NAVIGANT

ENERGY

New Hampshire
State Energy Strategy

Presentation of the Baseline Energy Forecast to the:

State Energy Advisory Council

January 24th, 2014

In today's meeting we will discuss the purpose of the baseline energy forecast, the forecast methodology, the results, and outline next steps.

1. » Purpose and Methodology
2. » Electric Sector Forecast
3. » Thermal Sector Forecast
4. » Transportation Sector Forecast
5. » Summary and Key Takeaways
6. » Next Steps

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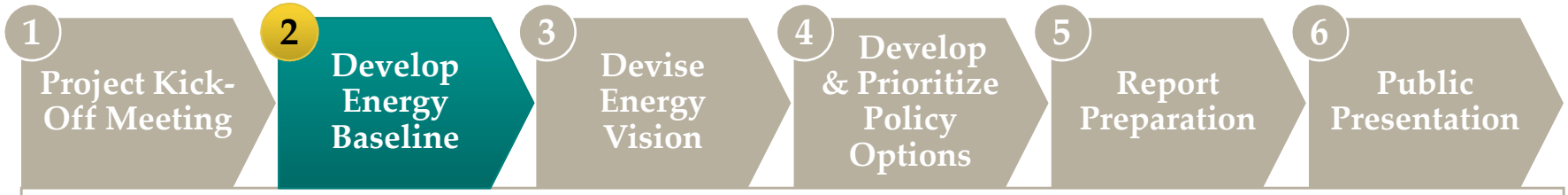
Task 2: Navigant will develop a baseline forecast informed by current and proposed policies, demand profiles, and supply infrastructure.



In Task 2, Navigant will develop a forecast of New Hampshire's energy landscape using:

- Current and Proposed Energy Policies, Programs, and Regulations:
  - Existing and proposed legislation, regulations, policies and programs at the state, regional (ISO-NE), and national level that may influence energy use in state
- Energy Demand in New Hampshire: Current and Projected
  - Demand will be divided into the electric, thermal, and transportation sectors. As appropriate, we will sub-divide consumption into residential, commercial and industrial applications.
- Energy Supply and Infrastructure in New Hampshire: Current and Projected
  - Including a discussion of power generation assets, distribution and transmission systems; current thermal and transportation energy infrastructure.

Deliverable: A summary of New Hampshire's energy baseline that synthesizes supply and demand patterns, key issues and the state of existing energy policies/discussions.

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Navigant's baseline forecast leverages industry standard sources of energy data, accounts for existing plans, and reports meaningful metrics.

Data

- Publicly Available, Industry Standard Data Sets
- National, ISO-NE, NH
- Are there additional sources of data we should be considering in developing the Business As Usual (Baseline)?

Plans, Policies, and Assumptions

- Plans, policies, and NH specific information used to shape the forecast
- Are there additional policies we should be considering in developing the Baseline?

Metrics

- Quantitative indicators of the future state of NH Energy
- Broken out by sub-sector and fuel
- Common Units
- Are these metrics appropriate given the State's priorities?

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Navigant used the Portfolio Optimization Model (POM) to forecast demand, price, emissions, and power generation infrastructure metrics for NH's electric sector.

Data

- EIA AEO
- Ventyx Generation and T&D Database
- Energy Velocity
- ISO-NE CELT 2012 Report
- DSIRE
- Navigant Analysis (POM)

Plans, Policies, and Assumptions

- NH RPS and Off-Ramps
- ISO-NE Regional System Plan 2012
- EPA Rules for SO_x, NO_x, and CO_2 (proposed 2014): assumes no new coal
- RGGI-New Cap
- Established Contracts (PPAs) for Renewables

Metrics

- In-State Capacity (MW)
- Fuel Prices ($/MBtu)
- Generation (GWh)
- Wholesale Price ($/kWh)
- Load (GWh)
- Peak Load (MW)
- Expenditures ($Million)
- Emissions (MT)

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While electric demand is largely steady through the forecast period, emissions are in decline and the overall cost of electricity is rising.

Generation

- Utilization of power generation assets is driven by the economic dynamics of the fuels consumed and environmental regulations.
- The Seabrook nuclear plant continues to provide substantial base-load power.
- 20% of in-state generation will come from renewables by 2025.

Demand

- The increase in efficiency of appliances and building systems is offset by the number of units leading to steady levels of residential demand.
- Commercial demand is projected to grow in contrast to industrial demand as the New Hampshire economy shifts from manufacturing to information technology.

Emissions and Expenditures

- While emissions from the electric sector are in decline as we move to cleaner sources of energy and higher efficiency, total expenditures are forecast to increase as the wholesale price increases.

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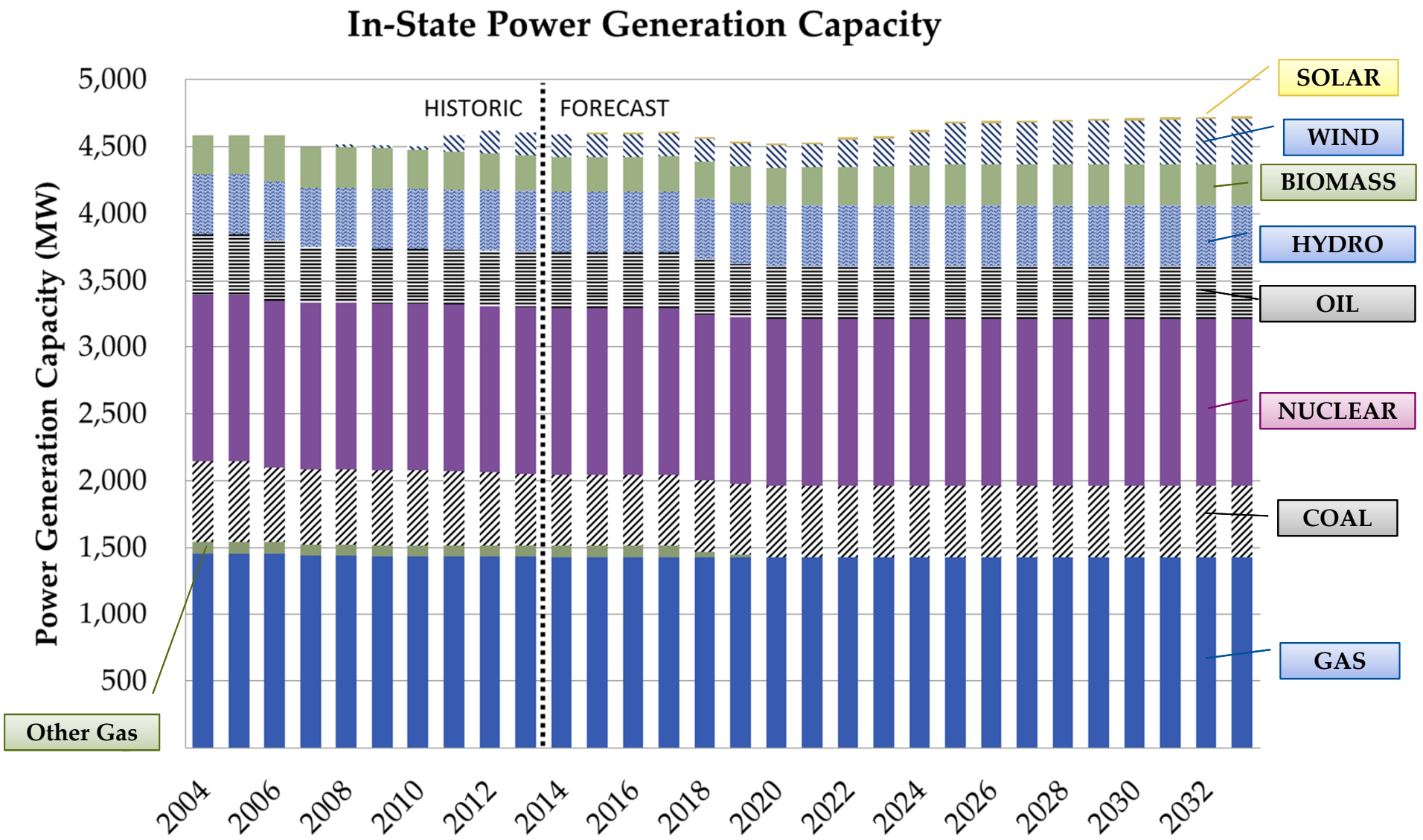

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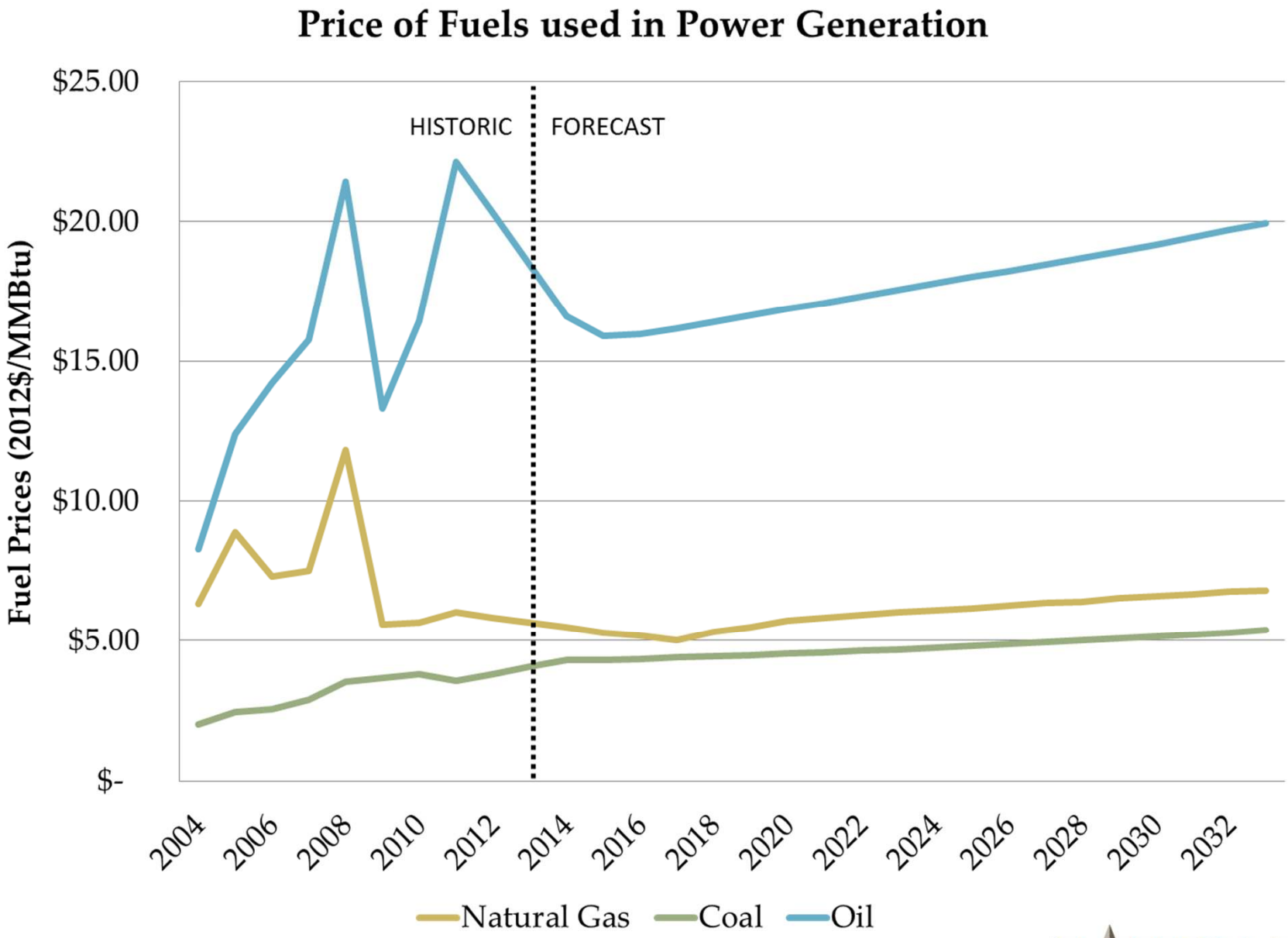

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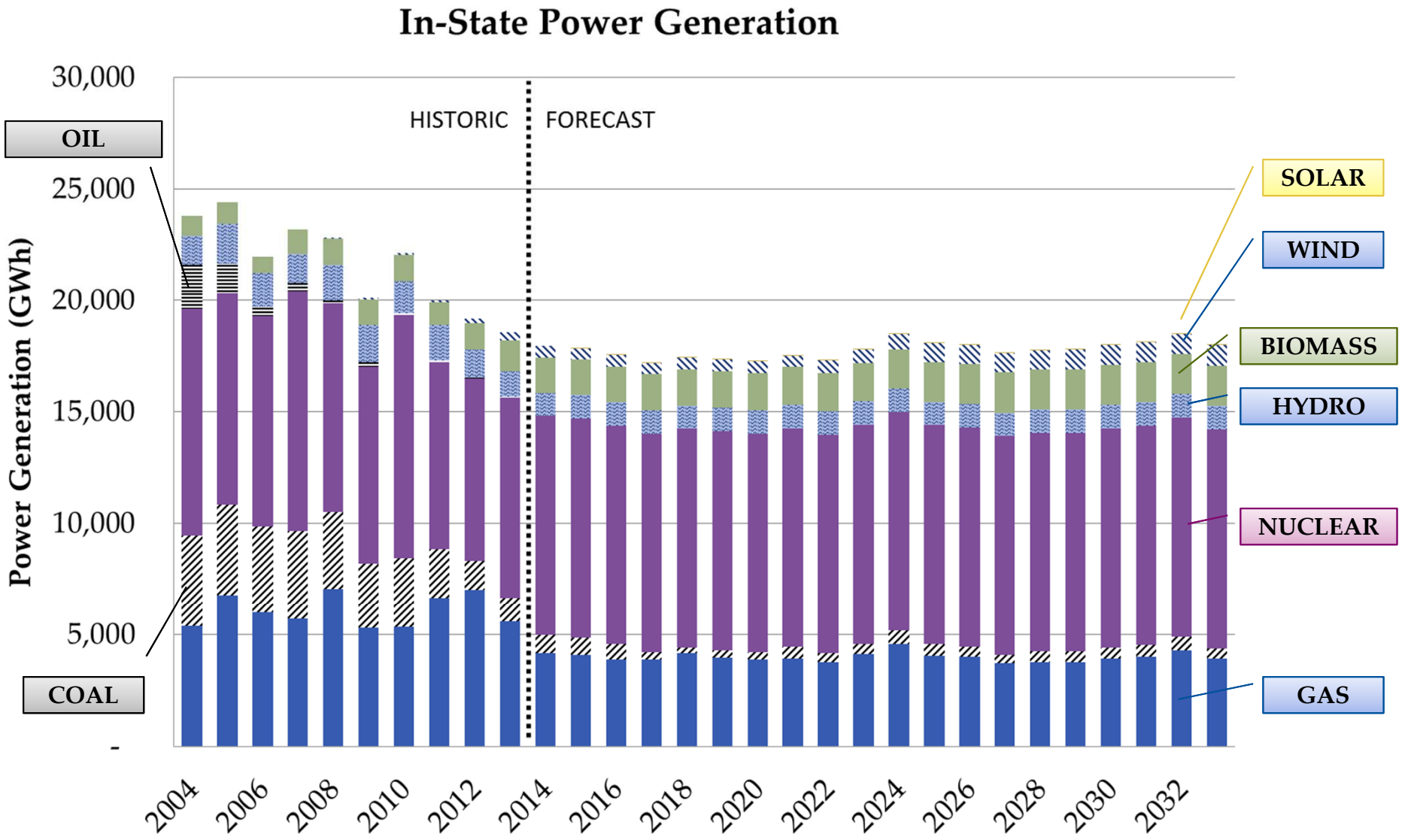

