



## Session 7: APERC Research Activities

# 6<sup>th</sup> APEC Energy Demand and Supply Outlook

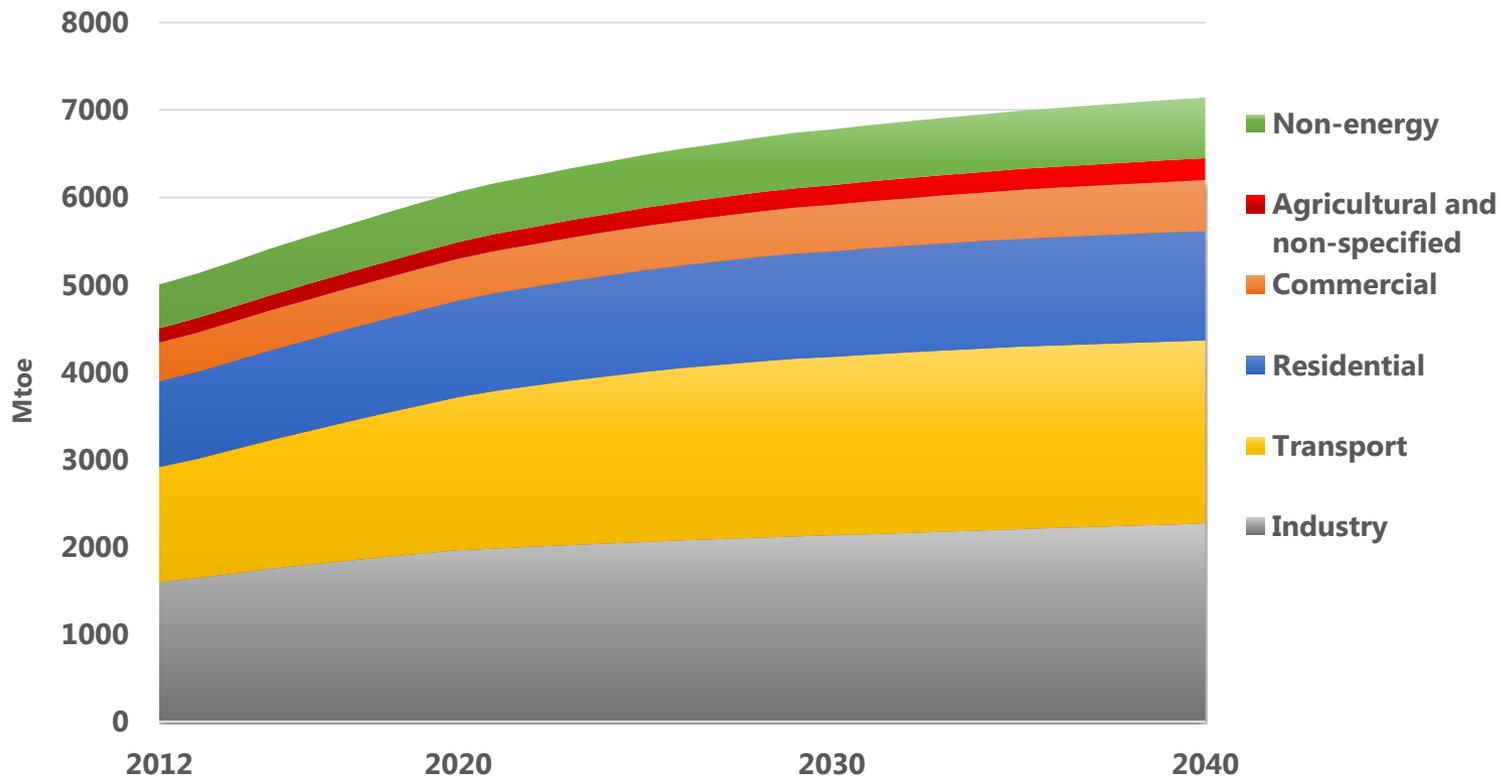
Cecilia Tam  
Deputy Vice President, APERC



