



Fossil Fuels and Energy Security

Fossil Fuels in the APERC Region: A U.S. Viewpoint

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Key Takeaways

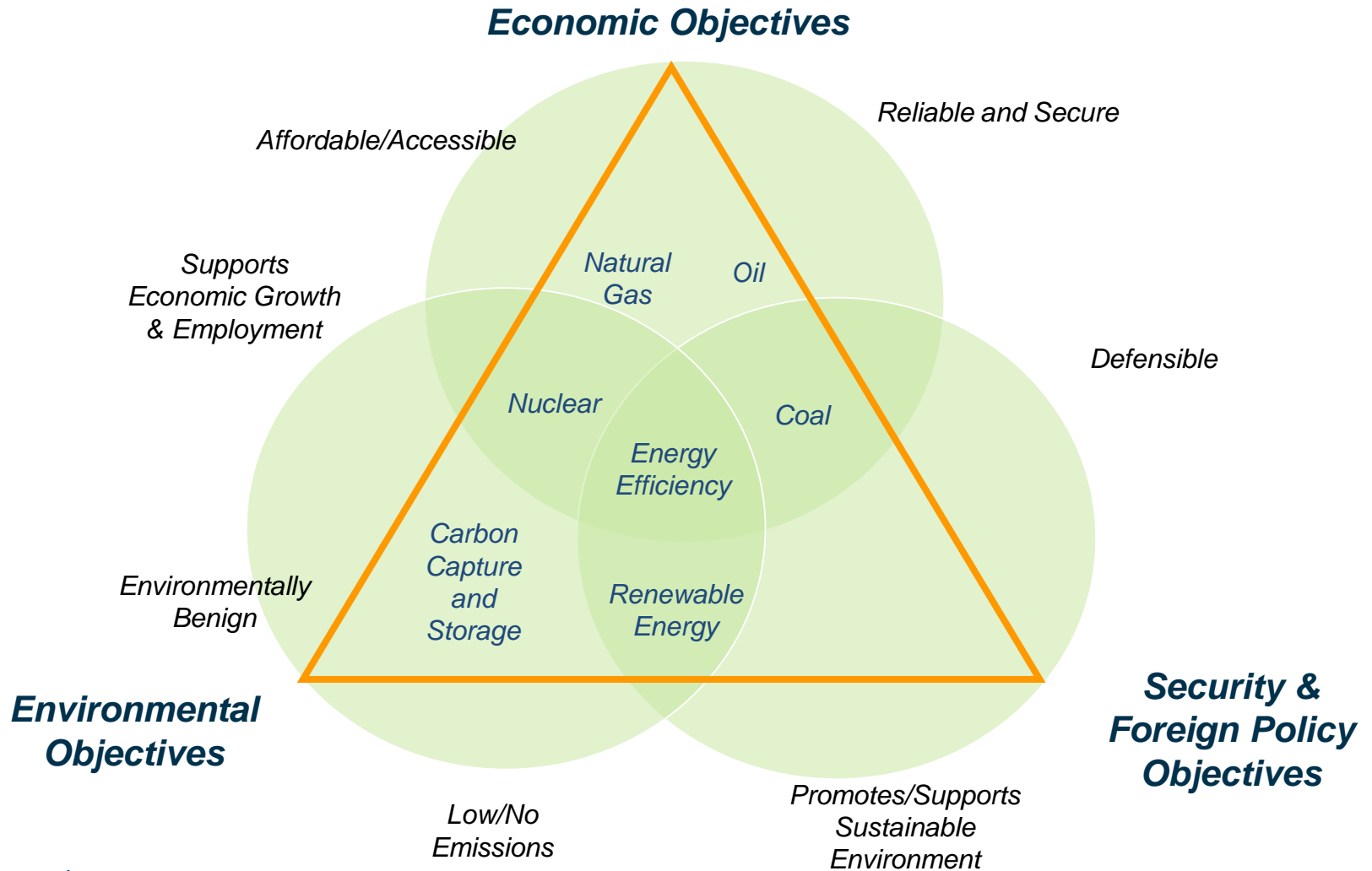
- Energy security is a function of risk management
- Energy policy must consider economic objectives and environmental considerations in addition to security
- APERC energy security envisions cleaner fuels and the decoupling of energy consumption from economic growth
- APERC total fossil fuel supply projections fall slightly (86%→83%) over the period to 2040, but absolute amount rises
- U.S. total energy use in EIA reference case only grows 5% over 2016-2040, with natural gas and renewables rising most
- Elimination of the U.S. Clean Power Plan could keep coal use from falling by 1/3 over the period to 2040
- Low-price U.S. gas could reduce use of coal and renewables