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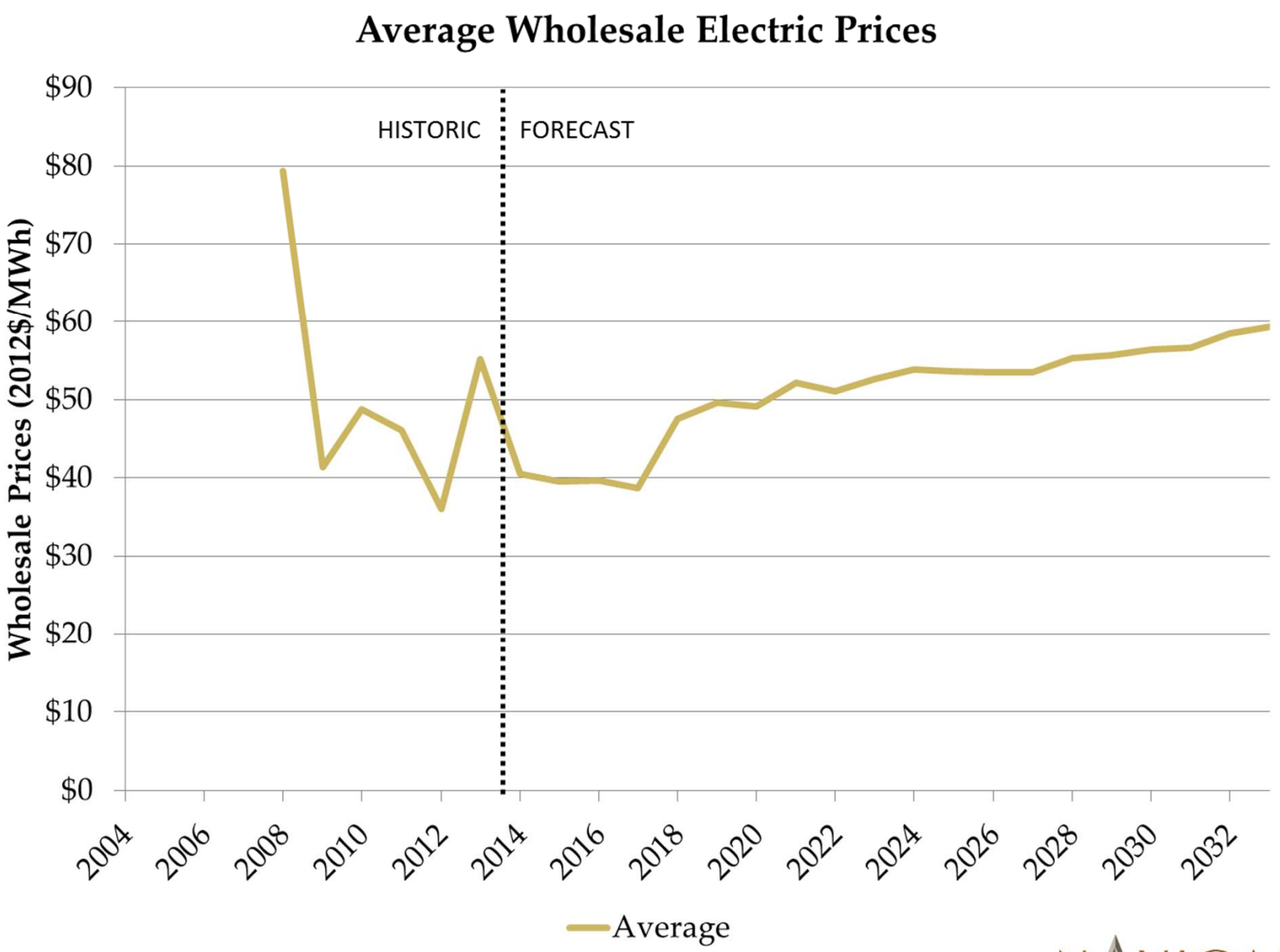

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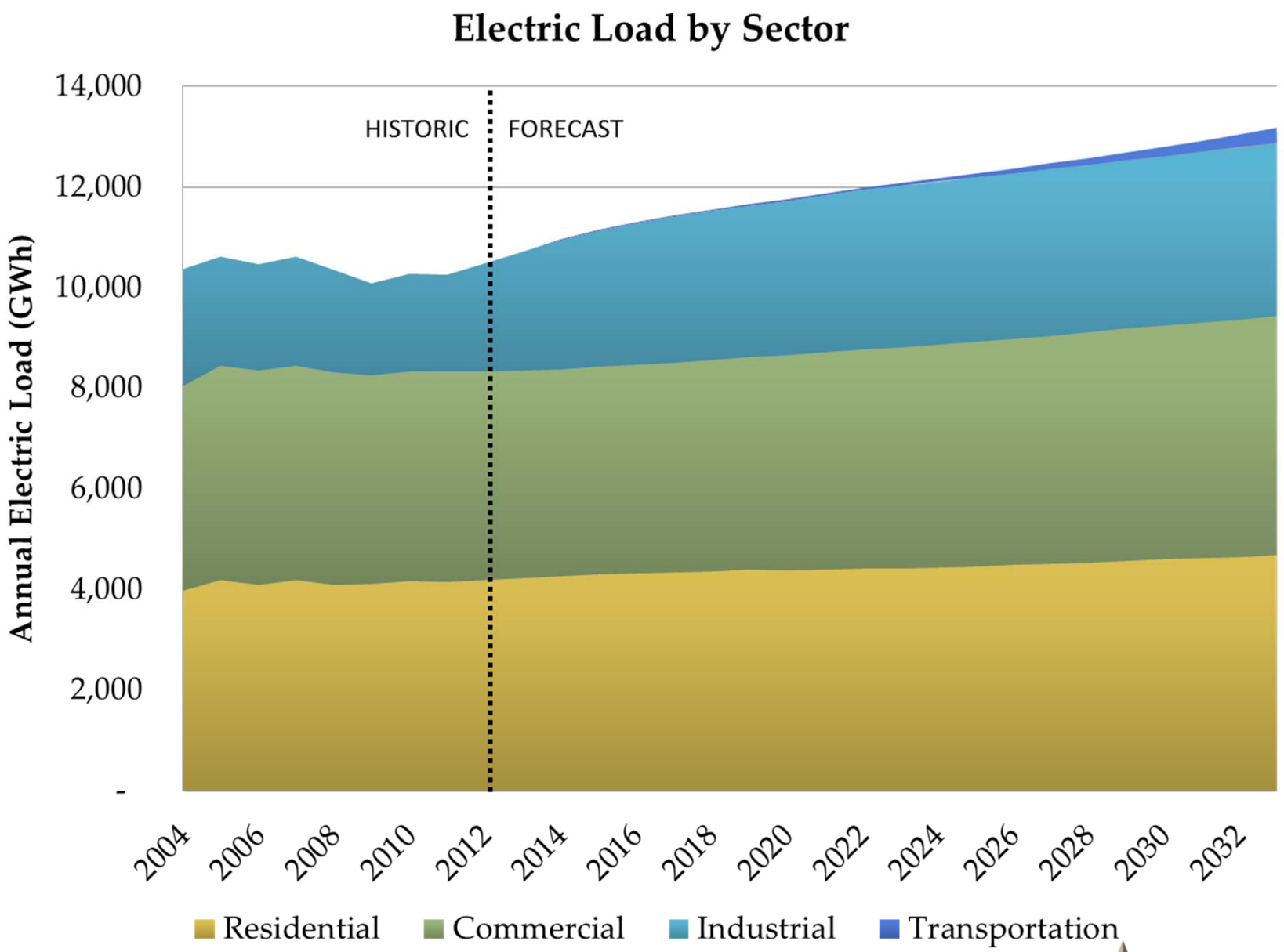

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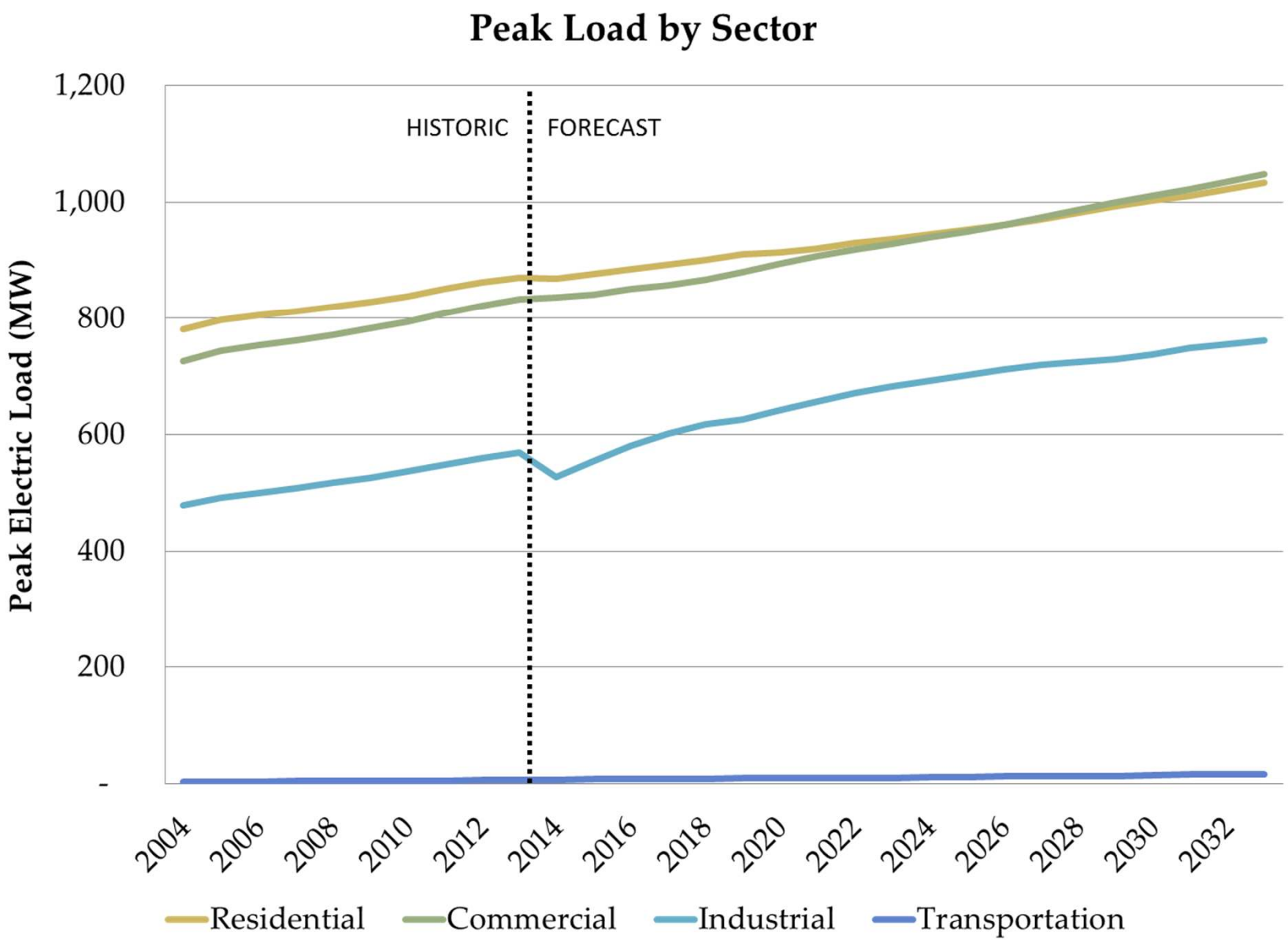

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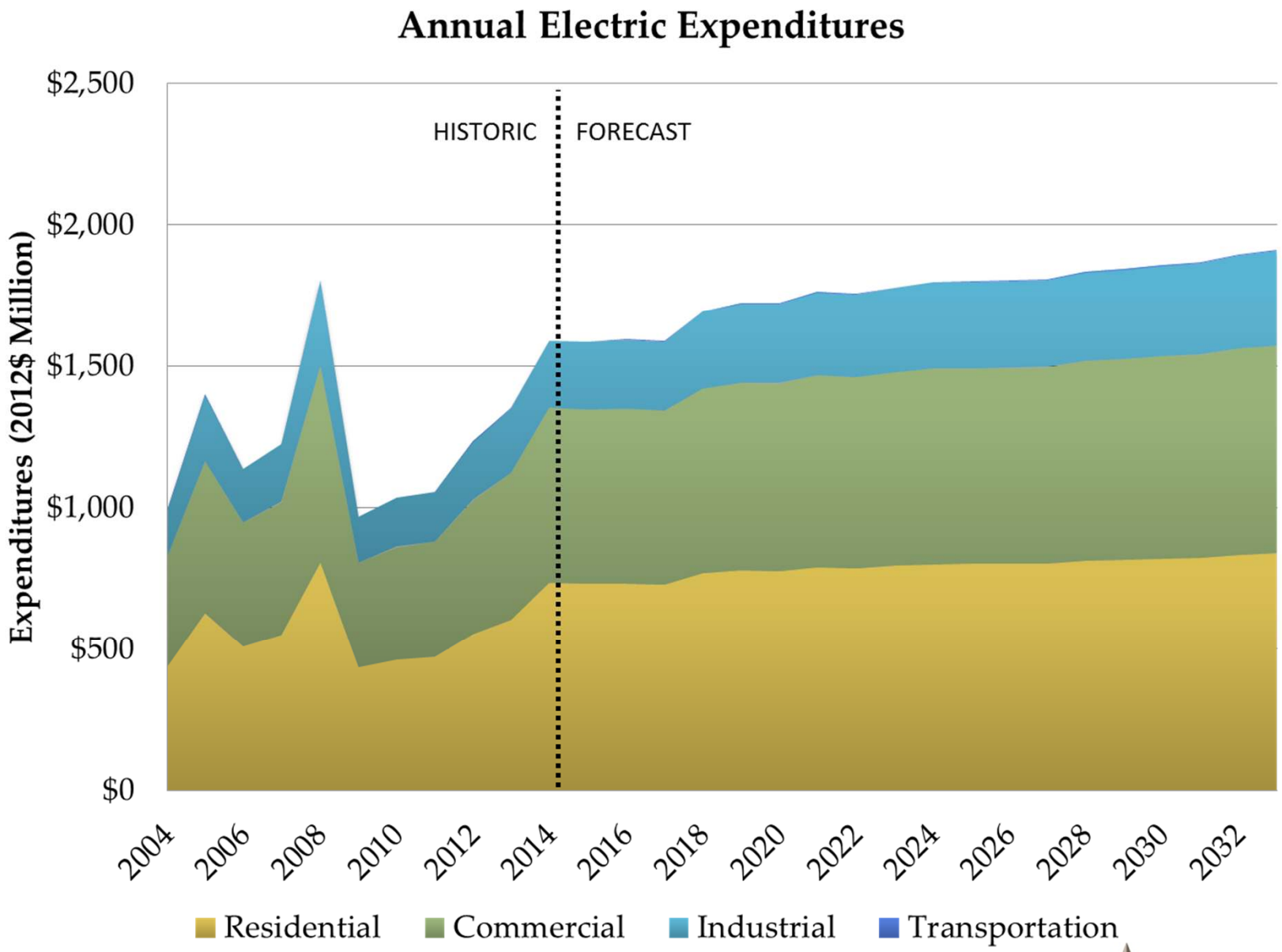