# Business as Usual (BAU) Scenario

# APEC Total Final Energy Demand

## Preliminary results

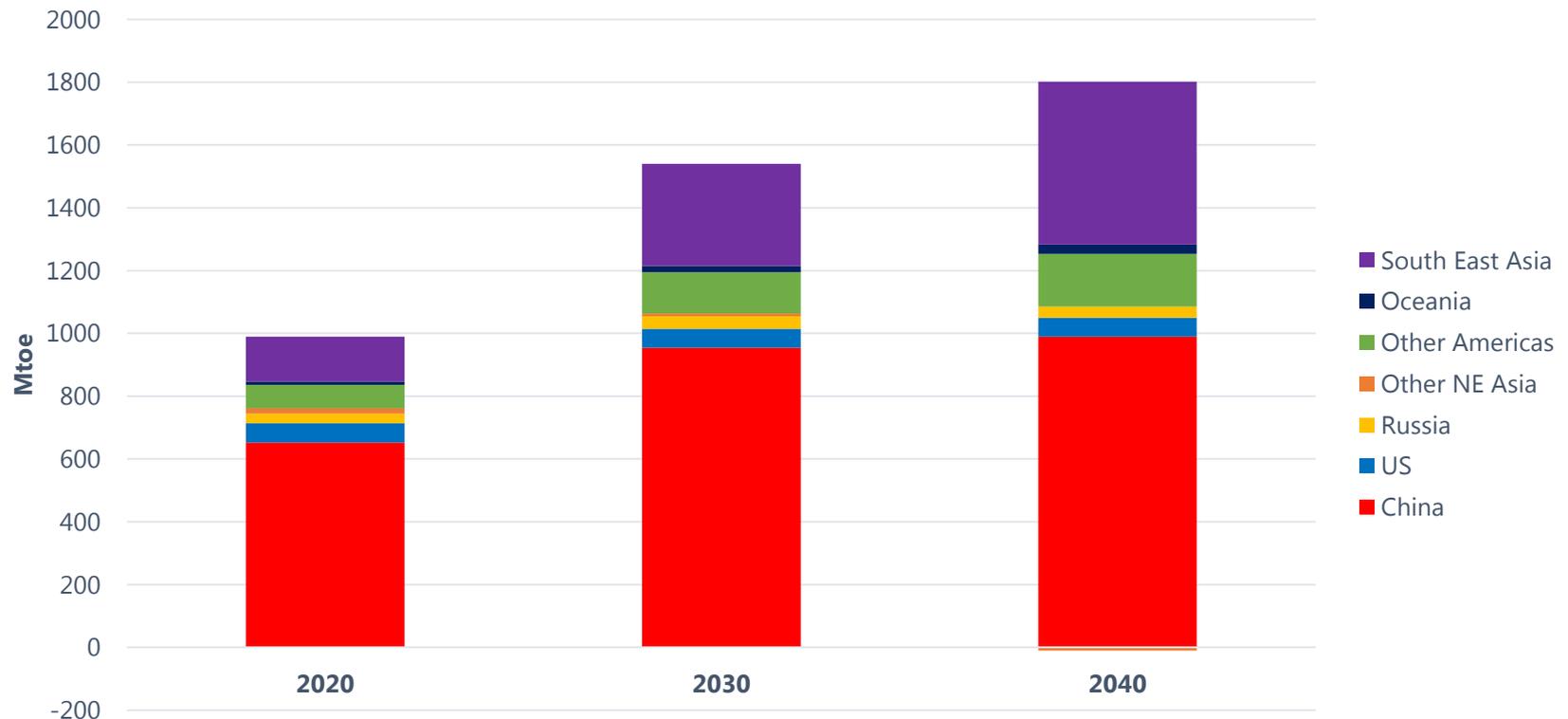


Source: APERC Analysis

**Energy demand rises 50% by 2040, led by higher demand in transport**

# Growth in Final Energy Demand compared to 2012

## Preliminary results



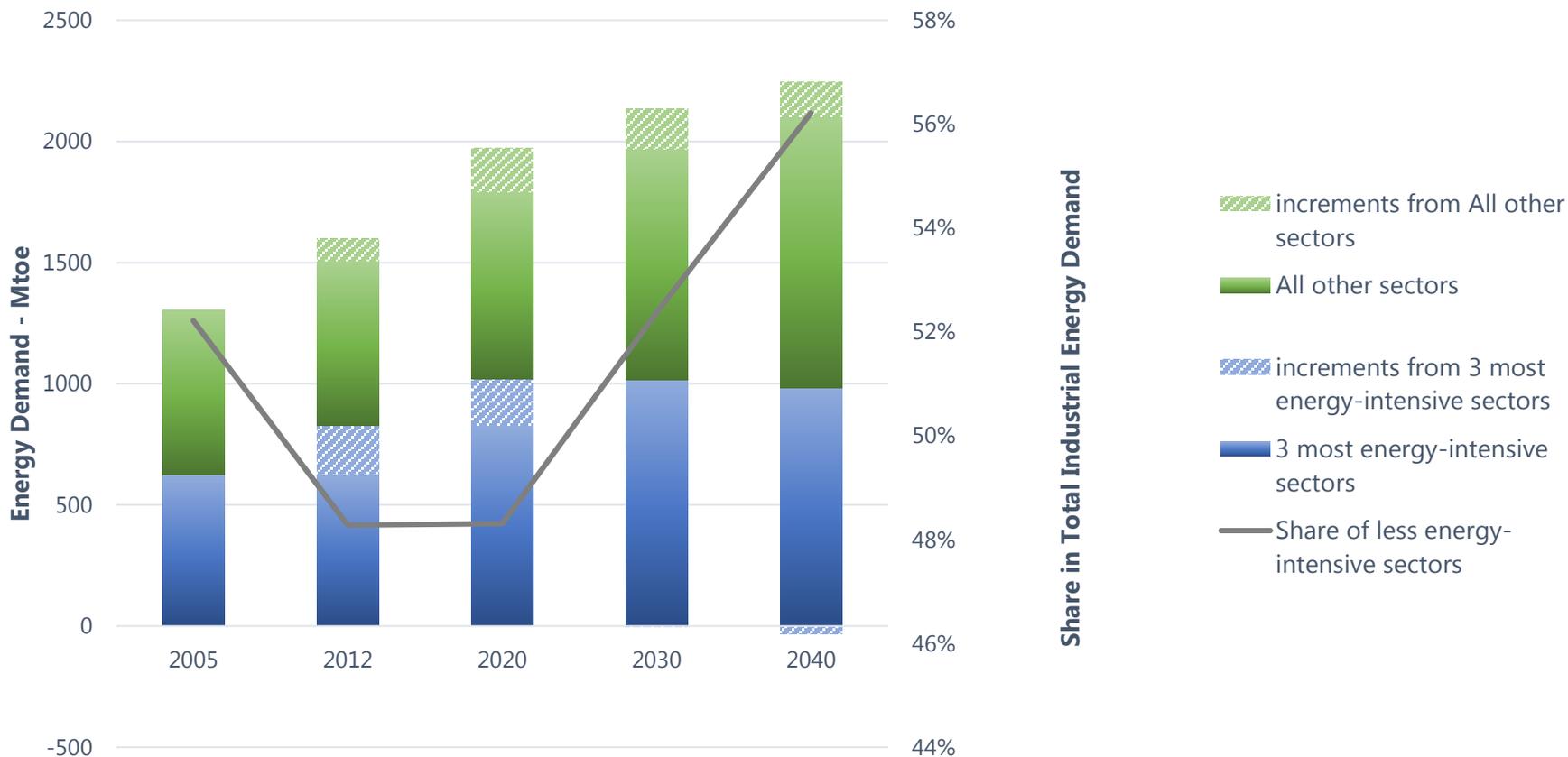
Source: APERC Analysis

## China and South East Asia account for nearly 90% of all additional demand

Note: **Oceania** (Australia, New Zealand and PNG), **Other Americas** (Canada, Chile, Mexico and Peru), **Other North East Asia** (Hong Kong, Japan, Korea and Chinese Taipei), **South East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam)

# Changes in Industrial Energy Consumption

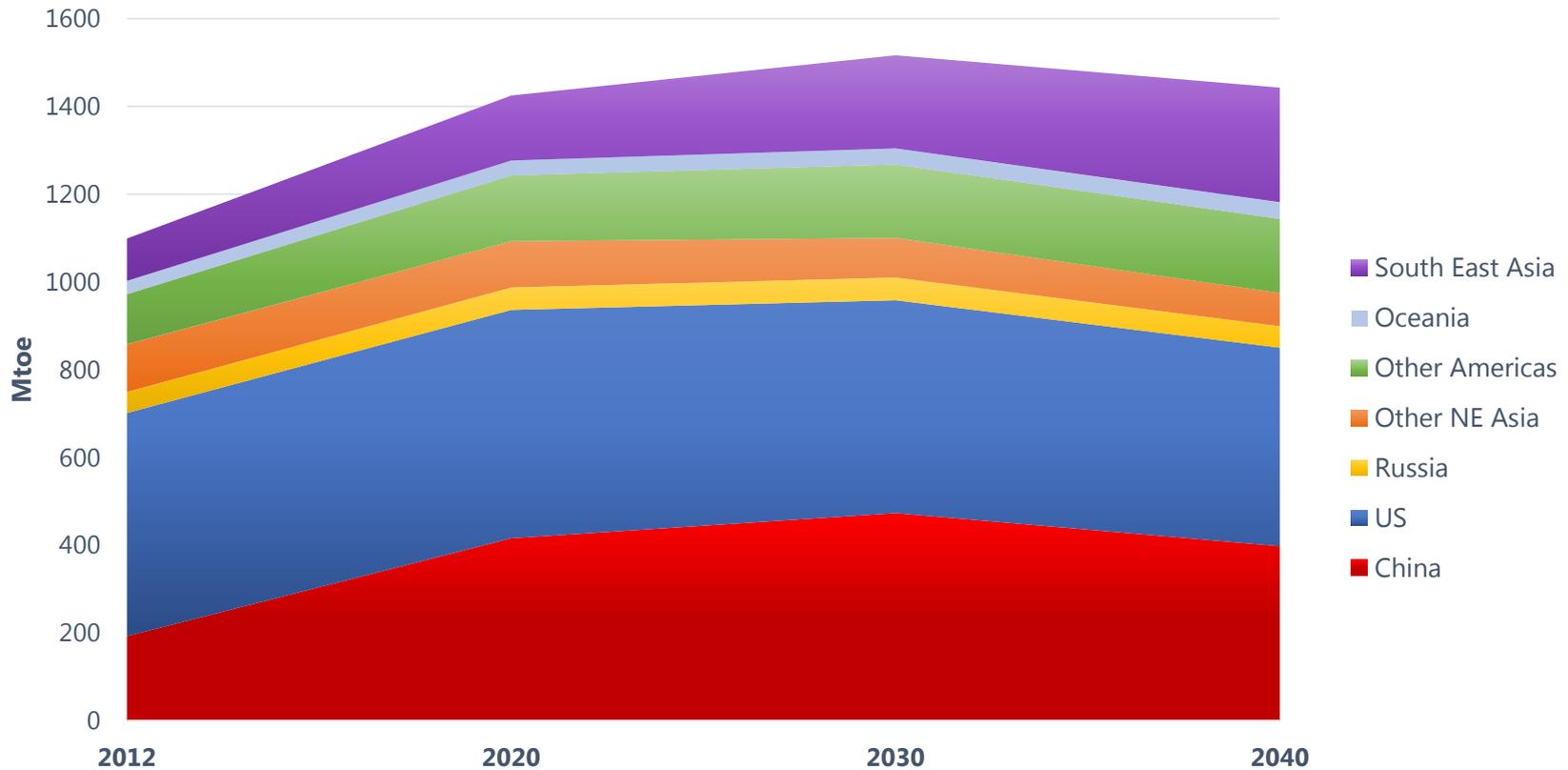
## APEC Industrial Energy Demand by Sector (Mtoe)



