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ENERGY

New Hampshire
State Energy Strategy

Resource Potential Webinar



March 14th, 2014

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

1. » State Energy Strategy Process Overview
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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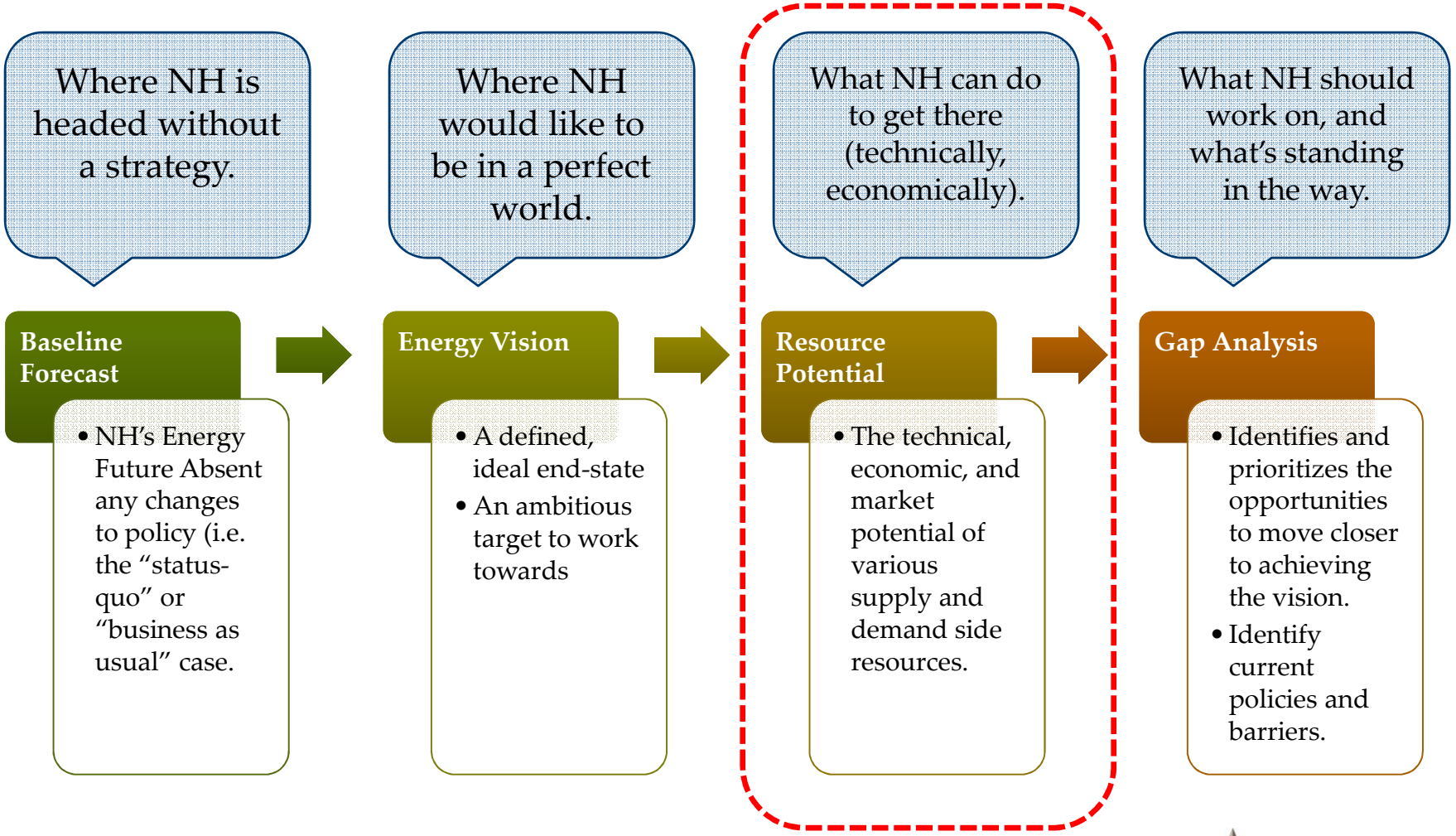
To date, Navigant has prepared the baseline forecast, developed the energy vision, and analyzed the potential of various energy supply and demand resources available to New Hampshire.



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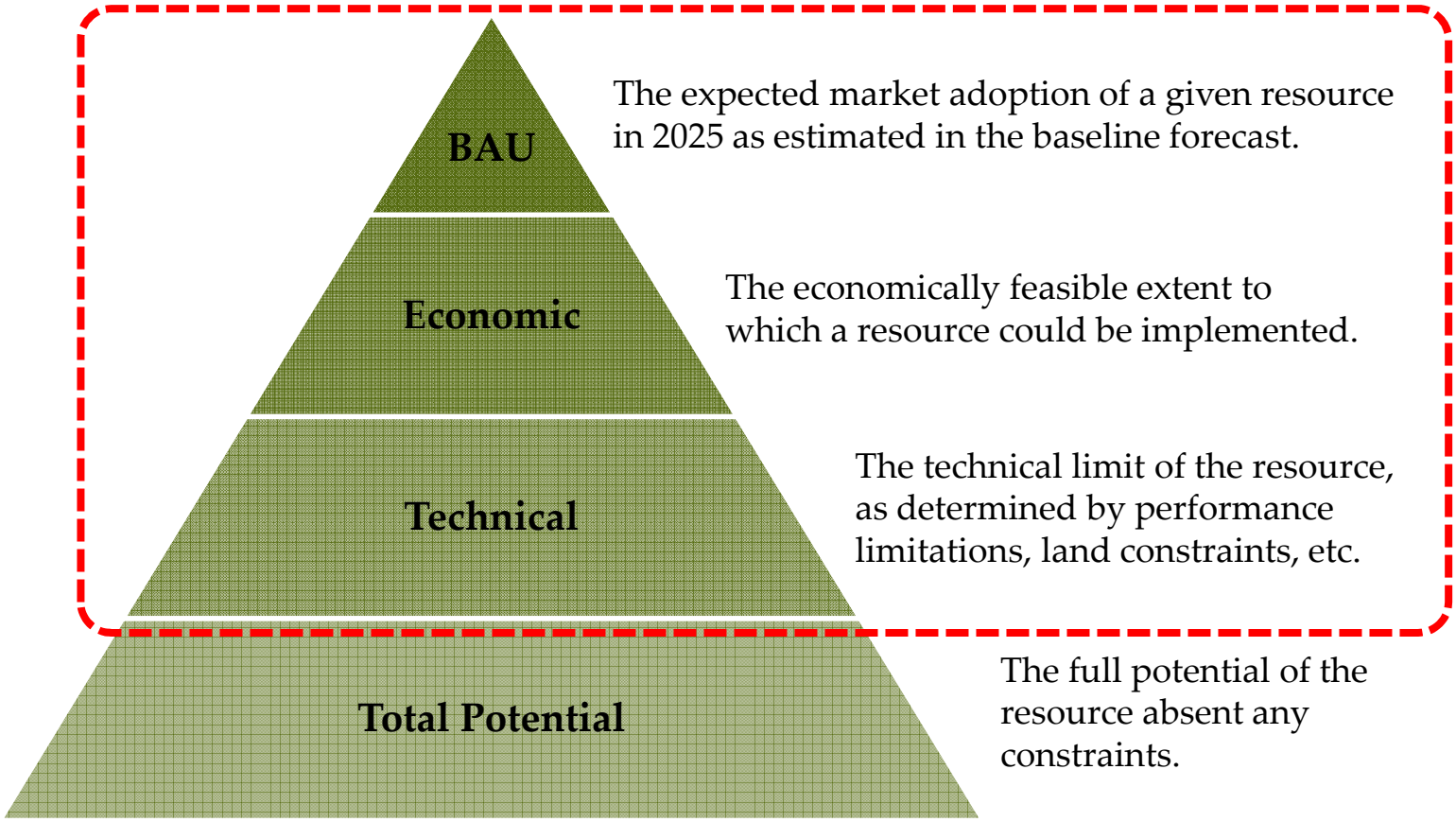
For each resource, Navigant estimated the technical potential, the economic potential, and the expected market adoption as indicated by the BAU (baseline forecast) in 2025.