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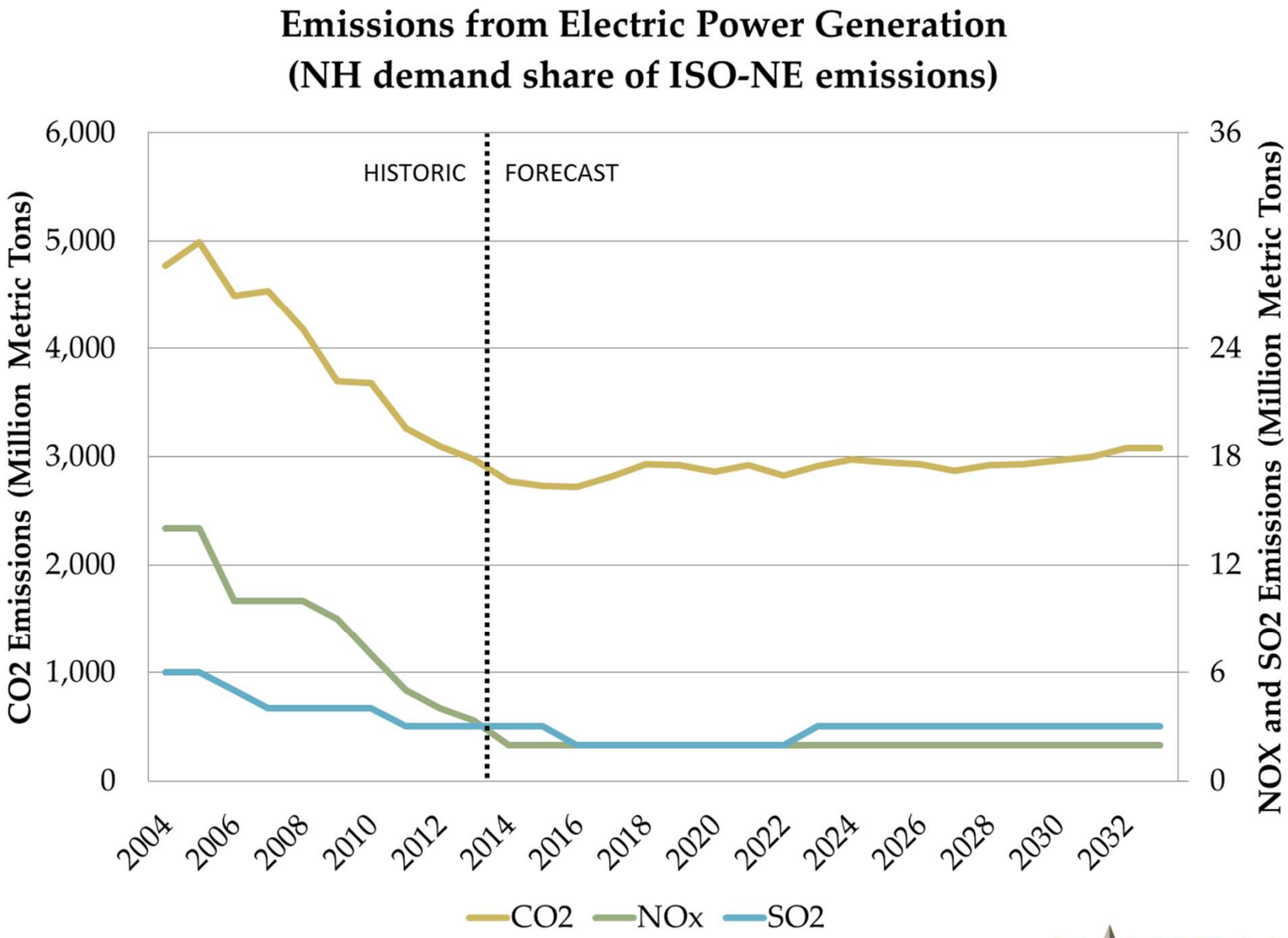

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Navigant relied heavily on the EIA SEDS and AEO as well as population and economic forecasts to inform its estimates for demand, fuel prices, expenditures, and emissions in the thermal sector.

Data

- EIA AEO
- EIA SEDS
- BEA
- DSIRE
- DOE EERE
- Natural Gas & HHO Distribution

Plans, Policies, and Assumptions

- NH RPS – Thermal Carve-out
- CORE NH Energy Efficiency Programs
- NH incentives for biomass, solar, and geothermal

Metrics

- Consumption (BBtu)
- Fuel Price ($/MBtu)
- Expenditures ($Million)
- Emissions (MT)

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Demand and emissions in the thermal sector are forecast to hold steady, whereas fuel expenditures are forecast to rise by 25% through 2033.

Residential

- In reaction to increasing fuel prices, thermal energy consumption is forecast to decline slightly in the residential sector.
- The decline is the greatest among those using oil heat, enabled by fuel switching and efficiency retrofits.

Commercial and Industrial

- Like the electric sector, commercial demand for thermal energy is projected to grow in contrast to industrial demand as the New Hampshire economy shifts.
- Industrial fuel consumption declined in the past 10 years amid a shrinking manufacturing base

Emissions and Expenditures

- Total emissions in the thermal sector are forecast to hold steady through the forecast period as the switch to lower carbon fuels is offset by increases in demand.
- Total expenditures are forecast to increase.

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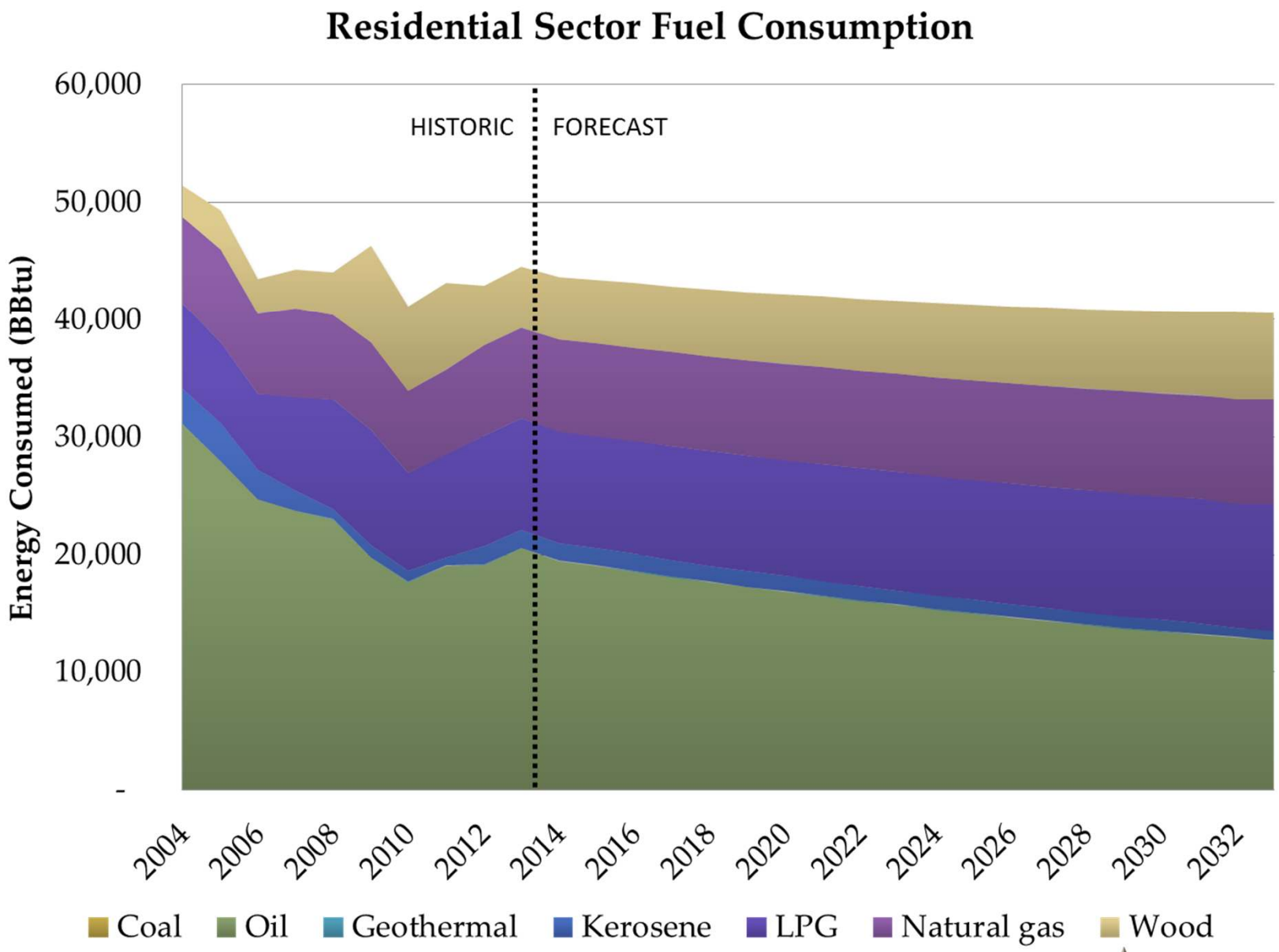

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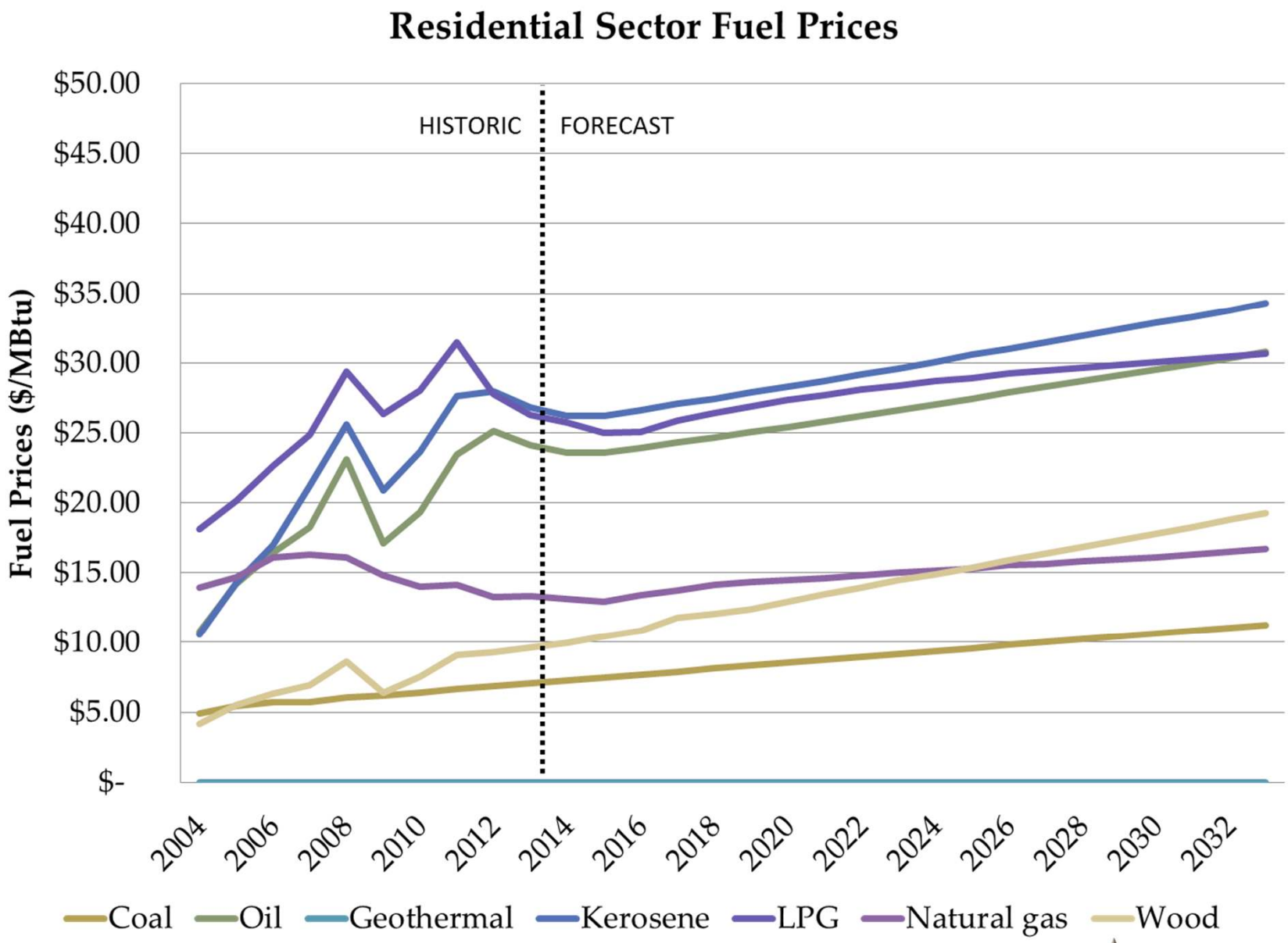

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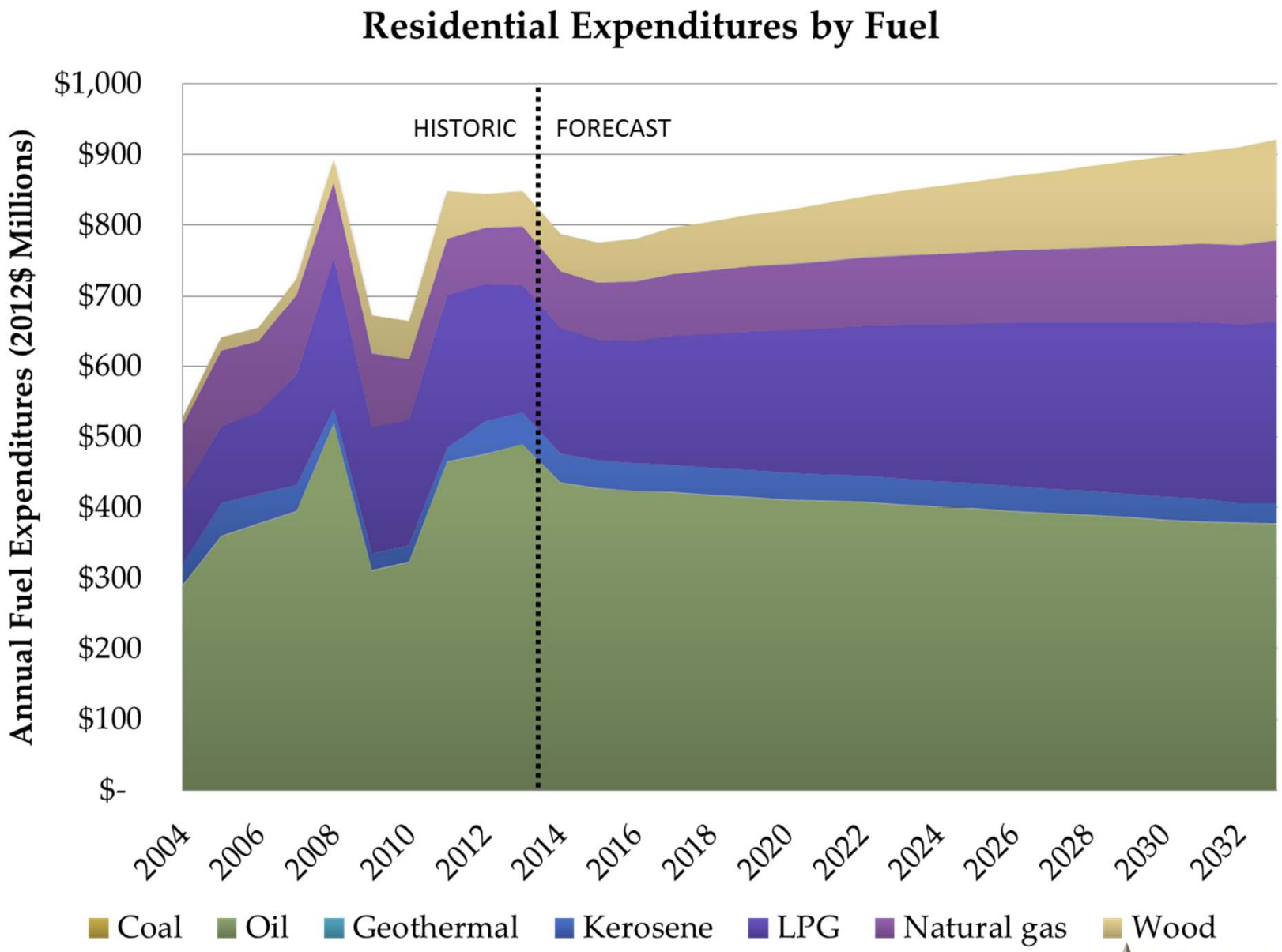

