

# Shell energy scenarios to 2050

An era of revolutionary change

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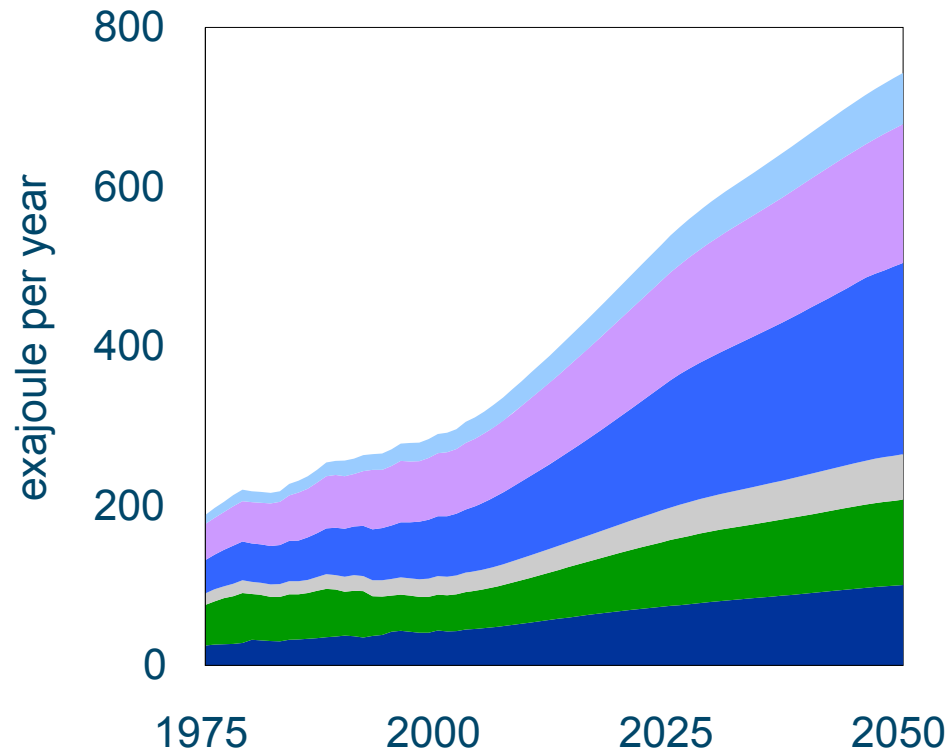
Washington, 1<sup>st</sup> April 2008

energy



# A surge in energy demand

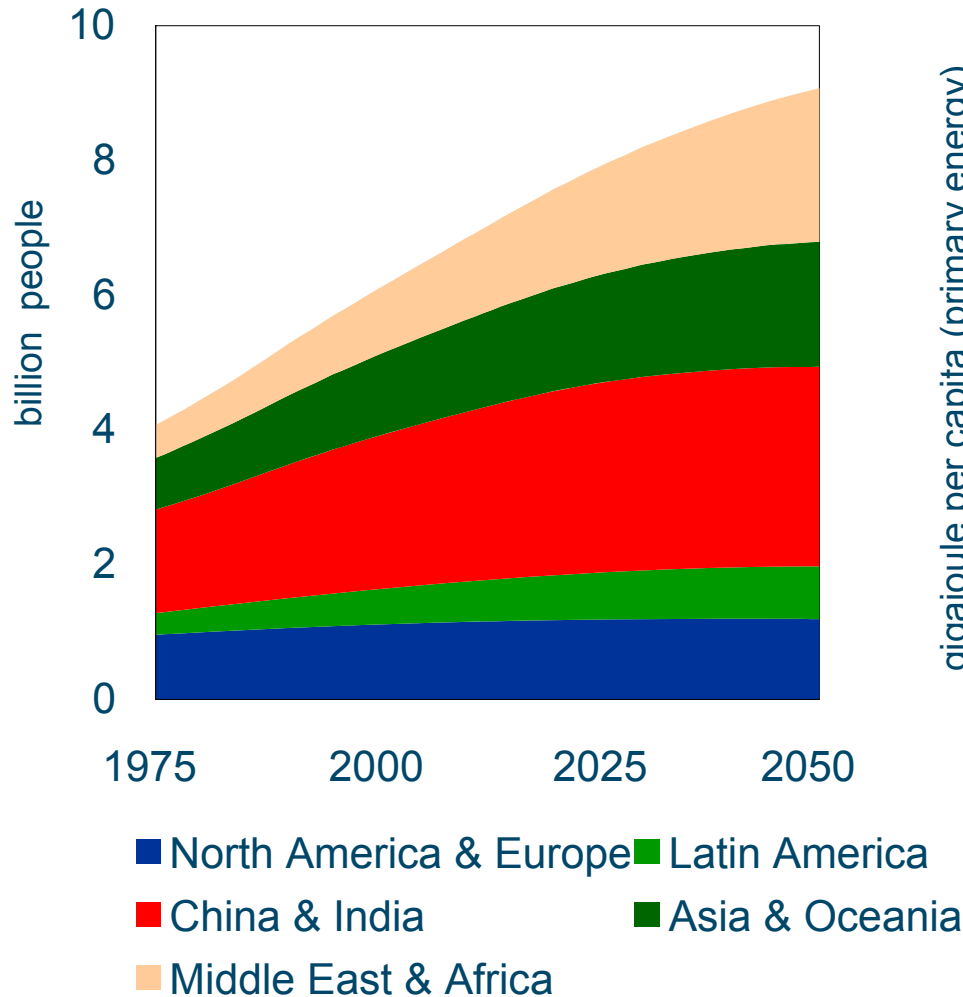
## “Business as usual” energy consumption by sector



