

Integrated Energy Network

A Pathway to Meet Our Global Energy Challenge

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Energy:

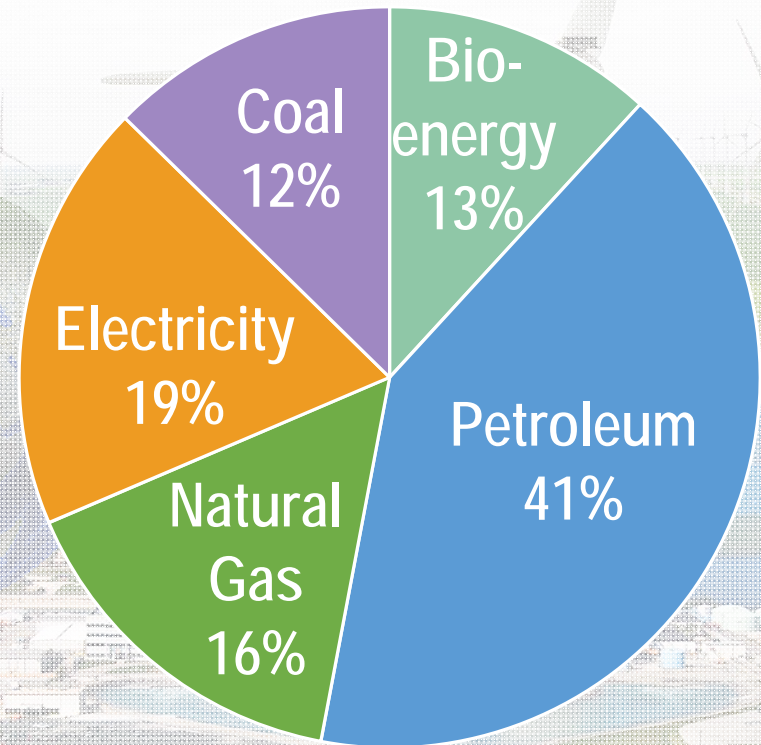


Energy:



Energy:

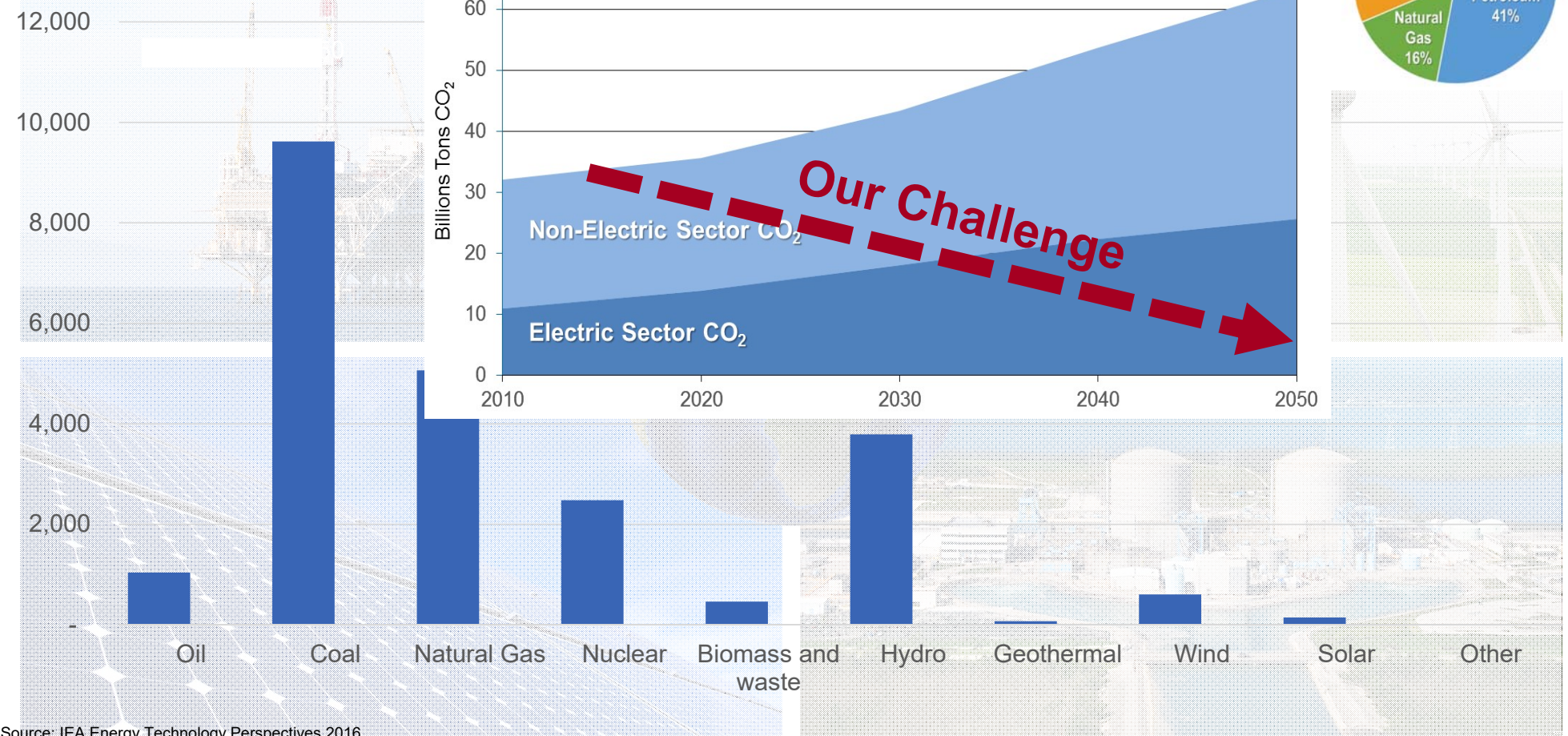
Petroleum	26 billion barrels
Natural Gas	55 trillion cubic feet
Electricity	19,841 billion kWh
Coal	2,174 million short tons
Bioenergy	2,330 million short tons of coal-equivalent



