

# Shell energy scenarios to 2050

An era of revolutionary change

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Rotterdam, November 2009

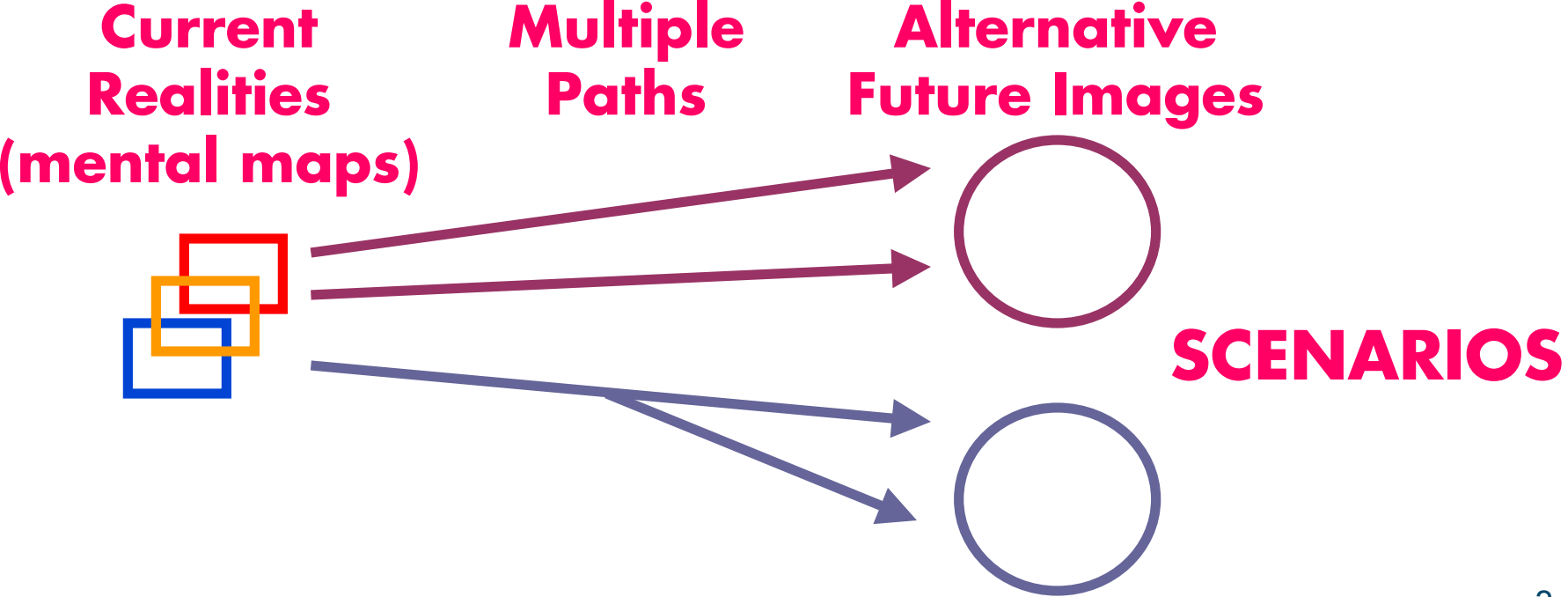
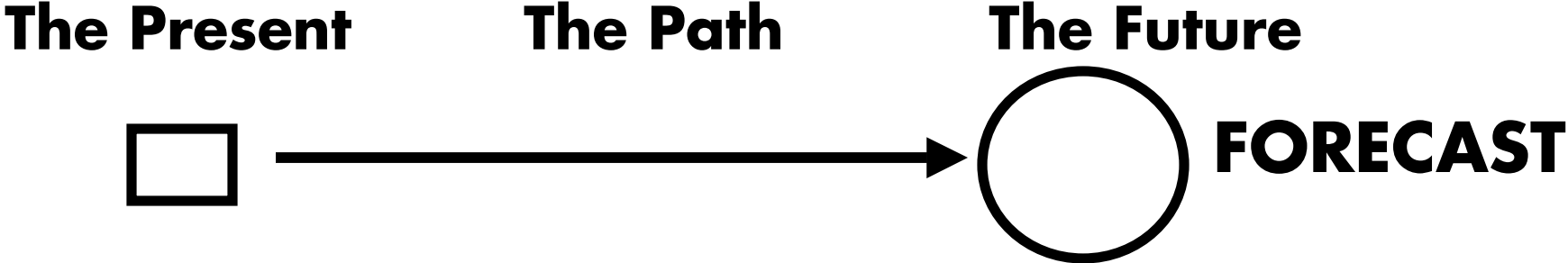
energy