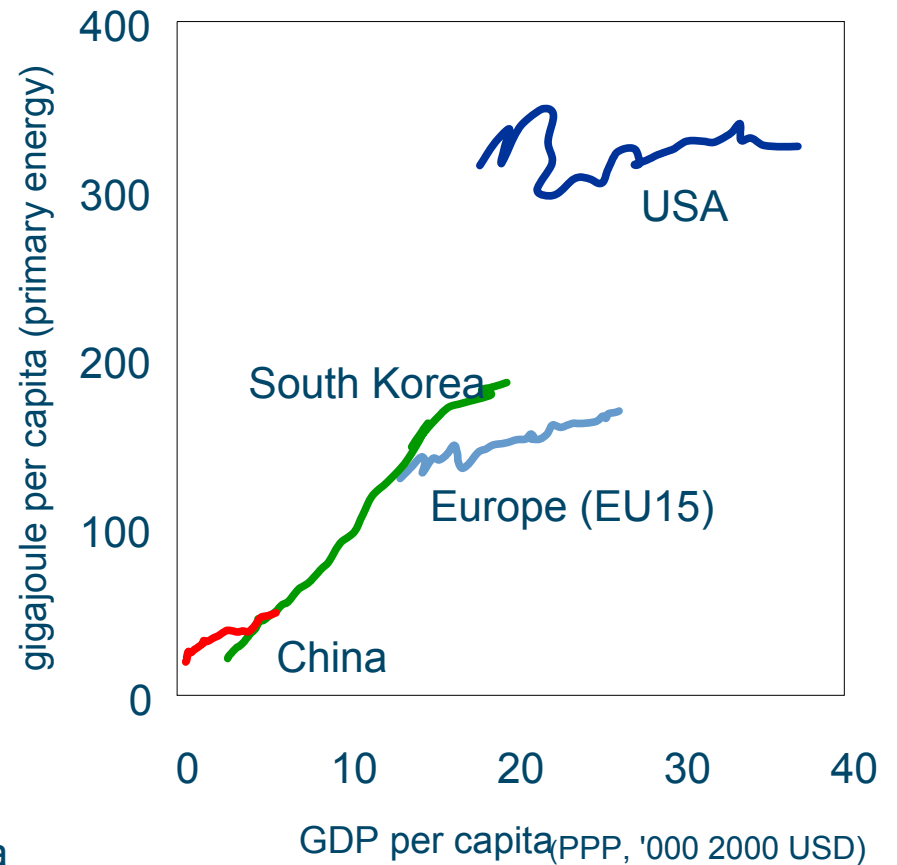
- Heavy industry
- Agriculture & other industry
- Services
- Transport
- Residential
- Non energy use (e.g. petrochemicals)

# Growth in population and prosperity are key drivers of energy demand

## Population



## Energy demand per person - History



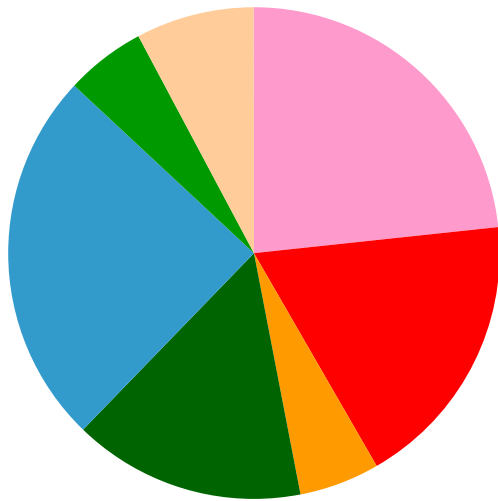
# Supply will struggle to keep pace



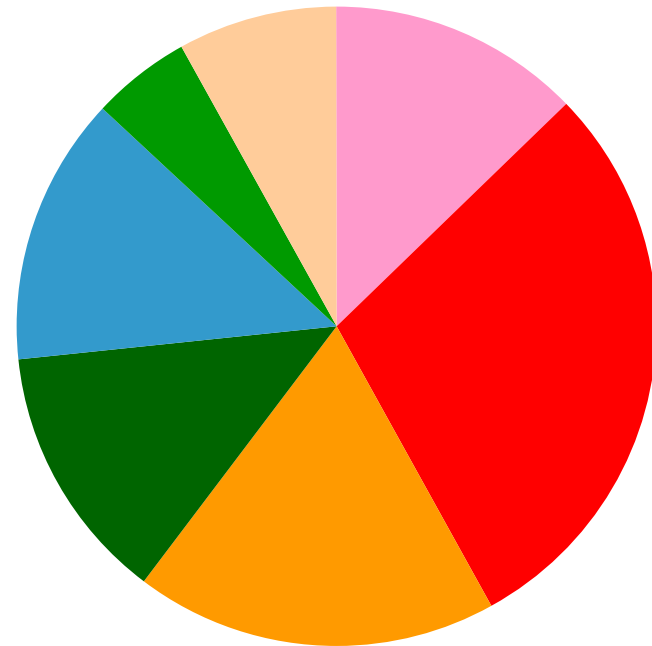
# In a “business as usual” world, CO<sub>2</sub> emissions would rise dramatically

