NAVIGANT

ENERGY

New Hampshire
State Energy Strategy

Presentation of the Revised Energy Vision and Resource Potential Study to the:

State Energy Advisory Council



March 7th, 2014

In today's meeting we will review the revised energy vision, discuss the methods used in the resource potential study, share our preliminary results, and outline the next steps.

1. » Revised Energy Vision
2. » Resource Potential Methodology
3. » Resource Potential Results
    a. » Energy Efficiency Resources
    b. » Thermal & Transportation Fuel Resources
    c. » Power Generation & Infrastructure Resources
4. » Next Steps

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1. » **Revised Energy Vision**
2. » Resource Potential Methodology
3. » Resource Potential Results
    a. » Energy Efficiency Resources
    b. » Thermal & Transportation Fuel Resources
    c. » Power Generation & Infrastructure Grid Resources
4. » Next Steps

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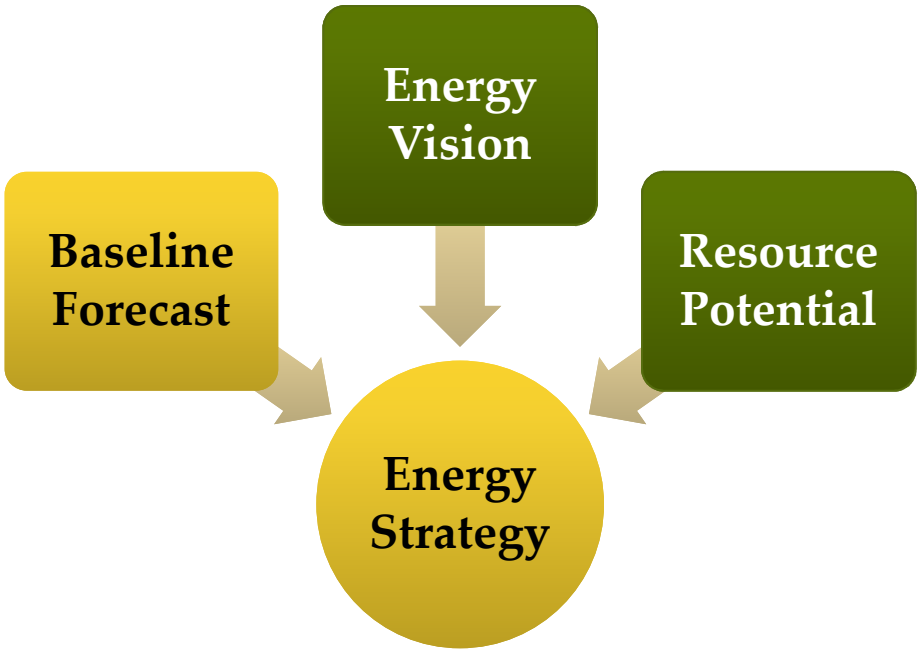
Navigant revised the energy vision and conducted a resource potential study to bridge the gap between what is predicted in the baseline forecast and the desired end-state of the energy vision.



Energy Vision

- a defined, ideal end-state, or target to work towards
- developed in advance of conducting resource potential to keep the vision free from constraints.

Resource Potential Study

- the technical, economic, and market potential of various supply and demand side resources.

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Navigant revised the energy vision based on feedback received during the roundtable discussion held on February 21st.

In 2025, every resident and business of New Hampshire is empowered to manage their energy bill by taking full advantage of the information, market mechanisms, and flexible energy systems and sources available to them. These services extend from the city centers and coastal areas of Southern New Hampshire to the rural corners of the Western regions and the North Country. Because of this, every dollar spent on energy in New Hampshire adds value to the lives of its residents and the prosperity of its businesses.

New homes as well as commercial and public buildings produce as much energy as they consume and nearly all older buildings have benefited from deep energy retrofits. These efforts incorporate the latest in energy efficient technologies, resulting from flexible policies and diverse market-based financing mechanisms that allow customers of all income levels to access the technologies they wish to use. Many of these energy saving technologies provide consumers with valuable information about their energy consumption while protecting their privacy. This gives consumers both peace of mind and the power to effectively manage their bills and contain costs. Consumers may choose to manage their energy themselves or rely on third party providers of energy management services to respond in real time to changing energy prices and other market conditions to reduce energy bills.

In addition to saving energy, in 2025 many individual households and businesses act as independent power producers - participating in dynamic local energy markets powered by distributed generation, reducing reliance on imported fuels. These localized energy systems provide an additional measure of resilience against grid outages and other supply disruptions by seamlessly switching between various fuels and stored power.

Consumers use the diversity of available fuels and the interconnected relationship of energy used in the electric, thermal, and transportation sectors to their benefit. In doing so, these systems promote the self-reliance of both individual communities and New Hampshire as a whole.

The residents and businesses of 2025 have many choices in the fuels they use for power, heat and transportation. The options for both power generation and building heating are enhanced by a boom in home-grown clean energy from New Hampshire - keeping dollars in state and reducing pollution. In the transportation sector, widespread vehicle charging infrastructure is the norm across the state and fueling stations supporting the latest technology dot the highways. Using this infrastructure, residents and business take advantage of the many options for electric vehicles, plug-in hybrids, and other new transportation technologies. People in New Hampshire also have many options to save money by using public transit, and more communities support new modes of transportation through their development choices.

In 2025, the stability of New Hampshire's energy policy continues to inspire confidence in investors and attract new businesses to the state - creating high quality jobs in energy. Suppliers receive the proper market signals to drive their business decisions toward creating an efficient energy system that empowers residents and businesses, promotes self-reliance, and securely delivers cost-effective, clean energy to all.

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Navigant leveraged publicly available information to estimate the potential of 32 resources related to energy efficiency, thermal & transportation fuels, power generation, and energy infrastructure.

Energy Efficiency

- Residential Electric Efficiency
- Residential Thermal Efficiency
- Commercial Electric Efficiency
- Commercial Thermal Efficiency
- Industrial Electric Efficiency
- Industrial Thermal Efficiency
- Light Duty Vehicle Fuel Economy
- Medium and Heavy Duty Vehicle Fuel Economy
- Avoided Vehicle Miles Traveled

Thermal & Transportation Fuels

- Residential Natural Gas Thermal
- Residential Biomass/Wood Thermal
- Residential Electric Thermal
- Residential Geothermal
- Residential Solar Thermal
- Commercial Natural Gas Thermal
- Commercial Biomass/Wood Thermal
- Commercial Electric Thermal
- Commercial Geothermal
- Industrial Natural Gas Thermal
- Industrial Biomass/Wood Thermal
- Industrial Electric Thermal
- Transportation Electrification
- Transportation Biofuel Consumption
- Transportation Natural Gas

Power Generation & Energy Infrastructure

- Residential Scale Distributed Solar PV
- Utility / Commercial Scale Solar PV
- Onshore Wind Resources
- Offshore Wind Resources
- Biomass Resources
- Hydroelectric Resources
- Combined Heat and Power
- Electric Storage