Energy Security = Risk Management

- **Identify Hazards**
- **Minimize Exposure:** avoid, reduce
- **Diversify Exposure:** by fuel, use, and geography
- **Shift Exposure:** insurance, contracts, joint ventures
- **Assess Continuously**

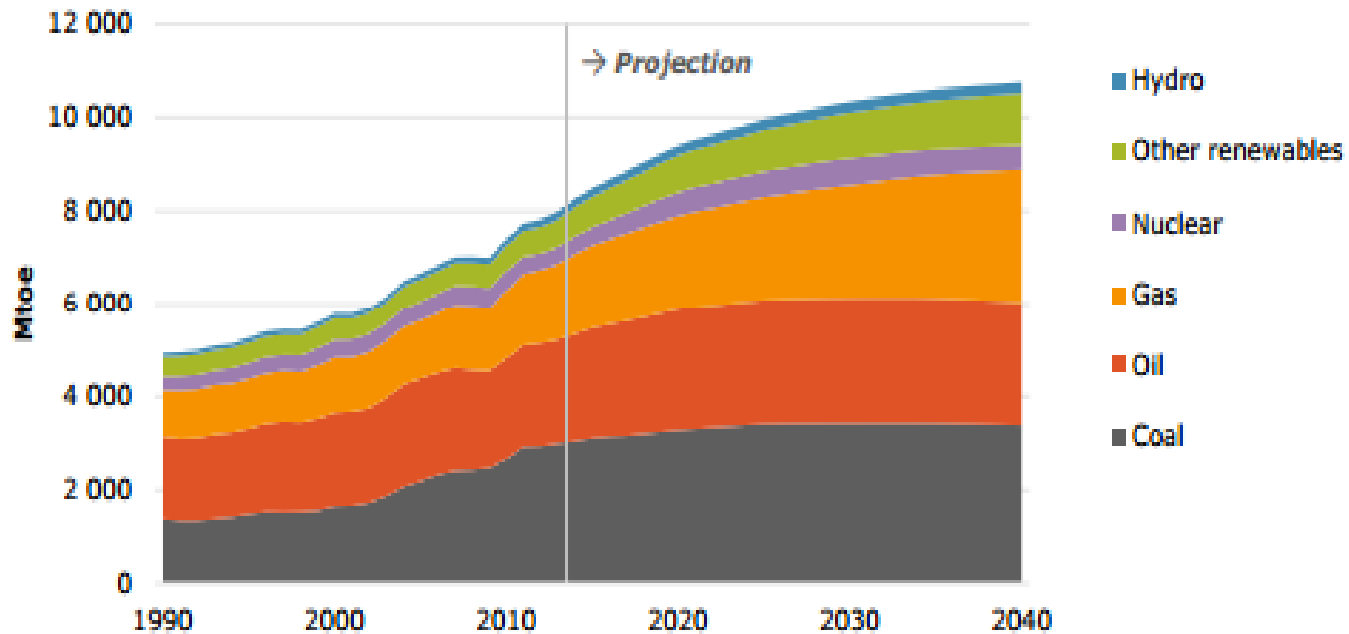
- Change in the fuel mix toward pipeline gas and LNG improves fuel diversity but comes with less supply-chain experience
- Low prices have: helped consumers, hurt producers, and made fossil fuels marginally more attractive than renewables
- U.S. policies intent on shifting away from fossil fuels are being reconsidered

Energy Policy Has Multiple Objectives



APERC Energy Outlook 2016

Figure 3.2 • Total primary energy supply by fuel, 1990-2040



Sources: APERC analysis and IEA (2015).