Source: IEA Energy Balance, 2016

Electricity:

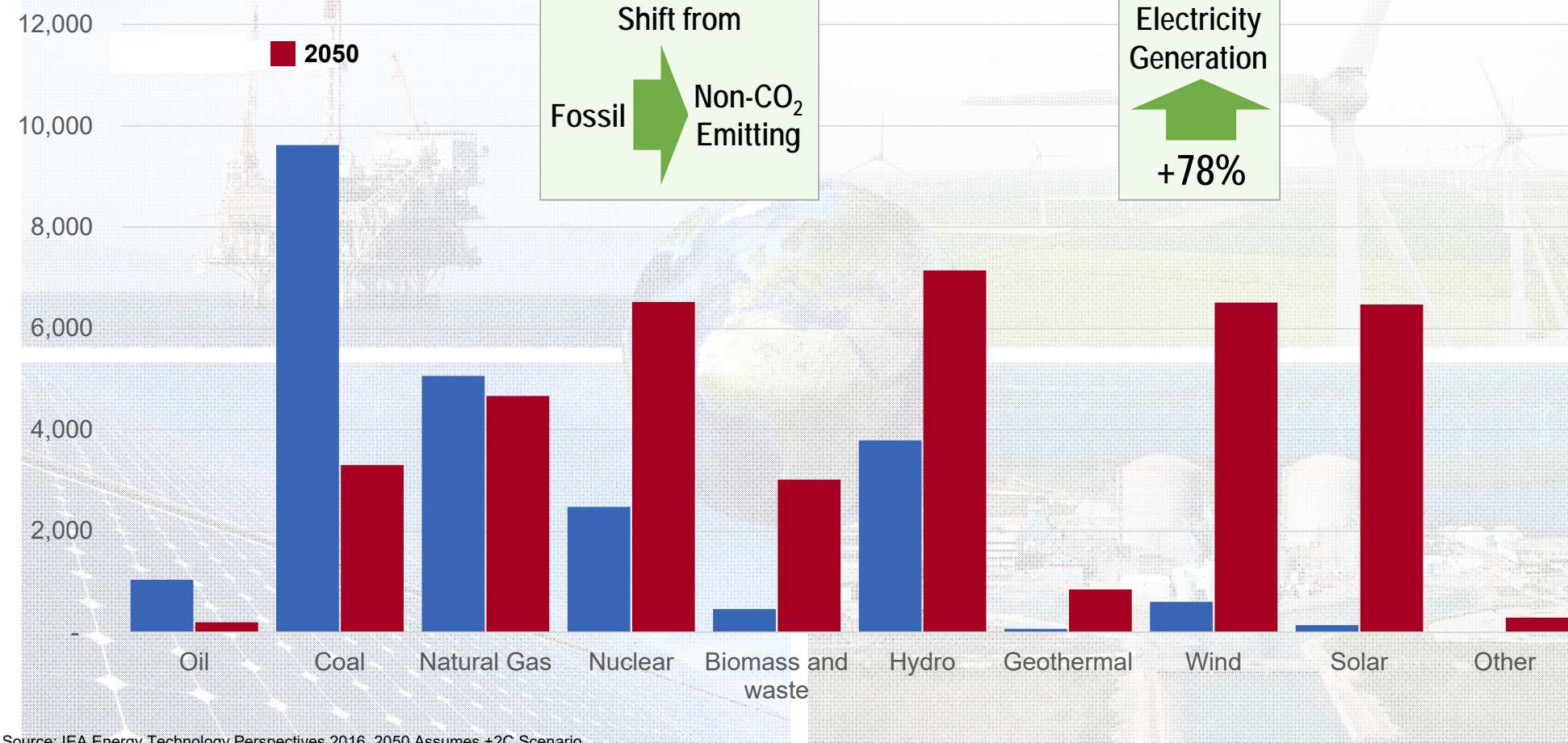
Global Electricity Generation (TWh)



Source: IEA Energy Technology Perspectives 2016.

