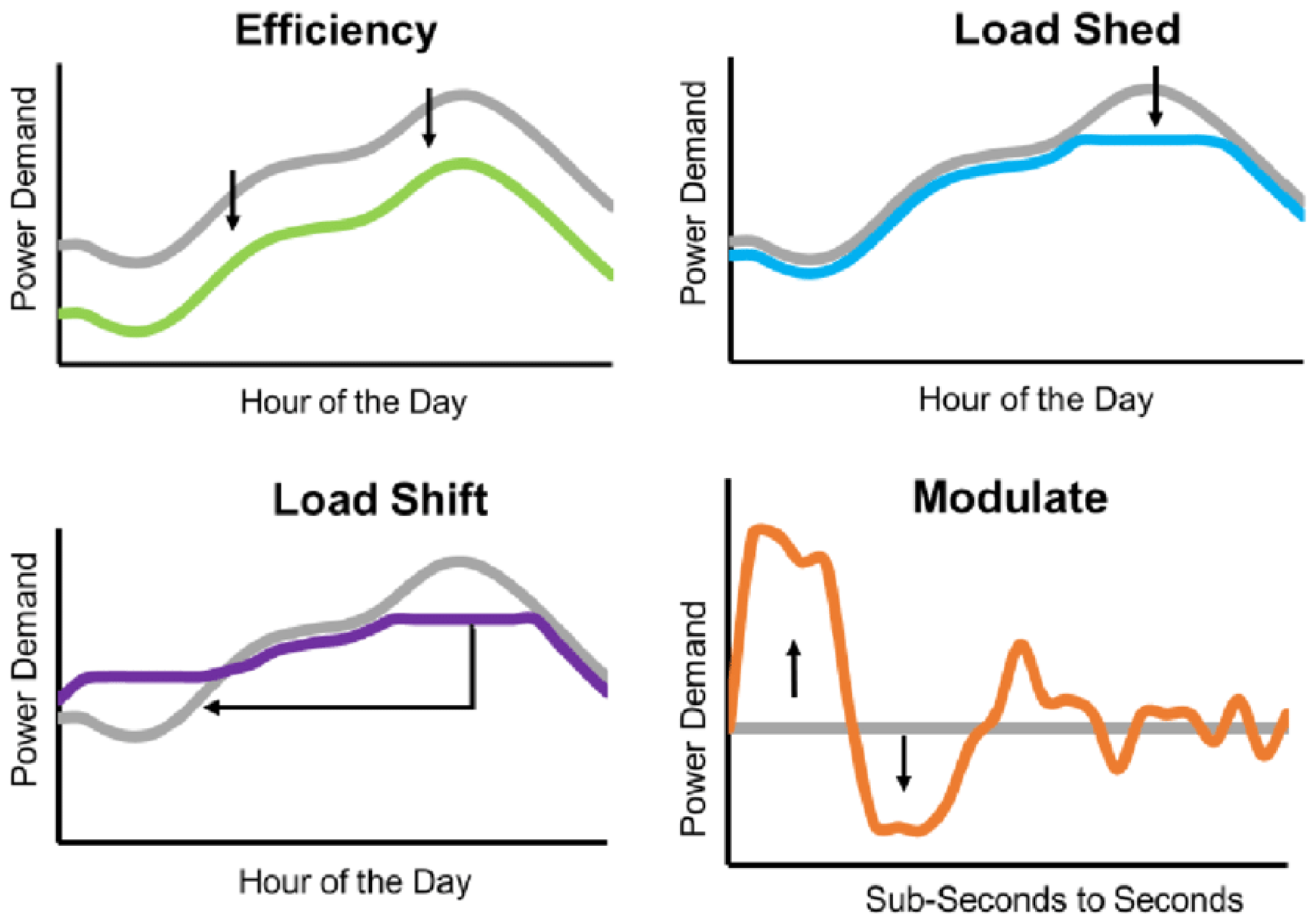
- Contract structure
- Asks power providers to match hourly load hour by hour regardless of changes in load
- Pay a premium for variable delivery quantities
- Outsource our demand management to a third party and removes any incentive we have to manage demand
- Not a recommended strategy for MBTA load



Draft for Discussion & Policy Purposes Only

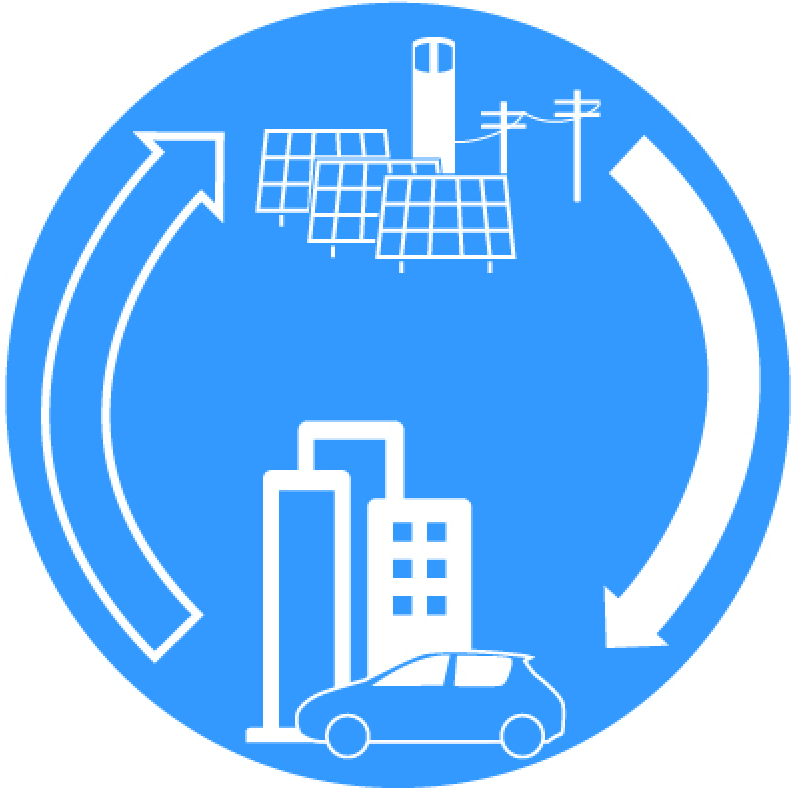
Demand Management

- Unrelated to current wholesale contract
- Reducing or shifting power consumption during hours the electricity grid is under high usage
- AKA Demand Response; Demand Side Management
- Large savings and Utility incentives for Demand management
- Possible at MBTA but difficult
  - Run trains at 6:00pm when grid is peaking
  - Lack the control system most entities use to participate in demand response programs



Demand Flexibility

- Dynamically modulating power consumption based on hourly local marginal pricing
- Use power when it is cheap and stop using power when it is expensive
- Advanced Energy Management concept
- Requires advanced control system the MBTA lacks
- MBTA’s service is too time bound to really implement demand flexibility



Cost of Going Non-Carbon

- Based on annual MWh of 360,000
- Suggesting a mix of MA Class I (28%) and ME Class II (72%) in line with MA Renewable Portfolio Standard
- Goes well above requirement to support MA renewable energy while still delivering on our fiscal duty

All MA Class I REC

$14,400,000

MA Class I (28%)

ME Class II (72%)

$6,000,000

ME Class II

Vt Tier I

MA CES E

$2,600,000

National Green-e

$1,400,000

Costs above the price of electricity