- Total supply growing 1.1%/year to 2040, rises by 35% over 2013-40
- Southeast Asia growth overtakes China growth after 2030
- Efficiency and conservation expected to decouple use from economic growth

APERC Energy Outlook 2016

Table 3.1 • Share of total primary energy supply by fuel, 1990-2040 (%)

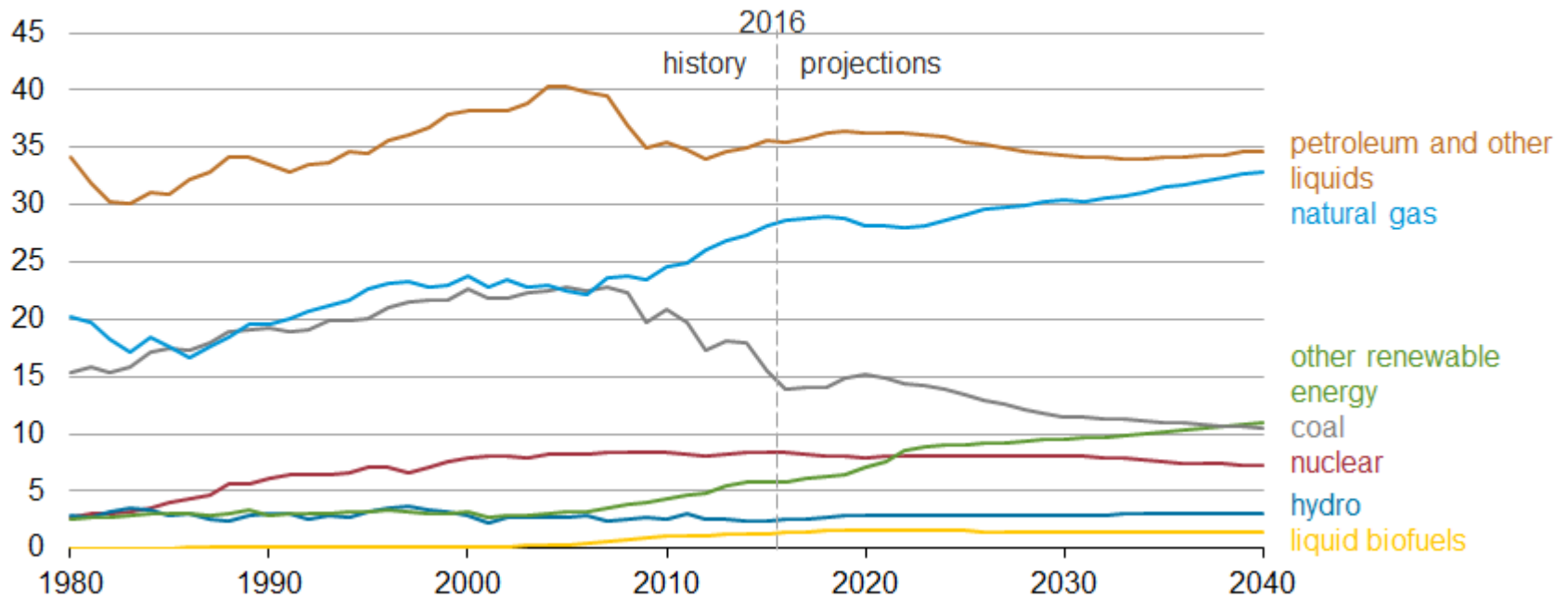
	1990	2000	2013	2020	2030	2040
Coal	28	28	37	35	33	31
Oil	36	35	28	28	26	25
Gas	20	20	20	21	23	27
Fossil fuel	84	83	86	84	83	83
Renewables	10	10	10	11	12	13
Nuclear	6	7	5	5	6	5
Non-fossil	16	17	14	16	17	17

Sources: APERC analysis and IEA (2015).