## Total direct CO<sub>2</sub> emissions from energy per year

2007 = 28 gigatonne



2050 = 65 gigatonne



North America

China

India

Asia & Oceania

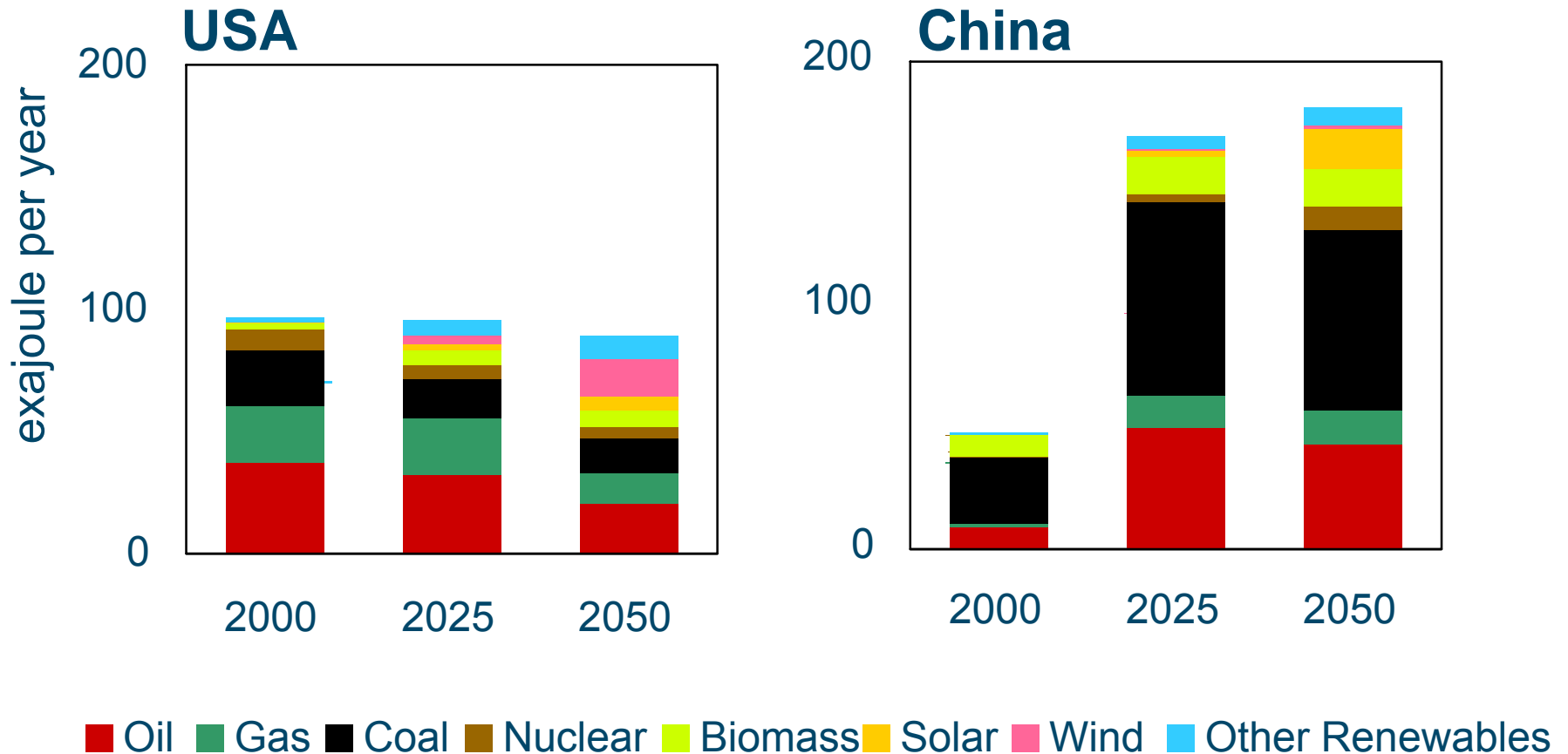
Europe

Latin America

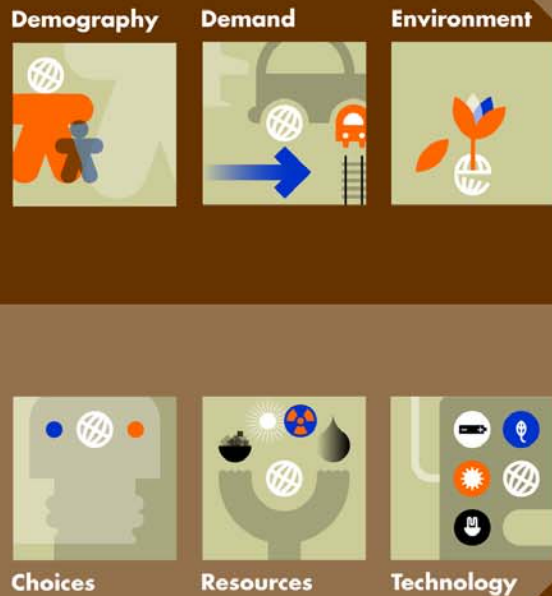
Middle East & Africa

# Energy transitions are inevitable

## Total primary energy demand



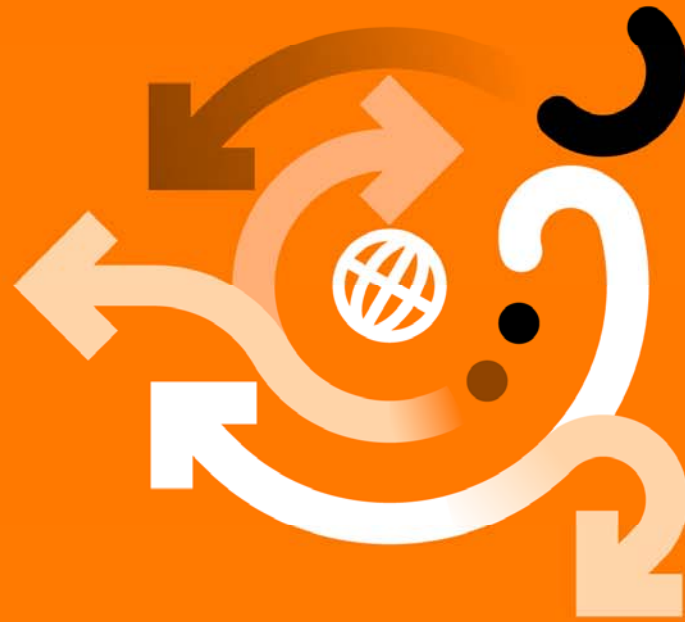