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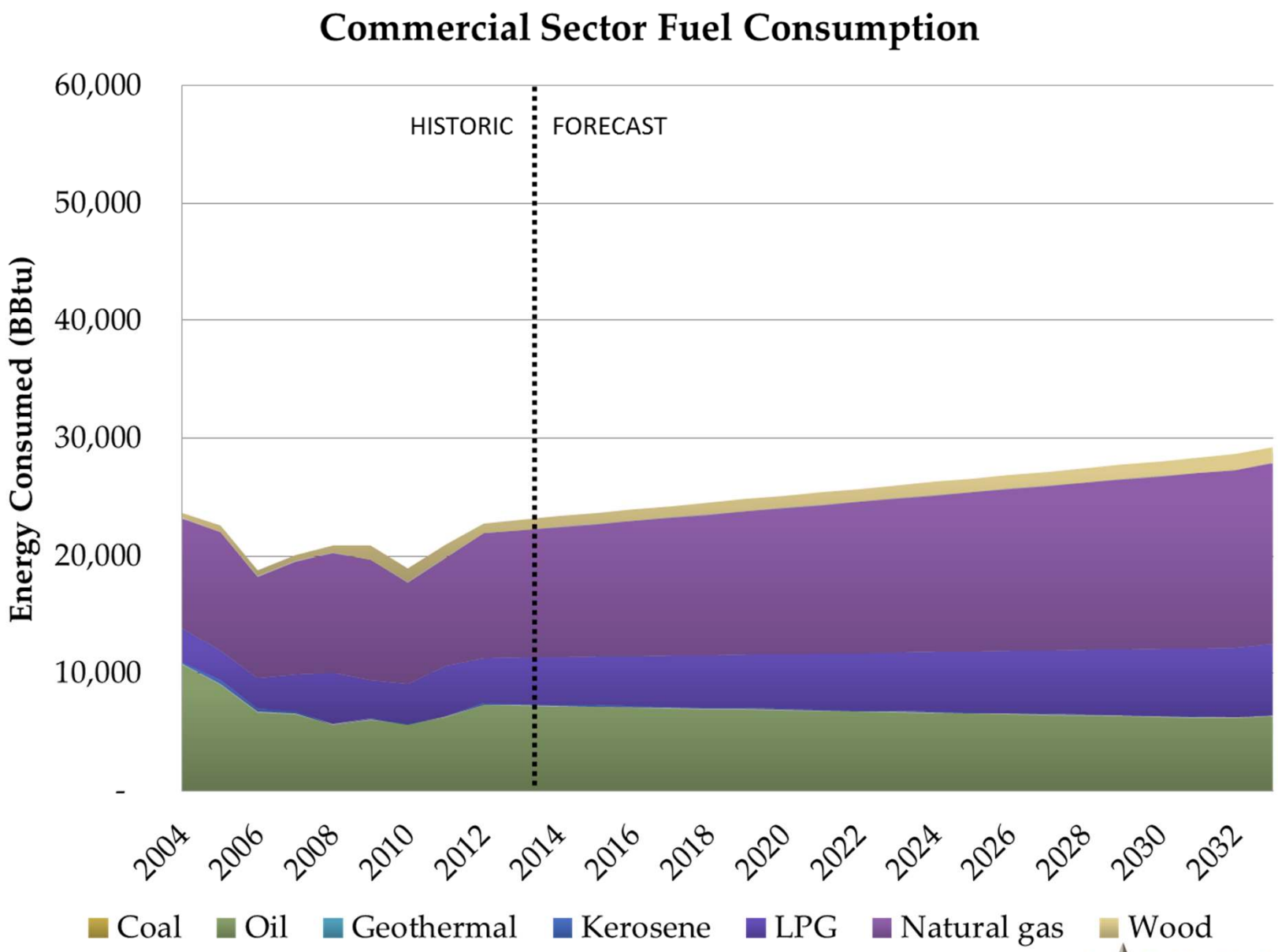

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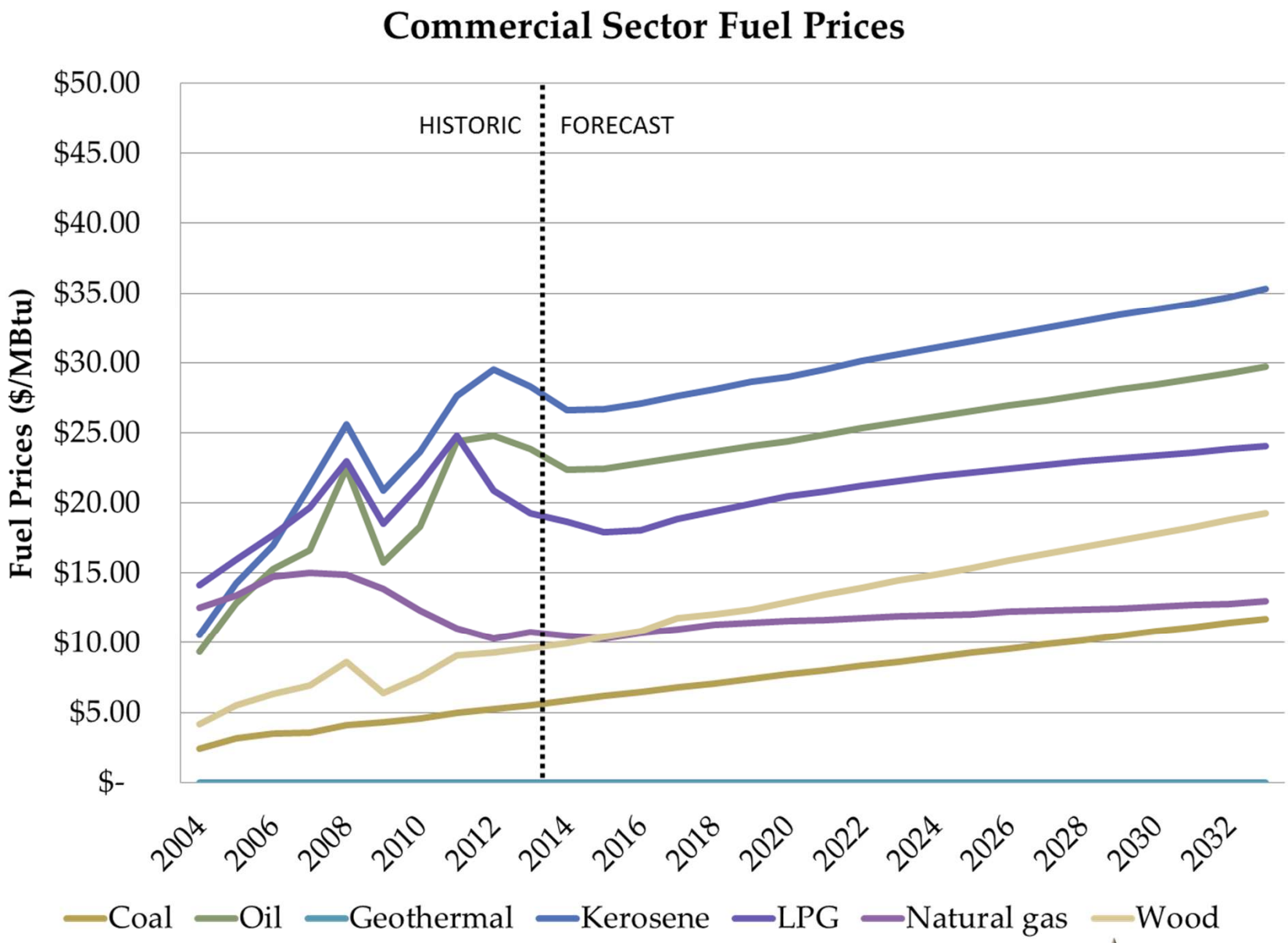

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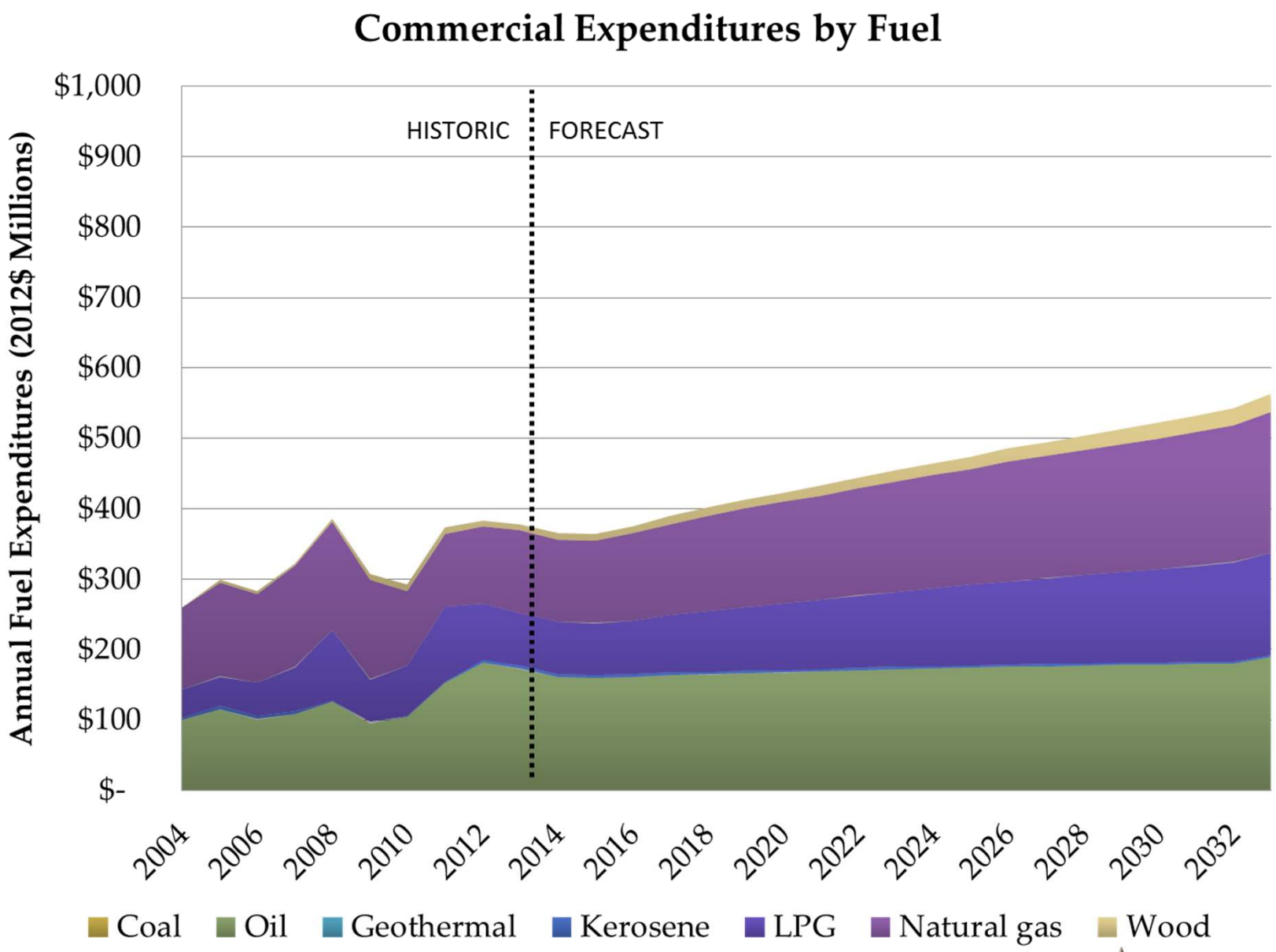

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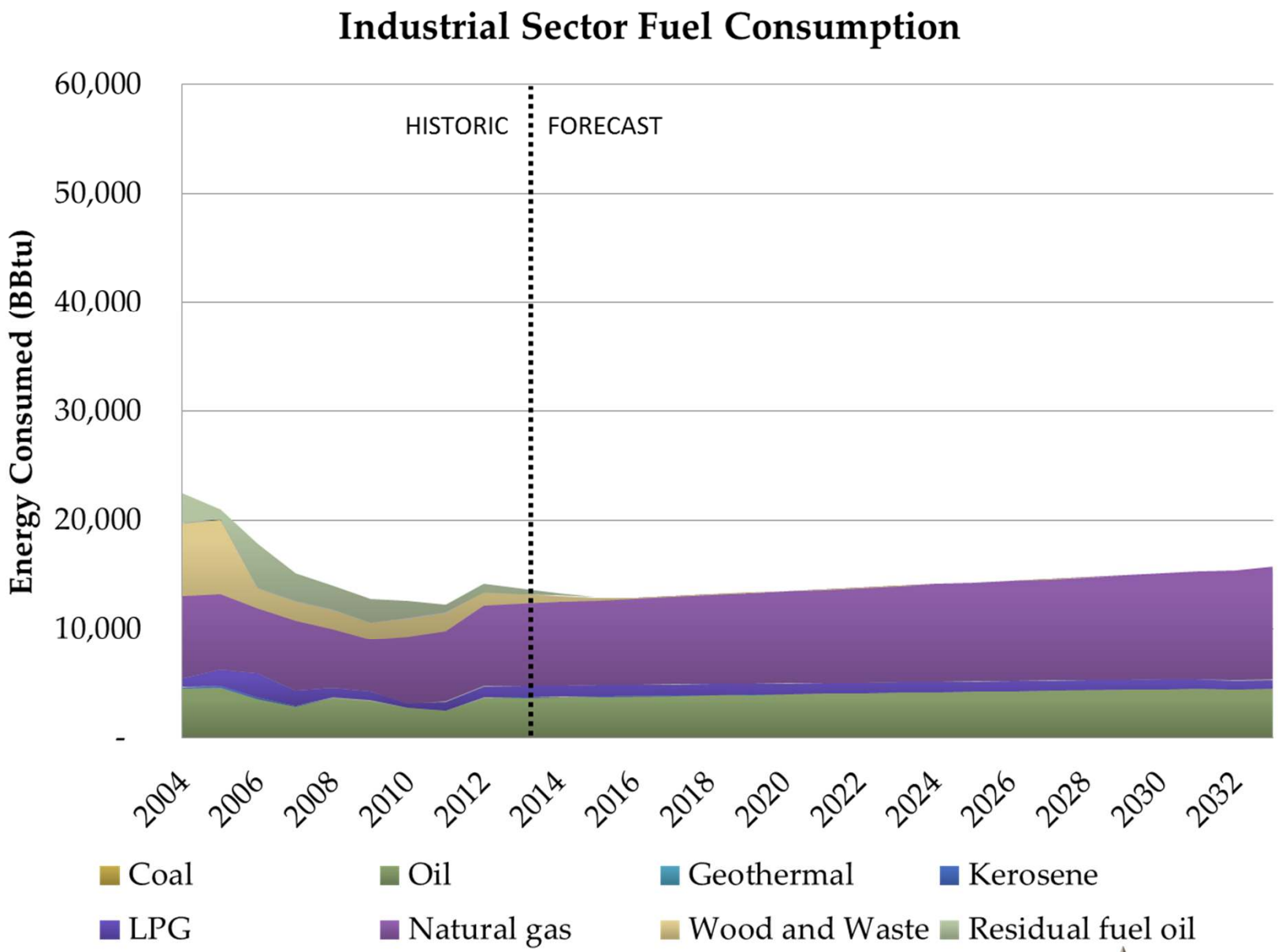

