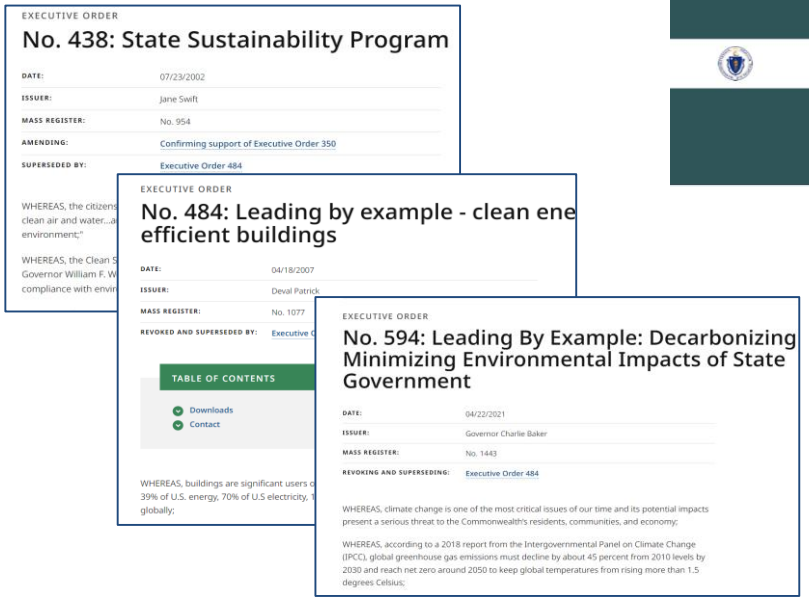
Presentation to

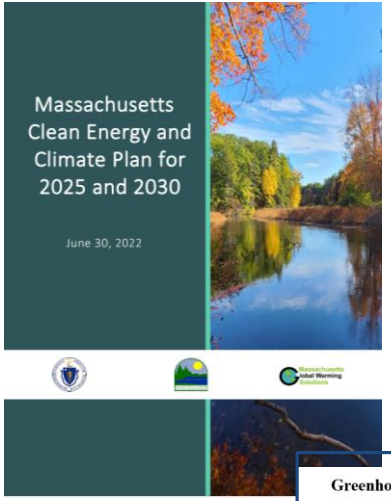
MWRA Advisory Board
Energy and Sustainability Program Overview

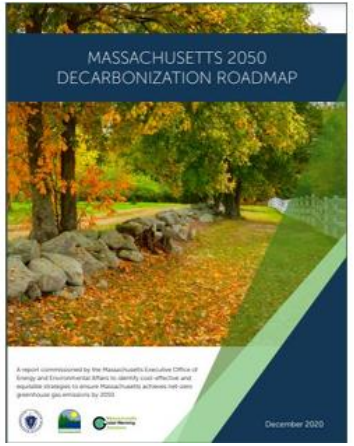
November 16, 2023

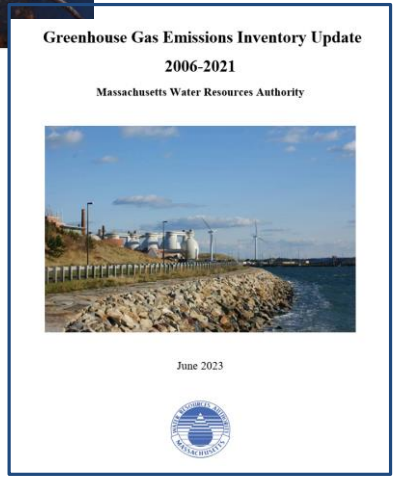
Energy Management Drivers

- State Climate Goals
- Executive Orders
- Environmental agency
- Fiscal responsibility