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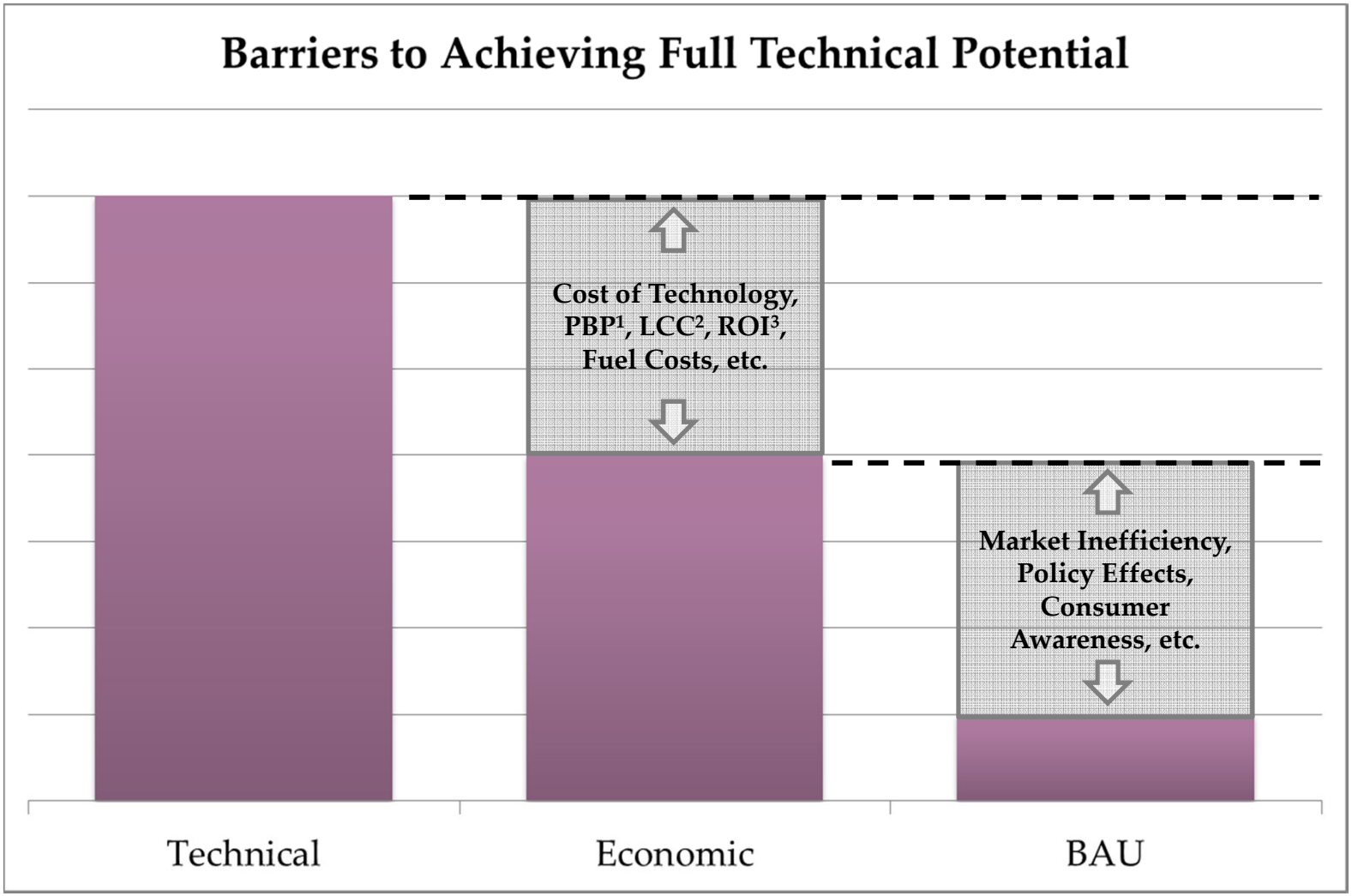
Understanding the types of barriers affecting each resource is critical to crafting effective policy.



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

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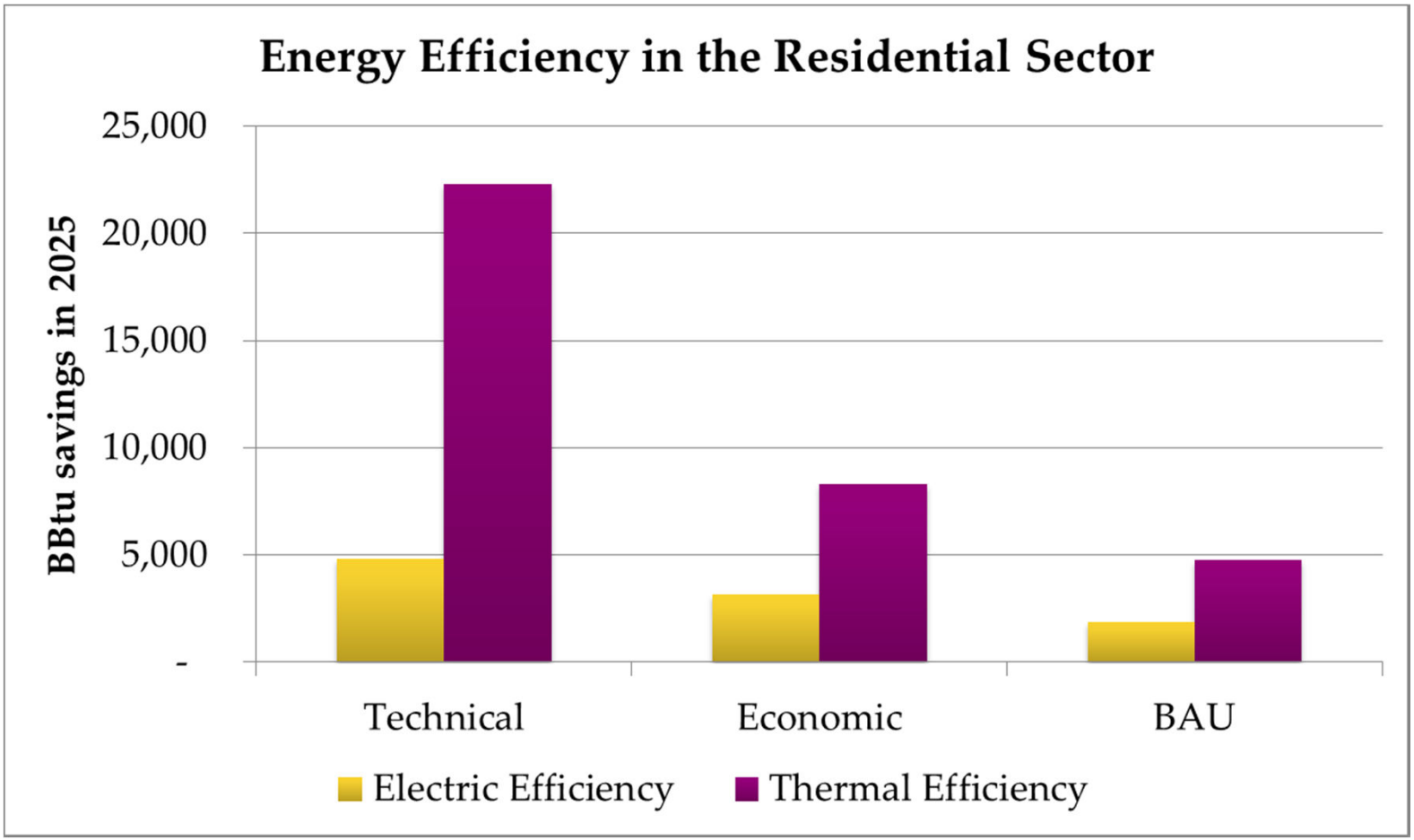
The residential sector could realize an additional 4,800 BBtu of economic efficiency gains above what is expected in the baseline forecast.



