Alternative Fuels
CAC Workgroup Meeting #9

September 9, 2022

NEW YORK STATE | Climate Action Council

Agenda

Housekeeping

Alternative Fuel Use in Buildings from the Integration Analysis

Review Strategies in Buildings, Electricity and Industry Chapters

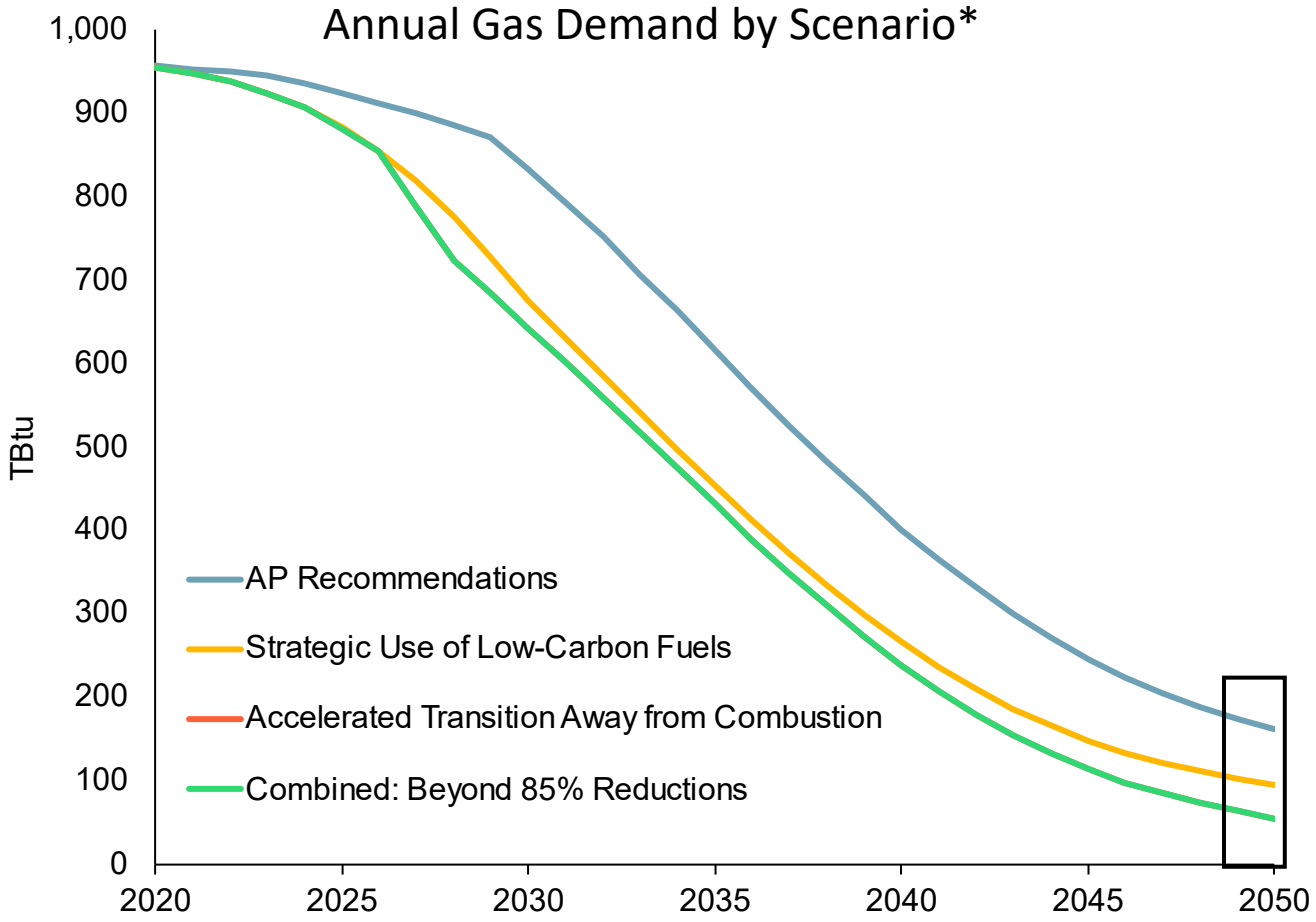
Discussion – Presentation to CAC at Sept 13 meeting