# Shell energy scenarios



National supply focus  
and reactive change

BLUEPRINTS  
SCRAMBLE

Emerging coalitions  
And accelerated change

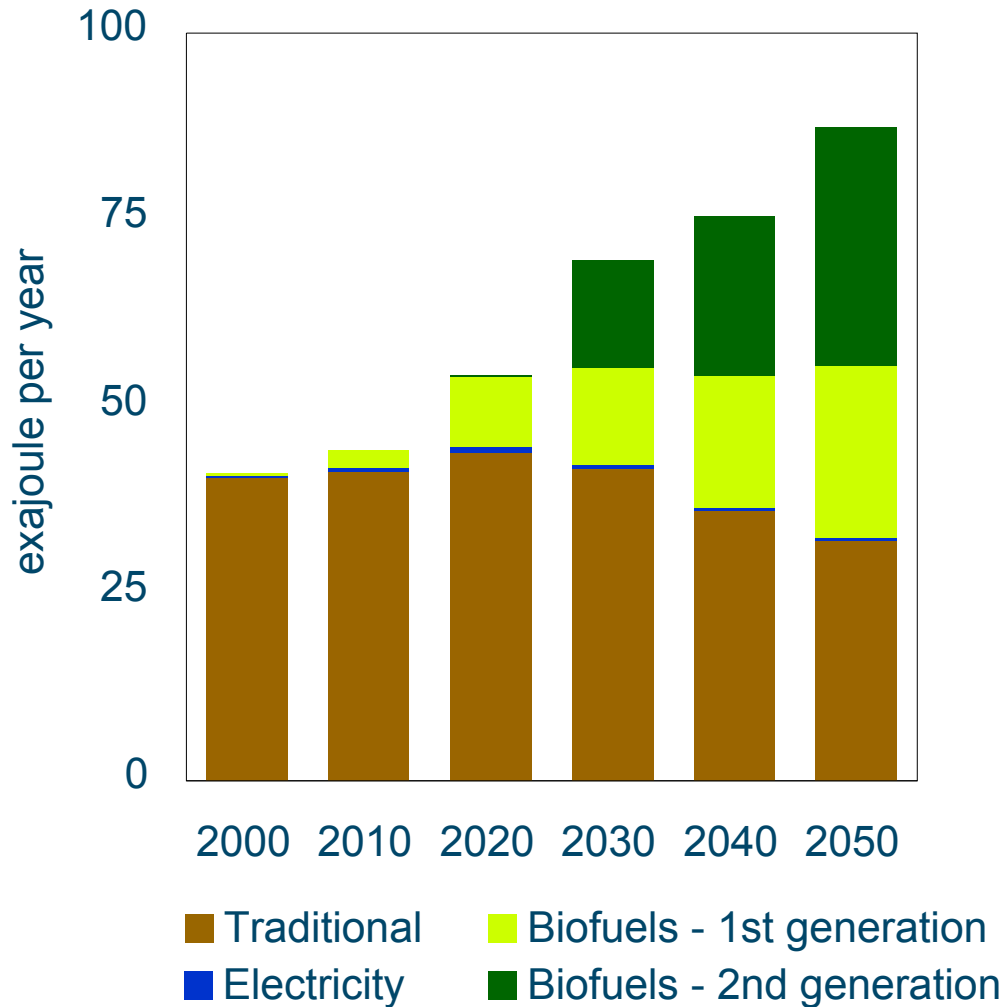


SCRAMBLE

**Scramble** – supply side focus but hits constraints

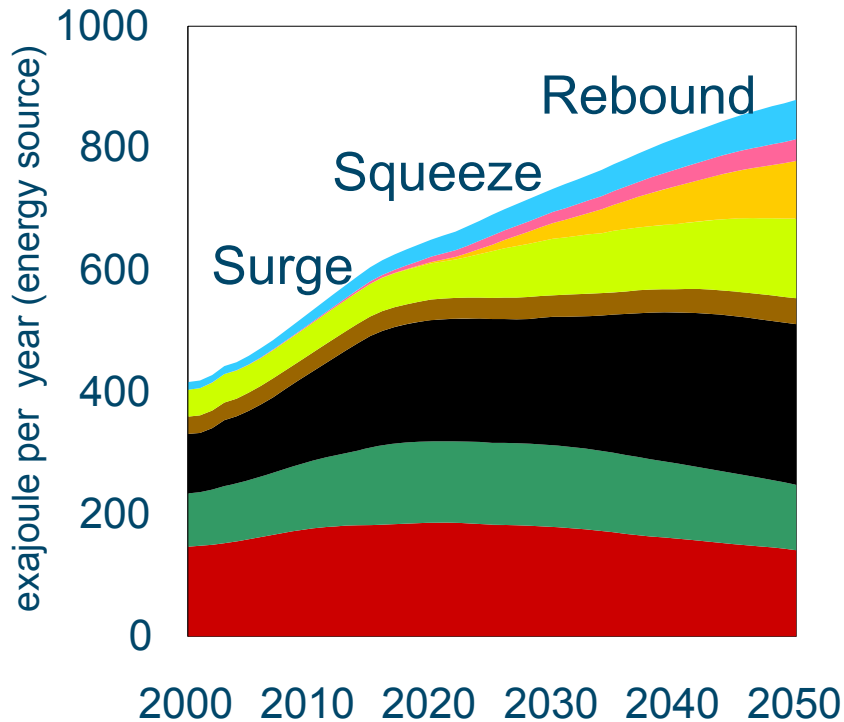


# Scramble - Biomass diversifies liquid fuel mix



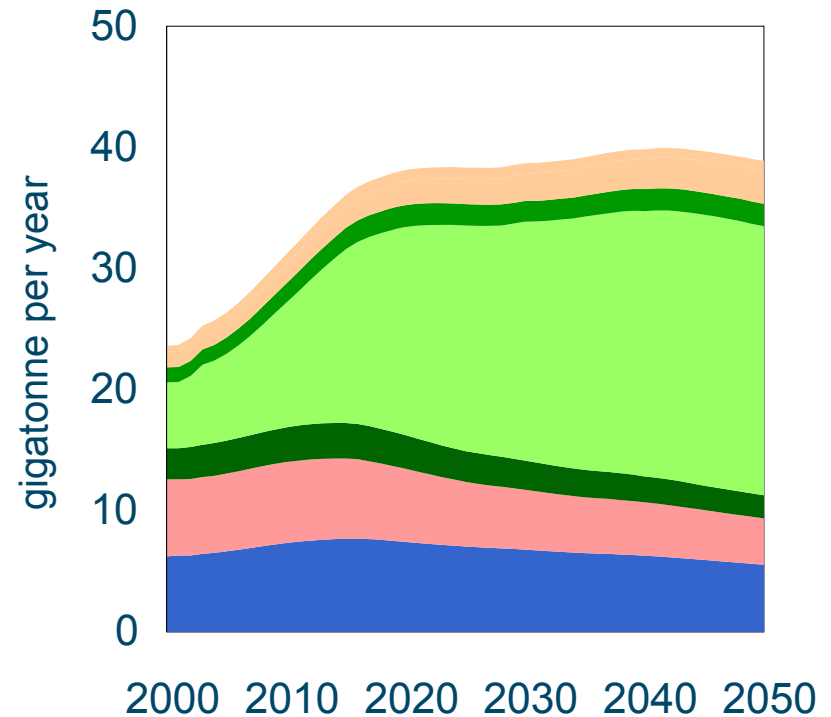
# Scramble – supply focus and late responses