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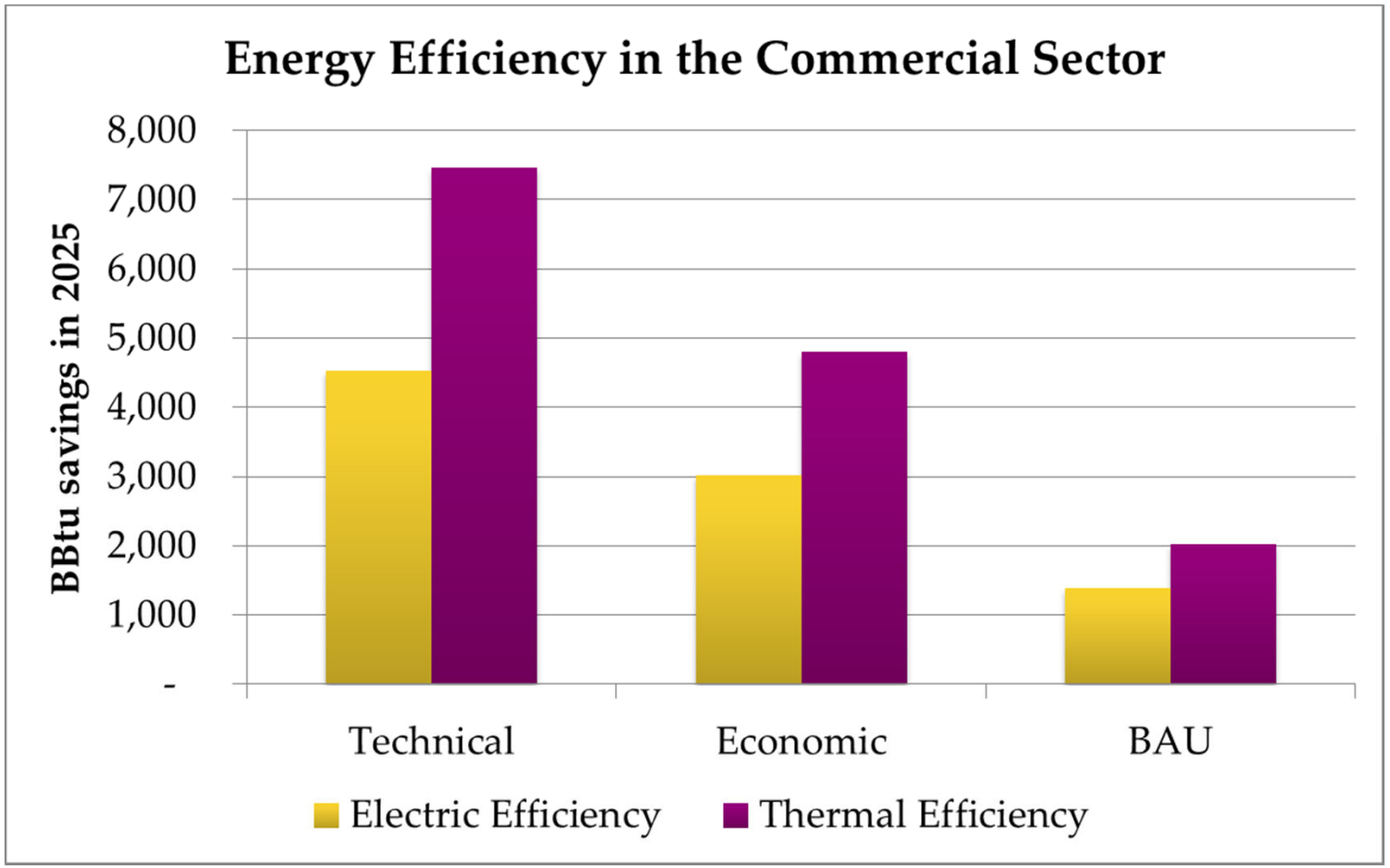
The commercial sector could realize an additional 4,400 BBtu of economic efficiency gains above what is expected in the baseline forecast.



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

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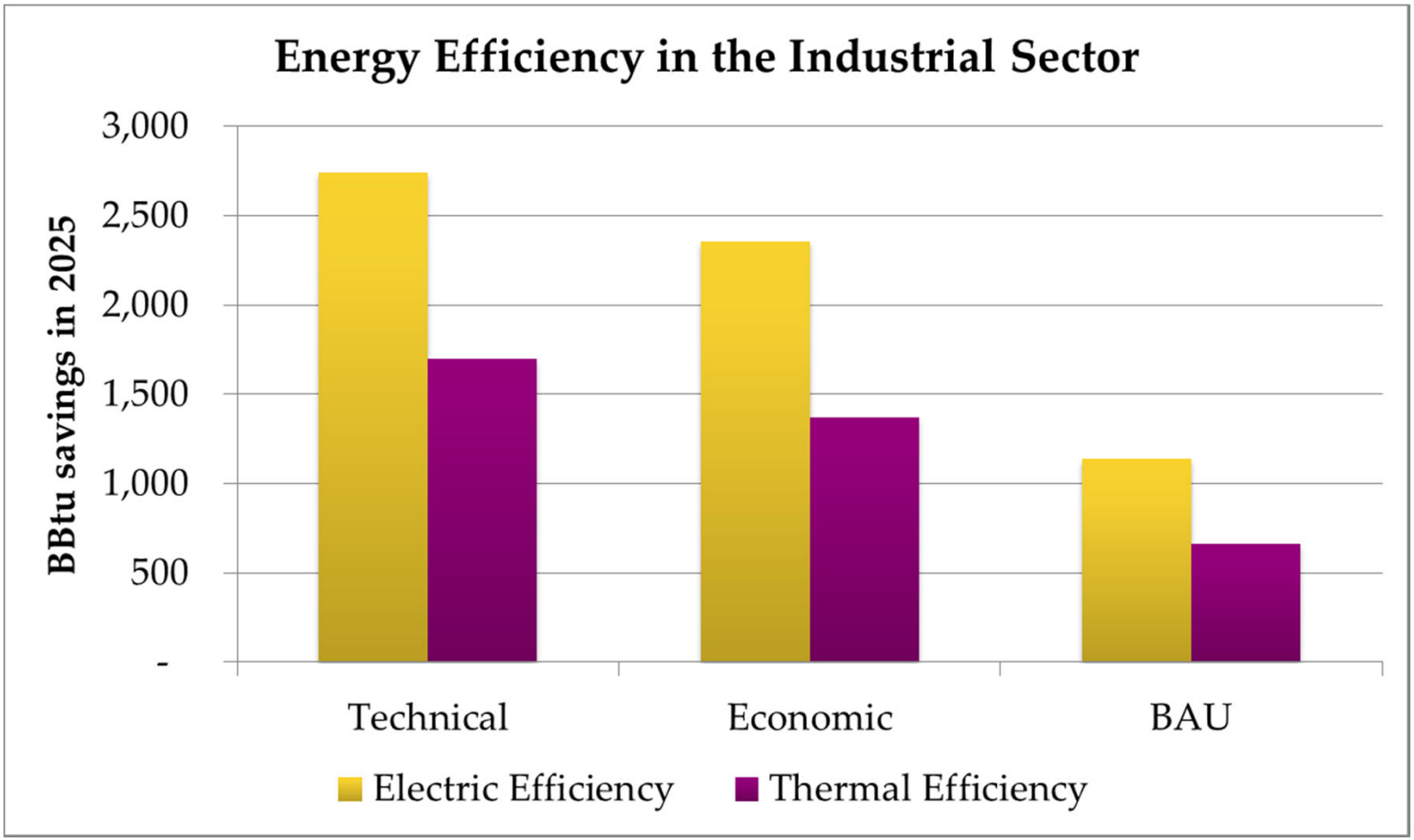
The industrial sector could realize an additional 1,900 BBtu of economic efficiency gains above what is expected in the baseline forecast.