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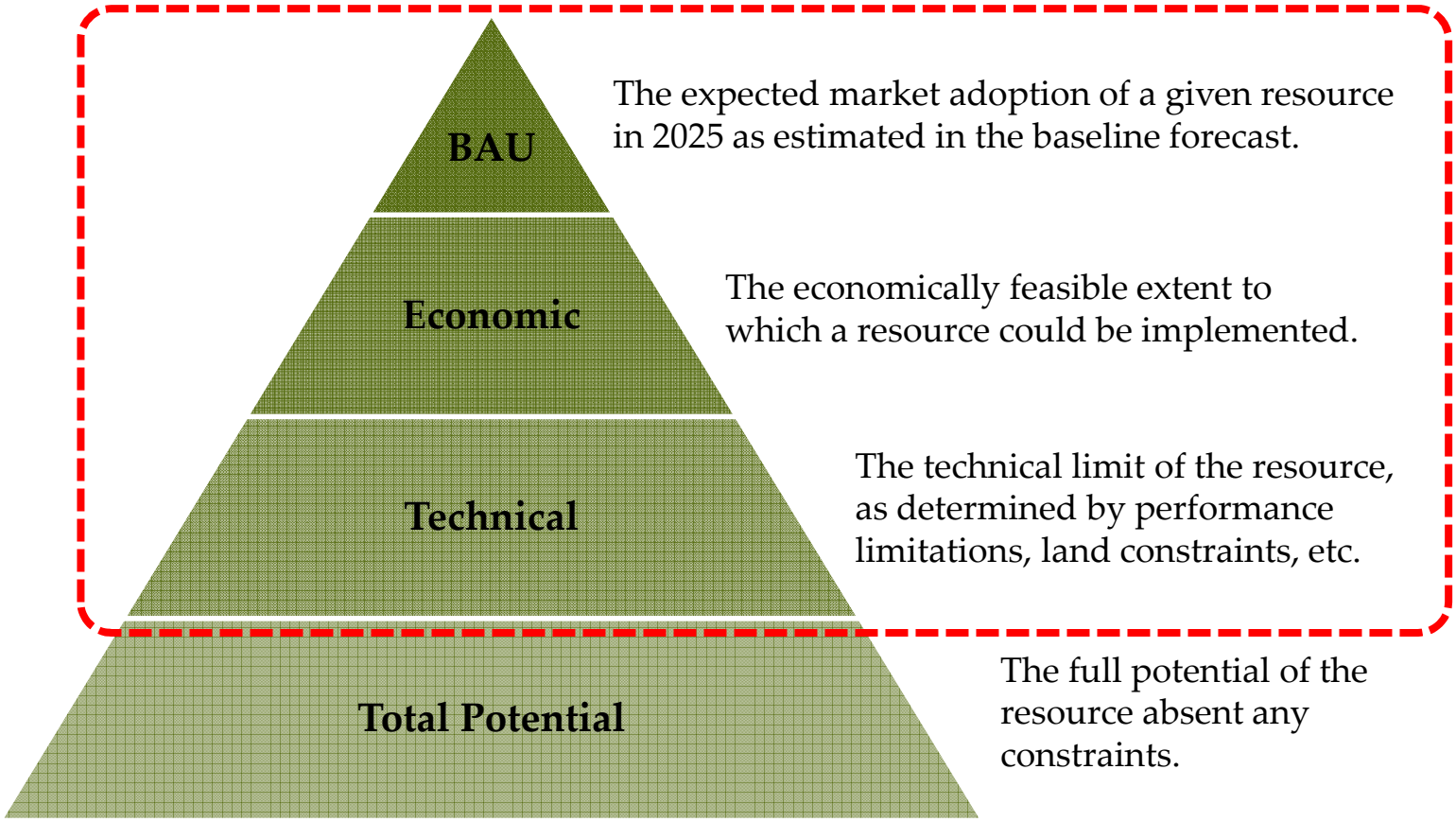
For each resource, Navigant estimated the technical potential, the economic potential, and the expected market adoption as indicated by the BAU (baseline forecast) in 2025.



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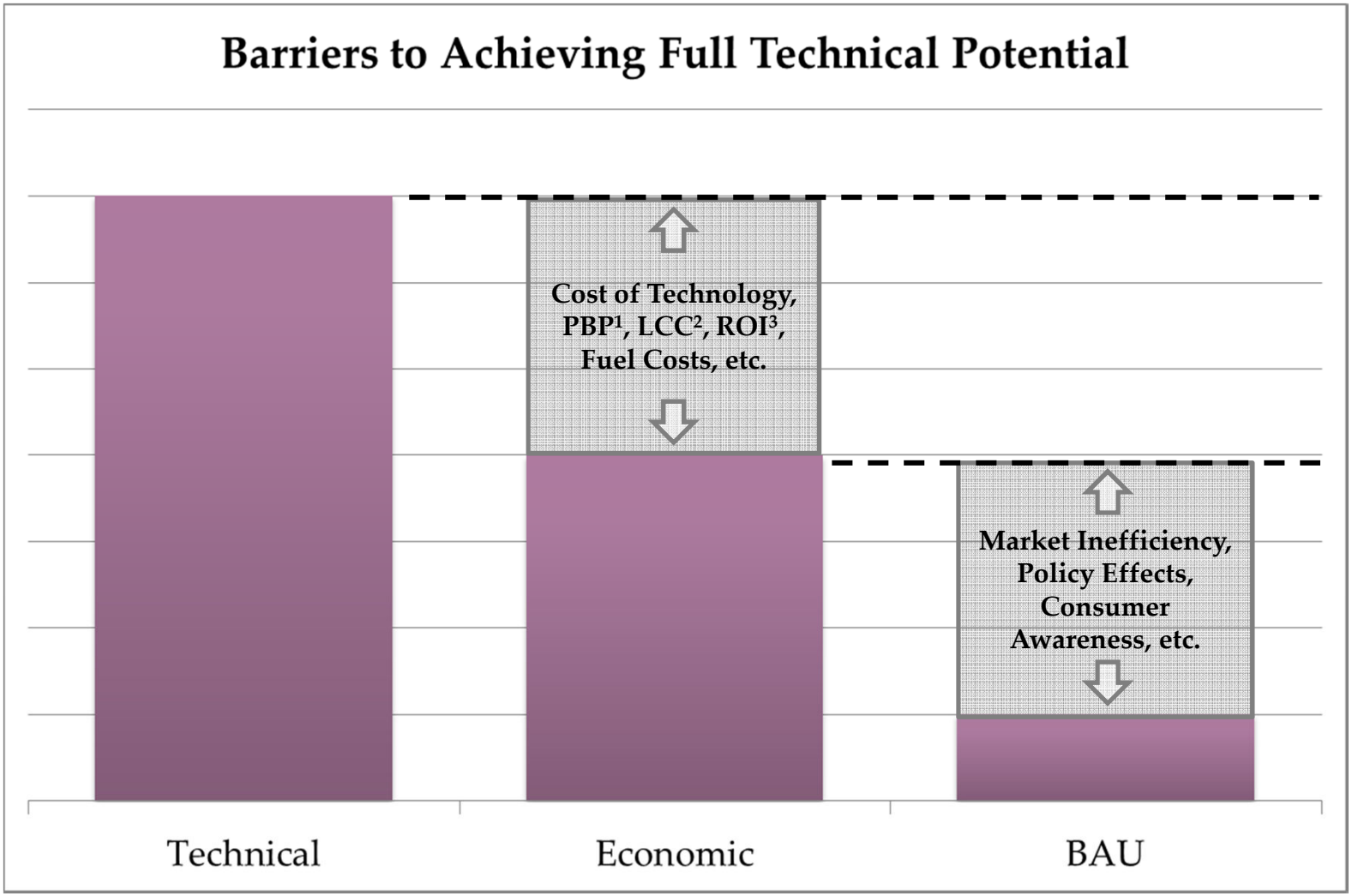
Understanding the types of barriers affecting each resource is critical to crafting effective policy.