## Total primary energy demand

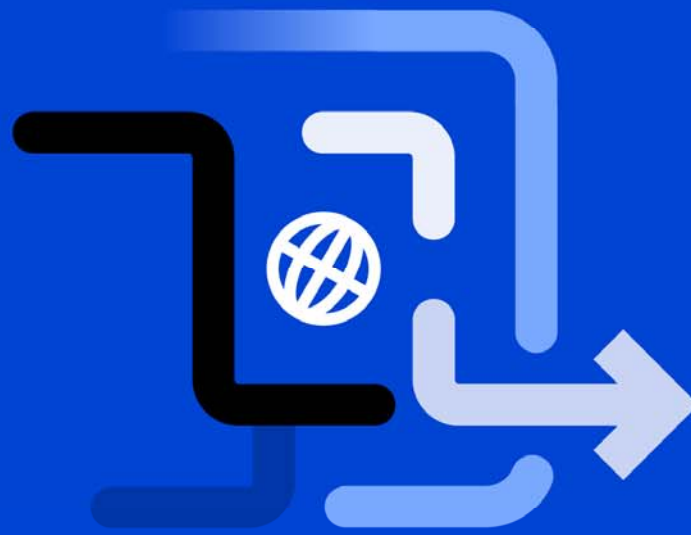


- Oil
- Coal
- Biomass
- Wind
- Gas
- Nuclear
- Solar
- Other Renewables

## Direct CO<sub>2</sub> emissions from energy



- Middle East & Africa
- Latin America
- Asia & Oceania - Developing
- Asia & Oceania - Developed
- North America
- Europe