Source: APERC Analysis

**Energy consumption in Cement and Steel decline as China's production peaks**

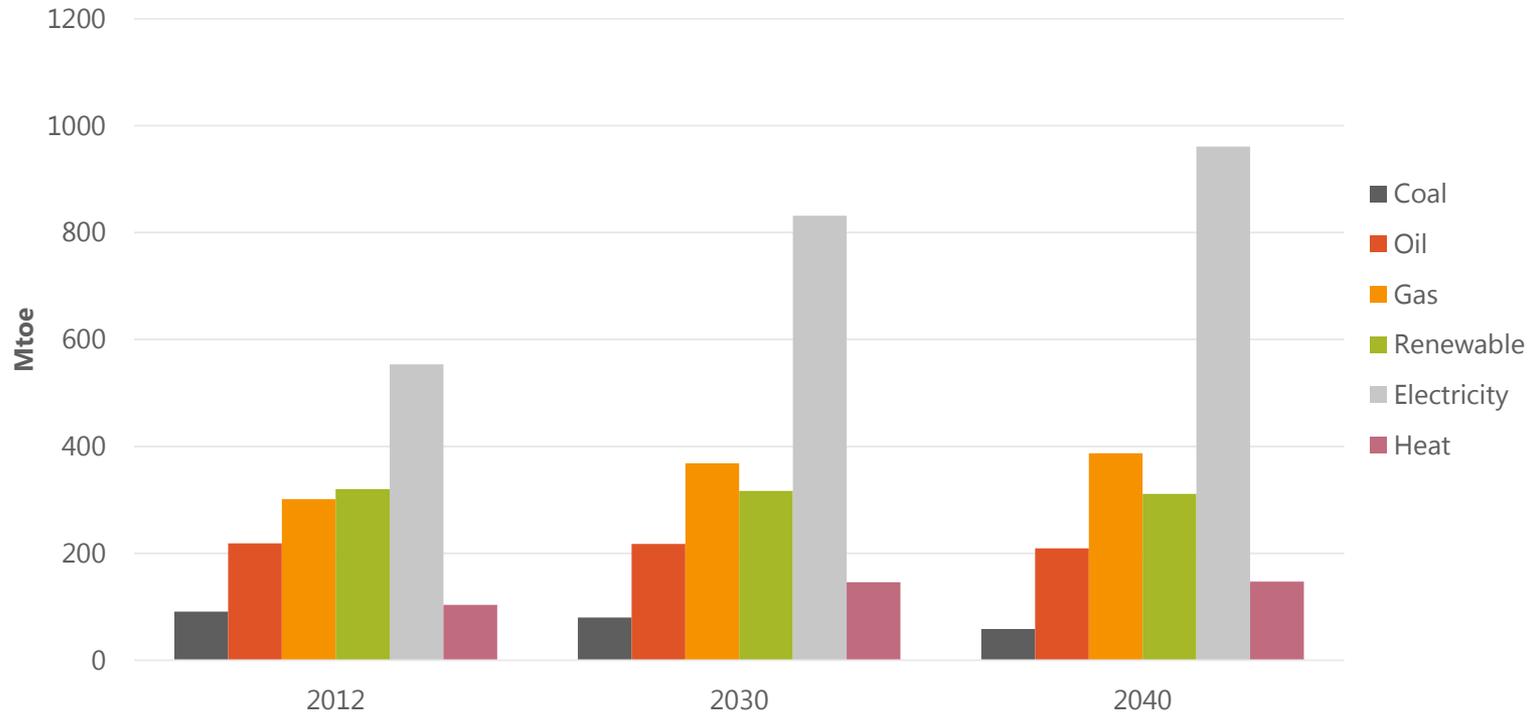
# Road Transport Energy Demand



Source: APERC Analysis

**Road transport energy demand will peak in 2030 thanks to slowing economic growth and tighter fuel efficiency**

# Final Energy Demand in Residential, Commercial and Agriculture



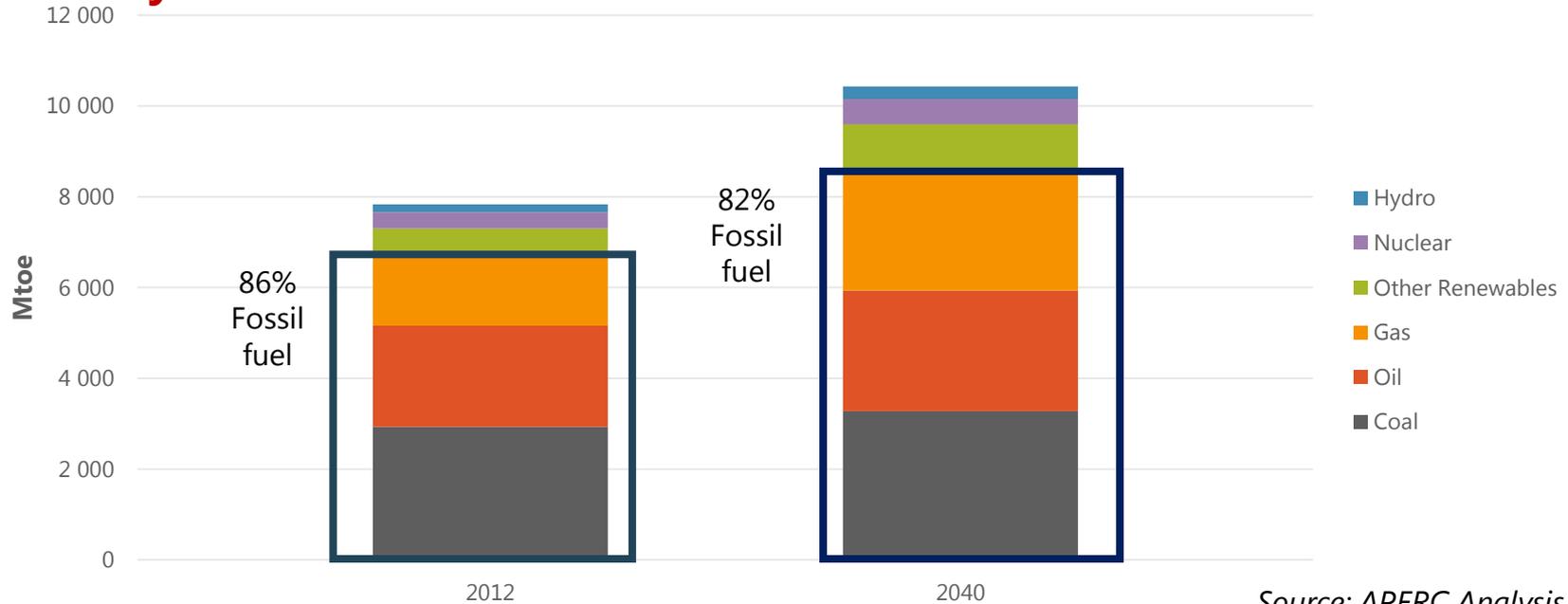
Source: APERC Analysis

|                 | Coal   | Oil    | Gas   | NRE    | Electricity | Heat  |
|-----------------|--------|--------|-------|--------|-------------|-------|
| AAGR(2012~2040) | -1.56% | -0.16% | 0.90% | -0.10% | 1.99%       | 1.27% |

**Electricity dominates energy use in residential, commercial and agriculture**

# Fossil Fuels Continue to Dominate

## Preliminary results



Source: APERC Analysis

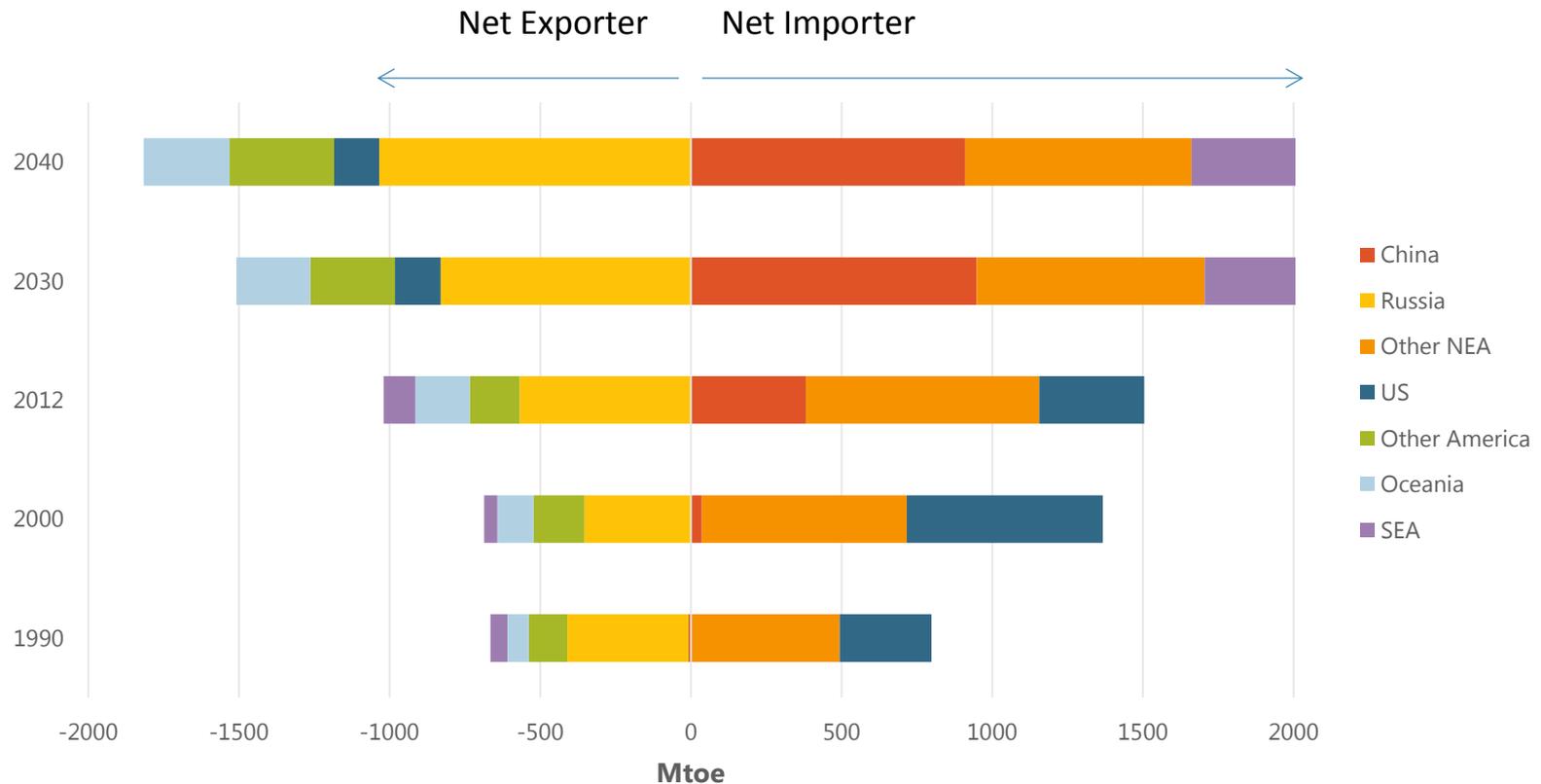
### Fuel Shares

|                         | 1990  | 2012  | 2040  |
|-------------------------|-------|-------|-------|
| <b>Coal</b>             | 27.9% | 37.5% | 31.4% |
| <b>Oil</b>              | 35.7% | 28.3% | 25.5% |
| <b>Gas</b>              | 20.2% | 20.2% | 24.9% |
| <b>Hydro</b>            | 1.9%  | 2.2%  | 2.7%  |
| <b>Other Renewables</b> | 8.6%  | 7.2%  | 10.2% |
| <b>Nuclear</b>          | 5.8%  | 4.6%  | 5.2%  |