Electricity:

Global Electricity Generation (TWh)

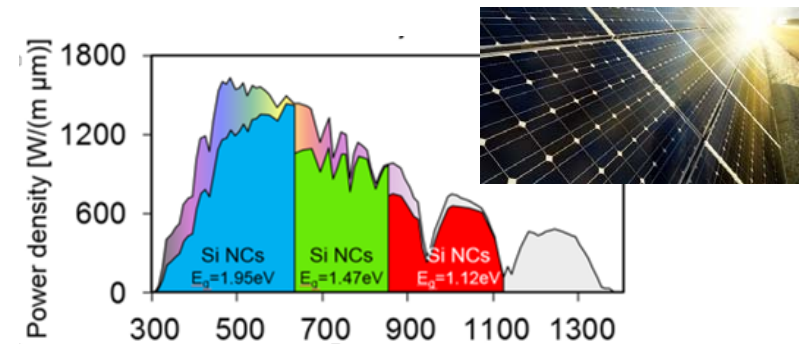
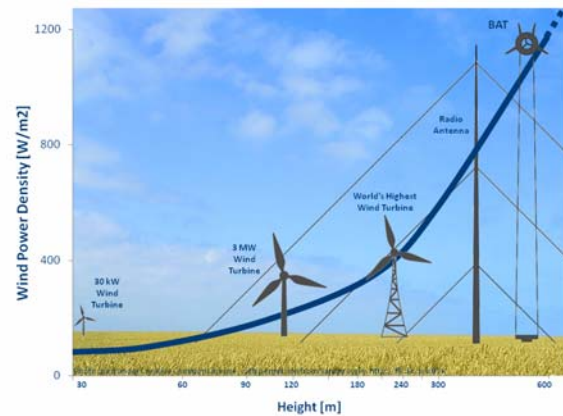
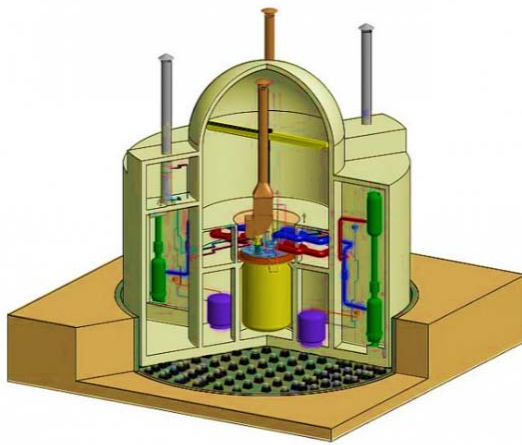


Source: IEA Energy Technology Perspectives 2016. 2050 Assumes +2C Scenario

Electric Power Research Institute



Producing Cleaner Energy:



Using Cleaner Energy:



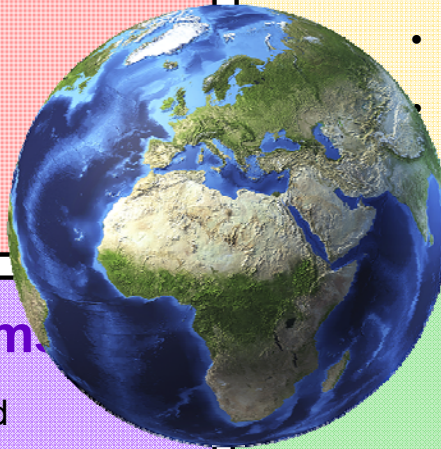
Envelope of Plausible Scenarios

Global Economic Slowdown

- Sustained low/negative economic growth and/or global conflict
- Negative electricity demand growth
- No new environmental policies
- Innovation focused on existing assets; international collaboration reduced

Hydrocarbon Fuels Dominate

- Hydrocarbon fuel prices low; supply abundant
- Low electricity prices
- Increased electricity use; grid demand growth
- Innovation focused efficient hydrocarbon extraction and using abundant fuels in a clean way



Localization of Energy Systems

- Focus on energy systems at local customer and community level
- Increased DG adoption results in a decrease in grid demand
- Innovation at the intersection of 3rd-party suppliers, technology developers, and electric utilities

Significant Reduction in Environmental Footprint

- International actions to significantly reduce environmental emissions
- Expansive new economy-wide environmental policies
- Electrification of economy with clean electricity increases demand

Integrating Energy Resources:



Integrated Energy Network:



A pathway to the future providing consumers with the flexibility to use, produce and manage energy the way they want - while ensuring society gets reliable, safe, affordable, cleaner energy.

- **Flexibility = advances in grid modernization, energy efficiency and electrification are needed.**
- **Societal benefits = economic improvements and economy-wide reduction in total environmental footprint.**

“Integrated Energy Network™” – Pathway to the Future



Technology Innovation:

Storage: Bulk to Micro



**Energy Efficiency
and Automation**



24x7 Quality & Capacity



Cleaner Energy



Microsensors



Microgrids



Resiliency



Electrification



Analytics



24/7 Communications



Together...Shaping the Future of Electricity

