



DECARBONIZATION ROADMAP

CCUS



Solve the CO2 sequestration problem (i.e. where and how)



Establish commercial viability of utility scale carbon capture for natural gas plants



Establish long-term, sustainable supply of natural gas

Install a CO2 transportation system (a pipeline)

Install carbon capture equipment on combined cycle natural gas power plants



NUCLEAR

Establish the viability of SMRs or micro-nuclear power generation

Offset power from thermal with nuclear

Achieve long-term carbon reduction using carbon capture

RES



Solve the thermal regulation problem

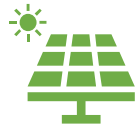
Resolve high-IBR penetration problem



Achieve a **firmed renewable energy system** design at the regional scale



Establish the commercial viability of new LDES technologies



Demonstrate how small scale Re can be regulated at power plant level for immediate carbon reduction



Develop new forms of renewable power



Determine how much renewable (variable) power can be regulated on the existing system

Install solar and wind to the extent possible using existing resources



Pursue renewable energy projects with aspirational power levels

Analyze system design, economic, and operational characteristics of large scale RE projects



BEES

Shape the grid with beneficial electrification and energy conservation

Scale up with increased energy storage capability

Achieve a firmed renewable energy solution at Railbelt scale

Final System Design

H₂

Establish the viability of H2 burning, utility-scale power plants

Solve large scale H2 storage problem

Establish viability of utility-scale H2 production (Done)

Demonstrate how H2 can regulate renewables (variable power)



Create new microgrids with BTM/FTM ESS as SDES/LDES solutions with added resilience characteristics



Eliminate energy flow restrictions between the regions

GRID DEVELOPMENT

HYDRO

Construct new hydro to match renewables for power regulation and system stability