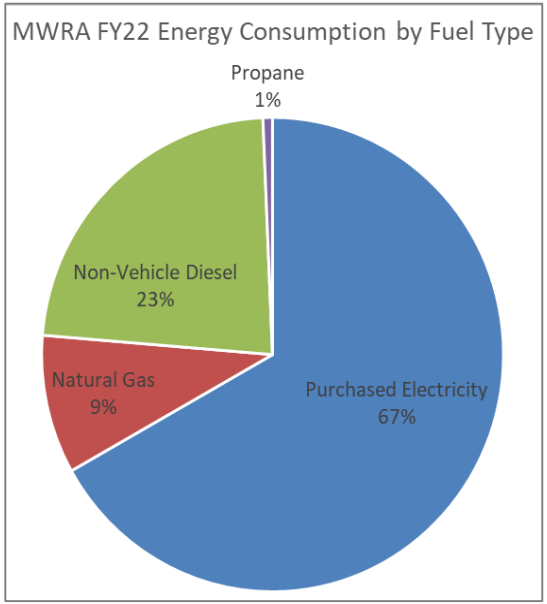


Energy Intensive Operations

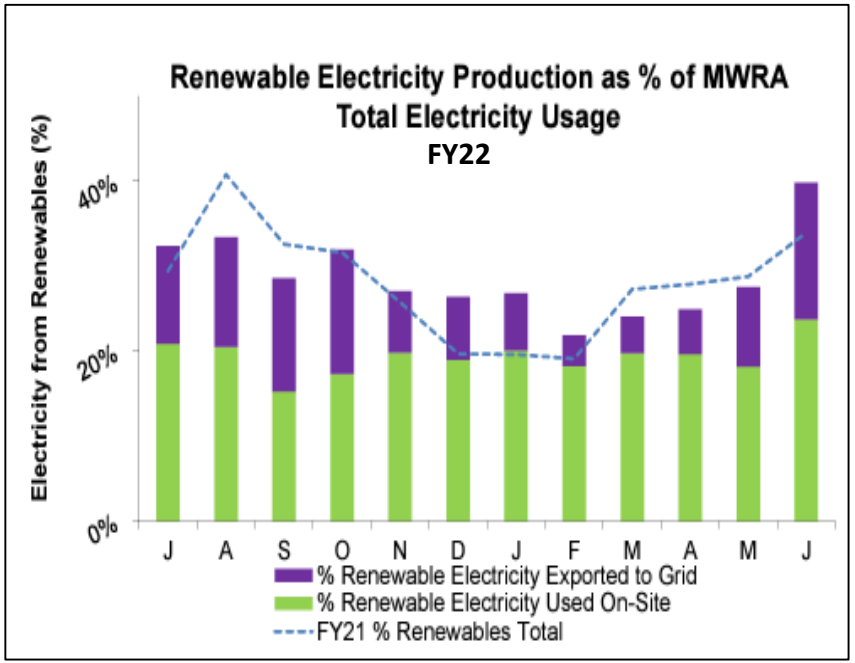
Total Energy Used in FY22

- **Electricity**
  - 158,700 MWh
  - $29.4 million
- **Fuel Oil**
  - 1.26 million gal
  - $3.5 million
- **Natural Gas**
  - 700,000 therms
  - $984,000

This is the equivalent of over 16,000 homes' energy use for one year.