[1]Payback Period, [2]Lifetime Cost to Consumer, [3]Return on Investment

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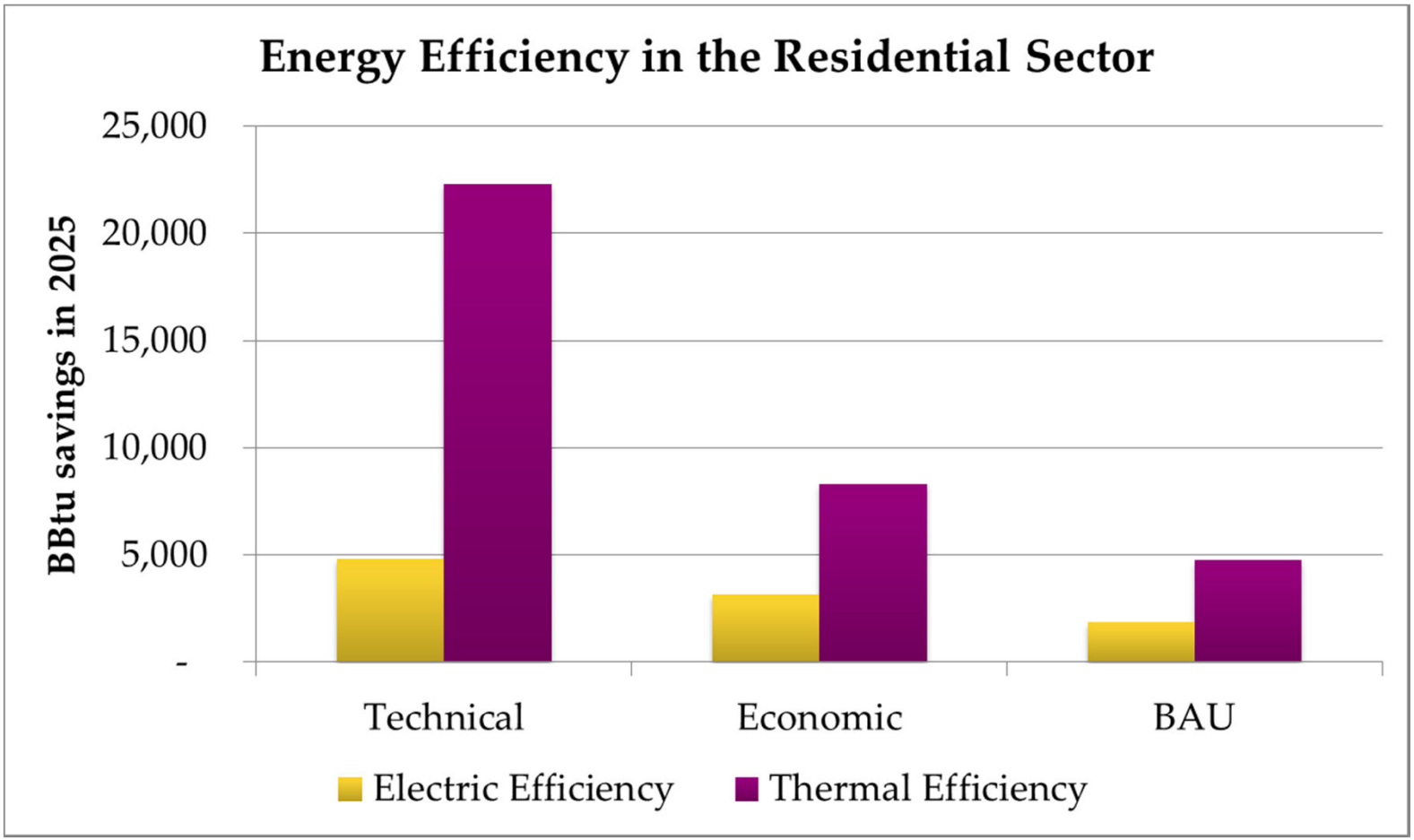
The residential sector could realize an additional 4,800 BBtu of economic efficiency gains above what is expected in the baseline forecast.



Sources: Navigant Analysis of PUC Report: Additional Opportunities For Energy Efficiency in New Hampshire, January 2009 and Navigant's New Hampshire Baseline Energy Forecast, January 2014

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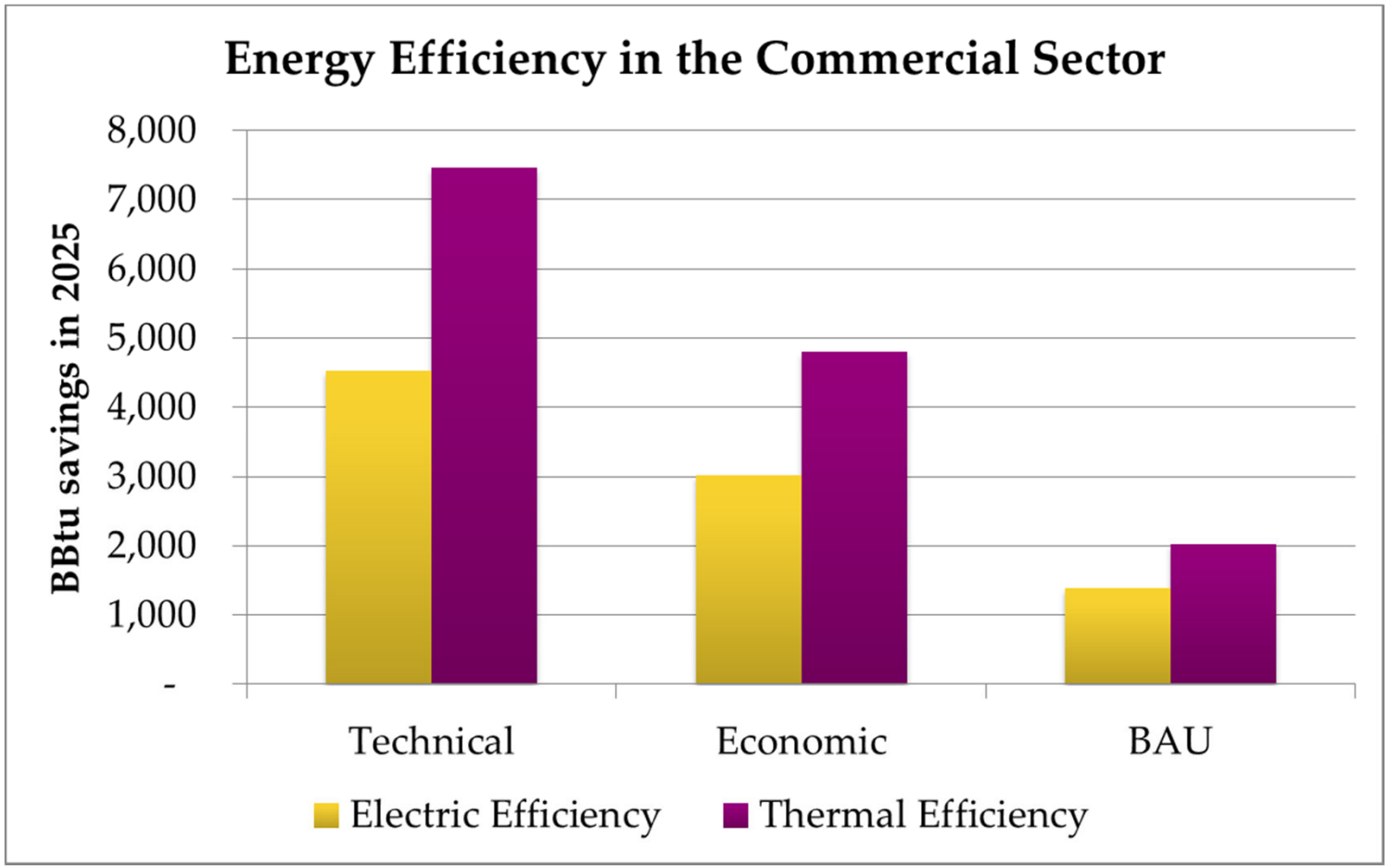
The commercial sector could realize an additional 4,400 BBtu of economic efficiency gains above what is expected in the baseline forecast.



Sources: PUC Report: Additional Opportunities For Energy Efficiency in New Hampshire, January 2009
Navigant Baseline Energy Forecast, January 2014