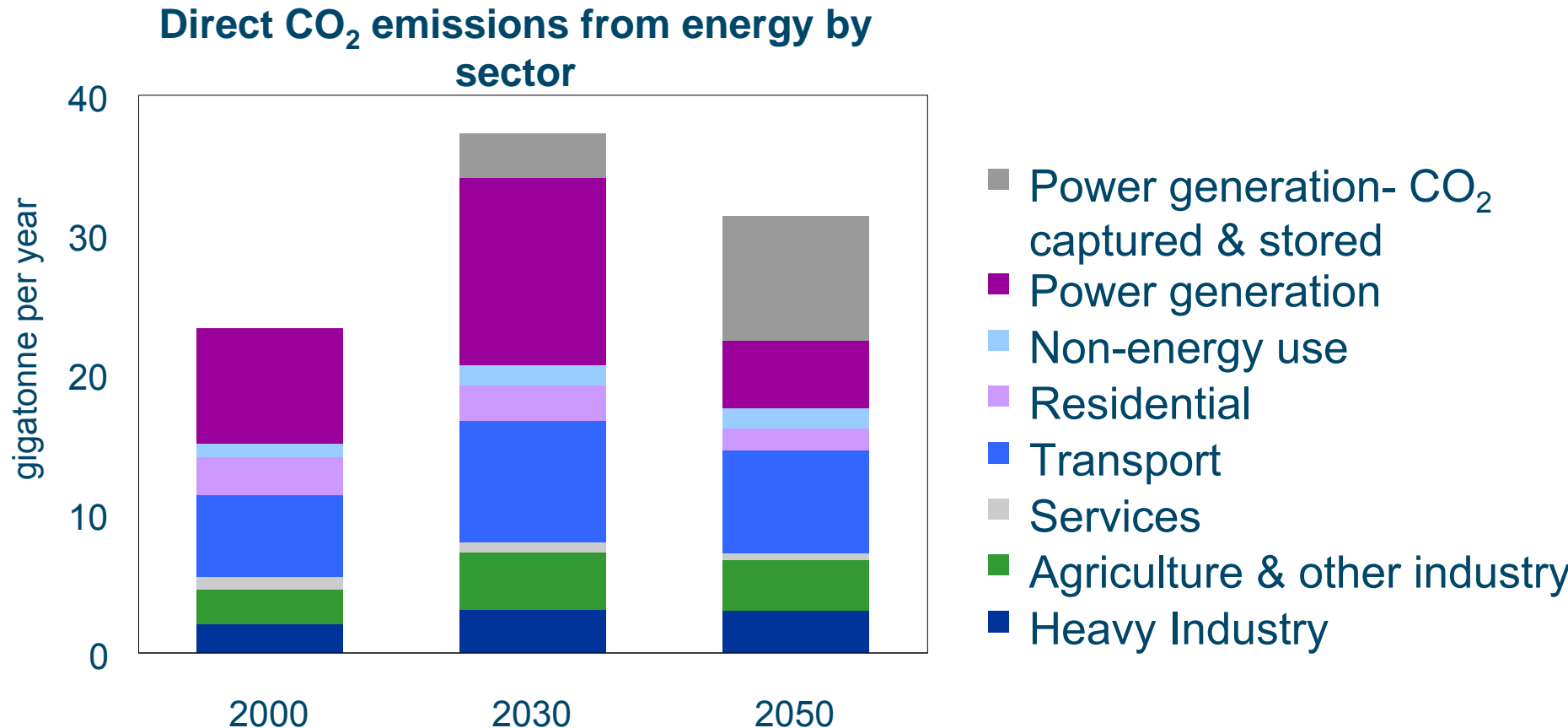


BLUEPRINTS

# Blueprints - CO<sub>2</sub> pricing stimulates efficiency and technology development

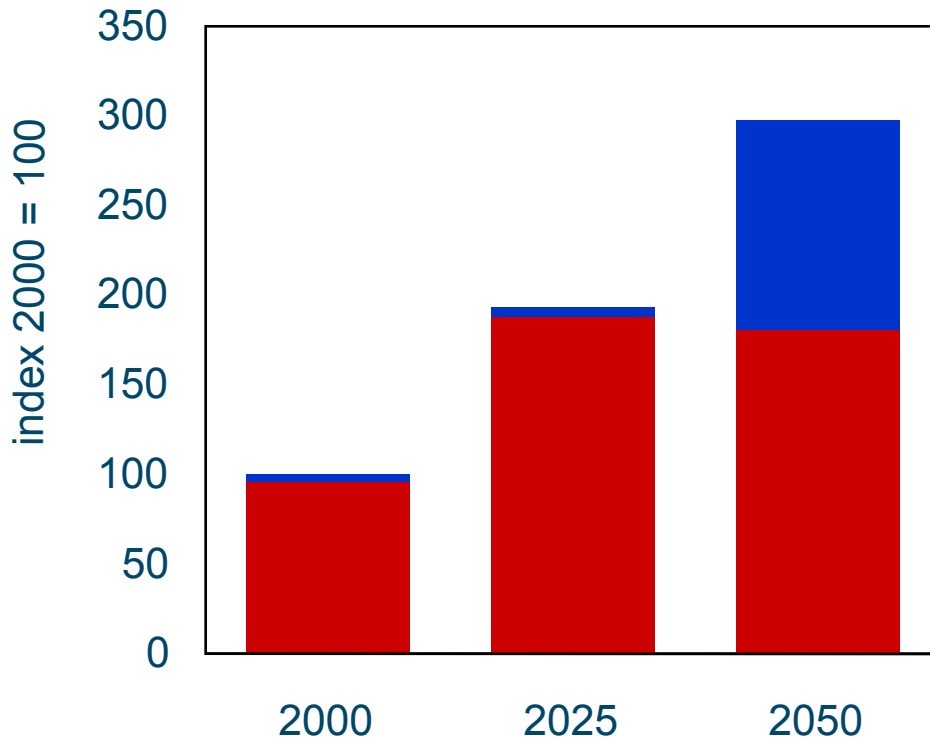


# Blueprints – CO<sub>2</sub> capture and storage abates ~30% of total emissions by 2050



# Blueprints - Efficiency and innovation in transport

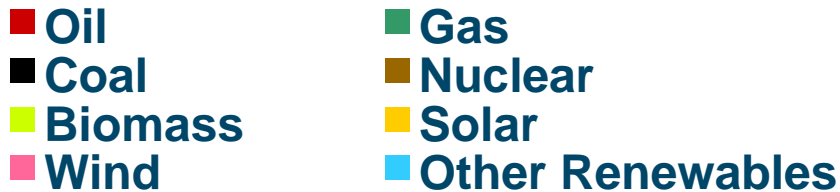
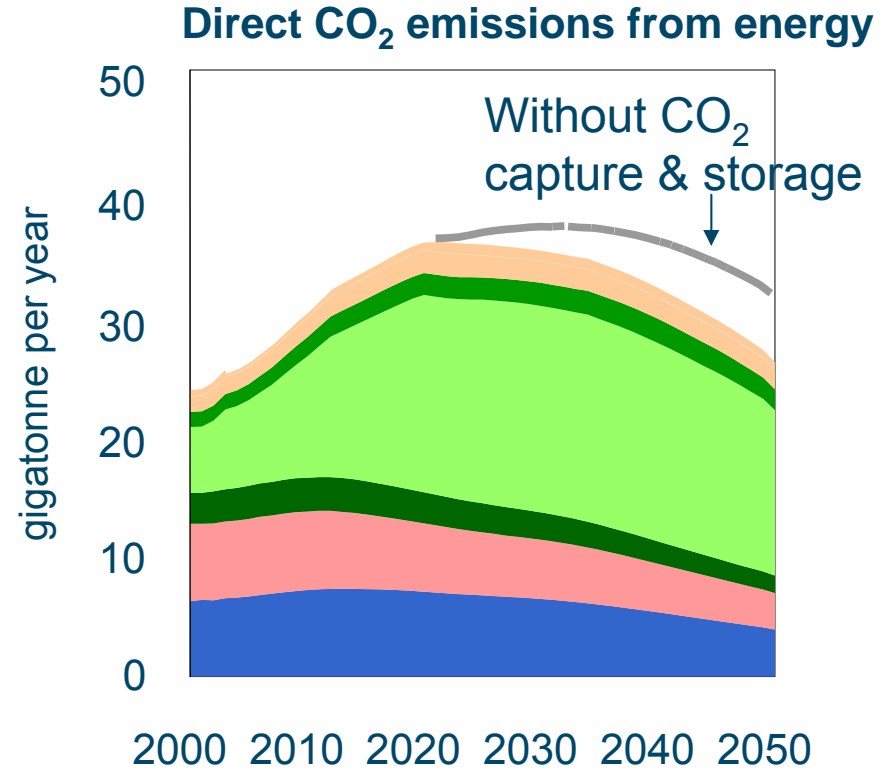
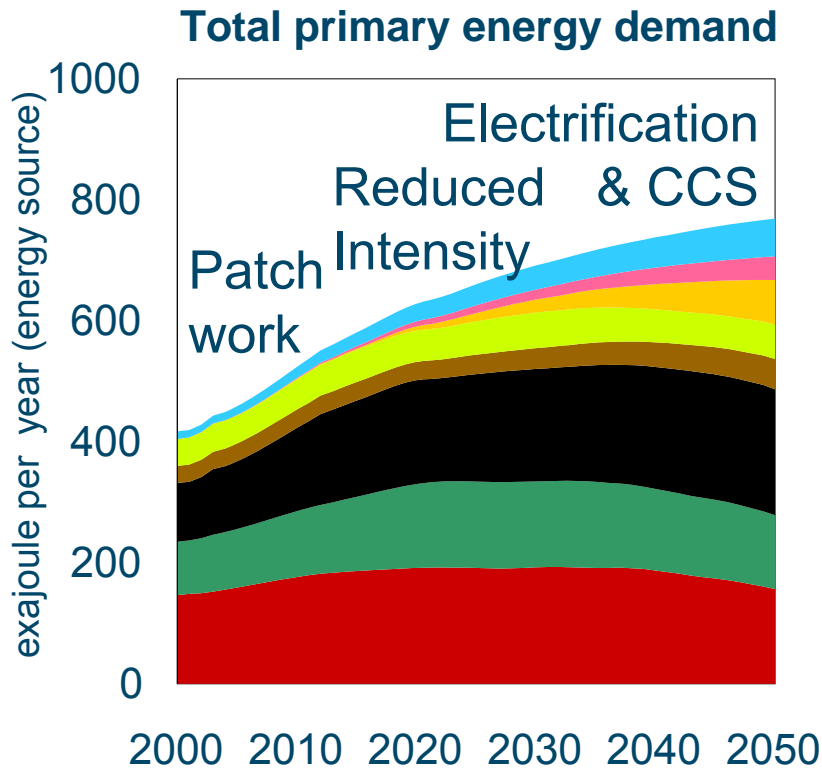
## Passenger distance travelled (world)