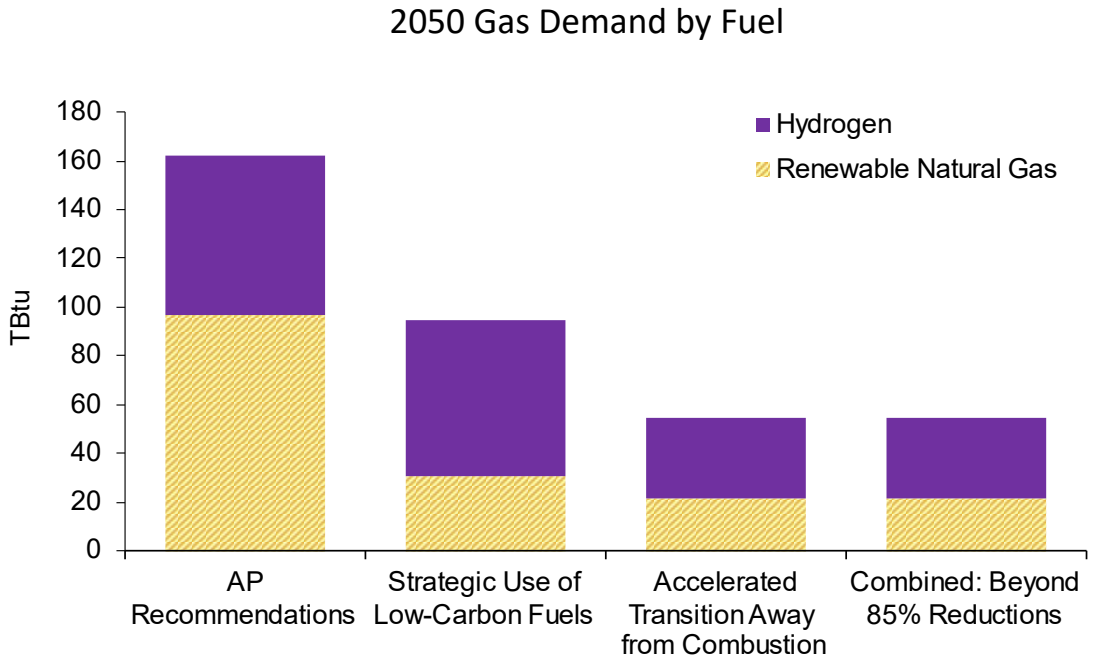
Buildings Chapter Overview (pg 120)

The Integration Analysis indicates that by 2050, the large majority of buildings statewide will need to use electric heat pumps for heating and cooling to meet the Climate Act requirements. This approach depends upon 100% zero-emissions electricity by 2040 and making energy efficiency improvements in all buildings, with the emphasis on improvements to building envelopes (air sealing, insulation, and replacing poorly performing windows) to reduce energy demand by 30% to 50%. The Integration Analysis finds that widespread building electrification is needed even with the strategic utilization of low-carbon fuels that are projected to be available, notably the use of RNG to meet back-up heating demands in a small proportion (less than 10%) of electrified buildings and the utilization of green hydrogen to power a smaller Con Ed district system by 2050.[158] To manage the impacts of widespread electrification on the State's electric grid, it will be important for buildings to adopt smart controls, energy storage, and other load flexibility measures. Policymakers also should assess the differential grid impact, costs, and benefits of cold climate air source, ground source, and community thermal heat pump systems; at this writing, related analysis in underway.