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# Transitions and Disruptions are inevitable; Scenarios help us wrestle with possible futures



# TINA

SEC

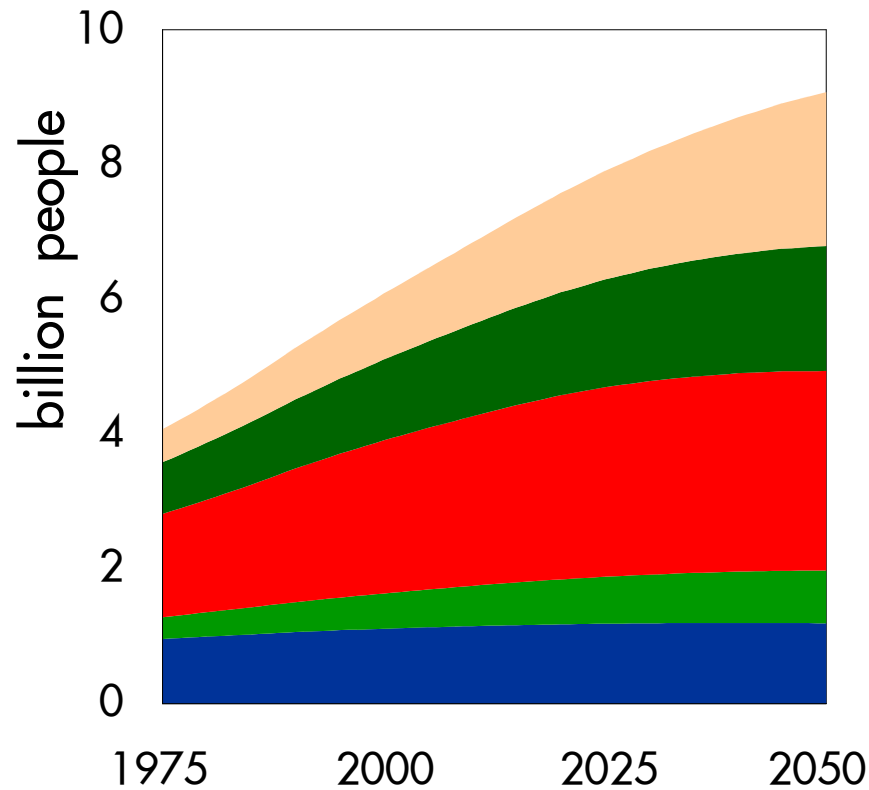
## A People-Centred Map of the World



Year 2000; Source Mark Newman, University of Michigan

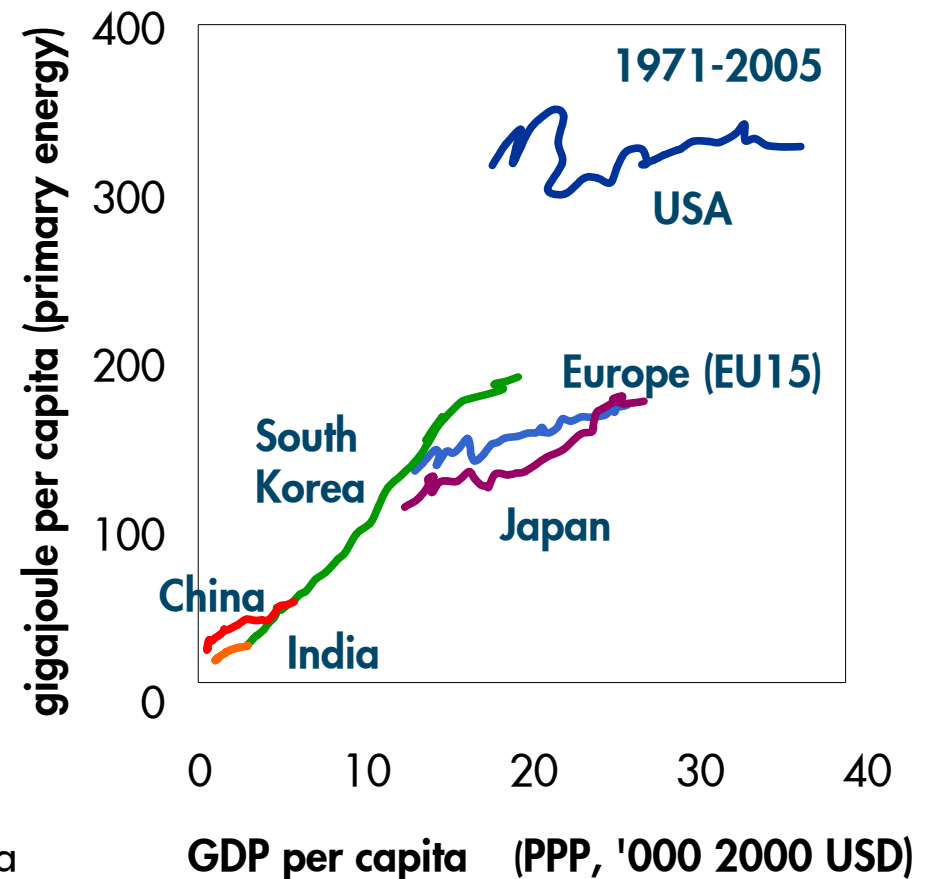
# All energy outlooks driven by the population & prosperity of rapidly growing economies