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

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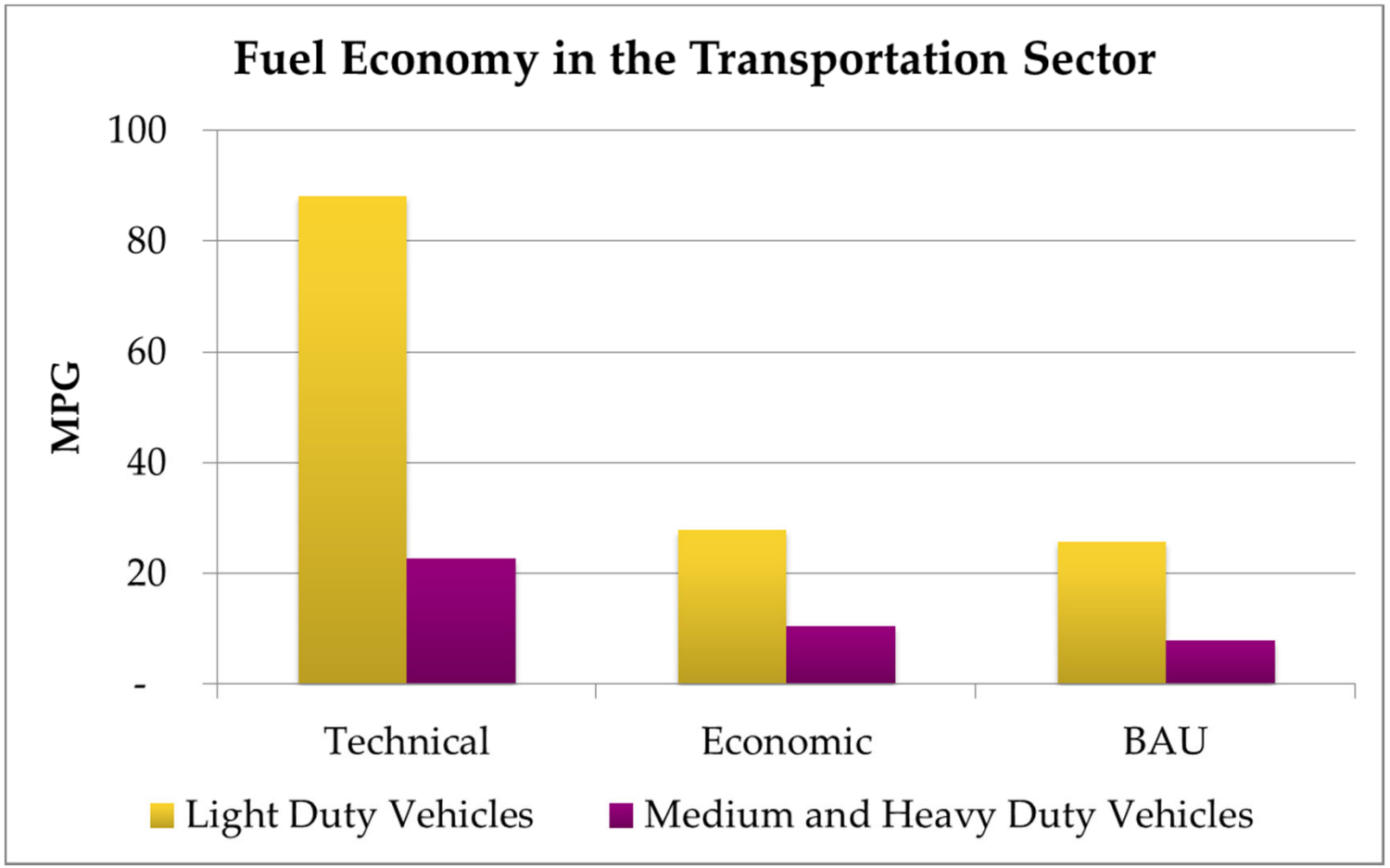
Significant increases in energy efficiency are technically achievable in the transportation sector, but will require a shift in economics.



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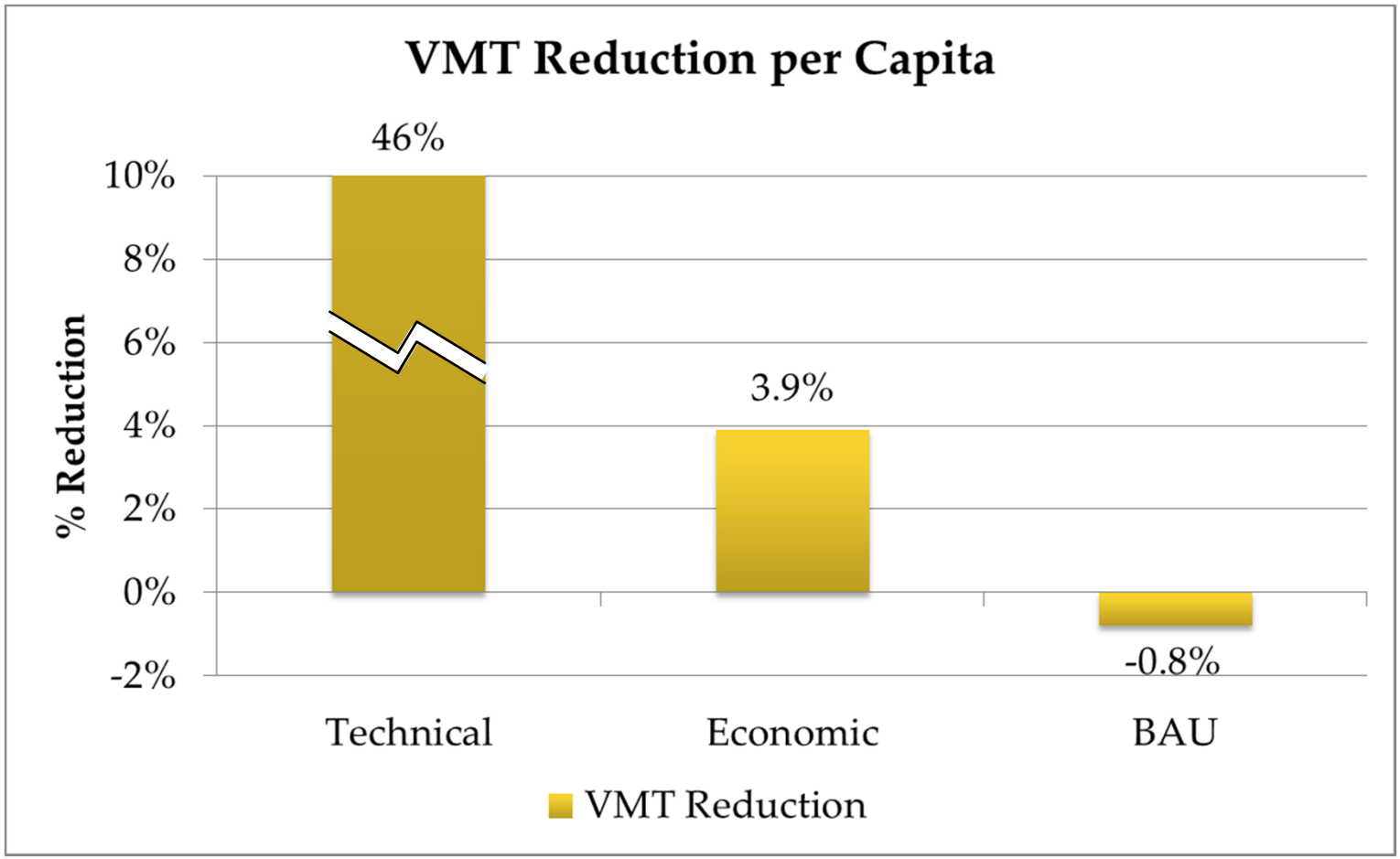
Where per capita VMT could be technically reduced by up to 46% and economically reduced by 3.9%, it is expected to increase by 0.8%.