**Natural gas demand will increase by 64% in 2040 from 2012 level while hydro and other renewables will increase by 82% within the same period.**

# APEC Energy Supply Gap

## Preliminary results

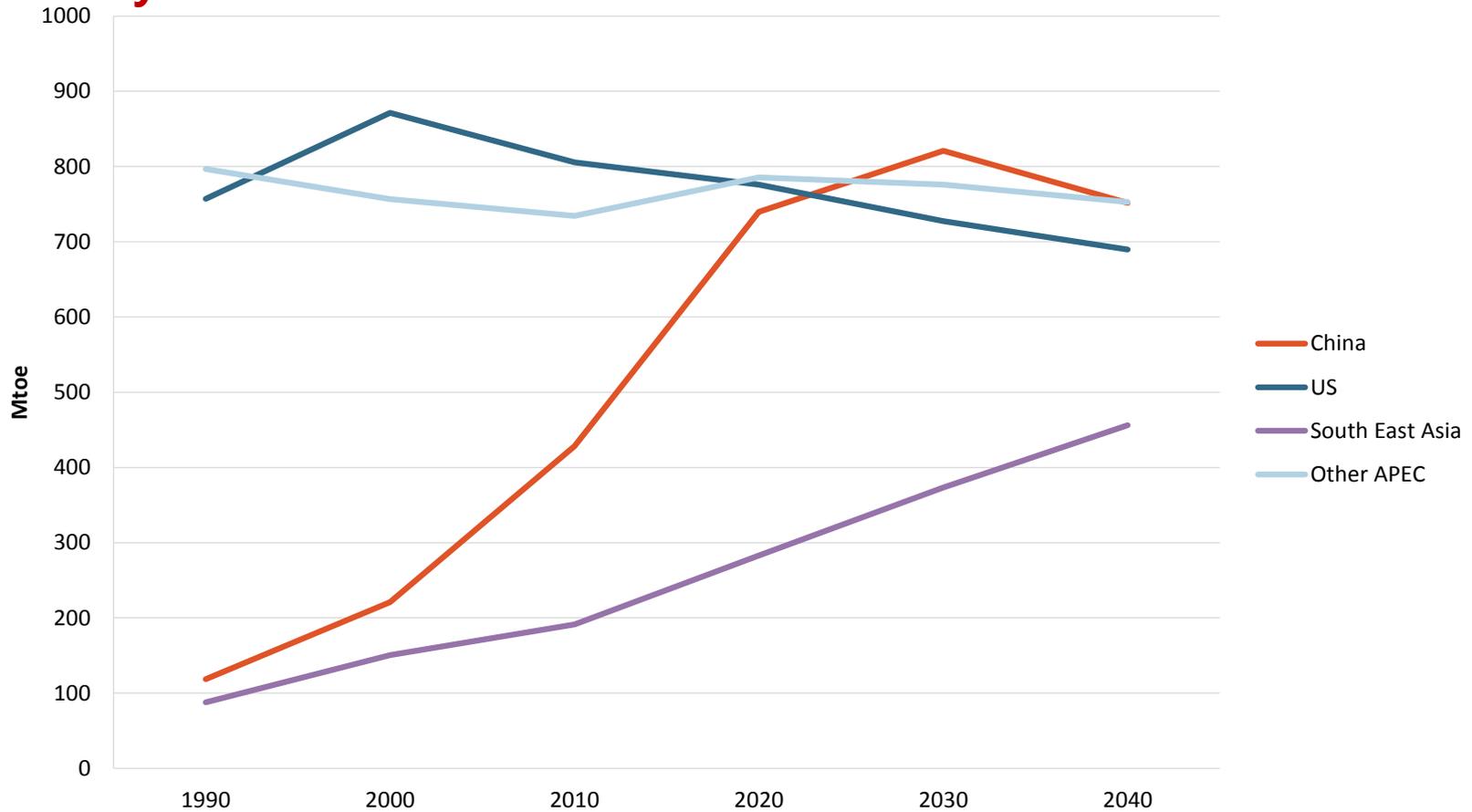


Source: APERC Analysis

Supply gap is define as demand minus production.