- Fossil fuel production up 23% (6,530 Mtoe in 2013 to 8,050 Mtoe in 2040)
- Net fossil fuel use up 40% (1,000 Mtoe in 2013 to 1,400 Mtoe in 2040)
- Net energy imports up 53% (1,500 Mtoe to 2,300 Mtoe)
- Intra-regional trade could be a big positive

U.S. Energy Use Relatively Flat but Fuel Mix Changes

Energy consumption (Reference case)
quadrillion British thermal units

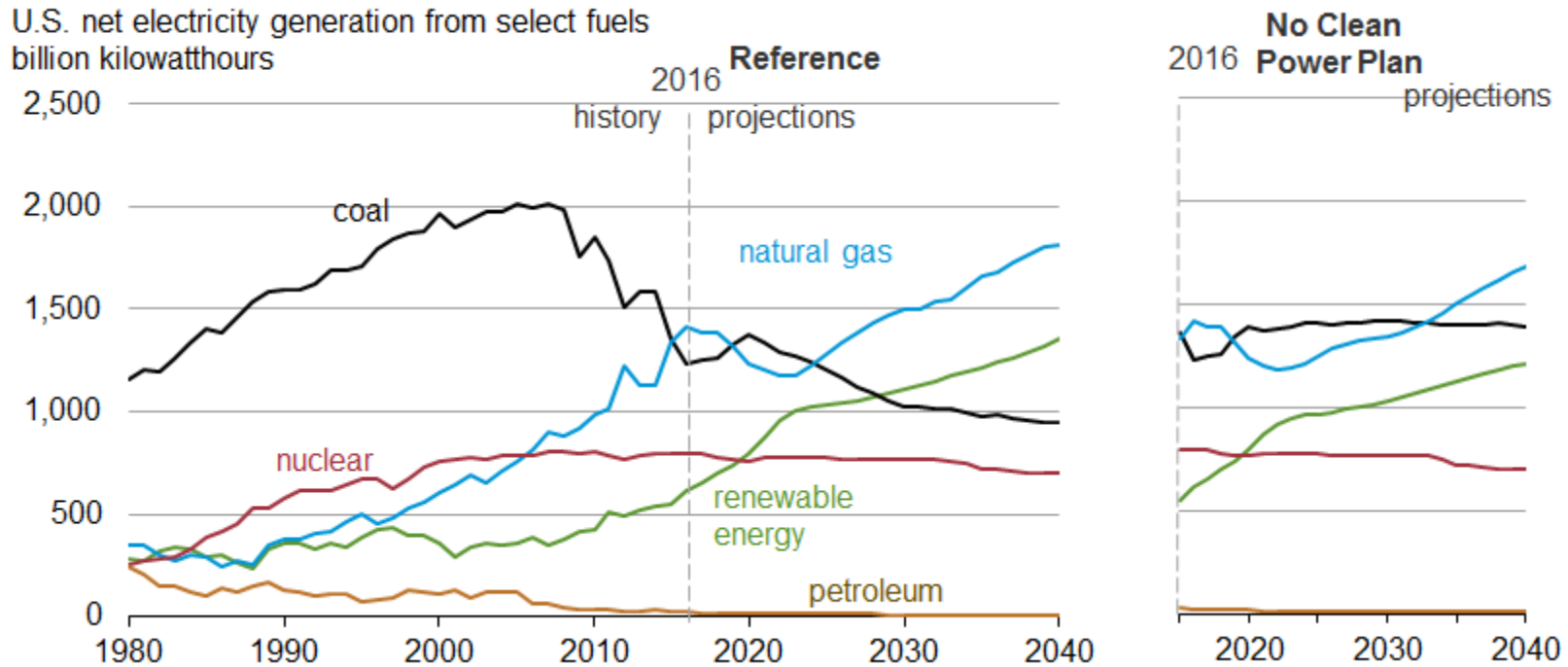


Source: EIA, Annual Energy Outlook 2017

Note: Reference case includes implementation of Clean Power Plan – this could change in the 2018 edition of the AEO