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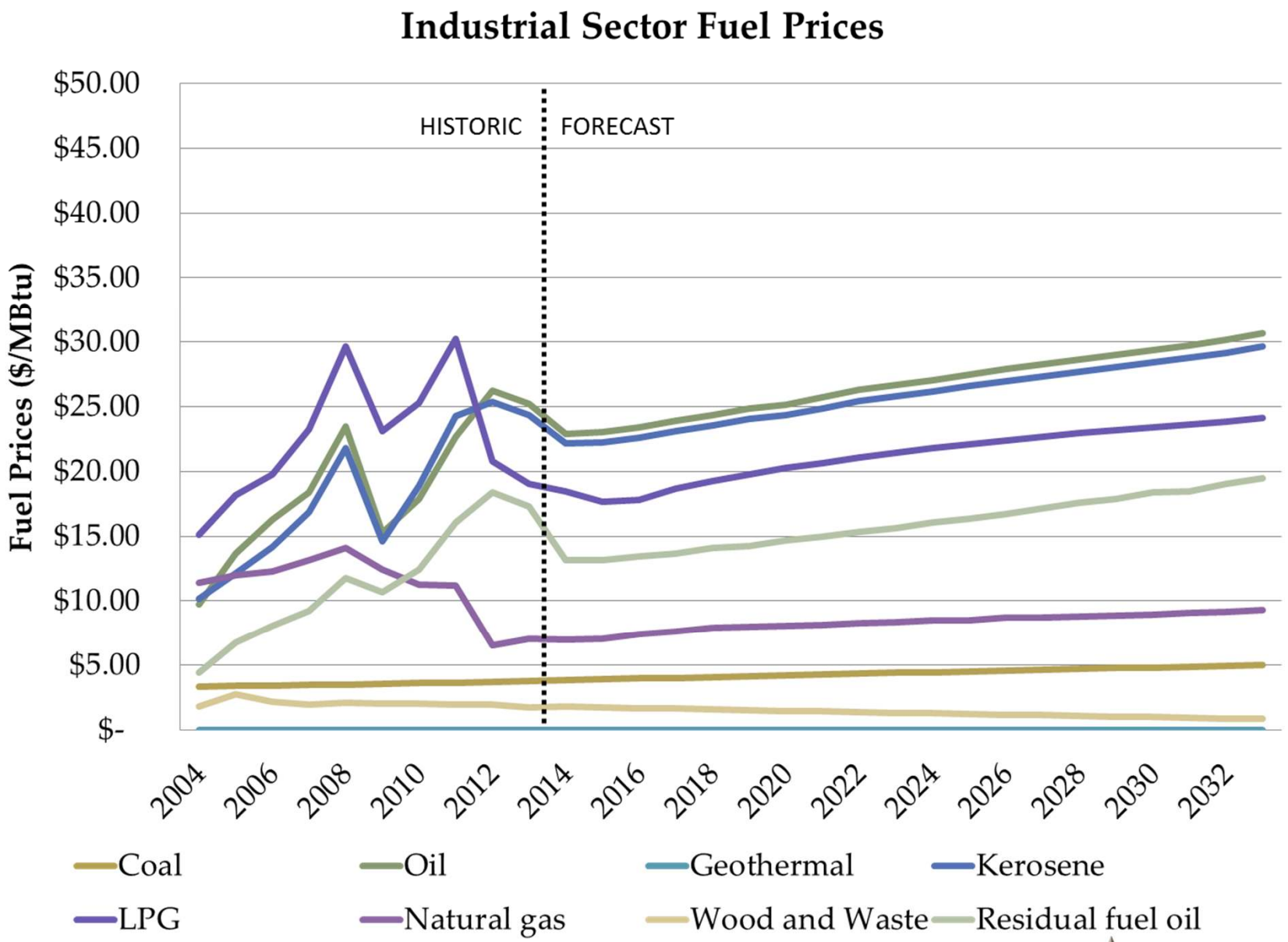

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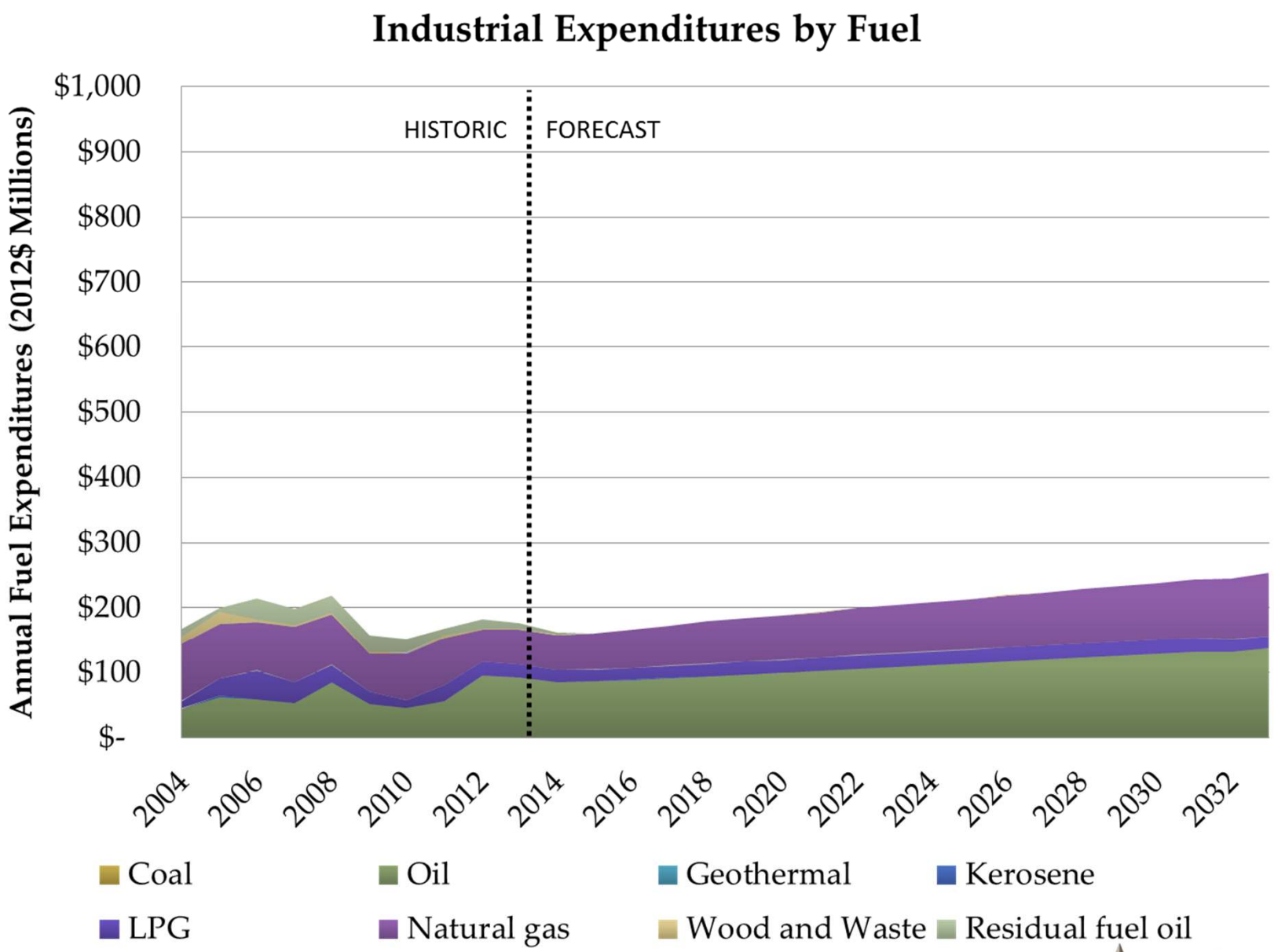

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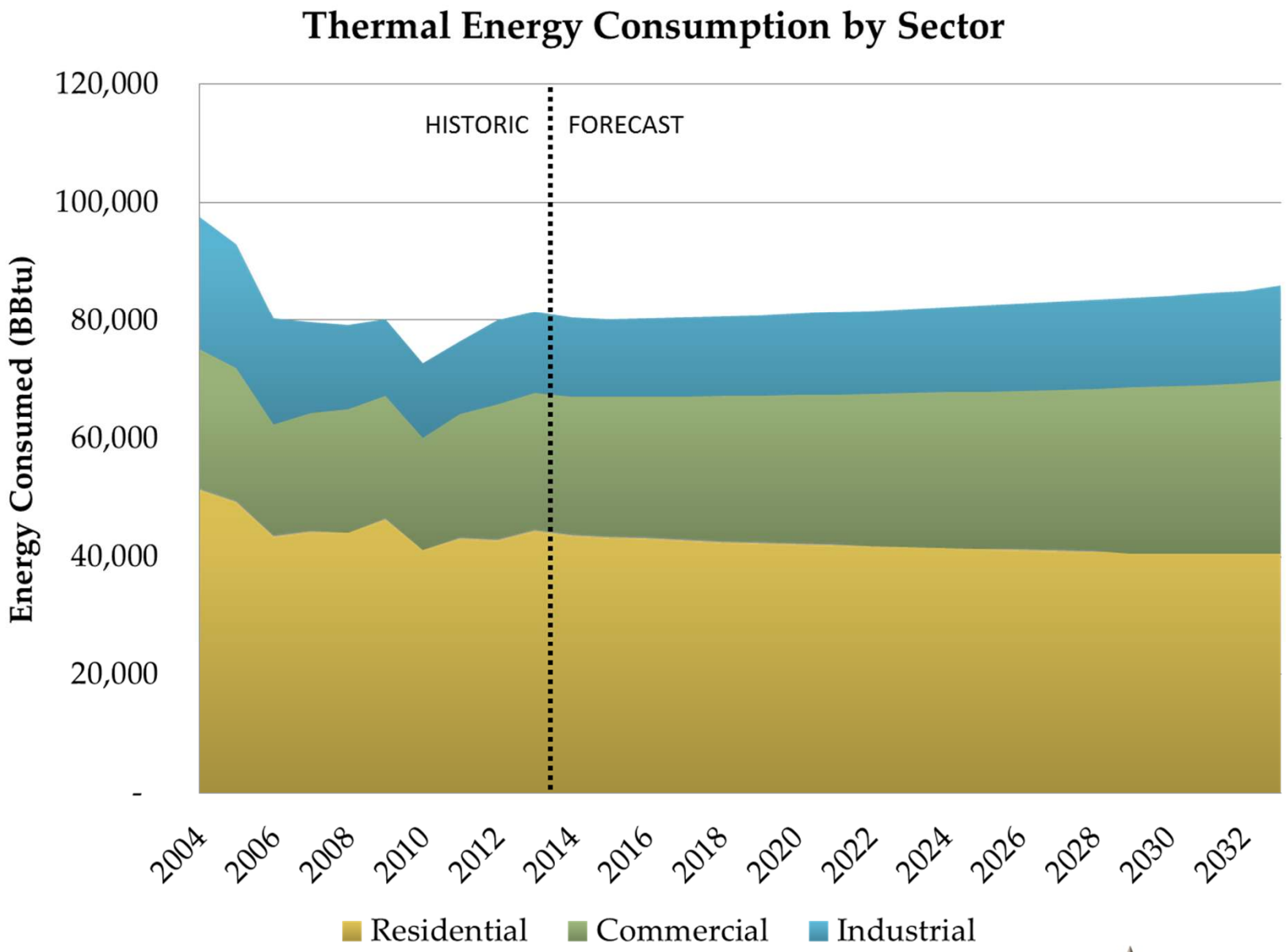

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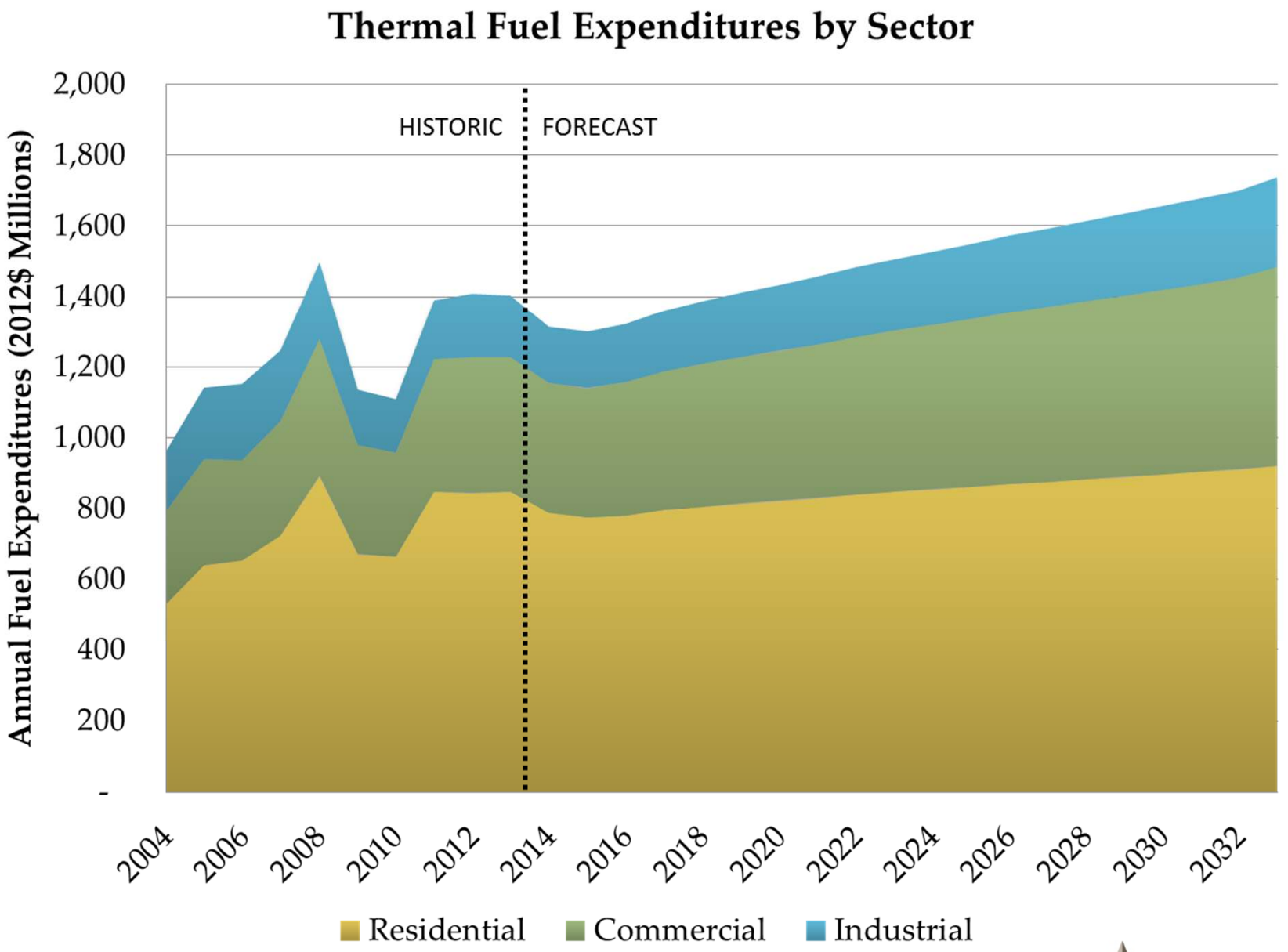