# Oil Demand

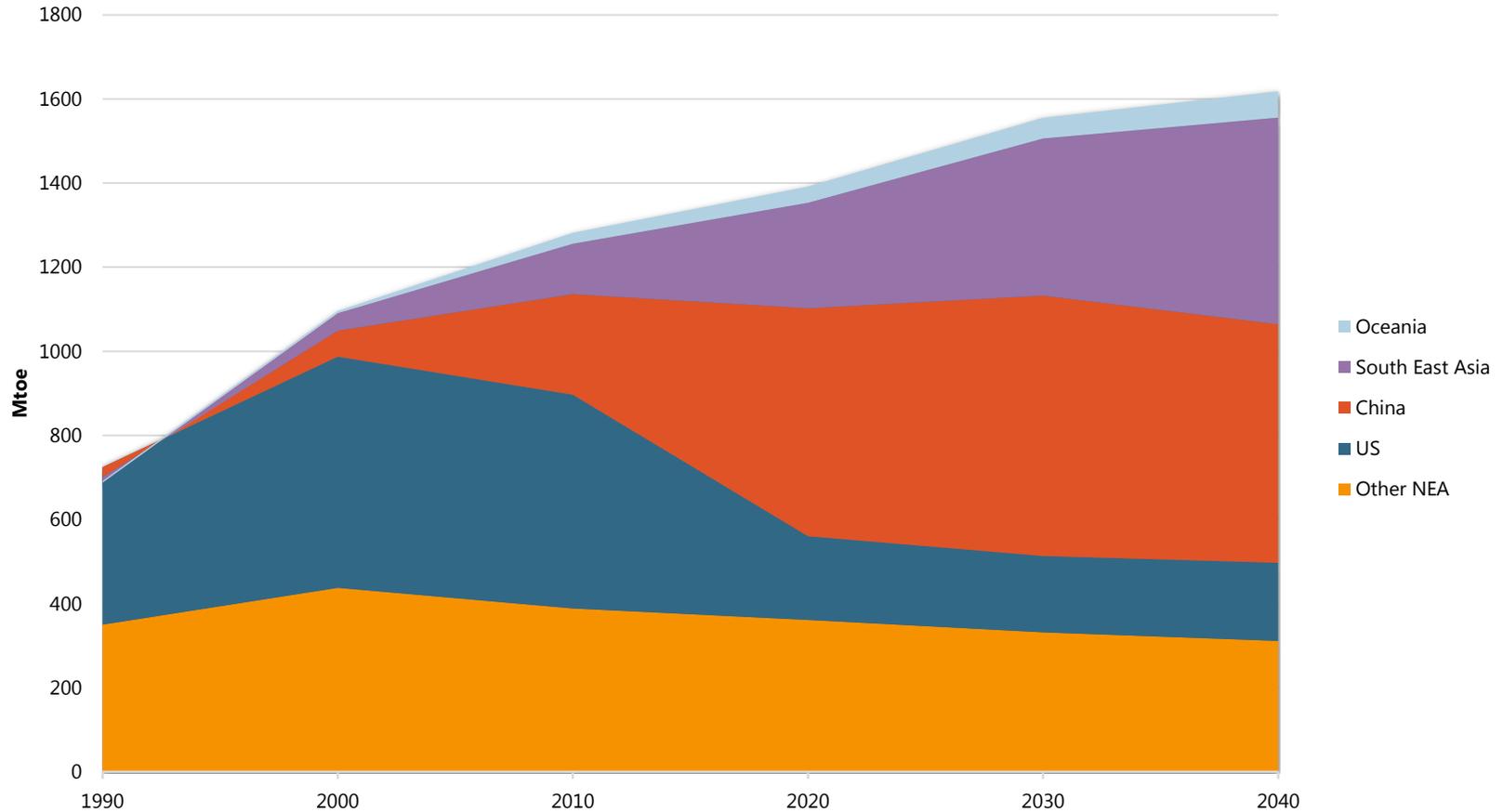
## Preliminary results



Source: APERC Analysis

# Net Oil Imports

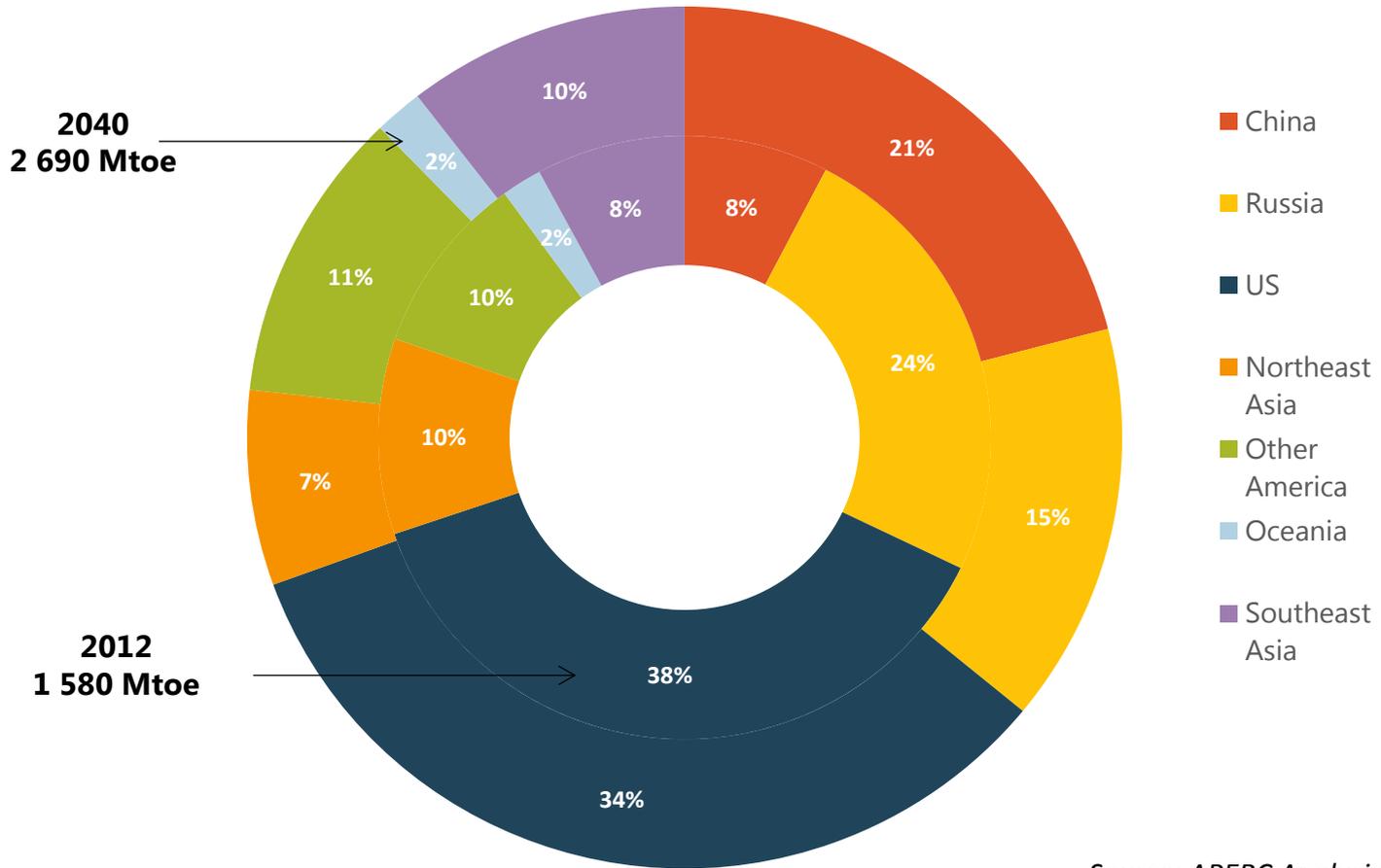
## Preliminary results



Source: APERC Analysis

# Natural Gas Demand

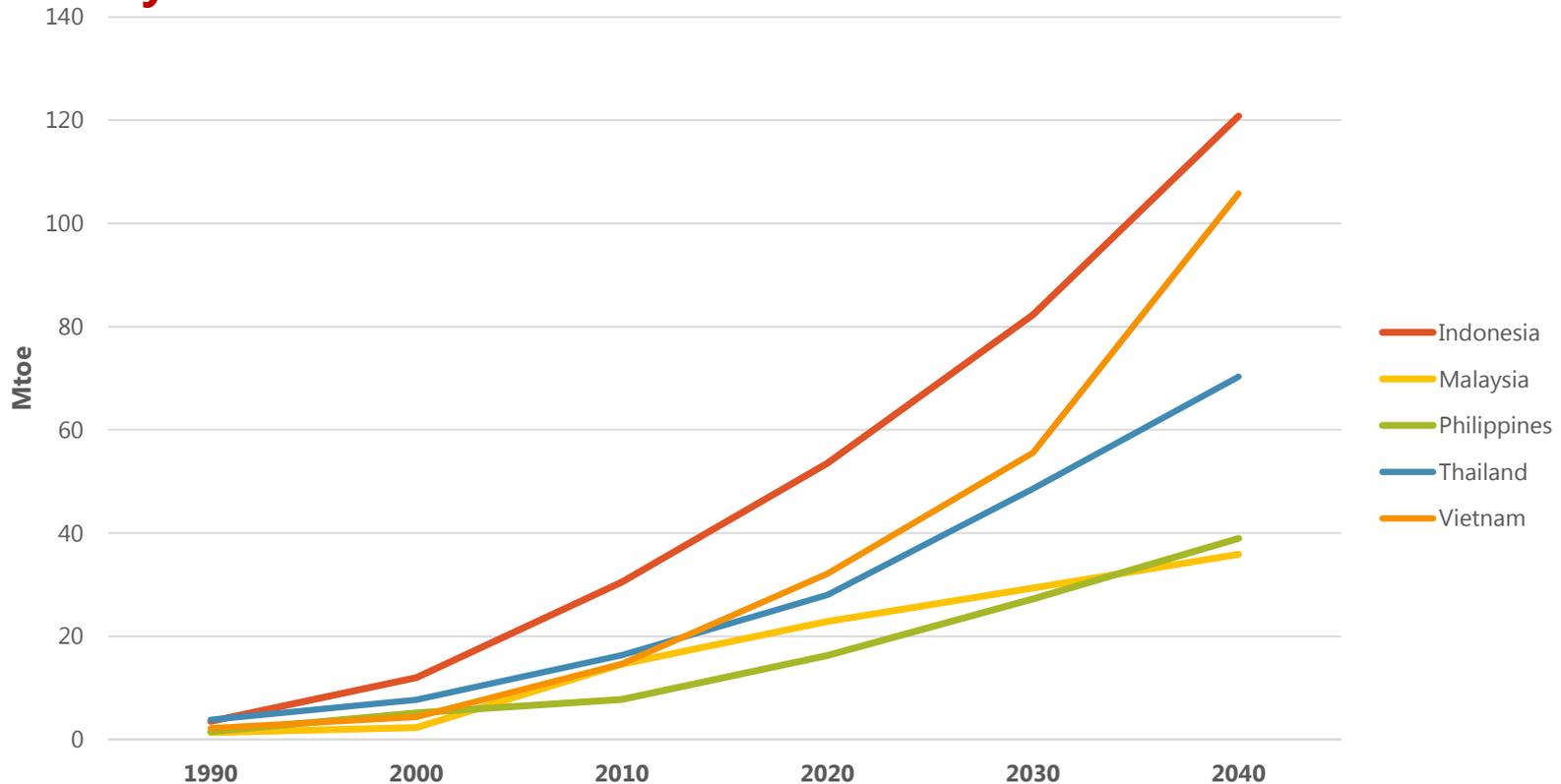
## Preliminary results



Source: APERC Analysis