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

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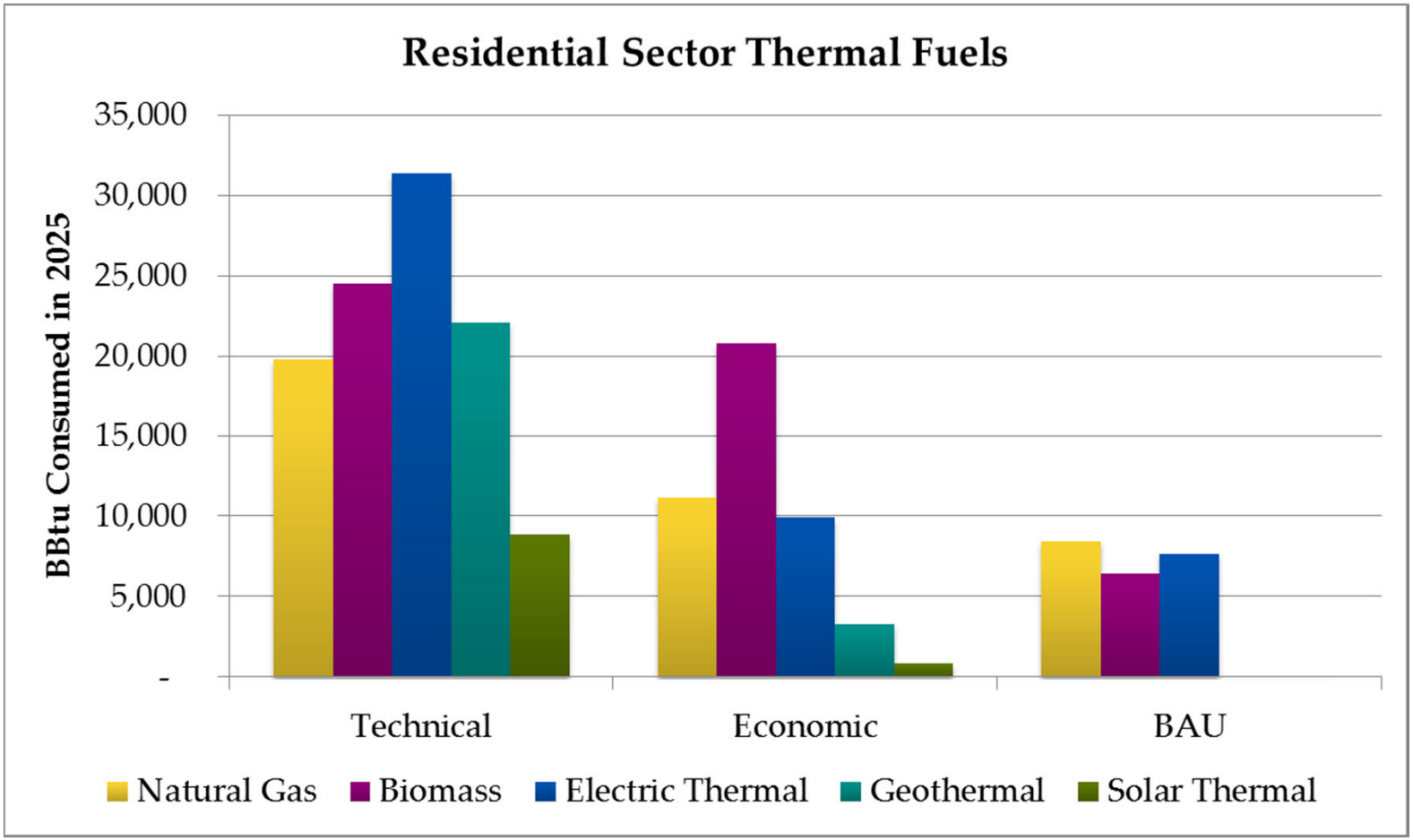
Many fuels could economically supply thermal energy to the residential sector, but it's forecast that few will see substantial market traction.