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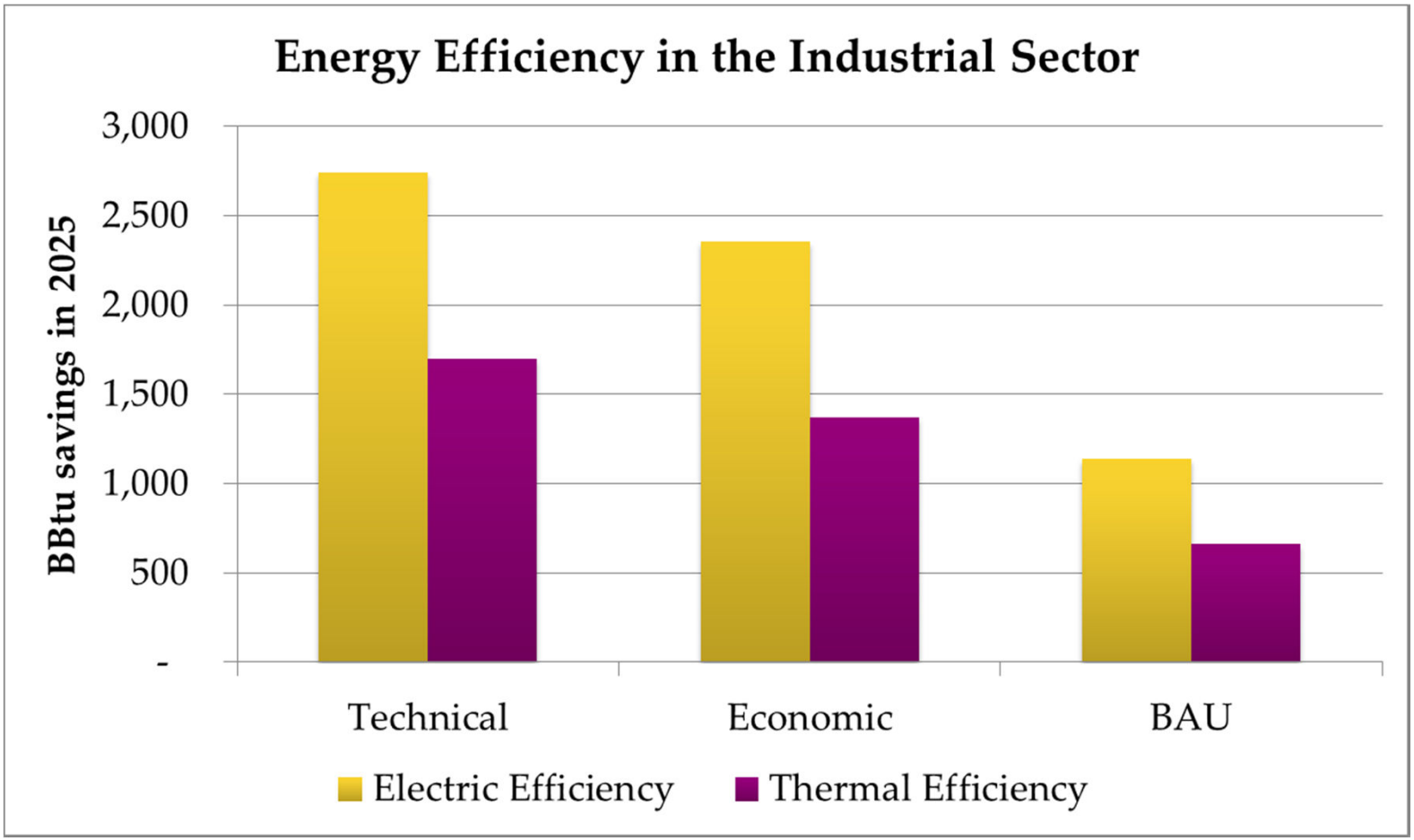
The industrial sector could realize an additional 1,900 BBtu of economic efficiency gains above what is expected in the baseline forecast.



Sources: PUC Report: Additional Opportunities For Energy Efficiency in New Hampshire, January 2009
Navigant Baseline Energy Forecast, January 2014

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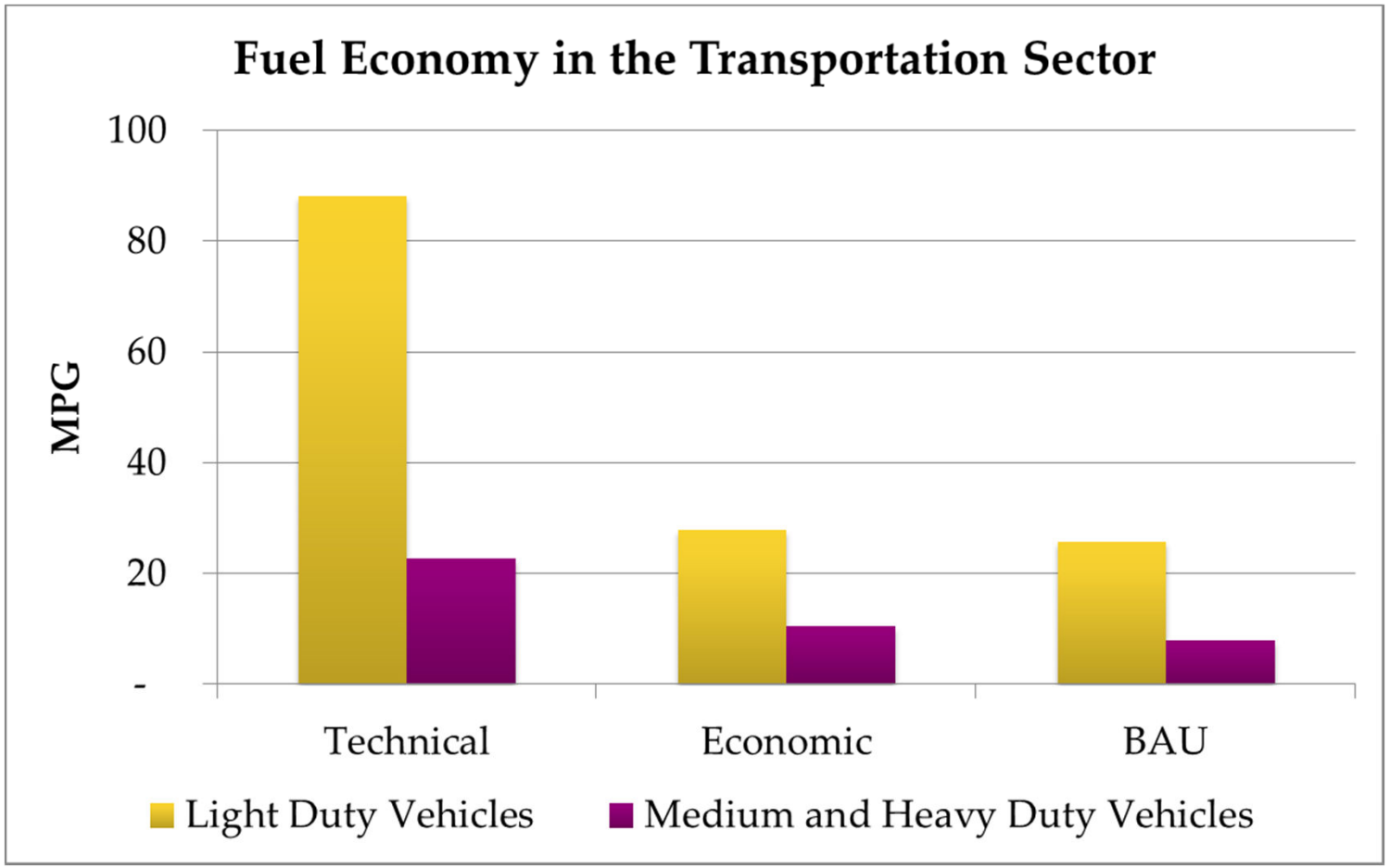
Significant increases in energy efficiency are technically achievable in the transportation sector, but will require a shift in economics.



Sources: Navigant Analysis of the 2013 ORNL Energy Databook, Idaho National Laboratory EV Project Data, Federal Highway Authority Fleet Statistics, DOE Alternative Fuels Data Center, the Navigant Research Internal PEV Sales and Characteristics Tracker, and the Navigant Baseline Energy Forecast