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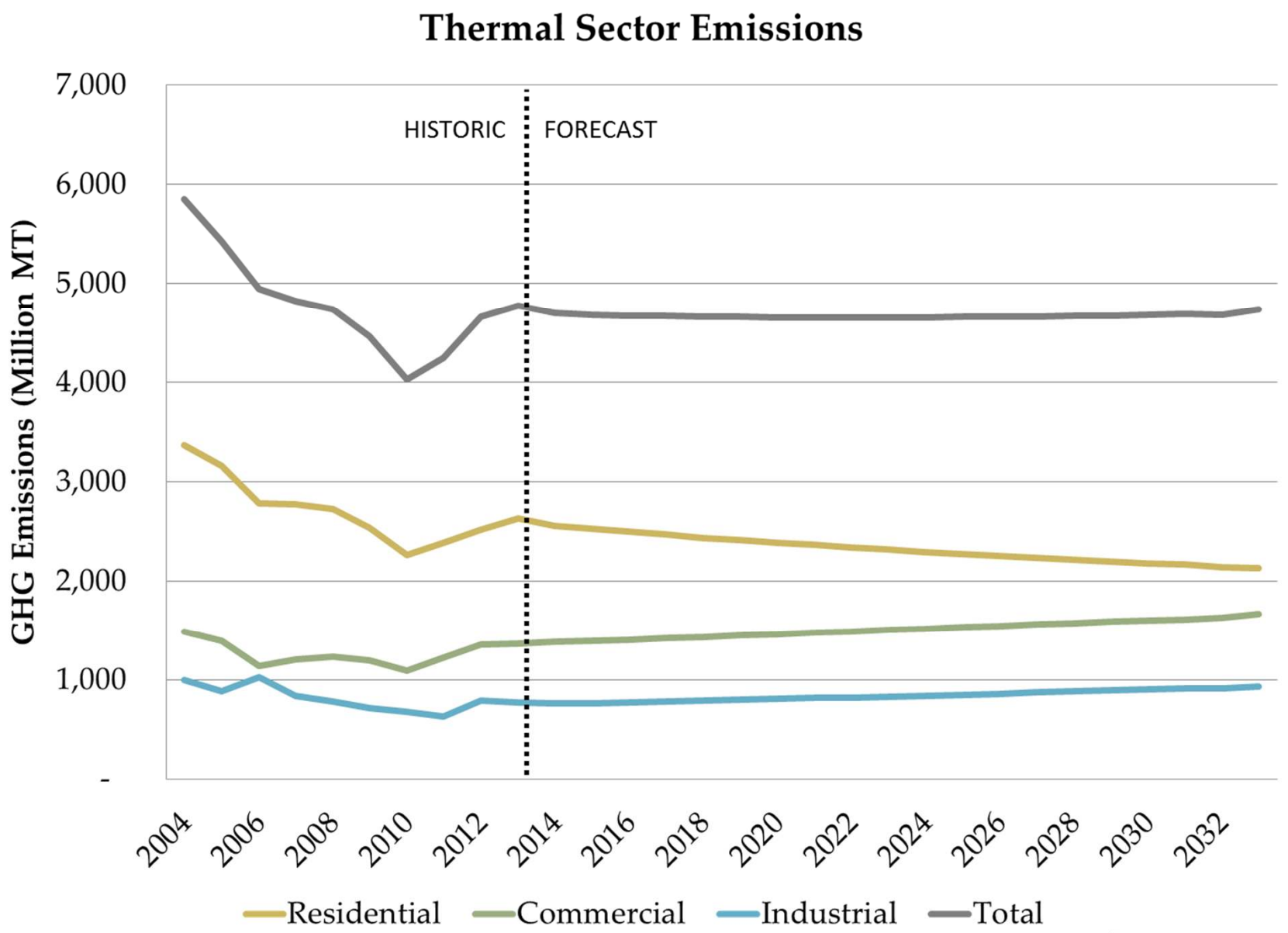

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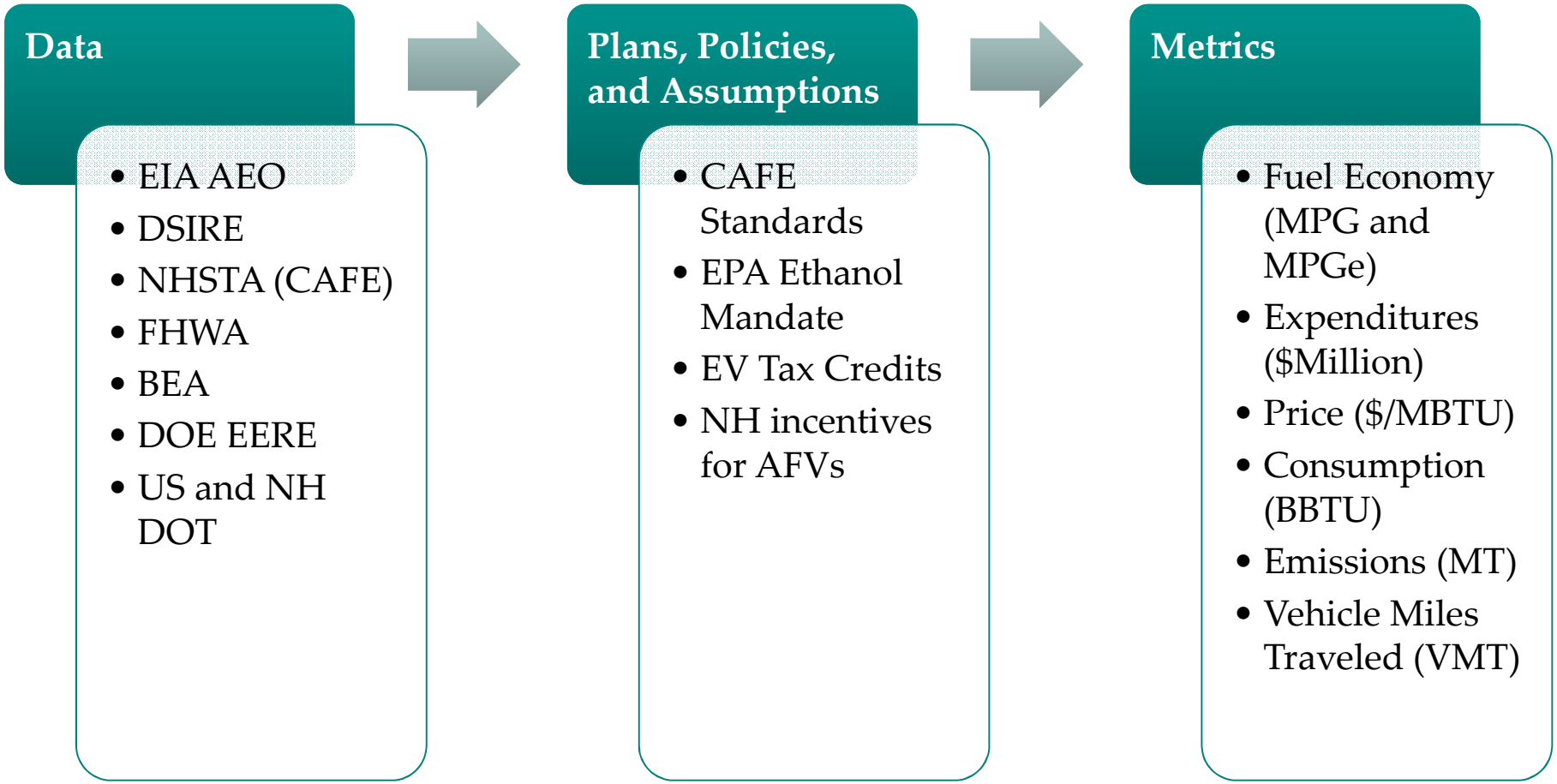
Navigant's forecast for the transportation sector uses a vehicle stock model, and demographic data to estimate miles traveled, fuel consumption, expenditures, and emissions.



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Demand and emissions in the transportation sector are declining due to increases in fuel economy. However, total expenditures are rising.

Fuel Economy

- The increase in average fuel economy of light duty vehicles is the single largest driver affecting energy consumption and emissions in the transportation sector.

Electric Vehicles

- Plug-in Electric vehicles dominate the AFV category, but still only account for a small fraction (7.5%) of total vehicle miles traveled in 2033.

Emissions and Expenditures

- Like the Electric and Thermal Sectors, emissions are forecast to decline, whereas overall expenditures are forecast to increase through 2033.

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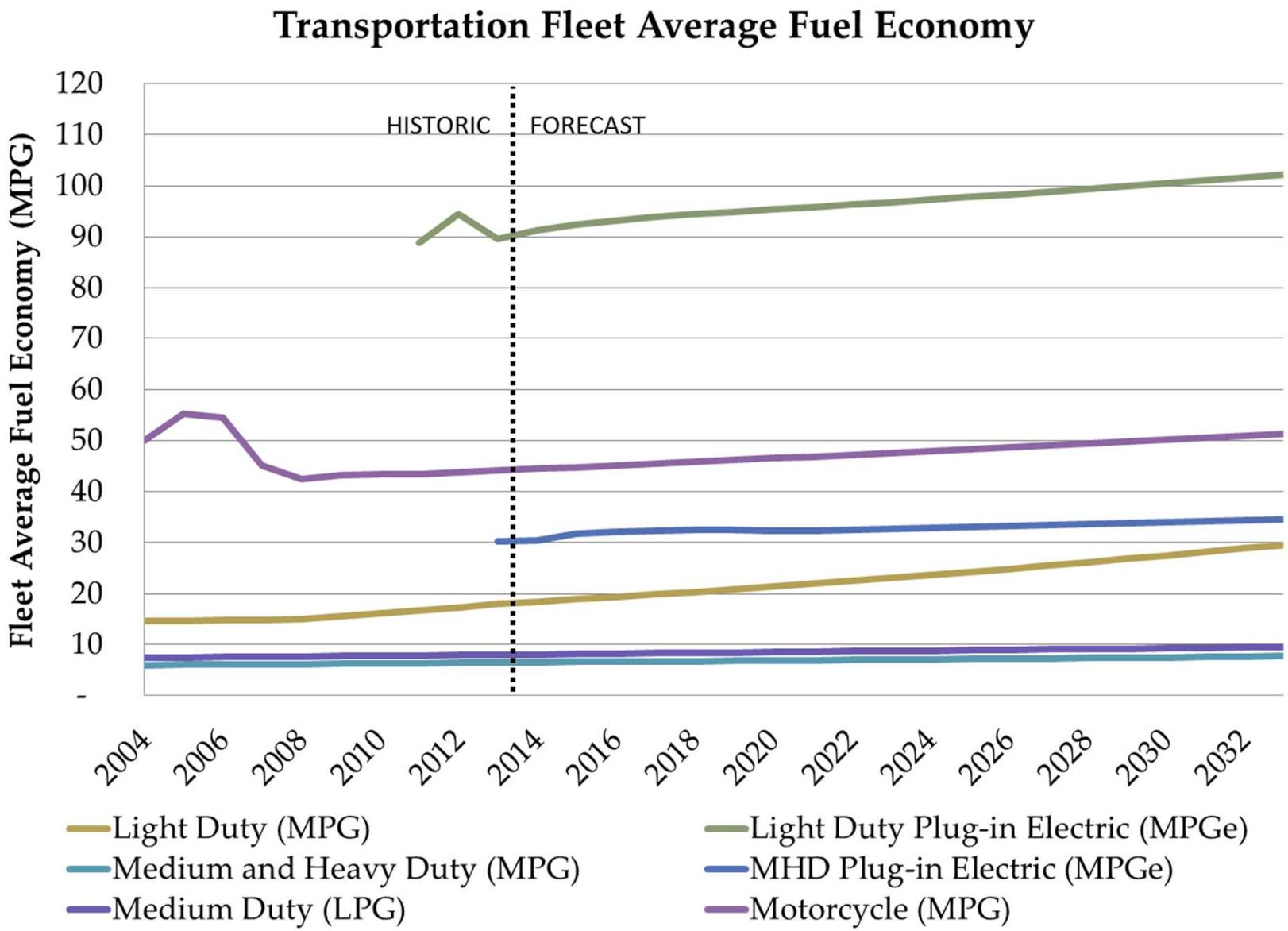

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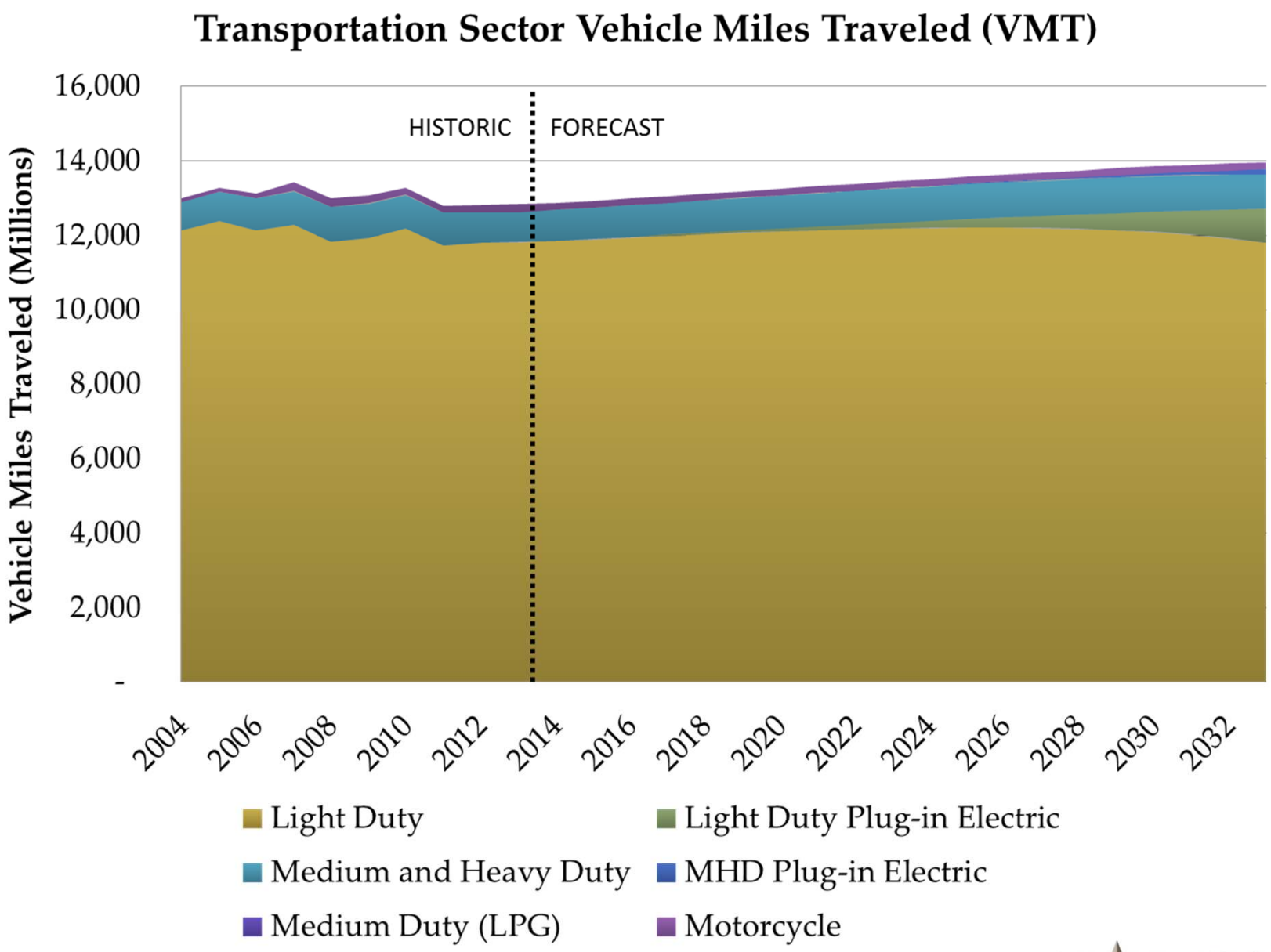