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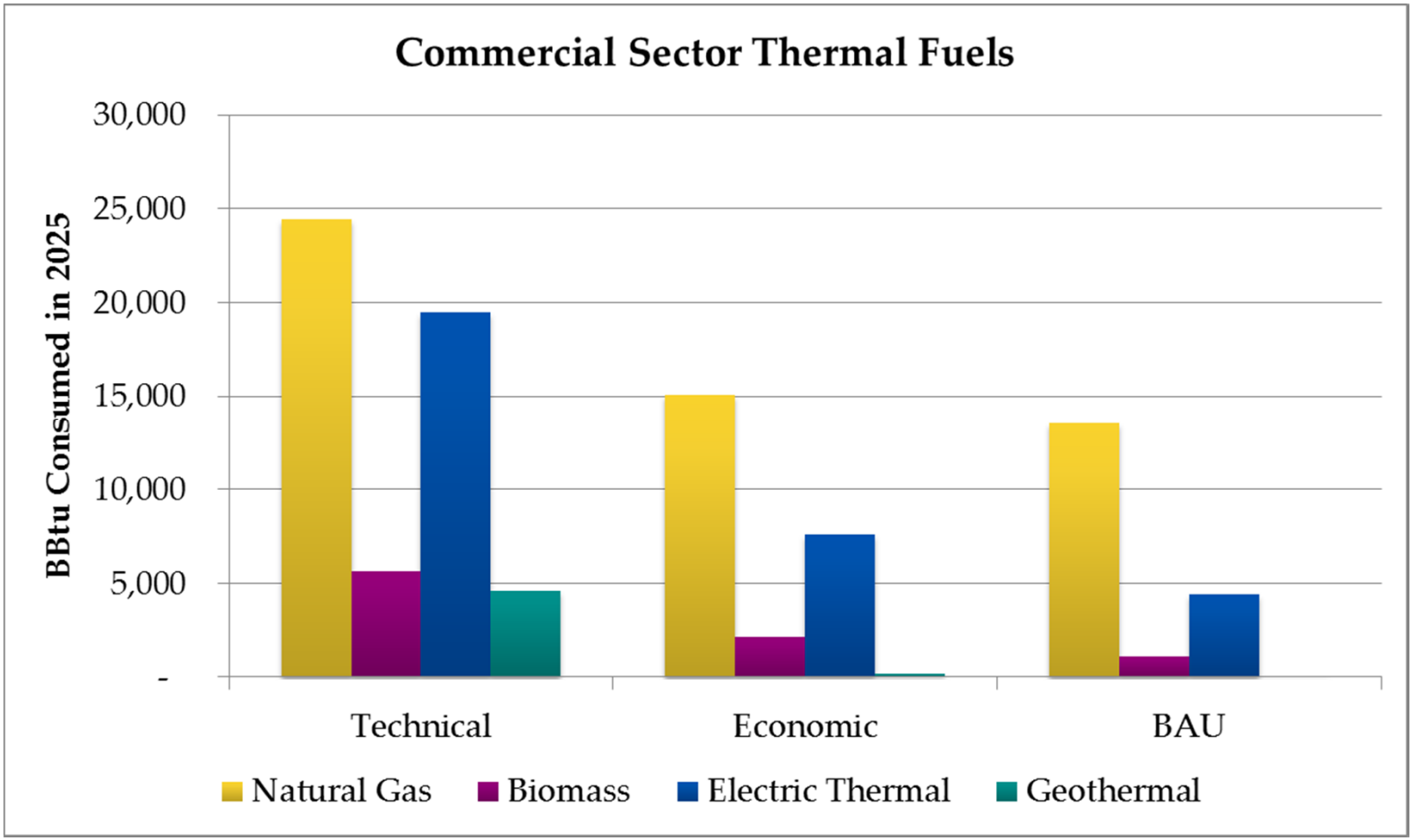
Unlike other fuels, the market potential for gas in the commercial sector closely matches its economic potential.



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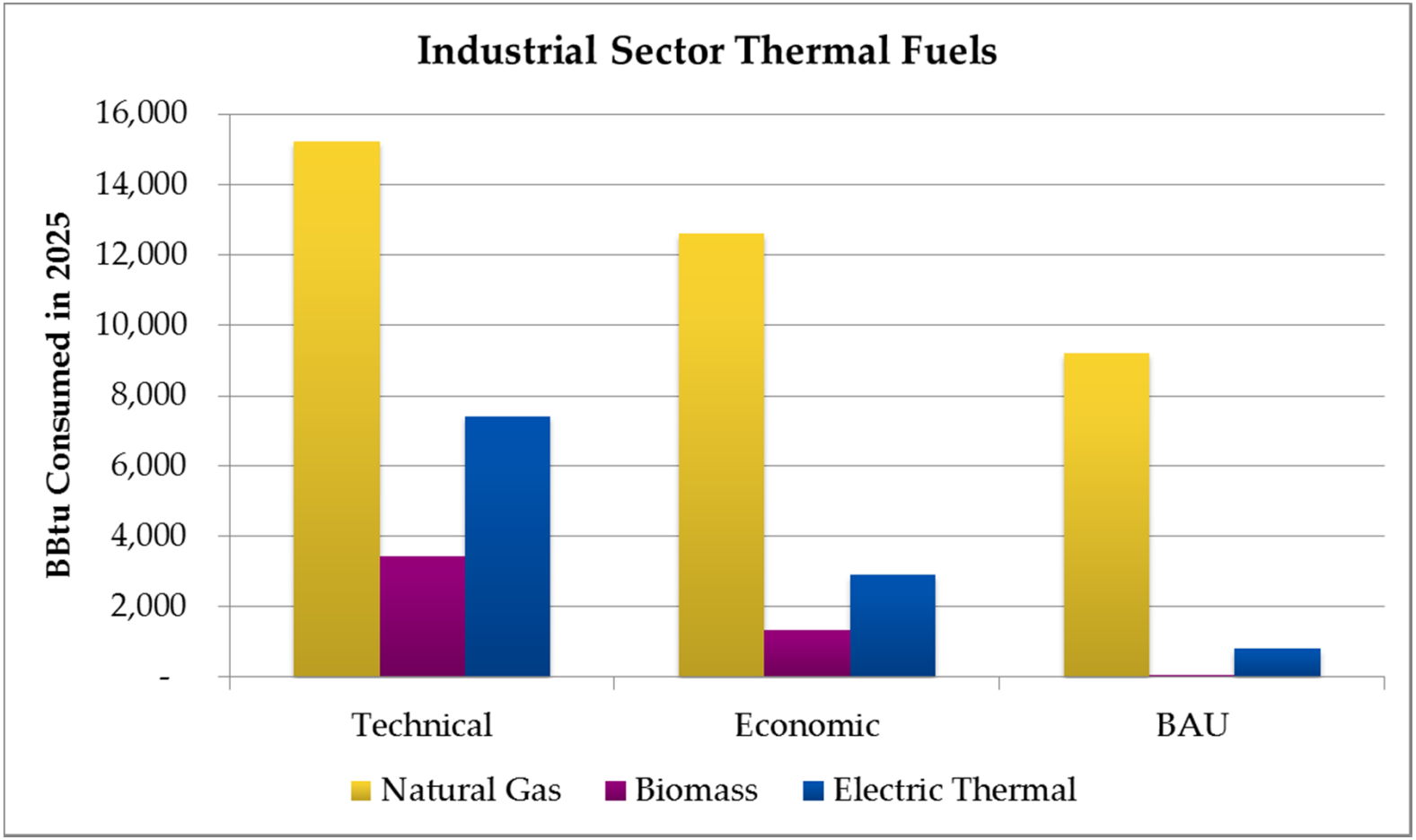
Similarly, gas is favored from an economic and market perspective in the industrial sector.