# Demand for Power to Fuel Coal

## Preliminary results

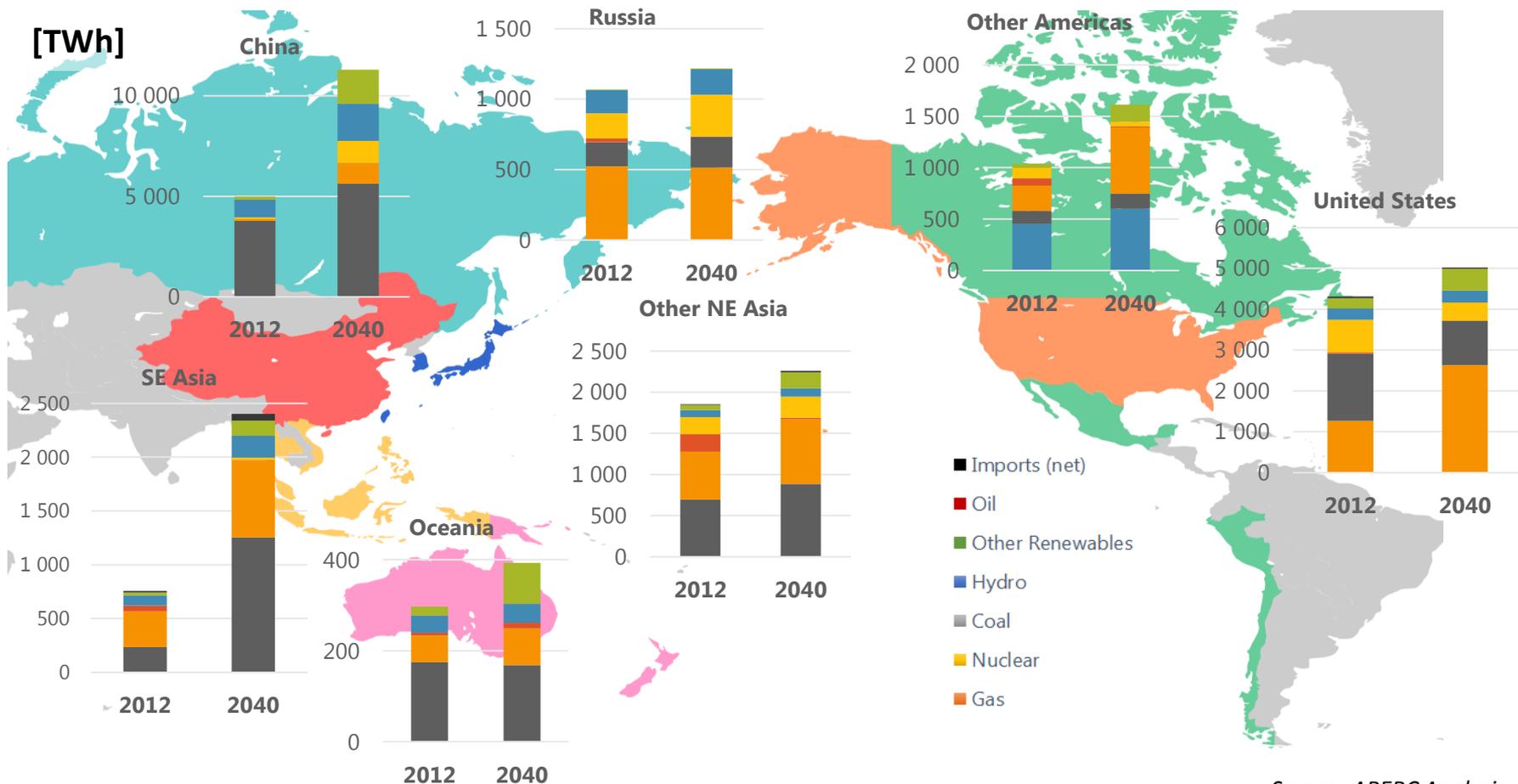


Source: APERC Analysis

# Electricity Generation By Region

## Generation, 2012 and 2040 [TWh]

Preliminary results



Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

Source: APERC Analysis

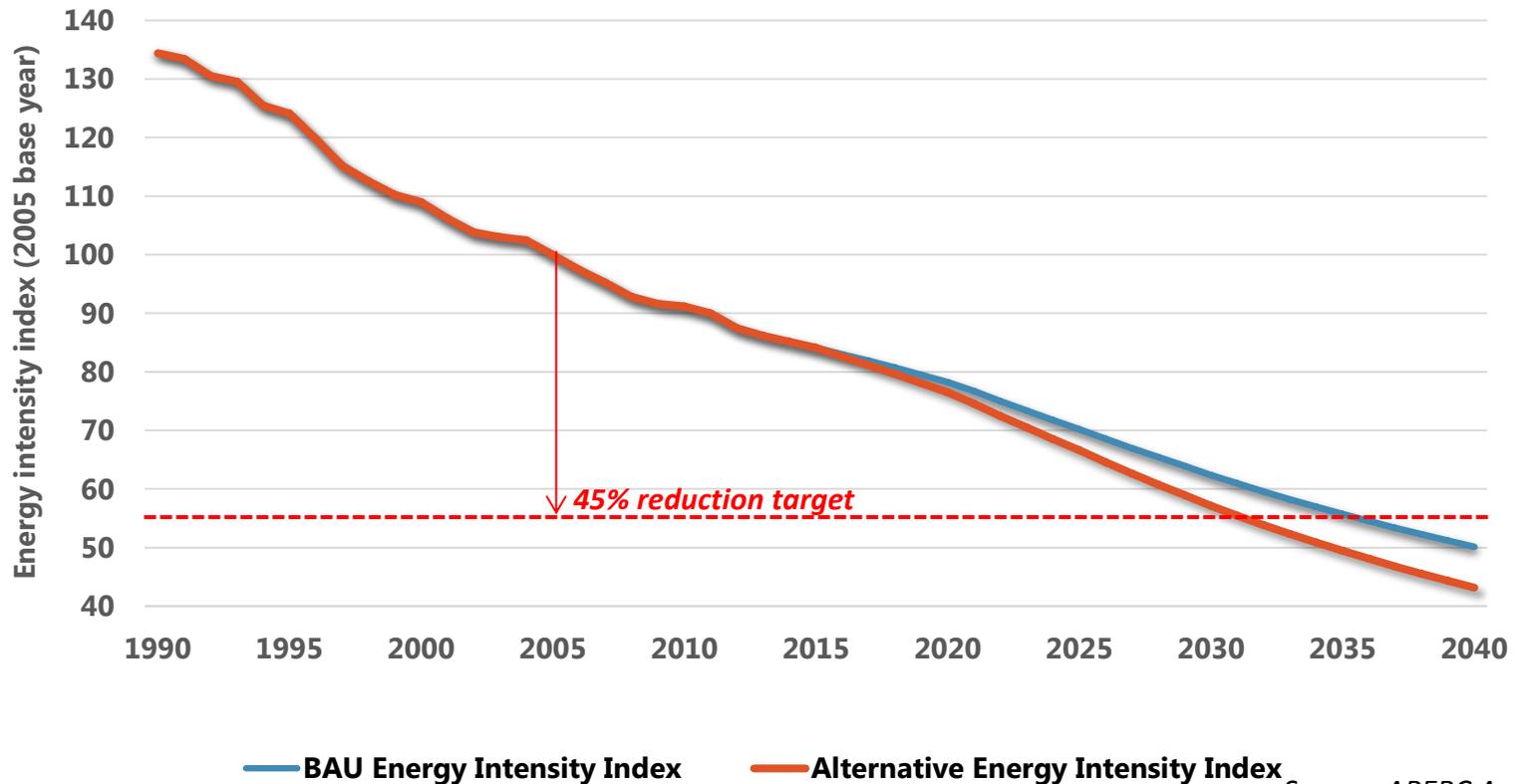
## China and South East Asia drive future electricity demand in APEC