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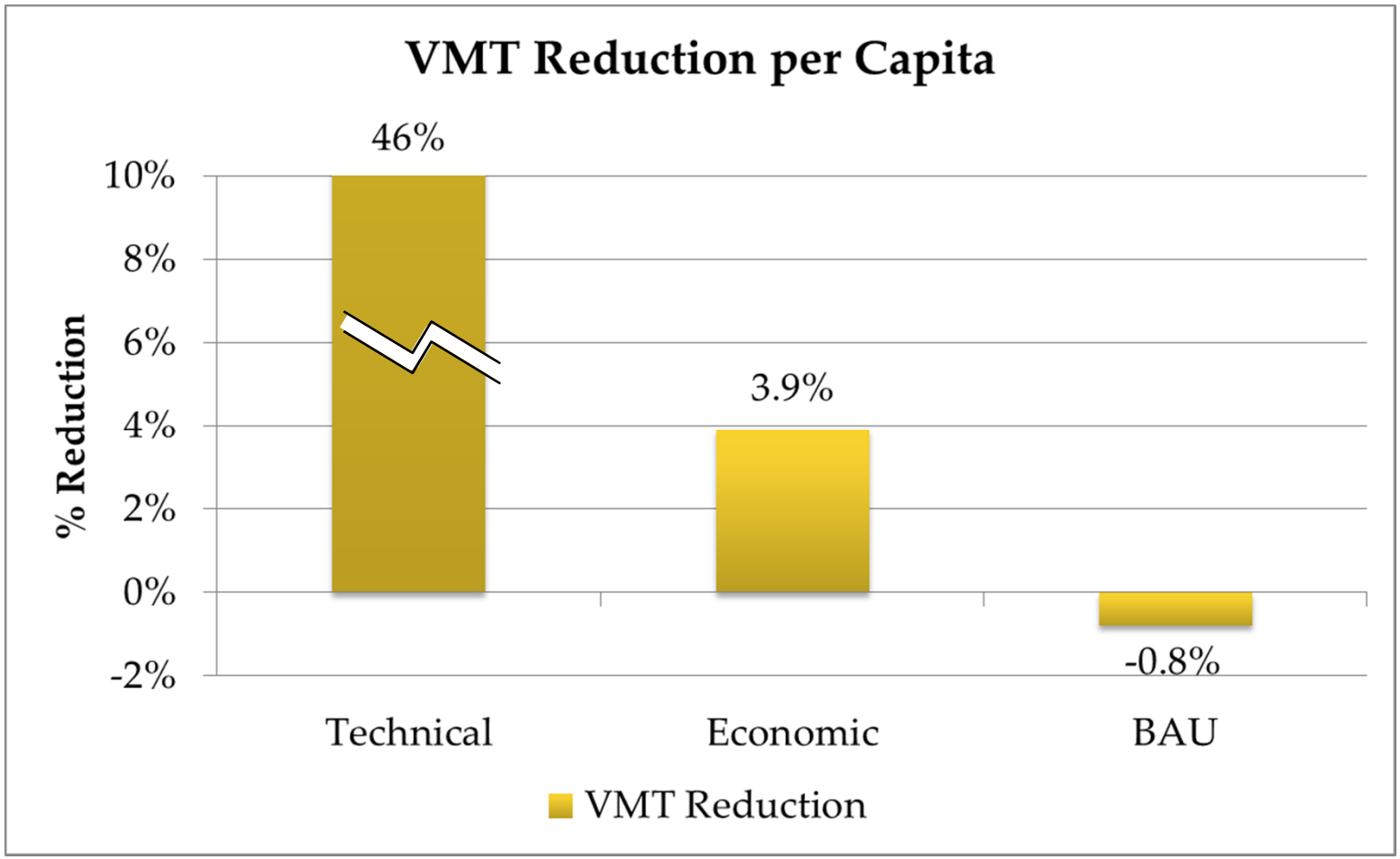
Where per capita VMT could be technically reduced by up to 46% and economically reduced by 3.9%, it is expected to increase by 0.8%.



Sources: Navigant Analysis of the Rocky Mountain Institute's Summary of U.S. VMT Reduction Strategies, NHOEP 2011 Population Estimates, City VMT reduction targets, and the Navigant Baseline Energy Forecast

NAVIGANT ENERGY

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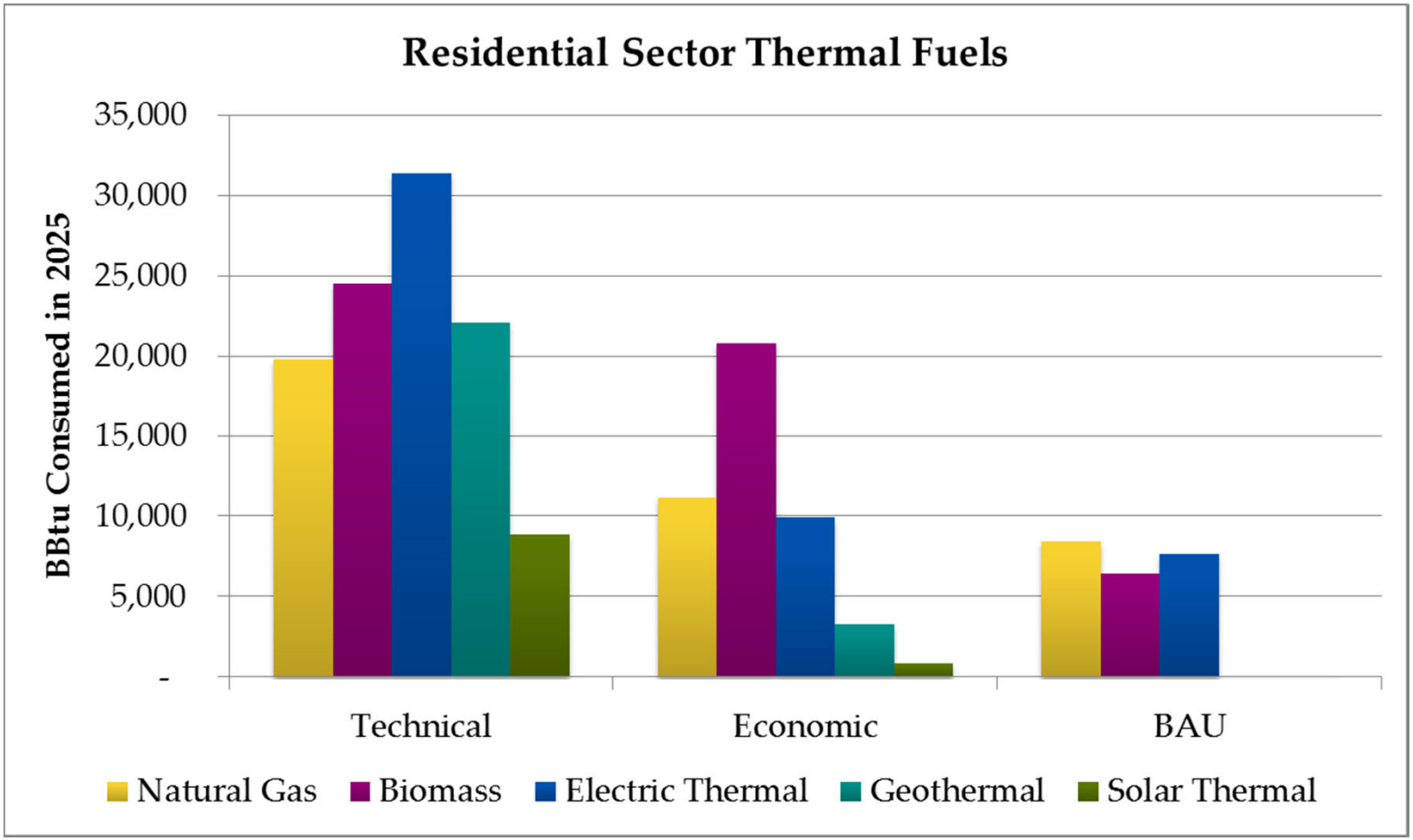
Many fuels could economically supply thermal energy to the residential sector, but it's forecast that few will see substantial market traction.



Sources: Navigant Analysis of Northern Utilities Rate Cases, ICF Study: Assessment of Growth for National Grid's NH Natural Gas Utility (Oct. 2012), Navigant Fisher-Pry Model for Renewable Thermal, US DOE Renewable Thermal Technologies Program, US DOE Building Energy Data Book, EIA RECS, and Navigant's Baseline Energy Forecast