[158] The "Strategic Use of Low-Carbon Fuels" scenario modeled in the Integration Analysis projects that 20% of installed heat pumps are GSHP and 80% are cold climate ASHP, of which one in ten ASHP are modeled to use fuel back-up to meet heating demands during the coldest 5% of hours. In this scenario, nearly all RNG is used in the buildings sector, assuming a 9% RNG blend in gas pipelines by 2030 and 100% RNG to meet dramatically reduced gas demand in buildings by 2050. The scope of RNG use is limited by available feedstocks and by the need to mitigate statewide emissions from all sectors (since under the Climate Act requirements for emissions accounting, RNG is a low-carbon fuel but it is not zero-emissions). Green hydrogen use is limited mostly to transportation, industrial purposes, and electricity reliability, though a small amount of hydrogen is used to power the Con Ed district system by 2050, with steam demand reduced by about 66% as many existing customers electrify in whole or in part.

End-Use Gas Demand

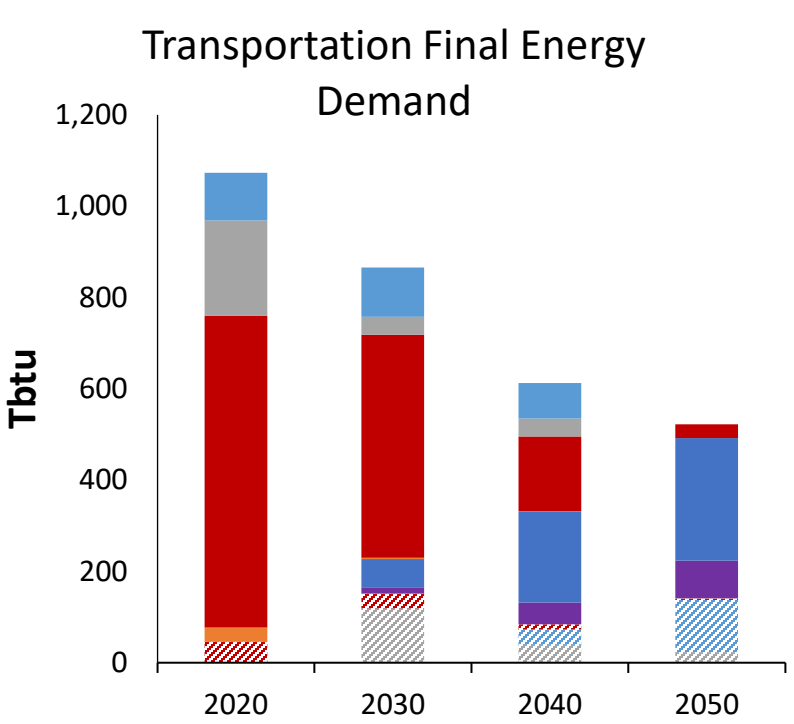


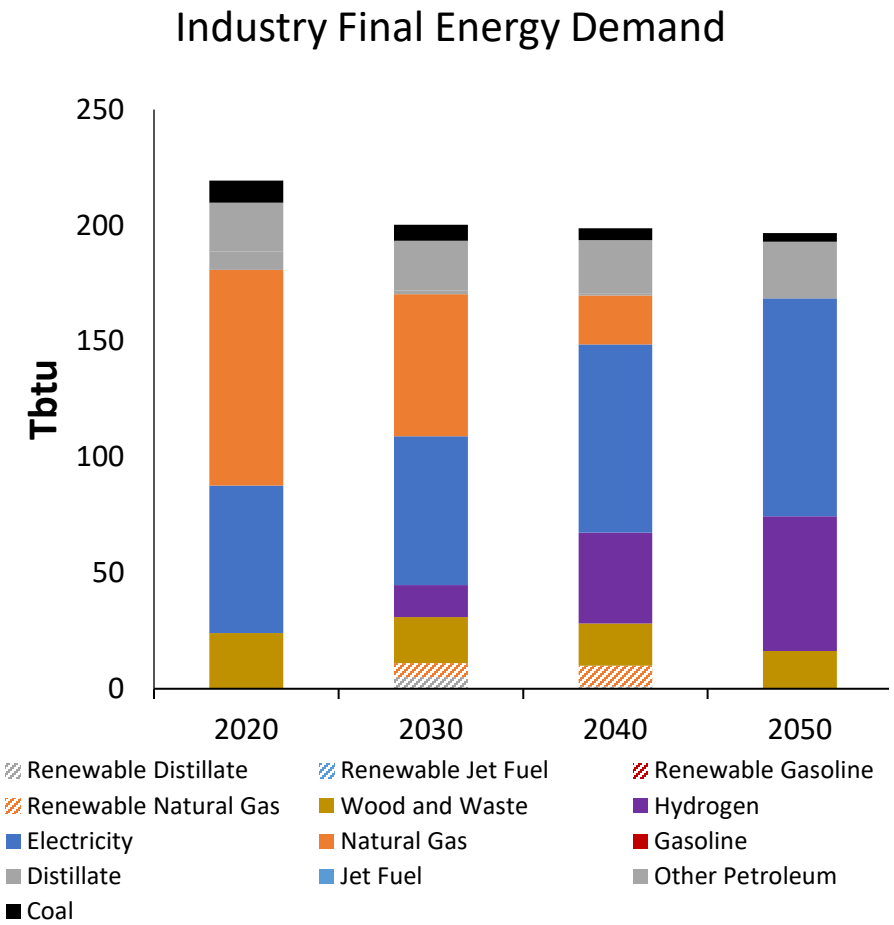


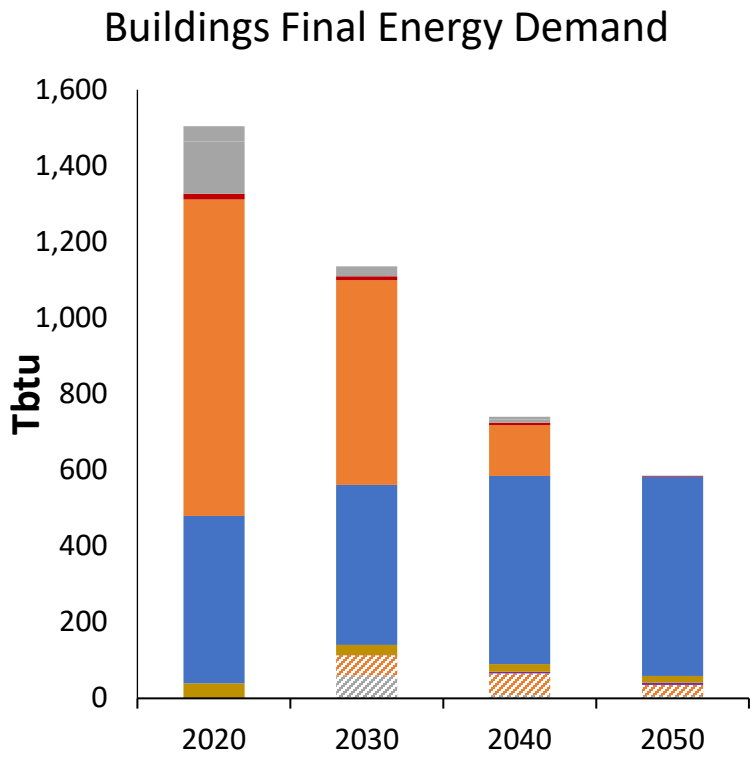
*Includes gas demand in buildings industry, and transportation. Excludes gas burned in electric generating units and hydrogen for fuel cell vehicles