# Alternative Scenarios

# APEC's Energy Intensity BAU vs Alternative

## Preliminary results

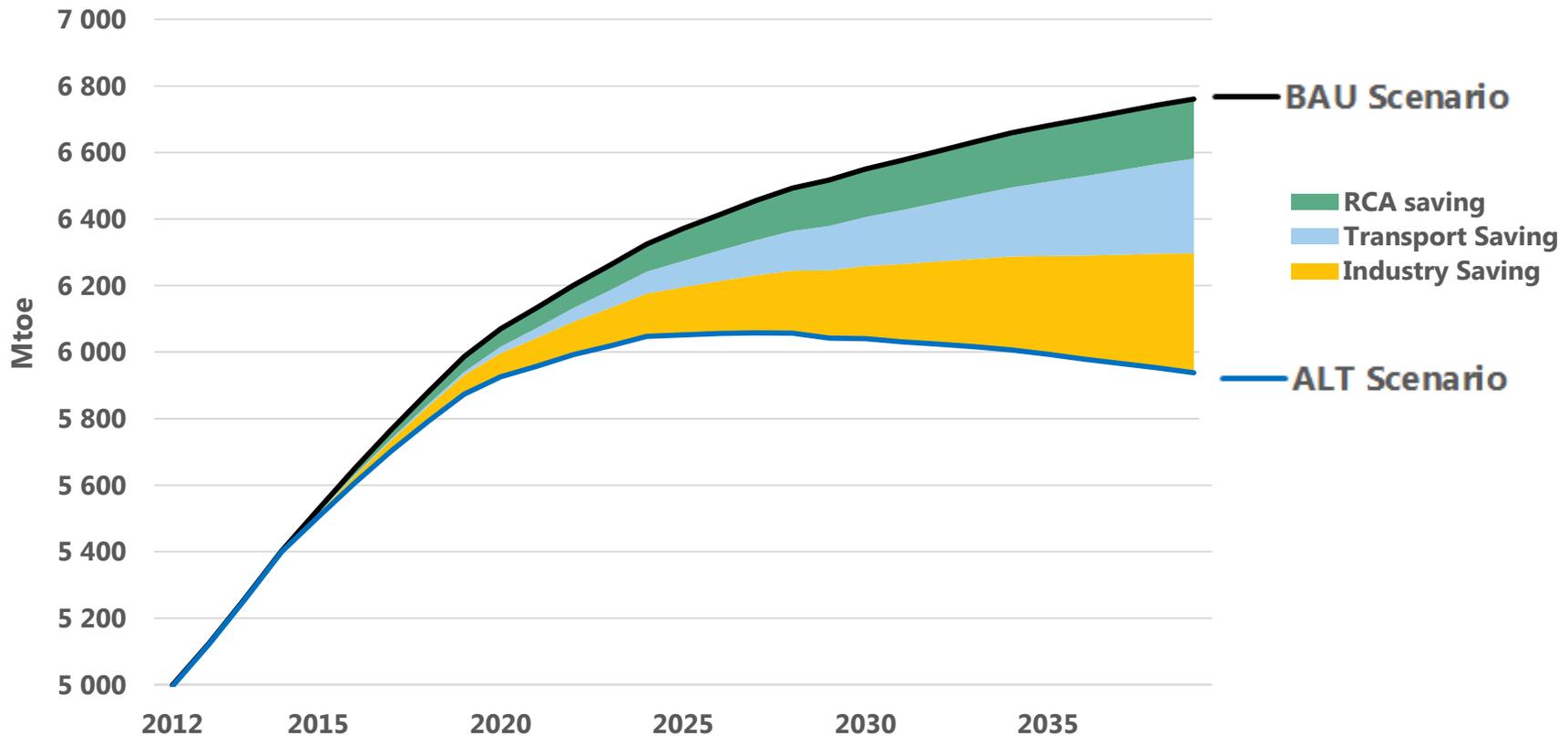


Source: APERC Analysis

**APEC's intensity target reached ahead of schedule in 2032 under the Improved Efficiency Scenario and in 2036 under BAU**

# Energy Savings Compared to BAU

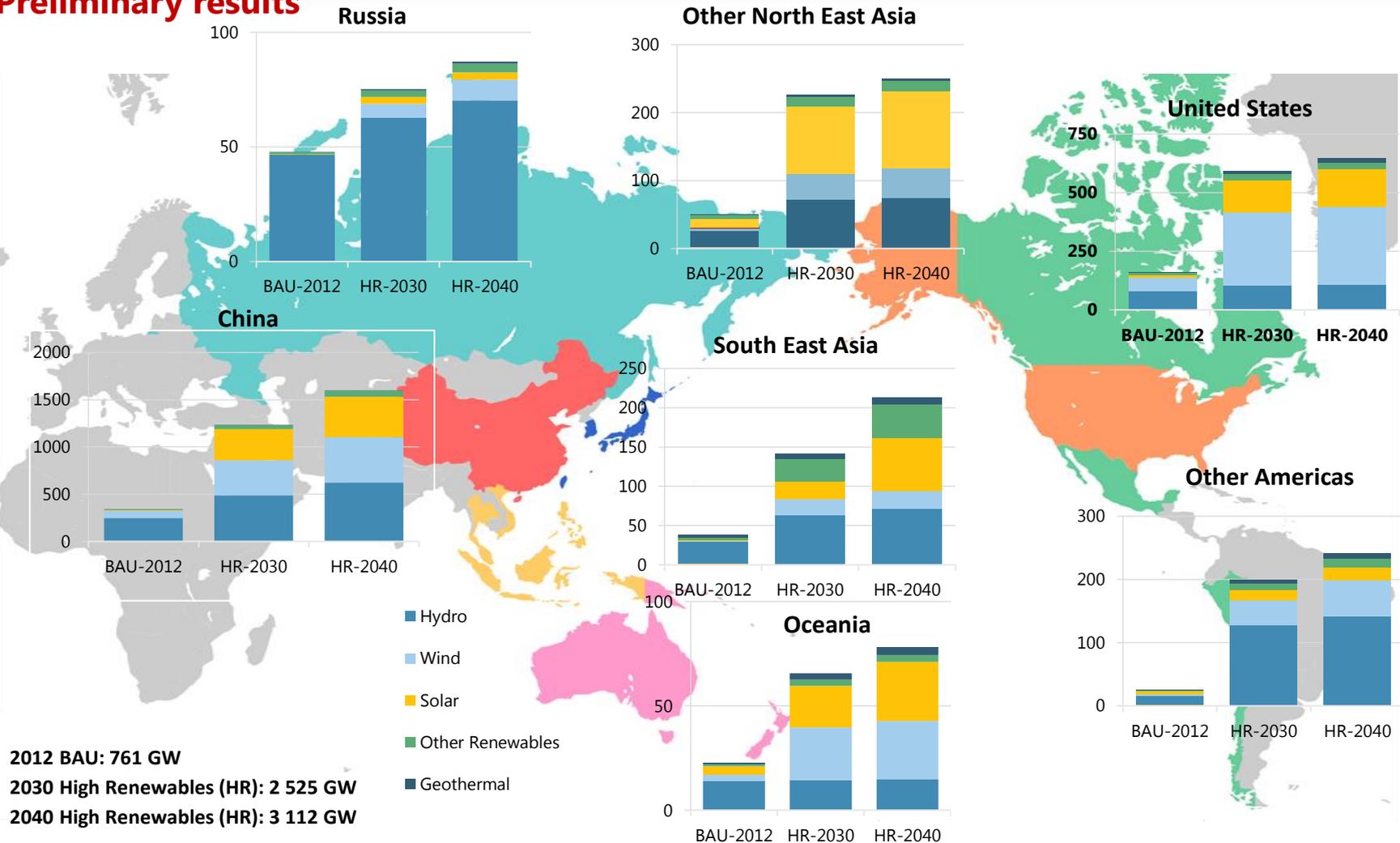
## Preliminary results



Source: APERC Analysis

# Renewables in APEC – 2012, 2030 and 2040

## Preliminary results



2012 BAU: 761 GW

2030 High Renewables (HR): 2 525 GW

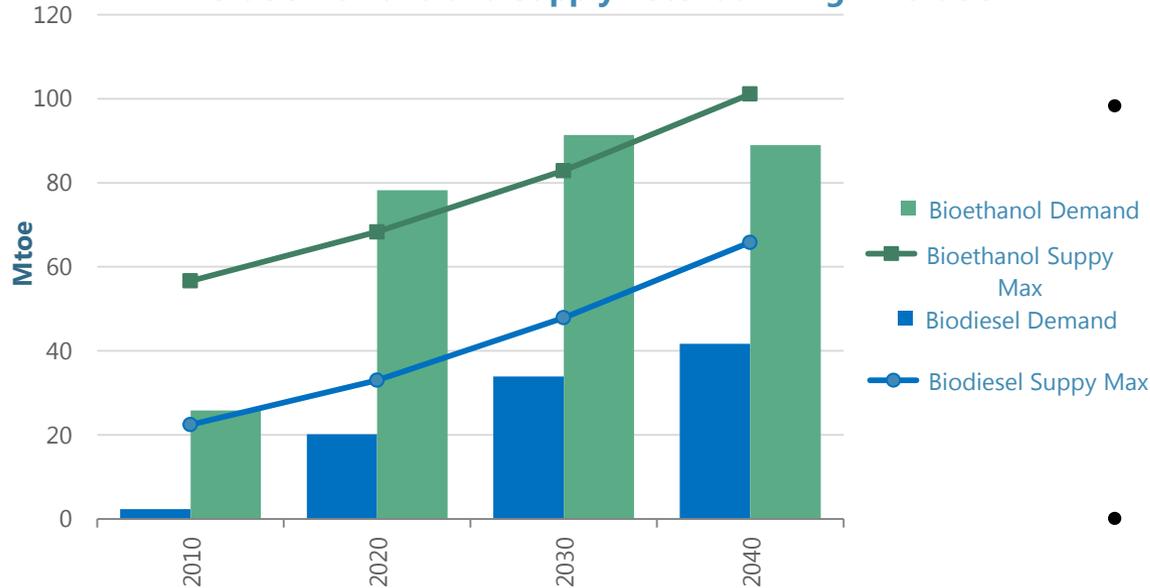
2040 High Renewables (HR): 3 112 GW

Source: APERC Analysis

Note: This map is for illustrative purposes and is without prejudice to the status of or sovereignty over any territory covered by this map.