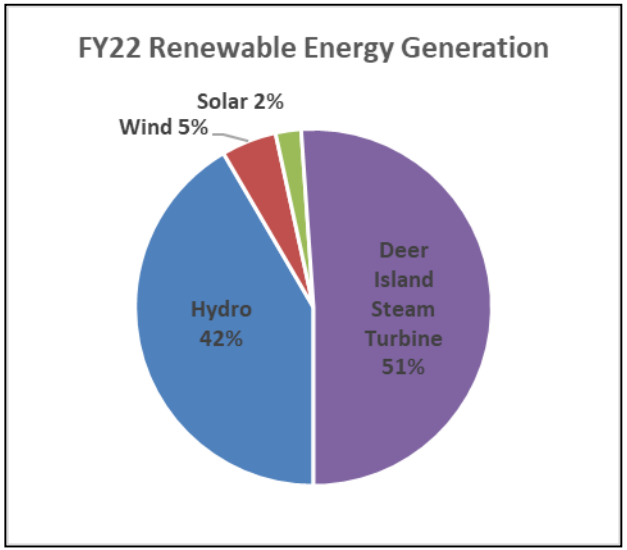


Renewable Energy

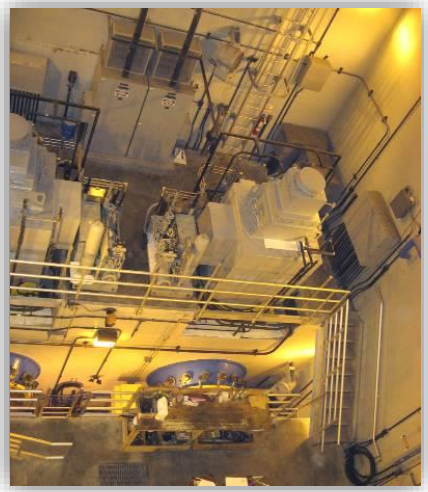


Renewable Energy Statistics

Using biomass, wind, solar, and hydroelectric, MWRA generated about 57 million kWh in FY22, at a value of nearly **$8 million** in avoided purchased energy costs.



Hydroelectric Power



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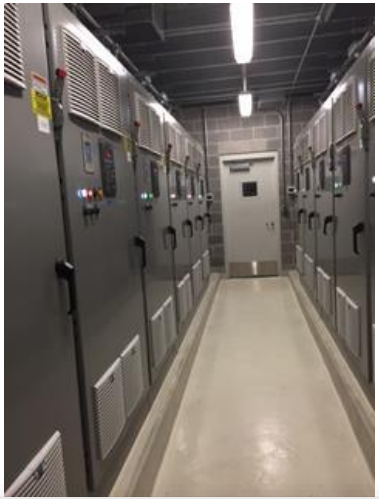
Wind Power

Solar Power

Energy Efficiency



Road Towards Net Zero

- Building Electrification
- Clean Transportation
- Combined Heat and Power Optimization
- Greenhouse Gas Emissions Tracking and Reduction Goals
- Innovation and Resiliency

Building Electrification

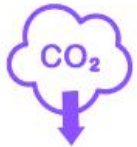
Wachusett Aqueduct Pump Station
Geothermal Heat Pump *During* Construction

Wachusett Aqueduct Pump Station *After* Construction

Spot Pond Heat Pumps

Clean Transportation

What are the benefits of electric vehicles?



Fewer
GHG Emissions

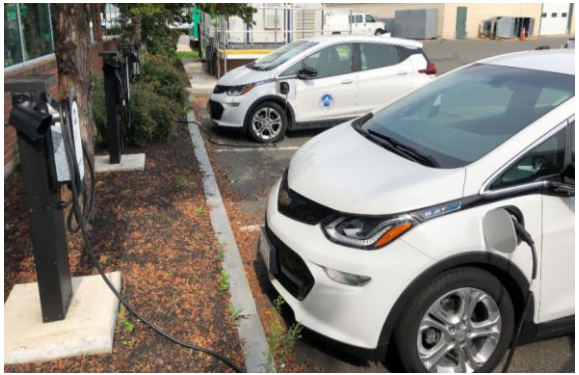
Better
Air Quality

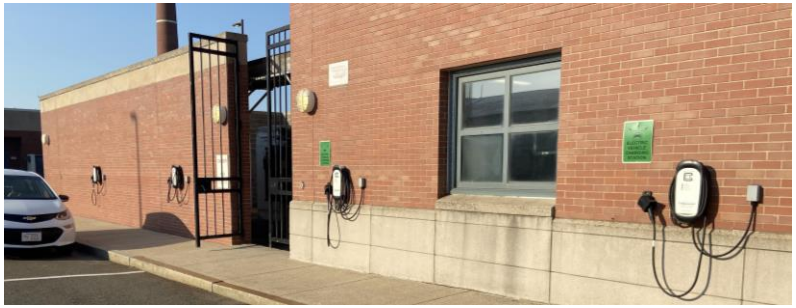
Less
Maintenance

Lower
Fuel Costs

Fun
To Drive!