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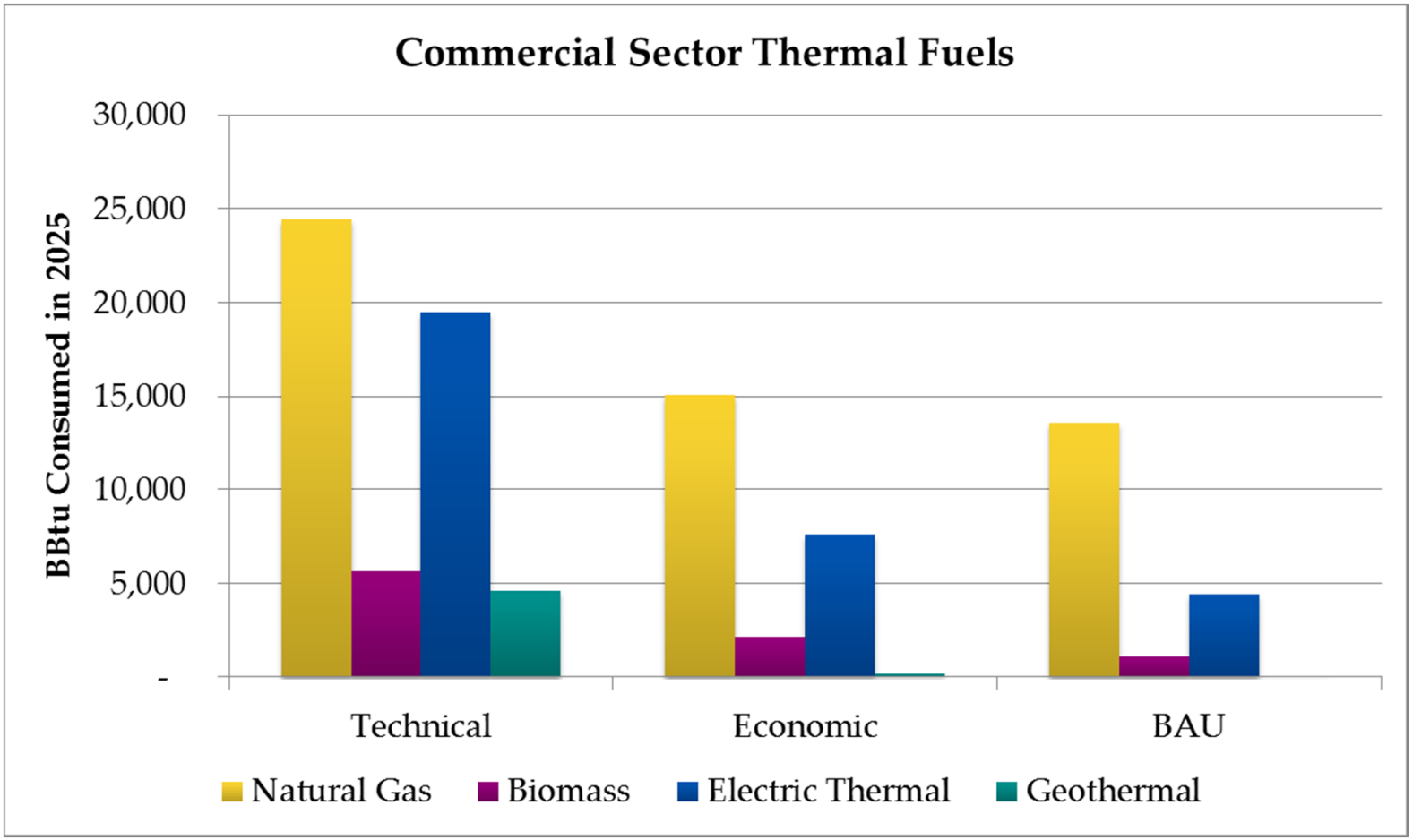
Unlike other fuels, the market potential for gas in the commercial sector closely matches its economic potential.



Sources: Navigant Analysis of Northern Utilities Rate Cases, ICF Study: Assessment of Growth for National Grid's NH Natural Gas Utility (Oct. 2012), Navigant Fisher-Pry Model for Renewable Thermal, US DOE Renewable Thermal Technologies Program, US DOE Building Energy Data Book, EIA CBECS, and Navigant's Baseline Energy Forecast

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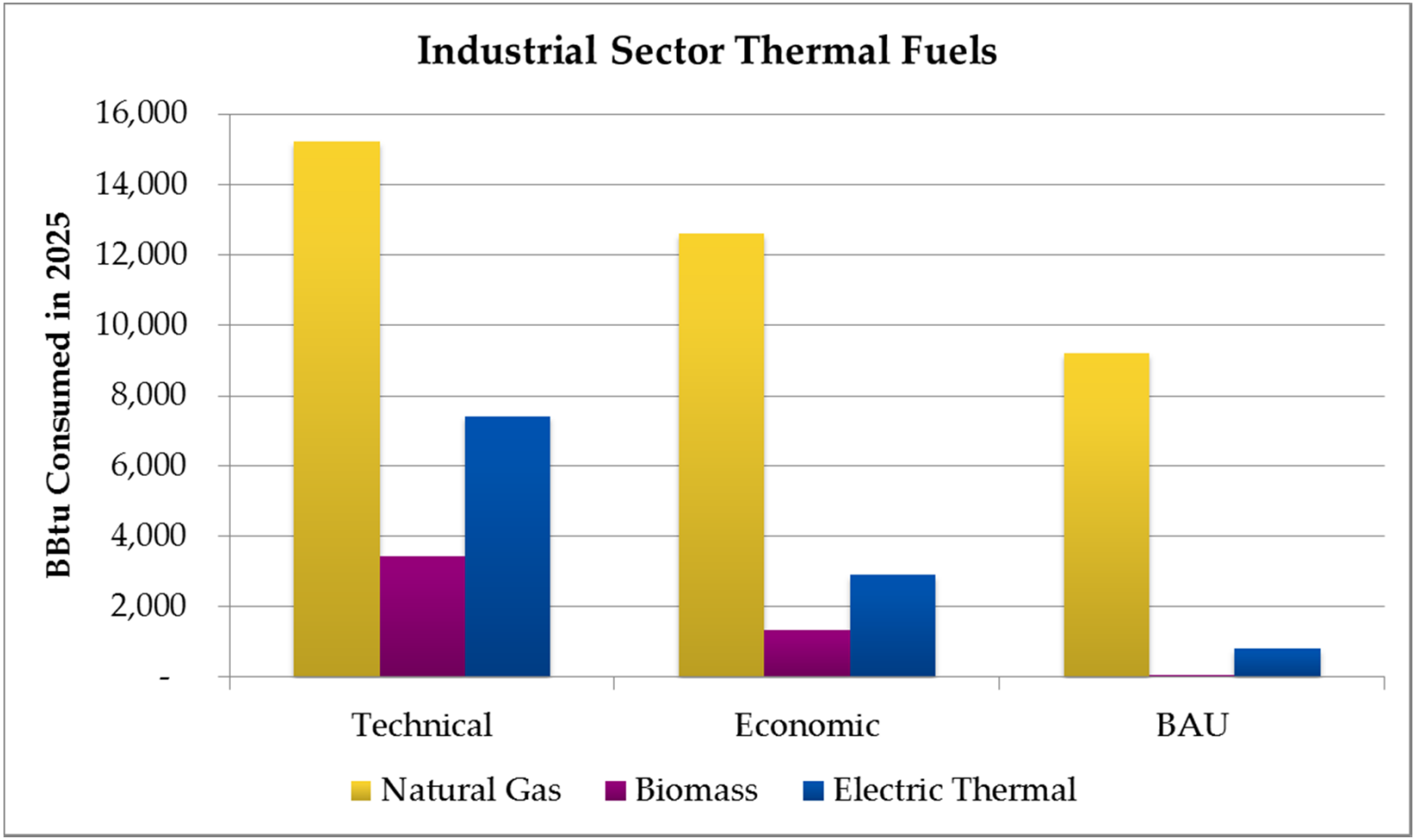
Similarly, gas is favored from an economic and market perspective in the industrial sector.



Sources: Navigant Analysis of Northern Utilities Rate Cases, ICF Study: Assessment of Growth for National Grid's NH Natural Gas Utility (Oct. 2012), US DOE Building Energy Data Book, and Navigant's Baseline Energy Forecast