■ Liquid fuels ■ Electric transport

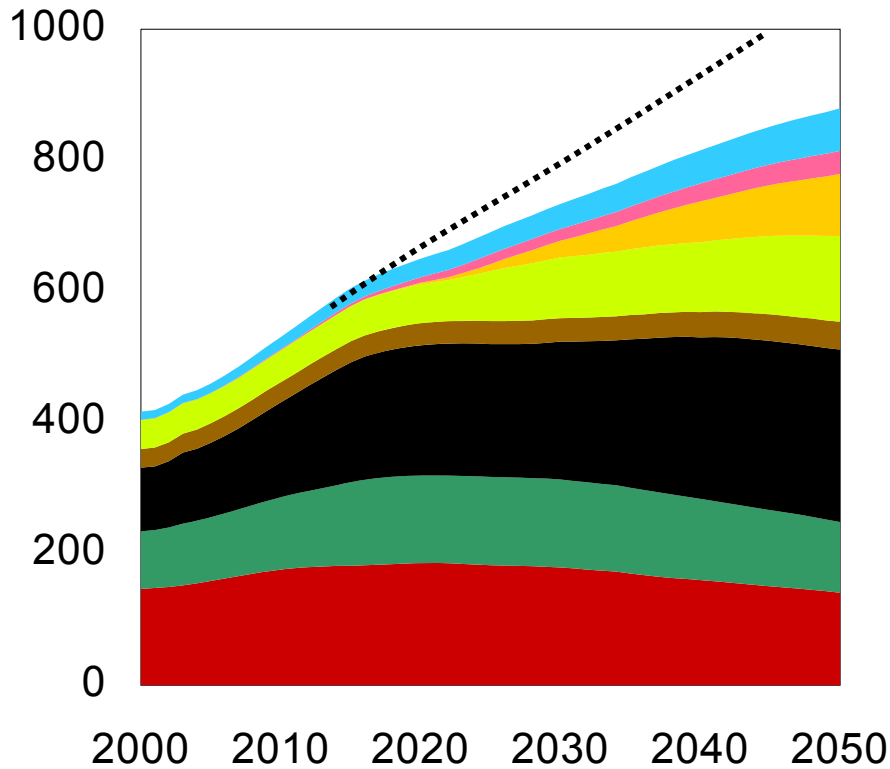


# Blueprints – multi-focus and early actions

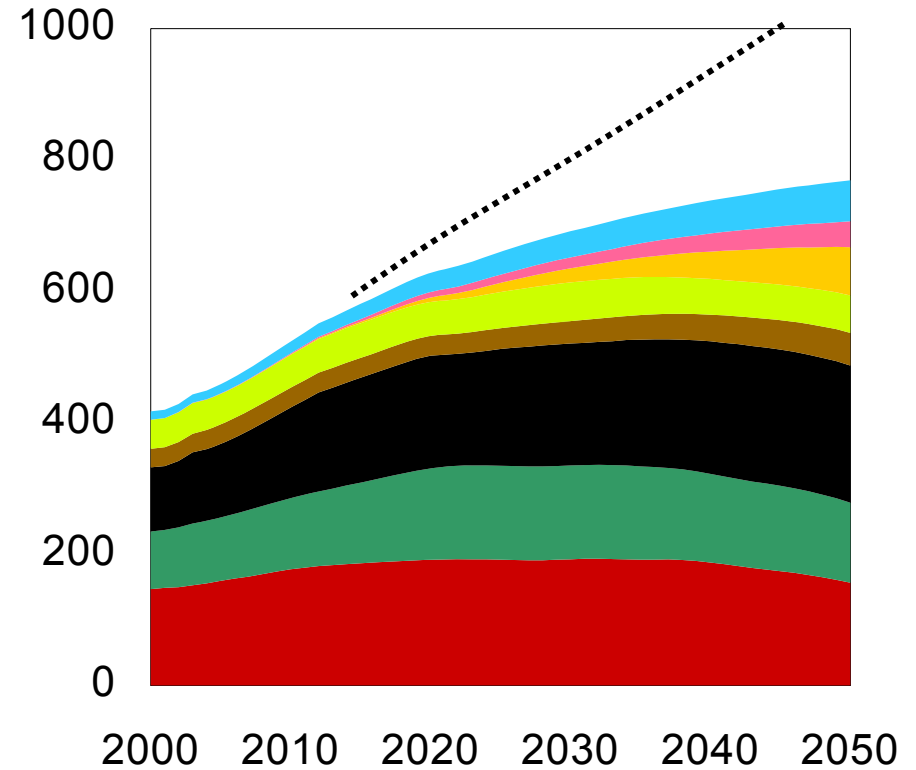


# Comparing the scenarios: energy mix

 **Scramble**



 **Blueprints**

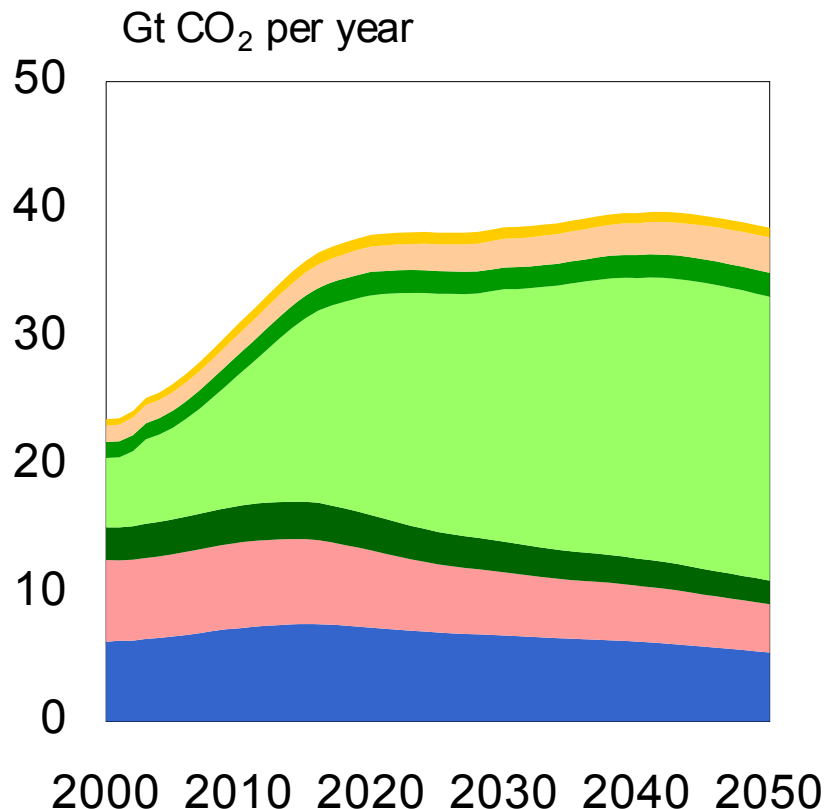


Oil Gas Coal Nuclear Biomass Solar Wind Other Renewables

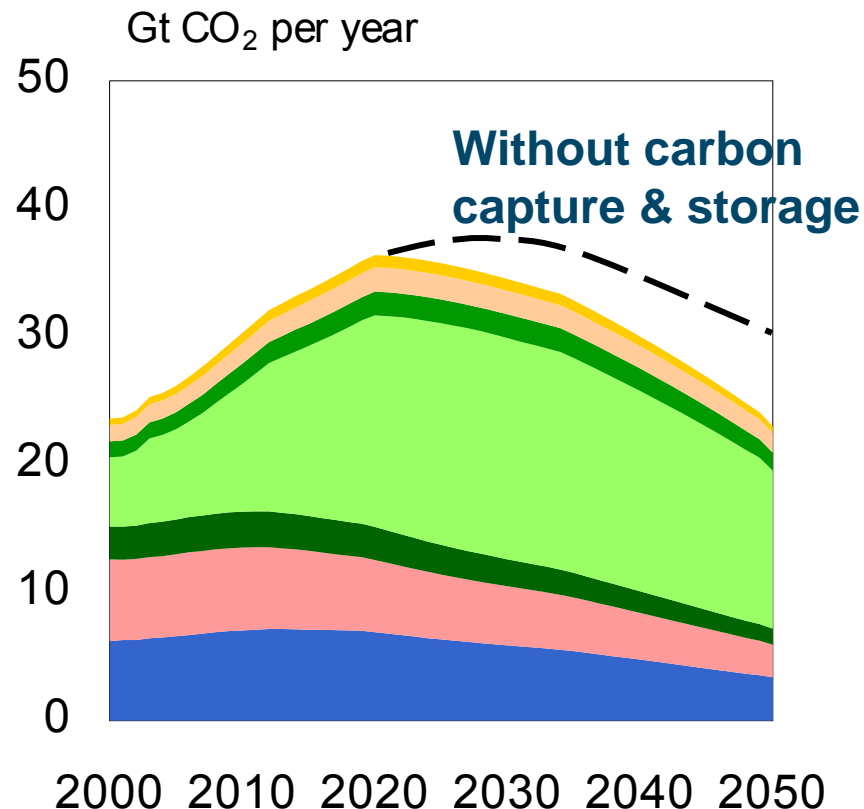
# Implications for CO<sub>2</sub> emissions from energy



## Late reactions



## Early actions



Europe