Electric Vehicle Charging Infrastructure





Existing EV Chargers

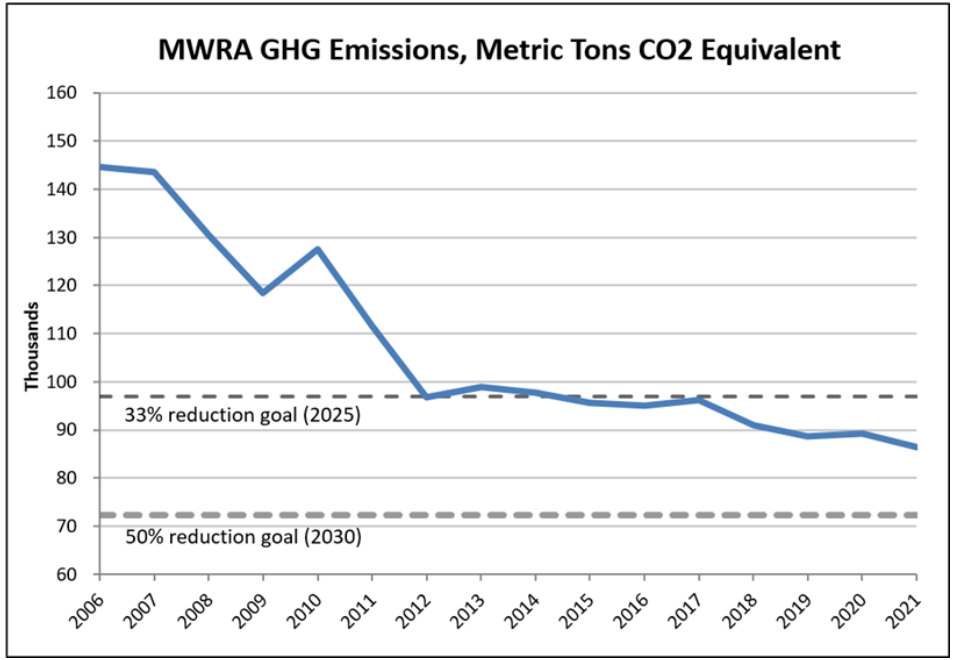
Proposed Chargers at Chelsea Facility

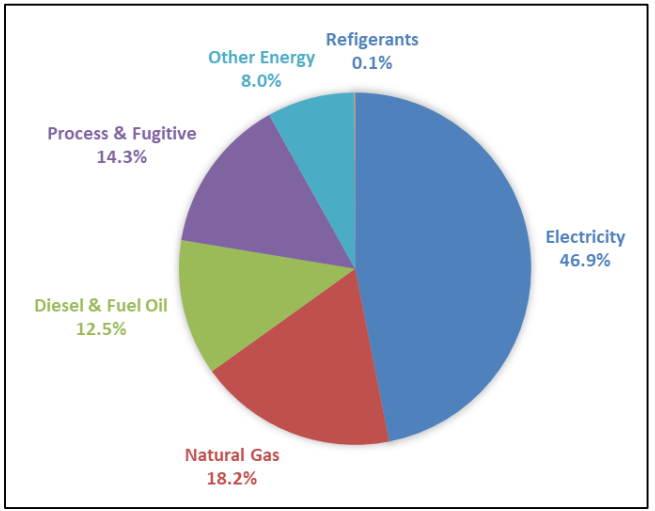
Combined Heat and Power Optimization

	Existing CHP	Proposed CHP
Electricity from Combined Heat and Power (CHP)	21%	48%
Combined Heat and Power (CHP) Efficiency	52%	68%
Energy from On-site Resources	~60%	~75%

Energy Performance Metrics for Existing and New CHP

Greenhouse Gas Emissions





FY22 MWRA Green House Gas Emissions Sources

Incorporate Social Cost of Carbon into Project Analysis

- Factor in Life-cycle Cost Analyses (LCCA) for Capital Projects
  - Include relevant costs and potential revenue streams to inform decisions

- Estimate of the **economic damage** caused by **emitting** a ton of carbon dioxide

- Use a social cost of carbon of $125/ton CO2e as a sensitivity assessment in MWRA's life cycle cost analyses