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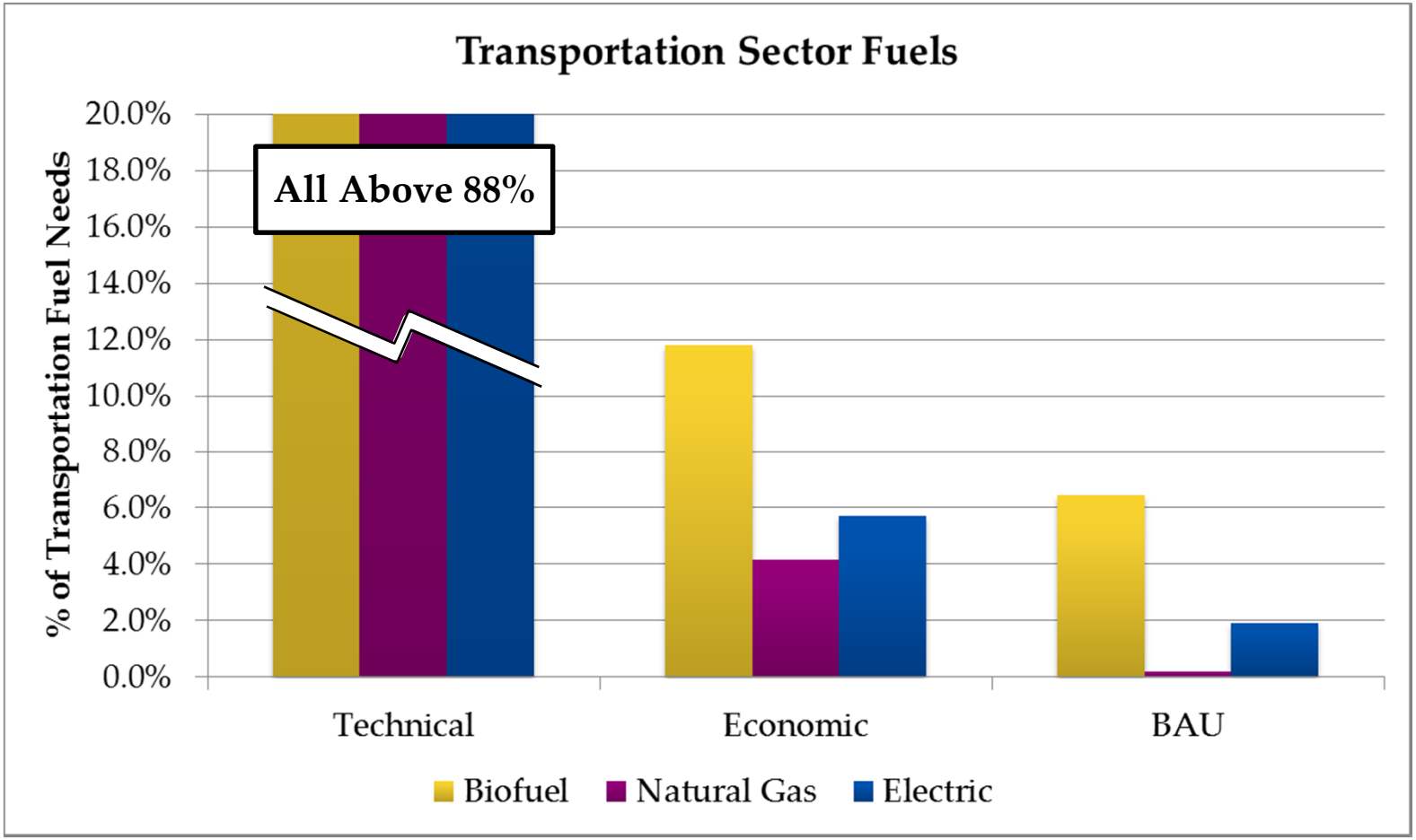
Alternative fuels could economically meet as much as 23% of fuel needs in 2025, but are only forecast to meet 9%.



Sources: Navigant Analysis of the 2013 ORNL Energy Databook, Idaho National Laboratory EV Project Data, Federal Highway Authority Fleet Statistics, DOE Alternative Fuels Data Center, the Navigant Research Internal PEV Sales and Characteristics Tracker, and the Navigant Baseline Energy Forecast

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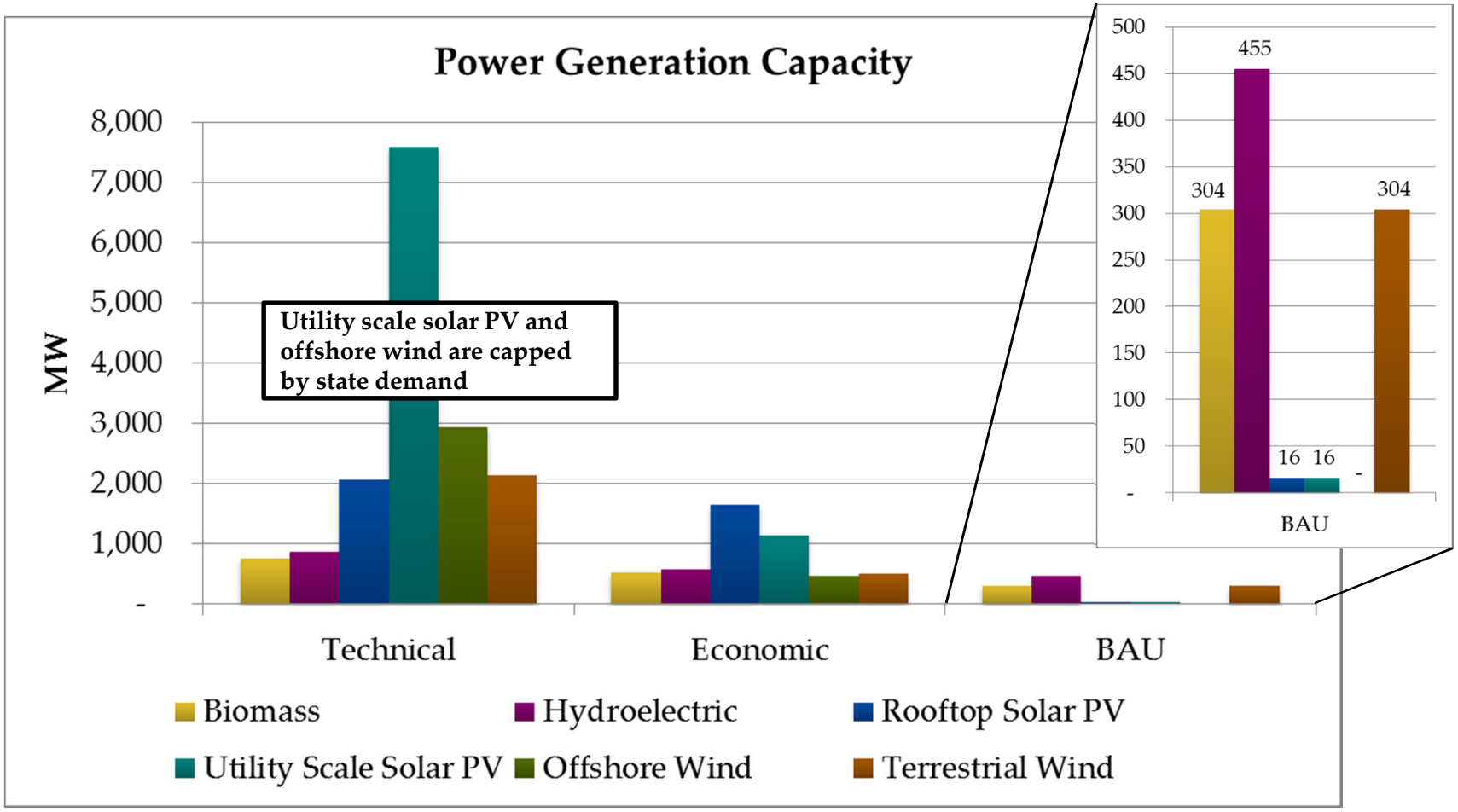
NH is projected to add only 23% of renewable power generating capacity that is economically justified, and 7% of what is technically potential.