Alternative Fuels in S2

Strategic Use of Low Carbon Fuels



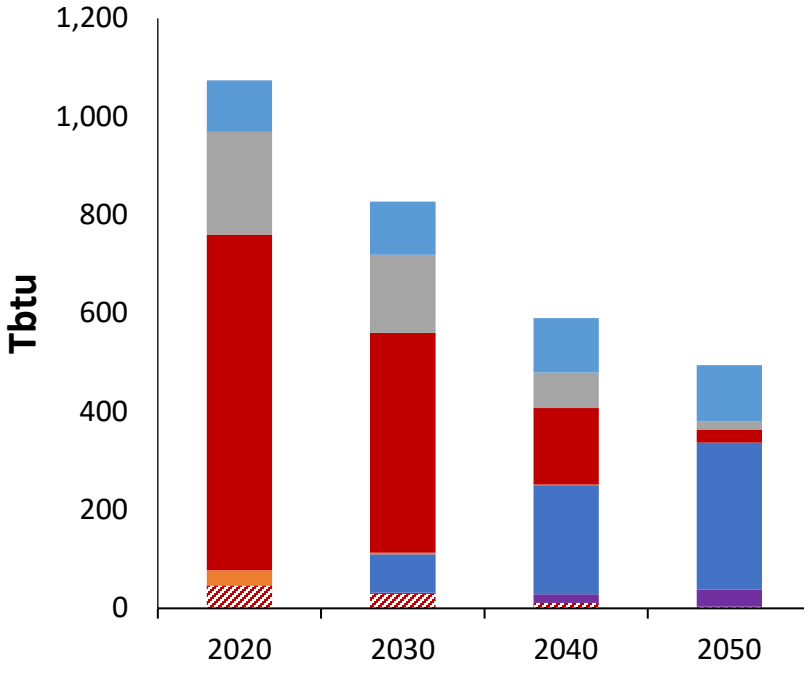




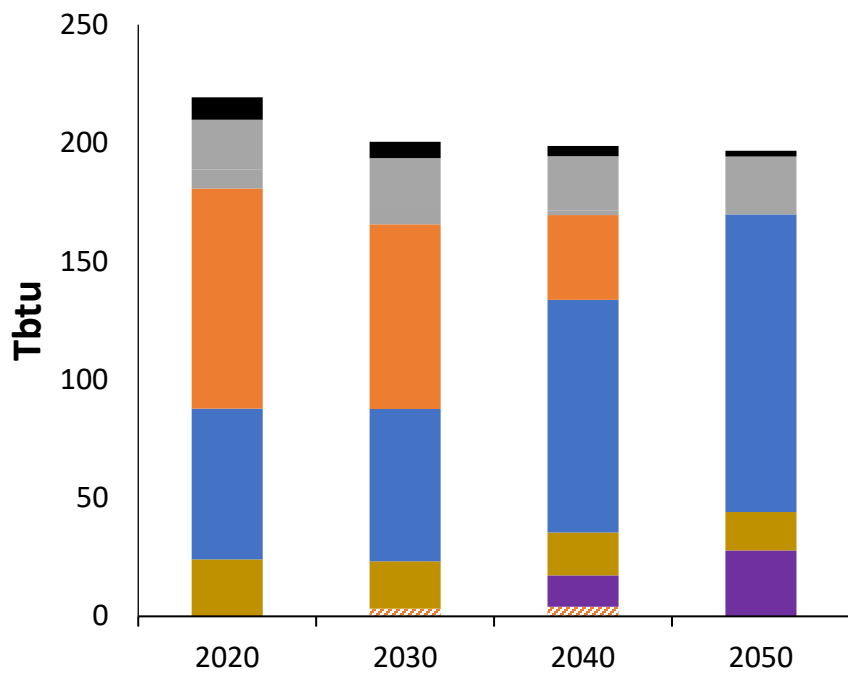
Alternative Fuels in S3

Accelerated Transition Away from Combustion

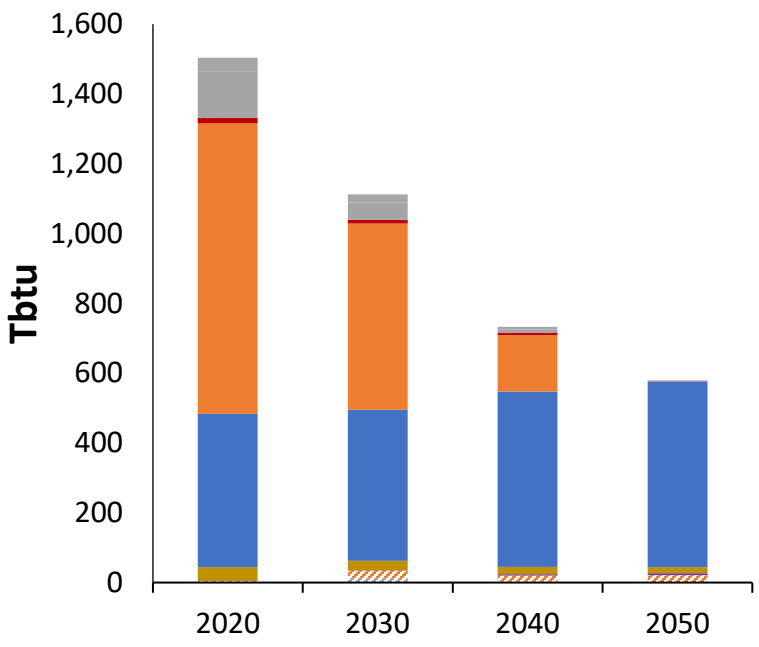
Transportation Final Energy Demand



Industry Final Energy Demand



Buildings Final Energy Demand



Renewable Distillate
Renewable Gasoline
Renewable Jet Fuel
Renewable Natural Gas
Hydrogen
Wood and Waste
Electricity
Natural Gas
Gasoline
Distillate
Jet Fuel
Other Petroleum
Coal

Buildings Chapter

B9. Support Innovation

Components of the Strategy

•**Support RD&D for low-carbon fuels:** Assess and then support RD&D needs with respect to the potential for some use of low-carbon fuels in buildings (such as RNG, green hydrogen, wood, and/or high-percentage biodiesel blends) and bioenergy with carbon capture and storage for harder-to-electrify buildings, which may include campuses with district energy systems.

•**Support RD&D for building resilience:** Assess and then support RD&D needs with respect to building resilience, as New York looks toward both widespread building electrification and more frequent extreme weather. Research, develop, and pilot grid-independent, non-fossil fuel approaches for heating and cooling buildings during prolonged power outages, such as long duration thermal storage, GSHP plus battery systems, and passive cooling approaches. Related RD&D investments (also discussed in Chapter 13. Electricity) include the flexibility and resilience of the electrical system and long-term energy and thermal storage solutions.

Electricity Chapter

E10. Explore Technology Solutions

Components of the Strategy

•**Prioritization:** During planning, prioritize emissions-free resources (such as storage, energy efficiency, and renewable energy) where feasible when considering end uses, technology limitations, impacts, and costs. However, should a substitute for natural gas still be needed, advanced green hydrogen and possibly RNG could fill this gap in order to maintain reliability, if scalability, feasibility, and environmental impact and air quality issues can be addressed.