Calculating the Social Cost of Carbon

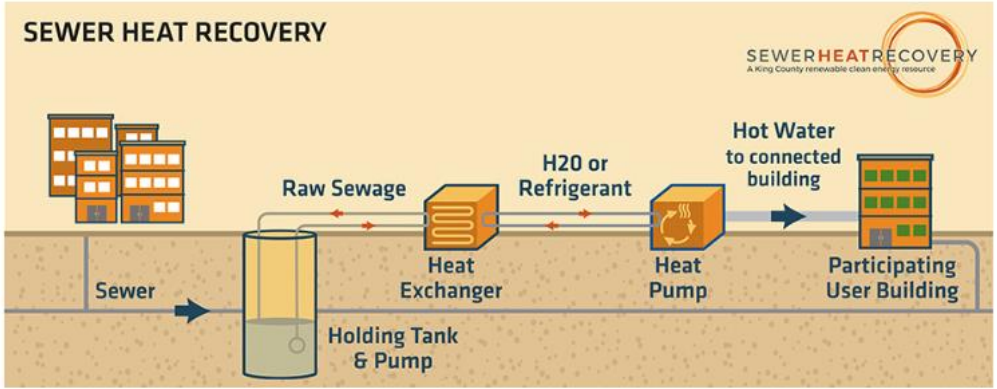
- SCC relies on complex specialized models to:
  - Predict future emissions and economic growth
  - Model future climate impacts
  - Assess the economic impact of these climatic changes
  - Convert future damages into their present day value

- Take **climate change** into consideration in **financial decision-making** – localizing a global problem

Resiliency and Innovation

- Battery Storage
- Heat Recovery

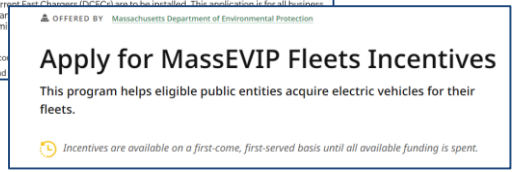
Battery Pilot Projects - Chelsea Admin Building and Brattle Court Pump Station



Wastewater Heat Recovery schematic (*image from King County*)

Funding Sources

- Clean Transportation
  - MassEVIP
  - Utility EV Make Ready
  - MOR-EV Trucks
- Energy Efficiency
  - Mass Save
  - MassDEP GAP Clean Energy Results
- Renewable Energy
  - Renewable Portfolio Standard
  - Energy Policy Act of 2005
- Capacity and Demand Management
- Power Sales
- Federal
  - Investment and Jobs Act
  - Inflation Reduction Act

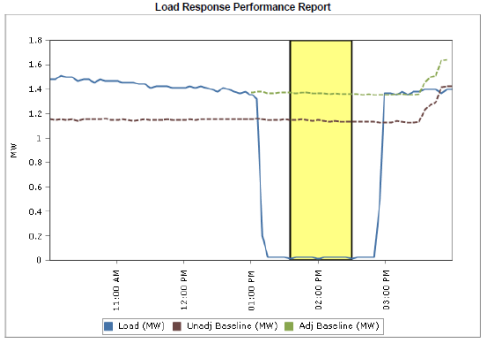


RPS Class I Renewable Generation Units

Updated June 1, 2022

Massachusetts Department of Energy Resources

Type	MA RPS Number	NEPOOL GIS ID	Plant - Unit Name	Fuel / Resource / Technology	Nameplate Capacity (MW)
AD	1015-02	NON38983	Deer Island Treatment Plant STG	Anaerobic Digester	18.000
AD	1015-02	NON38984	MWRA BP STG	Anaerobic Digester	1.100
HY	1154-10	NON39003	Deer Island Hydro	Hydroelectric	2.000
HY	1180-11	NON38939	MWRA Loring Rd Hydro 1 Weston	Hydroelectric	0.200
SL	1200-11	NON38938	MWRA Carroll PV Marlborough Solar 1	Photovoltaic	0.496
WD	1152-10	NON38970	MWRA Charlestown Wind	Wind	1.500
WD	1152-10	NON39005	MWRA Deer Island Wind 1	Wind	3.300
WD	1152-10	NON39006	MWRA Deer Island Wind 2	Wind	1.200



Next Steps

- Roadmap and Goal Setting
- Integrate Roadmaps into Existing Plans and Protocols
- Pilot Projects to Full Scale
- Identify and Acknowledge Implementation Challenges
- Investing Equitably in the Future