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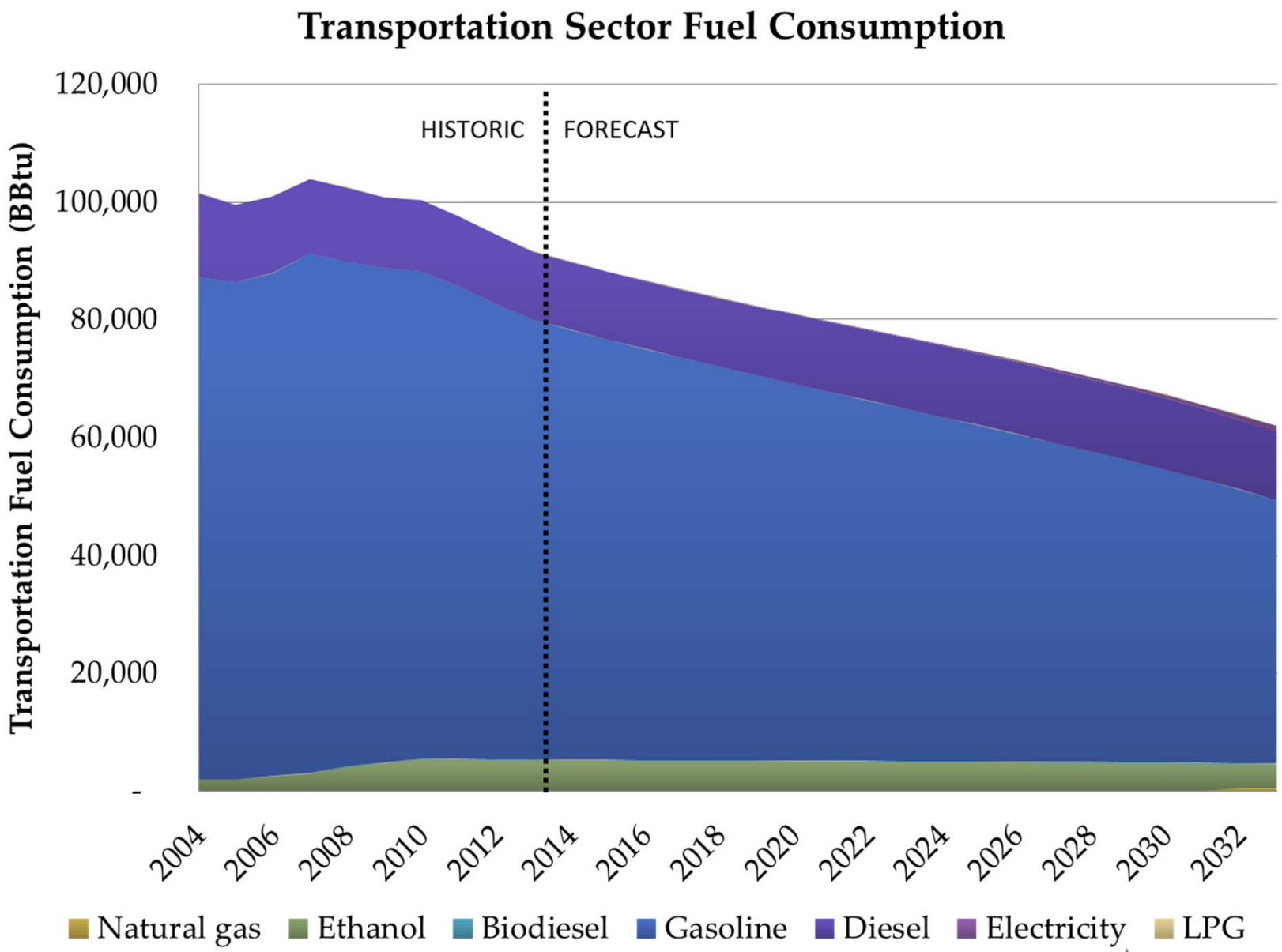

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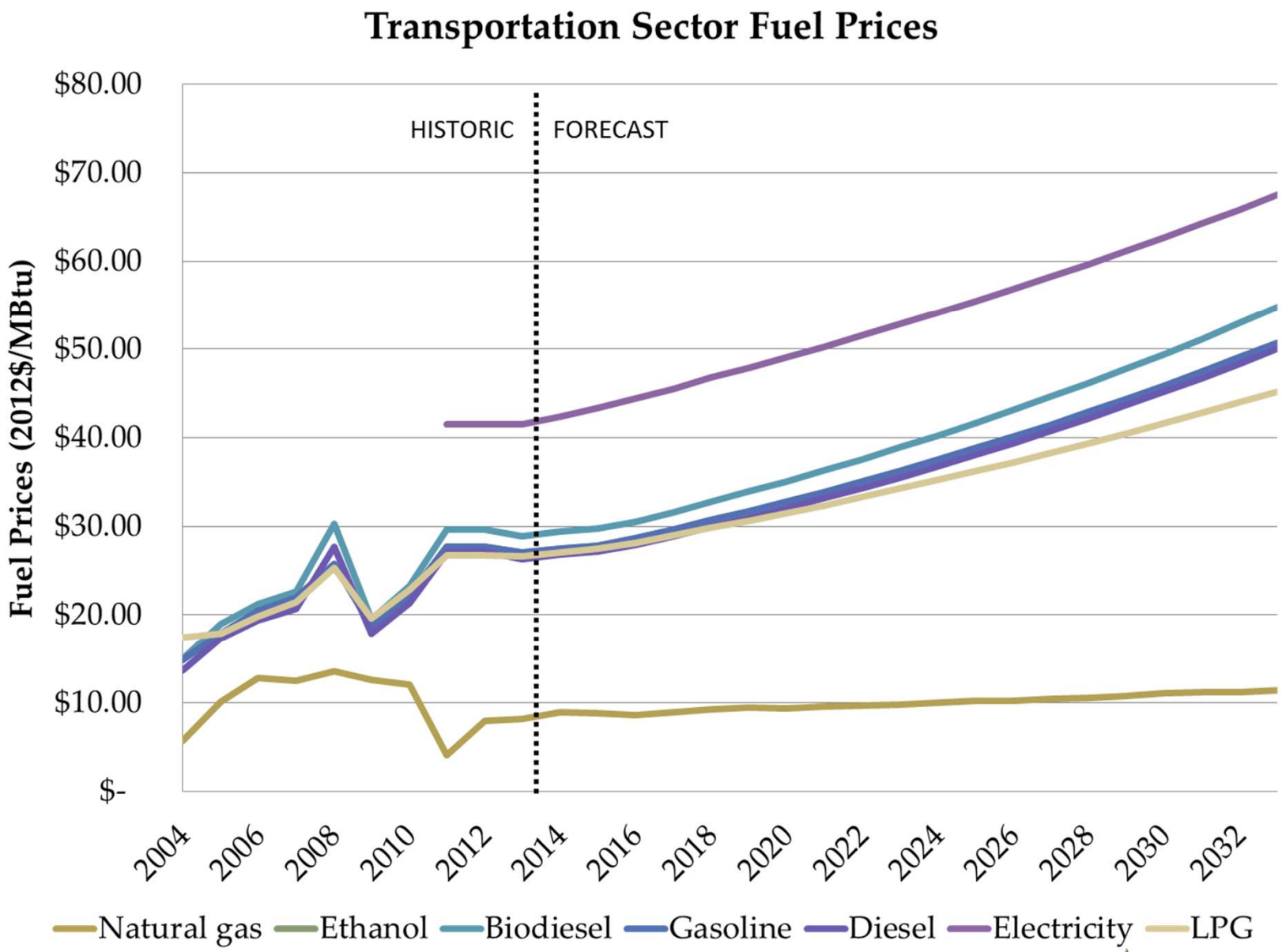

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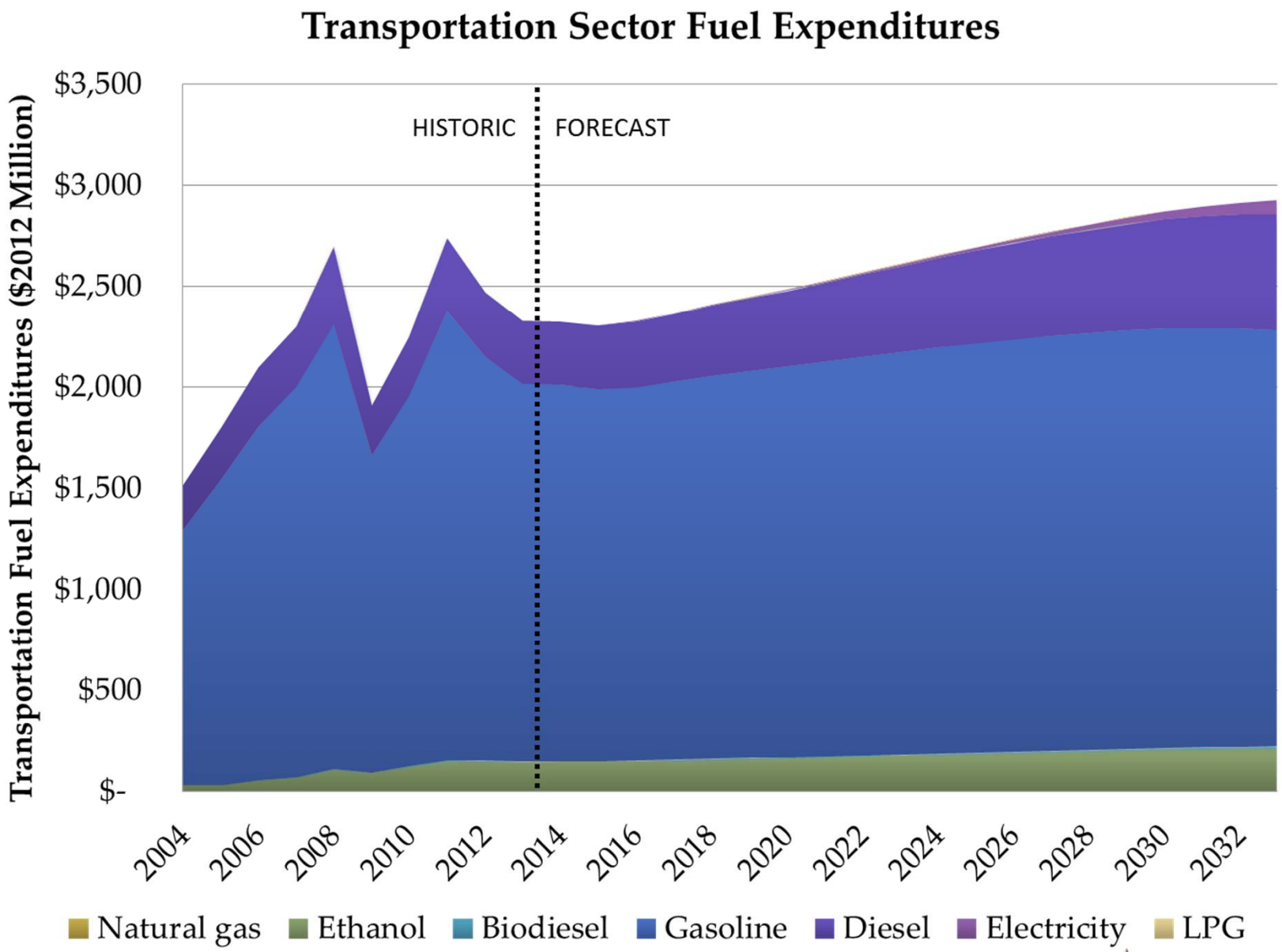

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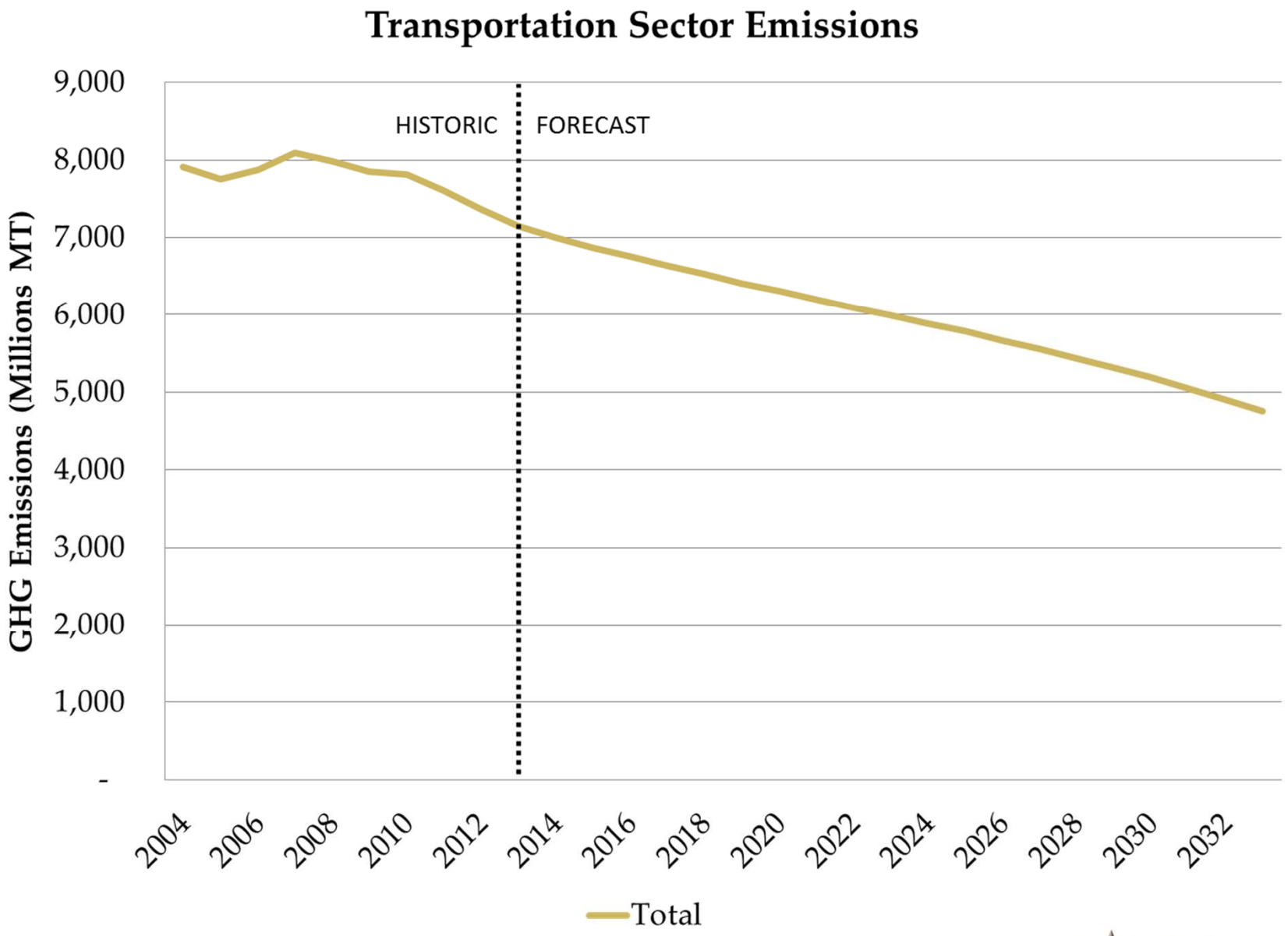

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Where demand patterns differ across the electric, thermal, and transportation sectors, total expenditures are consistently rising.