•**Analysis of impact:** Further analysis, technical development, and research is needed in order to determine the feasibility, climate impact, and health impacts of advanced fuels prior to infrastructure investment. Technological innovation, development, and scaled-deployment is needed in order to prove the effectiveness and economics of the technologies.

- •Determine the lifecycle GHG accounting framework of RNG and advanced green hydrogen. Priority utilization should be provided for feedstocks with the lowest GHG emissions, with strong preference given to zero- or negative-emissions sources.
- •The potential air quality and health impacts of producing and using these fuels and best practices/end uses to minimize these impacts.
- •The safety of advanced green hydrogen, storage, and pipeline operation.

Industry Chapter

I4.Research, Development, and Demonstration

- Energy efficiency
- Industrial electrification
- Low-carbon fuels, feedstocks, and energy sources (utilizing more renewable electricity)
- Carbon capture, utilization, and sequestration

The State could speed the deployment of some of these solutions with a robust RD&D agenda. This agenda should be informed by an analysis of which solutions are will have the greatest impact on the State's emissions. This includes impacts on not only the industrial sector, but the buildings, transportation, and power sectors, which are all likely to benefit from advancement of many of these solutions. Research should also determine guidelines that indicate which solutions should be incentivized and the manner in which they should be deployed. These guidelines should be set to prioritize those with lowest cost and those that will result in the greatest reduction of GHG emissions. The guidelines also should ensure that solutions are pursued only if they meet benchmarks for environmental justice and equity as well as for economic and technical scalability. After this analysis, public capital should be directed at supporting solutions via research funding as well as pilot and demonstration projects.

Presentation to CAC Meeting