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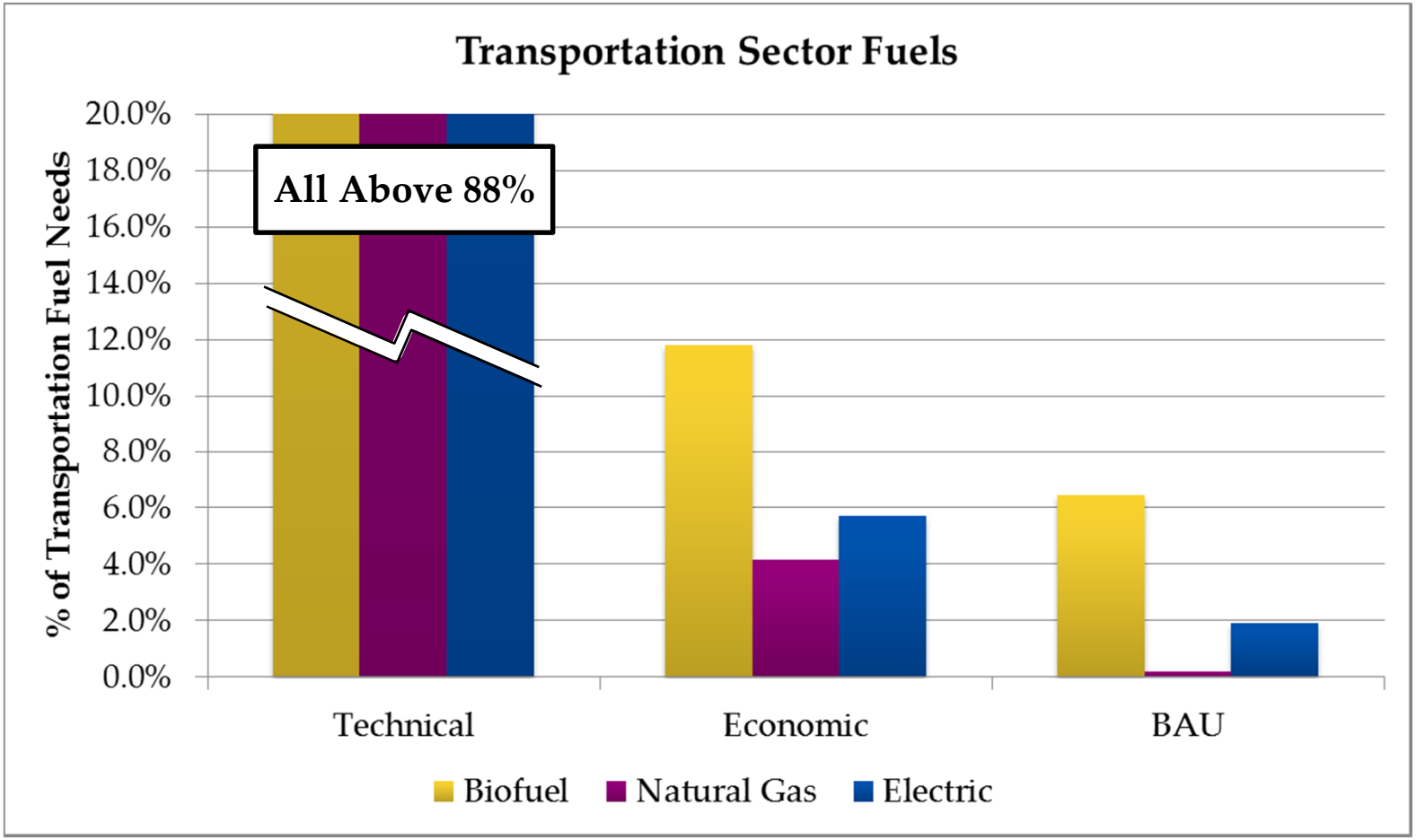
Alternative fuels could economically meet as much as 23% of fuel needs in 2025, but are only forecast to meet 9%.



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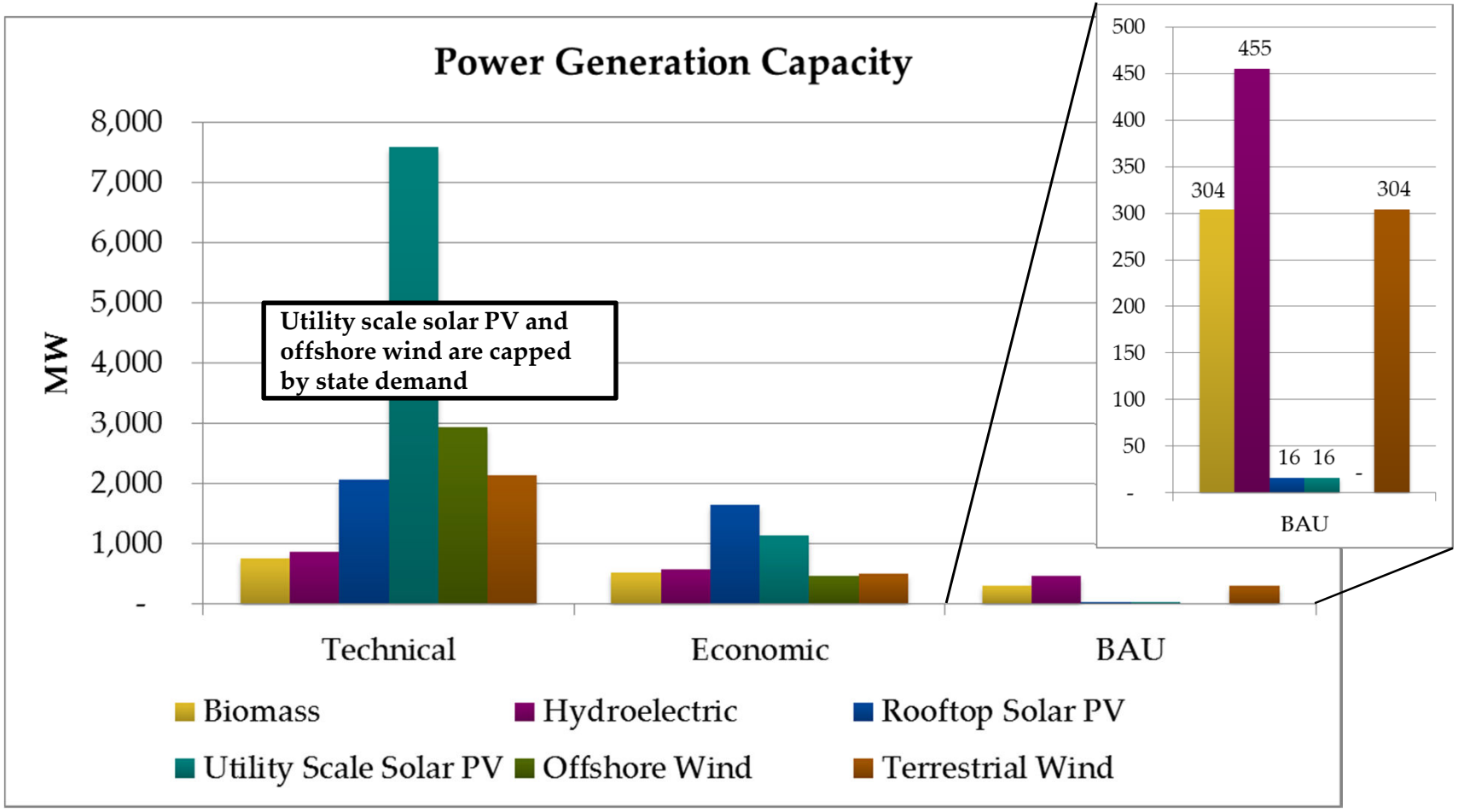
NH is projected to add only 23% of renewable power generating capacity that is economically justified, and 7% of what is technically potential.