North America

Asia & Oceania - Developed

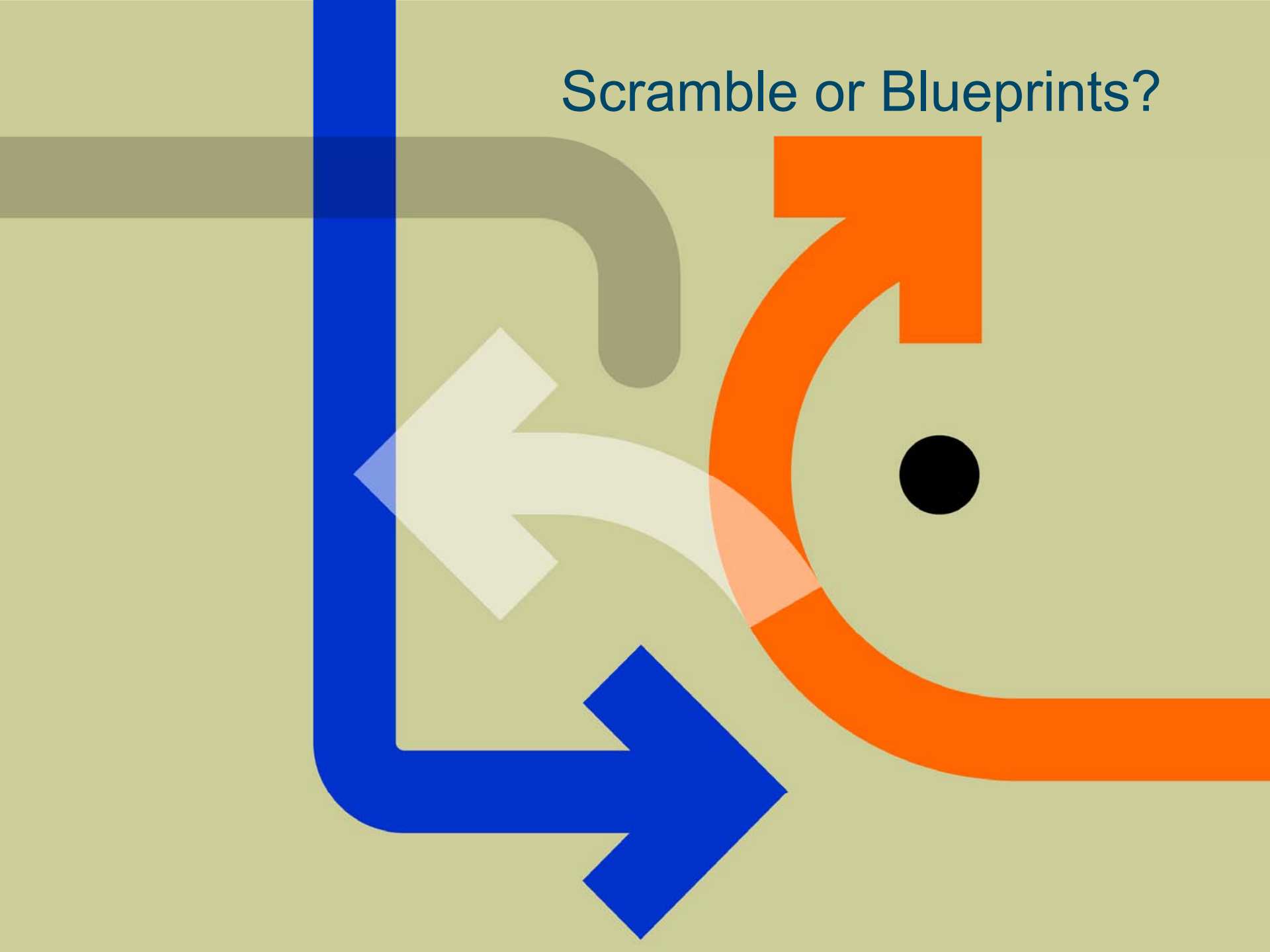
Asia & Oceania - Developing

Latin America

Middle East & North Africa

Sub-Saharan Africa

# Scramble or Blueprints?





# Actions and policy areas

- Cap and trade
- Carbon dioxide capture and storage
- Efficiency in the transport sector
- Credible targets for wind and solar in the power sector
- Robust efficiency standards for buildings and appliances

Q & A ?

? Q & A ?

? ? Q & A ?