Electric

- The power generation profile in NH is getting cleaner, driven by both environmental regulation and fuel economics.
- Gains in efficiency are largely offset by the increasing electric demand associated with a greater number of households, and the number of devices and appliances per household.

Thermal

- The thermal energy sector offers one of the most promising opportunities for gains in efficiency and cost containment.
- Recent price volatility in home heating oil is pushing customers away from this fuel, resulting in lower expenditures in the forecast.

Transportation

- Additional reductions in emissions and expenditures in the transportation sector will likely require changes in consumption patterns and alternative modes of transportation.

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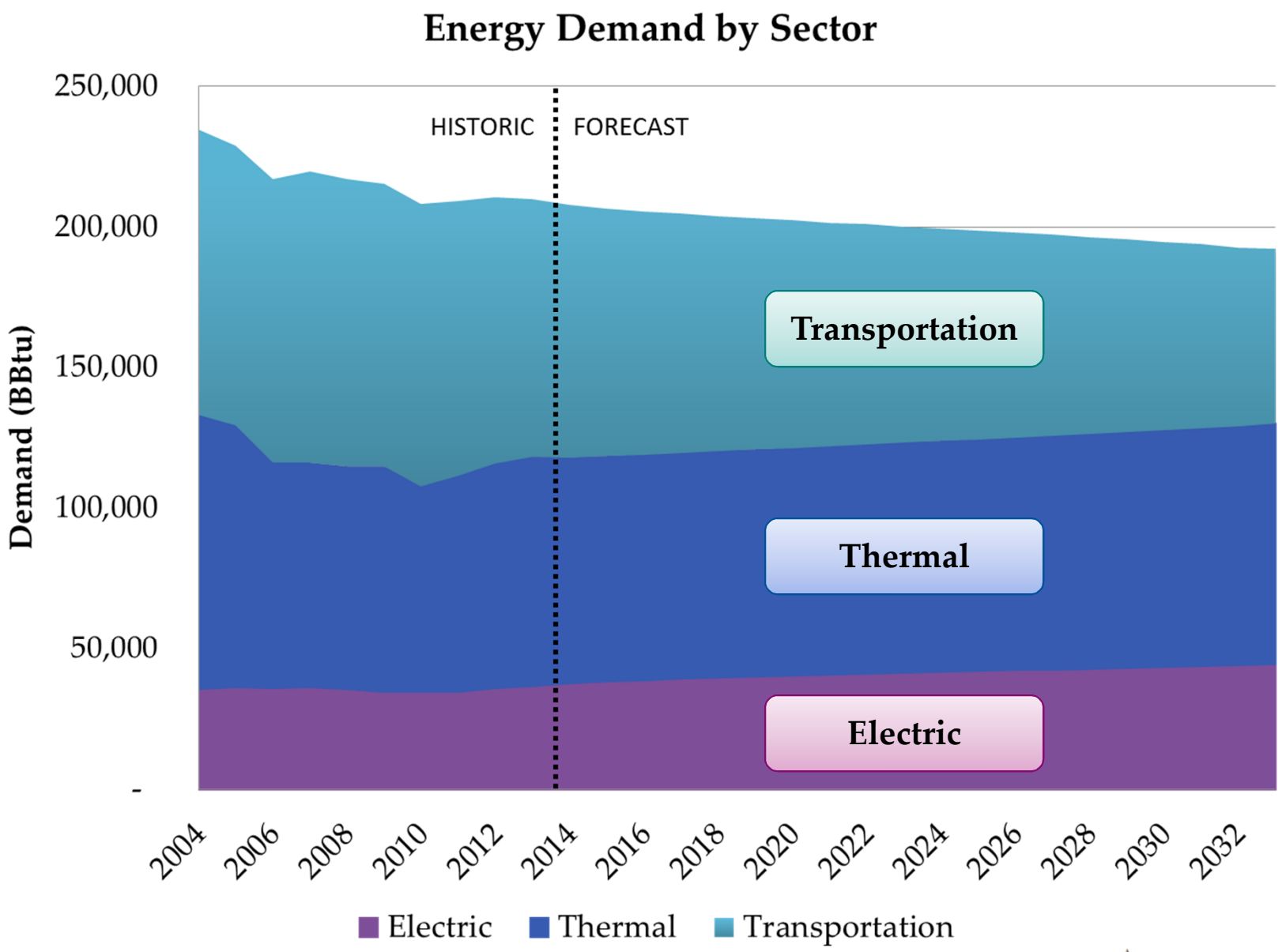

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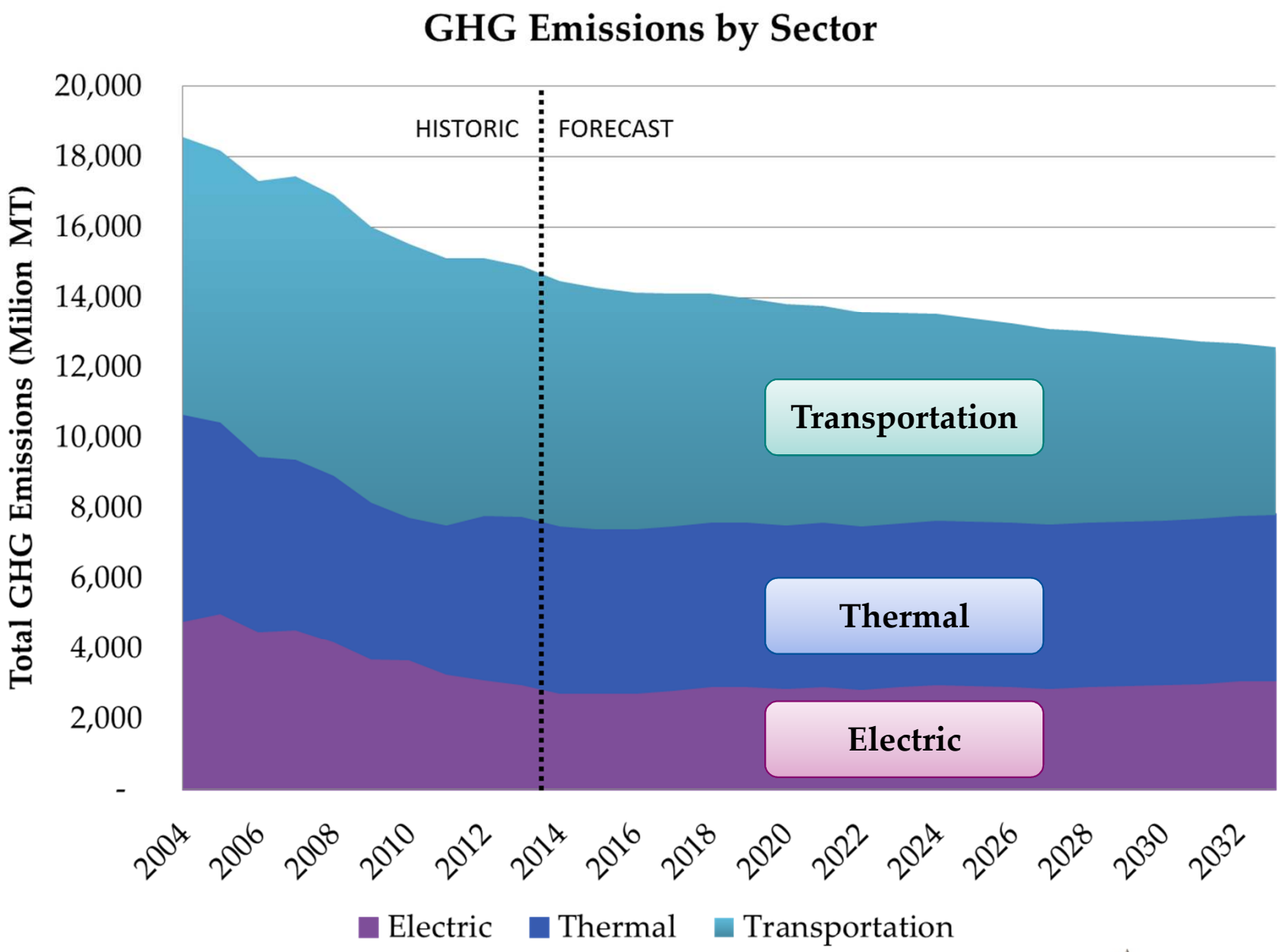

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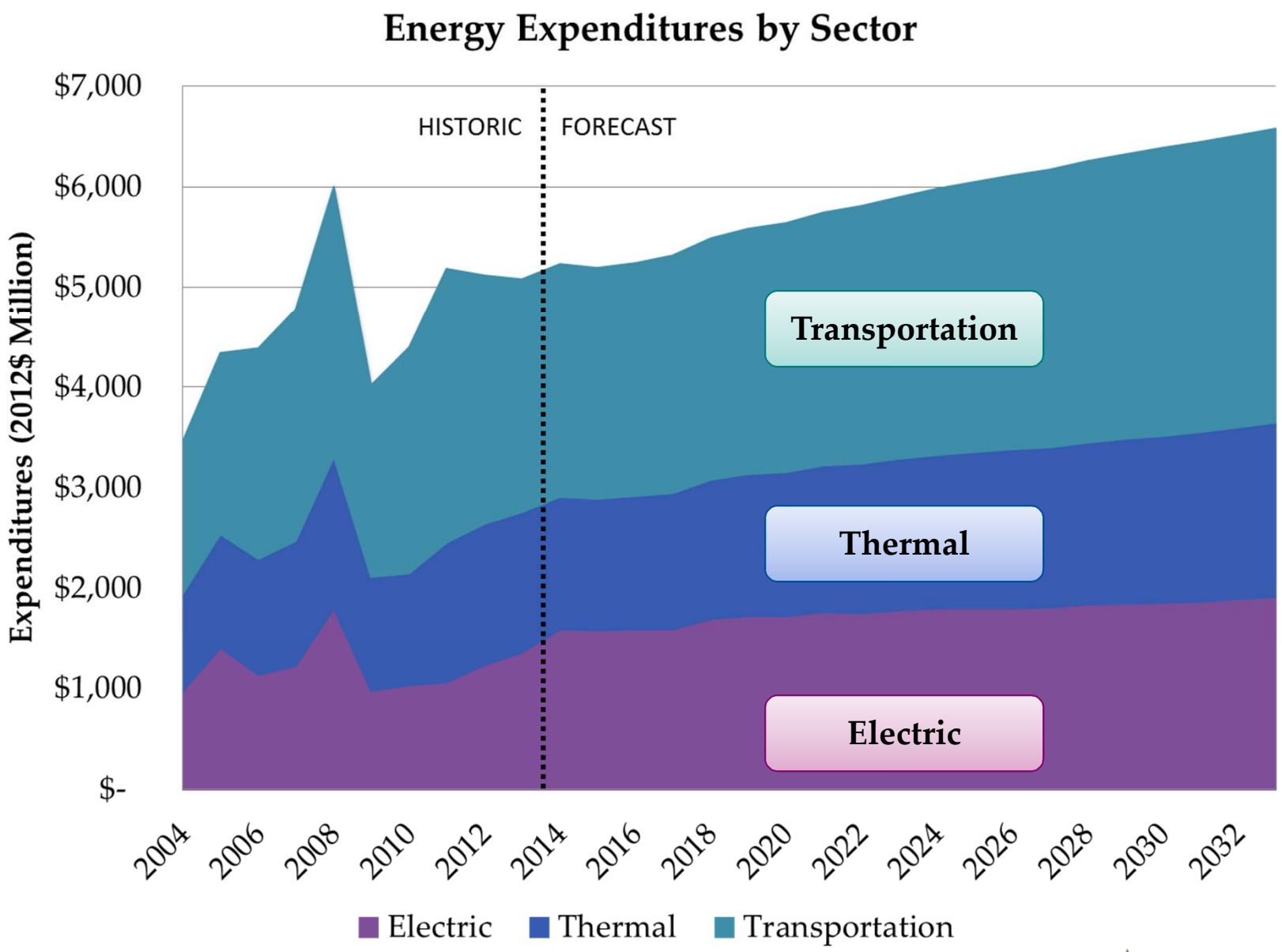

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Navigant will host a Webinar to solicit stakeholder feedback and finalize the Baseline forecast and outline the process for the Energy Vision.

Stakeholder Feedback on Baseline Forecast

- Navigant will host a Webinar on Tuesday January 28th at 1:30 PM ET to solicit additional stakeholder feedback.
- We'd appreciate all feedback to be submitted by close of business on Monday, February 3rd.

Task 2 – Final Baseline Forecast

- Navigant will revise the Baseline Forecast and present on the revisions during the February 10th meeting of the SEAC.

Task 3 – Energy Vision

- Navigant will introduce the process in the February 10th meeting and present a straw-man energy vision.
- Roundtable discussions with the SEAC covering this straw-man are slated to take place on February 21st.

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Task 3: Navigant will help the SEAC develop an energy vision informed by a study of resource potential and the input of stakeholders.

In Task 3, Navigant will:

- Review and consider relevant studies and plans of key stakeholders in New Hampshire
- Evaluate the energy resources at New Hampshire's disposal and assess the potential of these various resources
  - The list will be comprehensive, divided by sector (electric, thermal, and transportation), and will include a high-level technical potential quantification.
- Assess the viability of different resource options using stakeholder's input
  - Stakeholder input will be critical for this phase as it will allow for the development of a meaningful energy vision for New Hampshire.
  - Navigant will guide the energy vision development process by providing estimates of the impact different energy resources on the agreed upon metrics.

Deliverable: The outcome of Task 3 will be an energy vision (an end-state to work towards) for New Hampshire.

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