- Overall U.S. energy consumption remains relatively flat in EIA Reference case, rising only 5% by 2040
- Demand for natural gas for industrial activity, electric power, and exports drives gas consumption; coal use decline could be slowed by Trump administration policies

U.S. Environmental Policy Makes A Difference to Coal

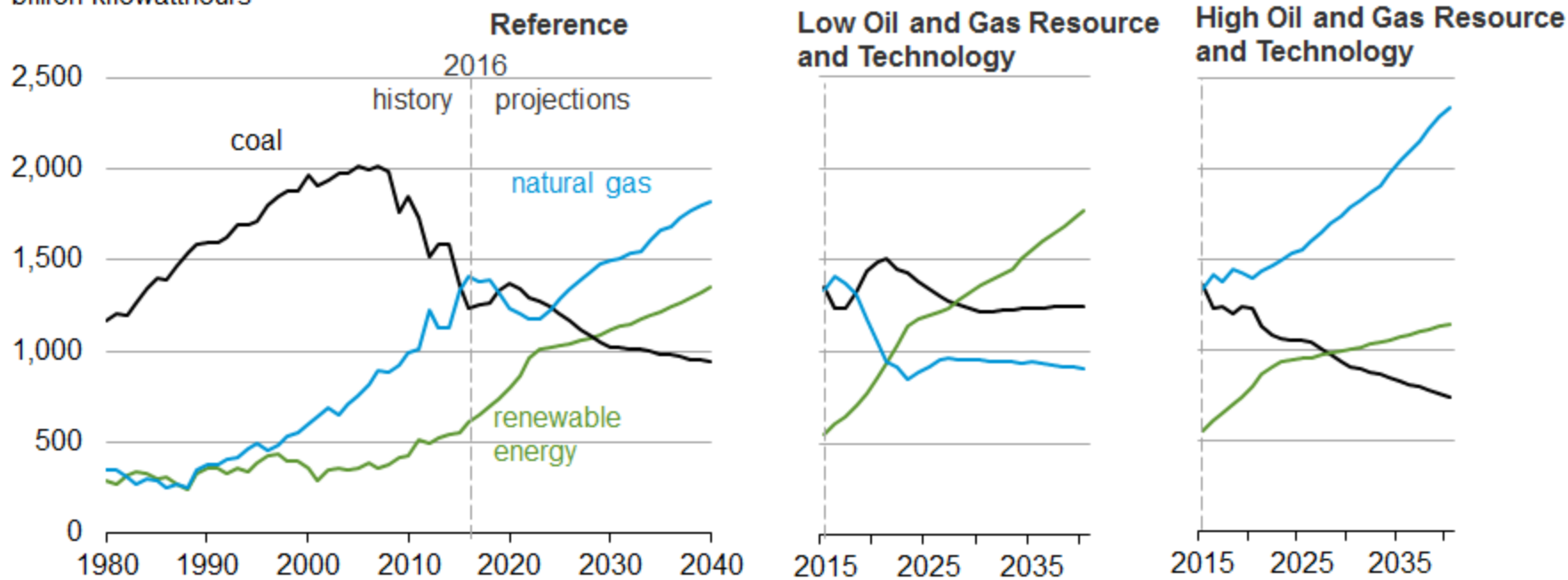


Source: EIA, Annual Energy Outlook 2017

- Policy changes and legal/regulatory uncertainties could give a result that is “in the middle” of these two cases

U.S. Gas Resources/Prices Affect Electricity Generation Mix

U.S. net electricity generation from select fuels
billion kilowatthours



Source: EIA, Annual Energy Outlook 2017

- Lower natural gas prices (High Res.& Tech. case) lead to natural gas-fired generation displacing coal
- Higher natural gas prices (Low Res.& Tech. case) favor growth of renewables
- Coal generation holds onto market share if Clean Power Plan is eliminated

For More Information

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