## Population



- North America & Europe
- China & India
- Middle East & Africa
- Latin America
- Asia & Oceania

## Energy demand per person -History



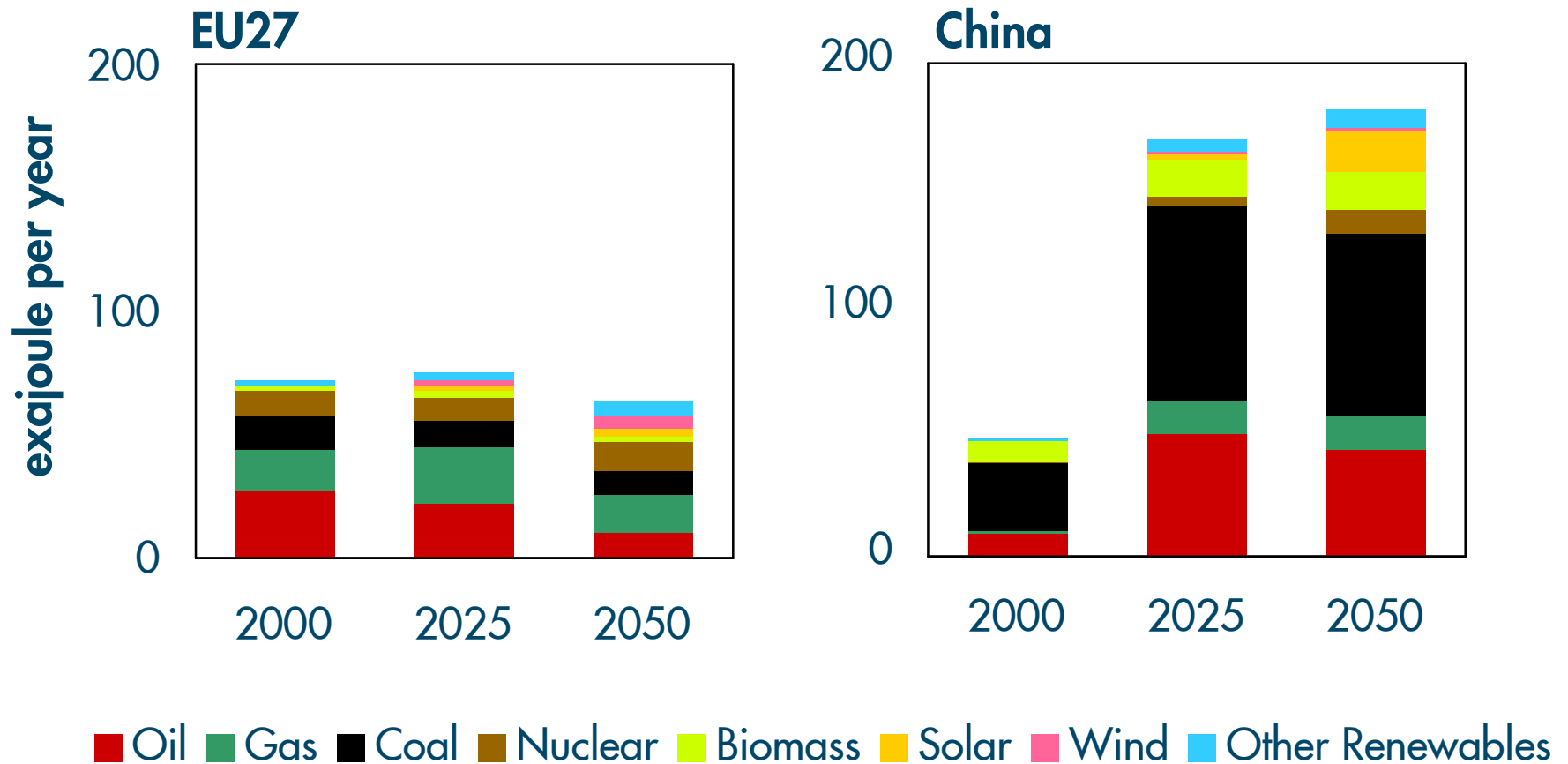
# Three Hard Truths

- **Surging energy demand**
- **“Easy” supply will struggle to keep pace**
- **Environmental stresses are increasing**