# Renewables in Transport

Biofuels Demand and Supply Potential - High Biofuels



## Preliminary results

- Just considering the gov't blend targets, the share of biofuels will more than double from 2.2% in the total transport demand in 2010 to 6.0% in 2030
- However as only 1<sup>st</sup> generation biofuels are assumed in the model, supply potential for bioethanol for both BAU and high supply does not meet the demand by 2020 onwards.

| Mtoe                     | 2010 | 2020 | 2030 | 2040 |
|--------------------------|------|------|------|------|
| Hi-Bioethanol Demand     | 26   | 78   | 91   | 89   |
| Hi-Bioethanol Supply Max | 57   | 68   | 83   | 101  |
| Hi-Biodiesel Demand      | 2    | 20   | 34   | 42   |
| Hi-Biodiesel Supply Max  | 22   | 33   | 48   | 66   |

# Alternative Power Mix Scenario

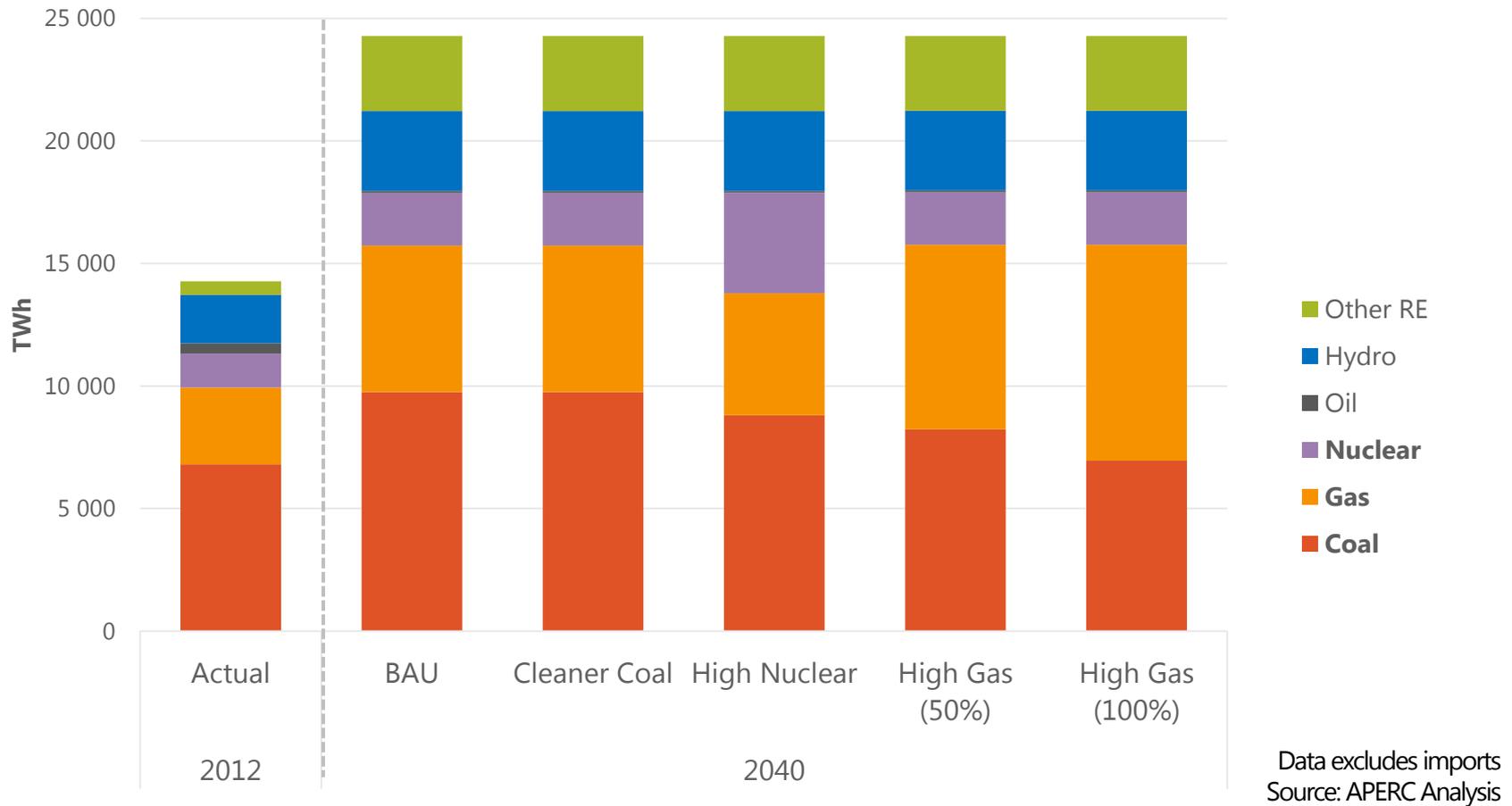
- The scenario strives to maximize the use of **clean coal, natural gas and nuclear in the electricity generation** of APEC member economies



- To illustrate the hypothetical effects and policy implications from drastic changes in the power mix

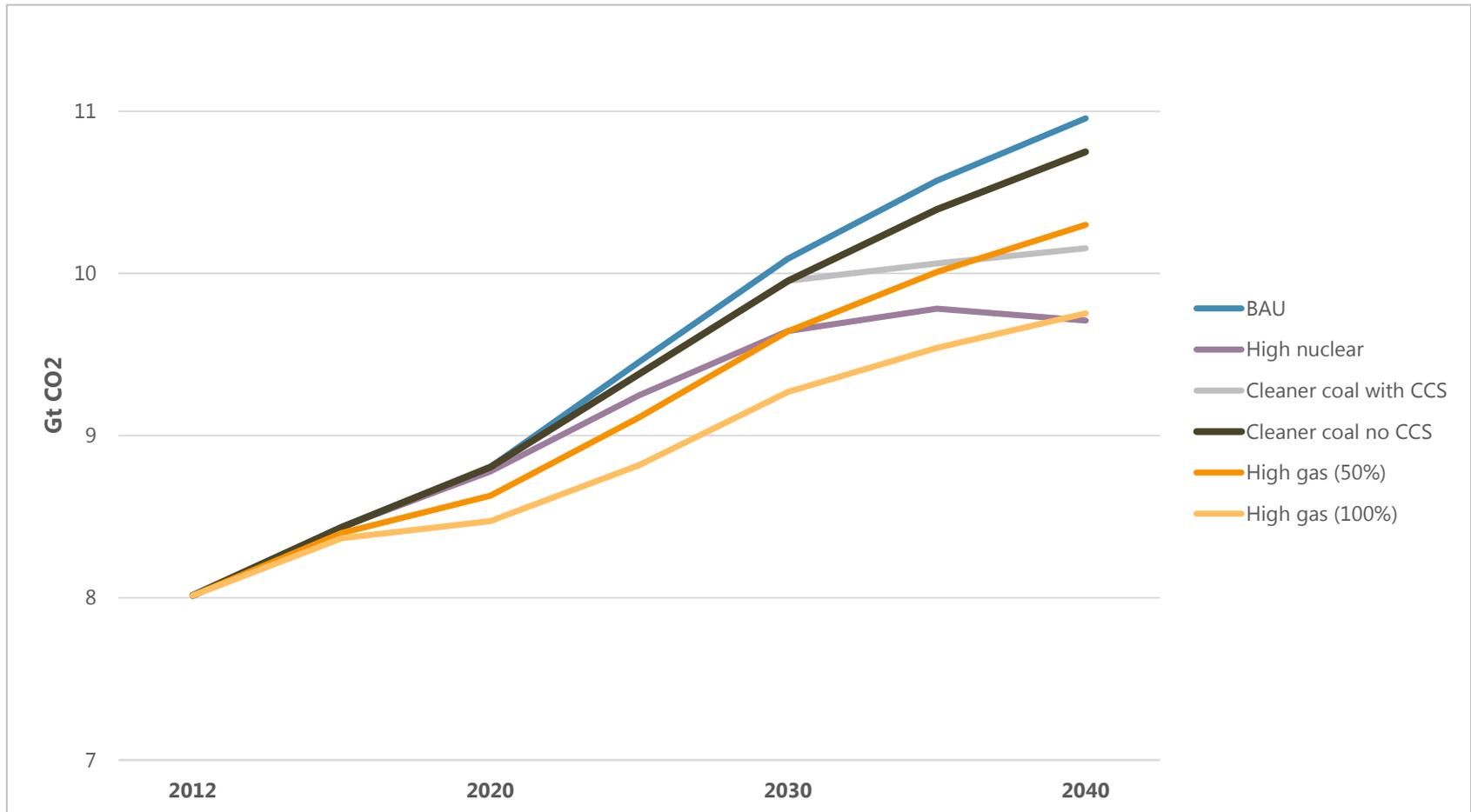
# Alternative Power Mix

## APEC's electricity generation, 2012 and 2040: Preliminary results



# CO<sub>2</sub> Emissions in Power Sector

## Preliminary results



Source: APERC Analysis



# Next Steps

- **Draft chapters finalised Sept-October**
- **Volume II (Economy Outlook) to be circulated for review end of October/early November, comments requested by end November.**
- **Volume I to be circulated for review end November, comments requested by the end of the year.**
- **Release Spring 2016**

***We look forward to your feedback  
on APERC's Outlook!***

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## **Part 2 – APEC Demand and Supply under Alternative Scenarios**

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- **Energy Investments**
- **Implications for Energy Security and Climate Change**

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- **Scenario Implications**
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  - **Sustainable energy future**
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