Sources: Navigant Analysis of the NREL Renewable Resource Data Center, NREL Report on Renewable Energy Technical Potentials: A GIS-Based Analysis, the New Hampshire Climate Action Plan (Appendix 8), and the Navigant Baseline Energy Forecast

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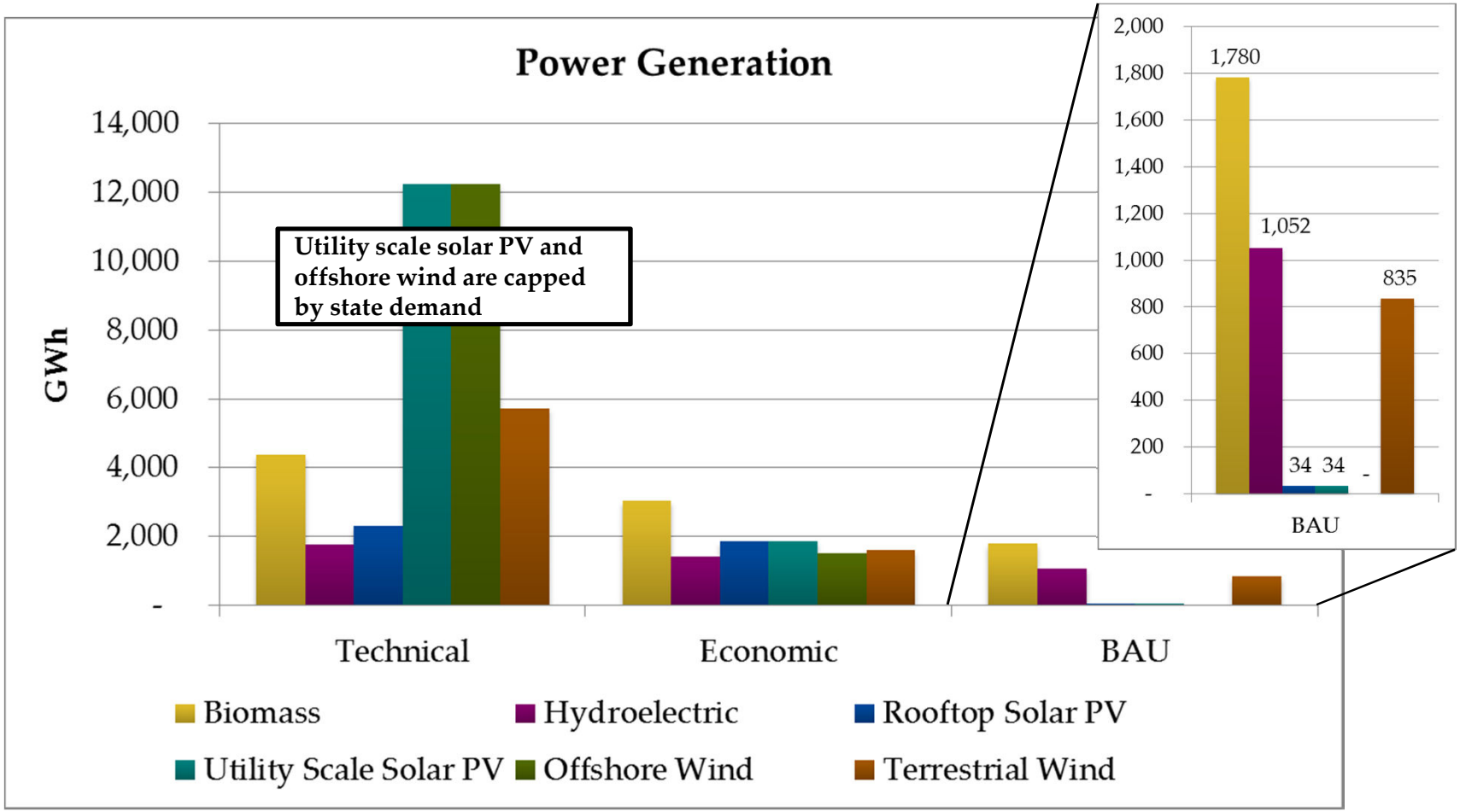
From a power generation perspective, the BAU capacity only produces 30% of the economic potential for power generation, missing significant opportunities in both classes of PV and offshore wind.



Sources: Navigant Analysis of the NREL Renewable Resource Data Center, NREL Report on Renewable Energy Technical Potentials: A GIS-Based Analysis, the New Hampshire Climate Action Plan (Appendix 8), and the Navigant Baseline Energy Forecast

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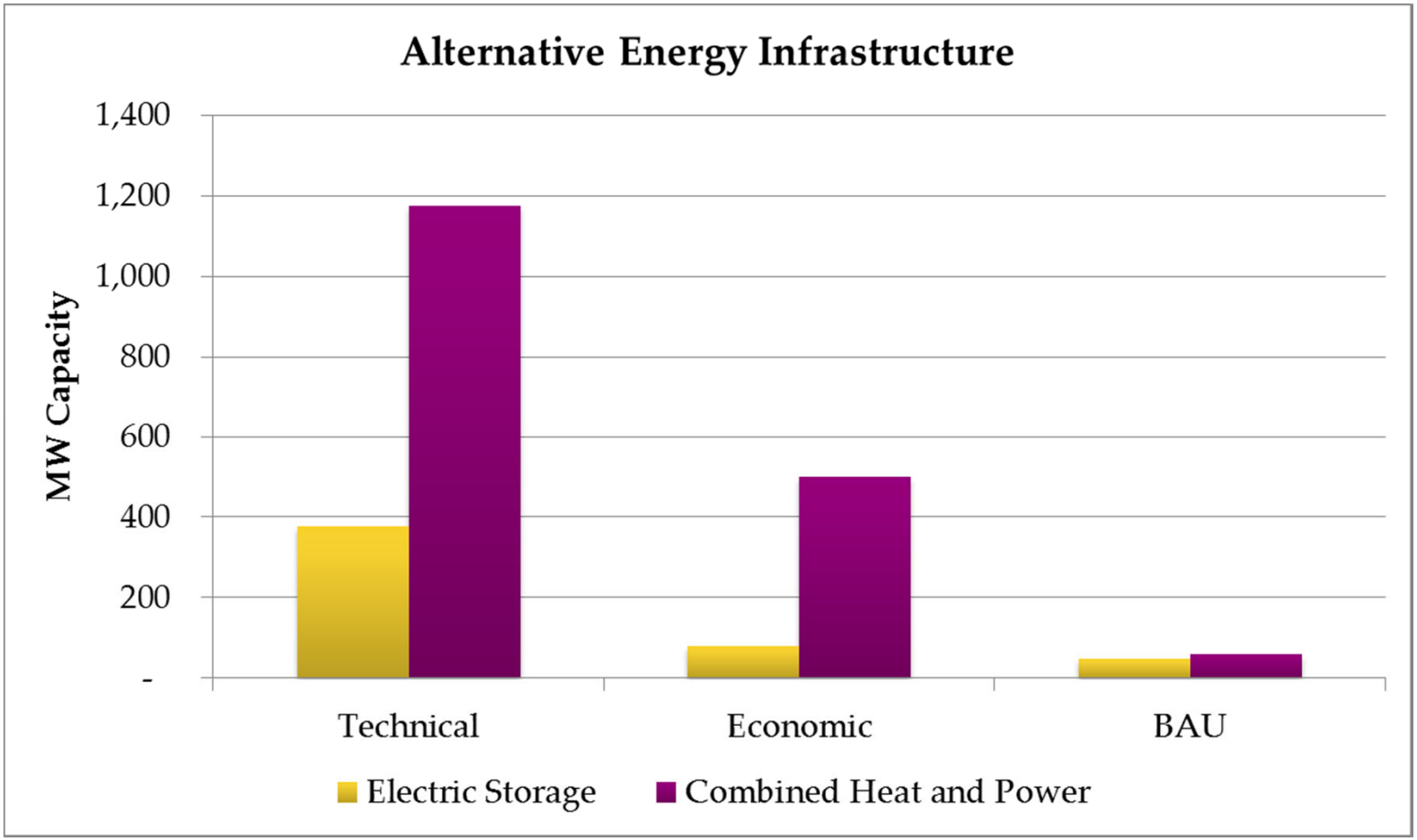
While CHP offers considerably higher technical and economic potential than electric storage, it is estimated their adoption in the market are about equal.



Sources: Navigant Analysis of the US DOE EERE - Cooling, Heating and Power (CHP) for Commercial Buildings Benefits Analysis, Hoovers Database, ISO NE Historic Demand Profile, and the Navigant Baseline Energy Forecast

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Navigant will host a Webinar to solicit stakeholder feedback and finalize the resource potential study and begin to identify gaps in policy.

Stakeholder Feedback on Resource Potential Study

- Navigant will host a Webinar on Friday March 14th at 10:00 AM ET to solicit additional stakeholder feedback.
- We'd appreciate all feedback to be submitted by close of business on Friday, March 21st.

Refined Resource Potential & Policy Gap Analysis

- Navigant will revise its resource potential study based on stakeholder feedback and present these findings on March 28th along with a policy gap analysis to highlight opportunities for change and begin the policy discussion.

Policy Discussion

- On April 11th, Navigant will present a list of prioritized resources along with the existing policy affecting these resources to facilitate a discussion of the current barriers to change.

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