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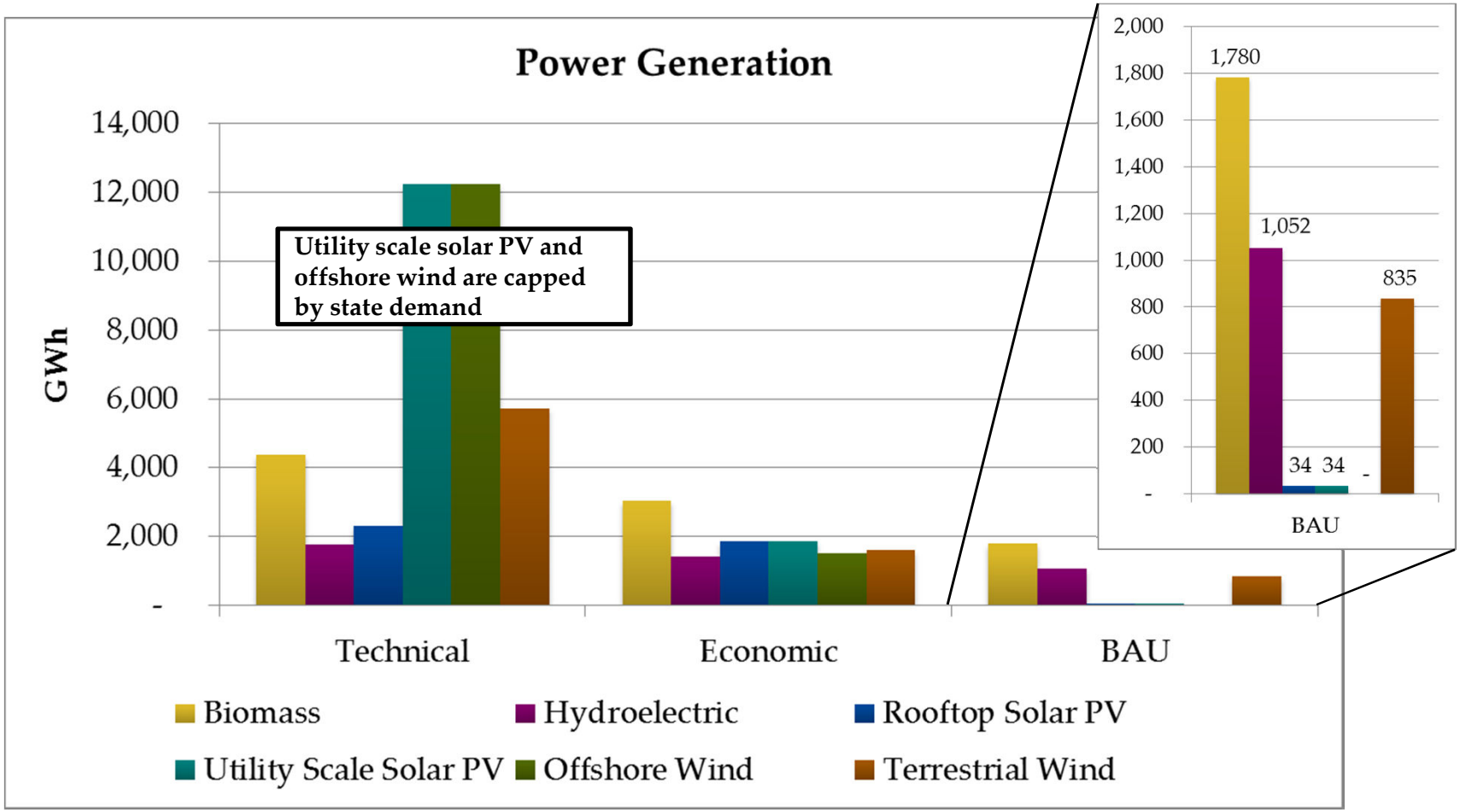
From a power generation perspective, the BAU capacity only produces 30% of the economic potential for power generation, missing significant opportunities in both classes of PV and offshore wind.



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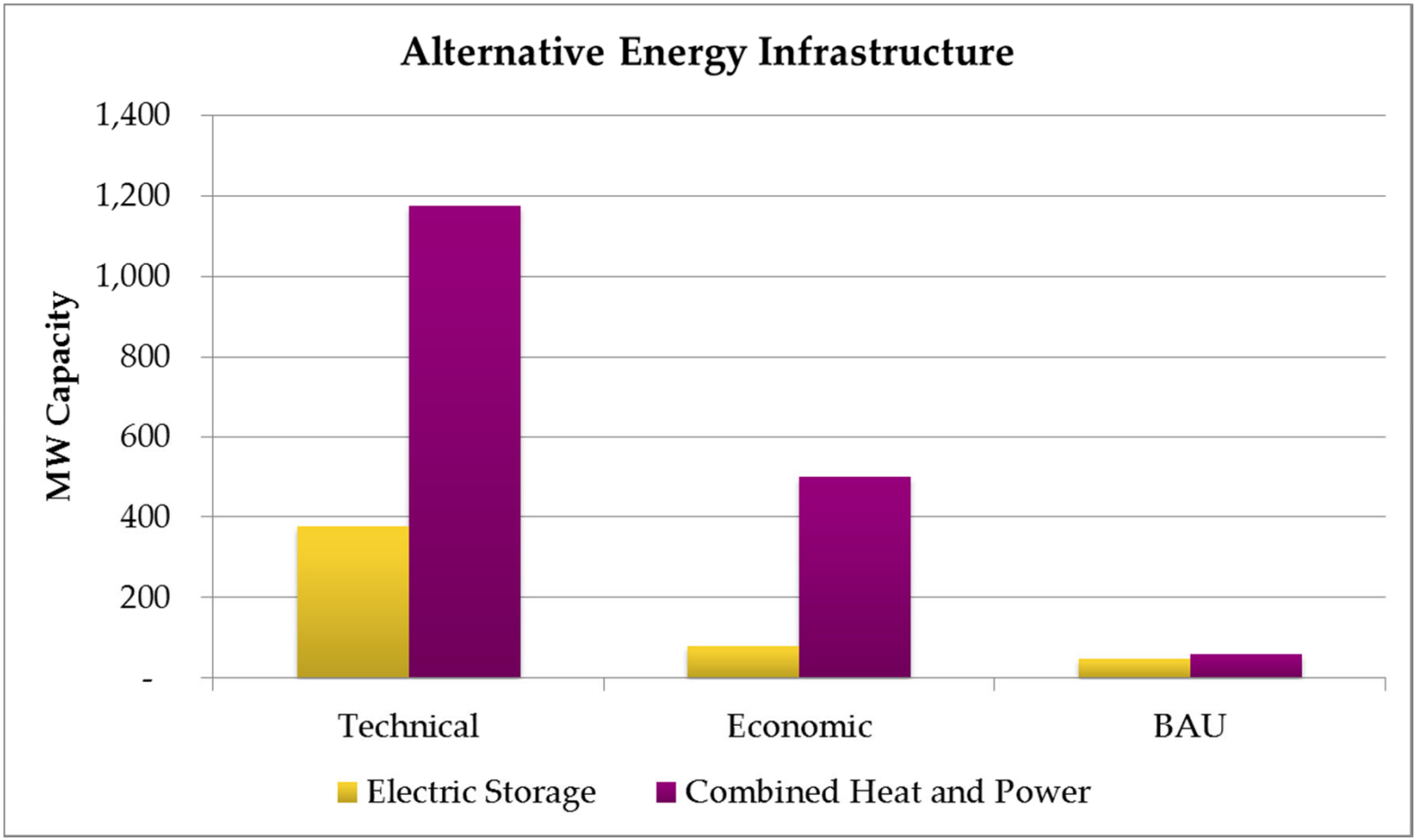
While CHP offers considerably higher technical and economic potential than electric storage, it is estimated their adoption in the market are about equal.



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 finalize the resource potential study and begin to identify gaps in policy.

Stakeholder Feedback on Resource Potential Study

- We'd appreciate all feedback on the webinar 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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Key CONTACTS

Ben Barrington – Project Manager
Managing Consultant
Atlanta, GA
404-575-3834
ben.barrington@navigant.com

Andrew Kinross
Director
Burlington, MA
781-270-8486
akinross@navigant.com

Randy Armstrong
Senior Consultant
Burlington, MA
781-270-8408
randy.armstrong@navigant.com

Lisa Frantzis
Managing Director
Burlington, MA
781-270-8314
lfrantzis@navigant.com

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