**TAN!A**

# Energy transitions are inevitable ...

## Total primary energy demand

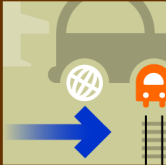


# Shell energy scenarios

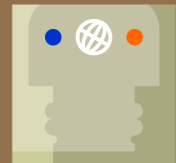
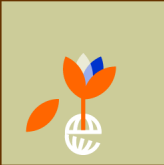
Demography



Demand



Environment



Choices



Resources



Technology

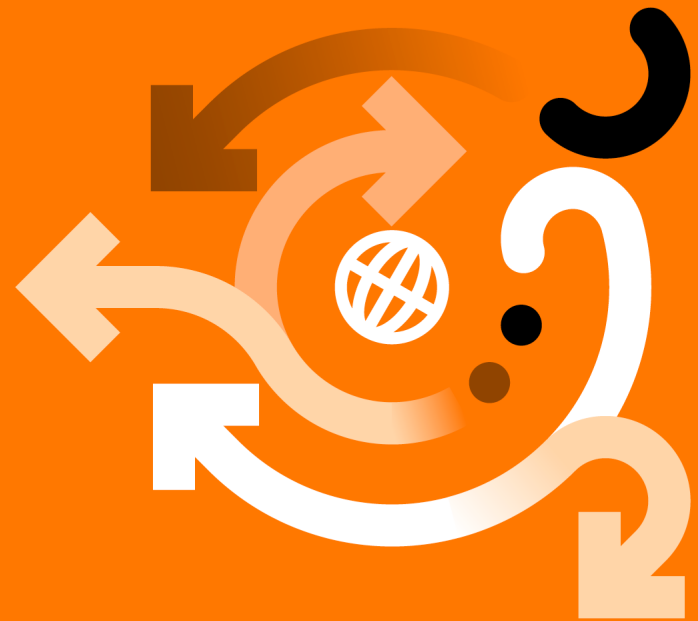


National supply focus  
and reactive change

Emerging coalitions  
and accelerated change

BLUEPRINTS

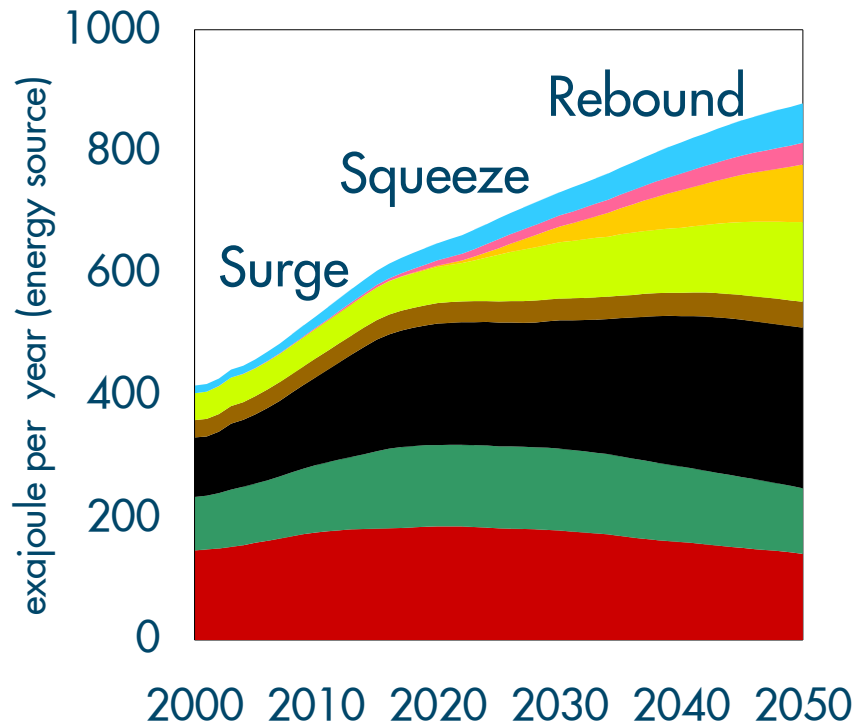
SCRAMBLE



SCRAMBLE

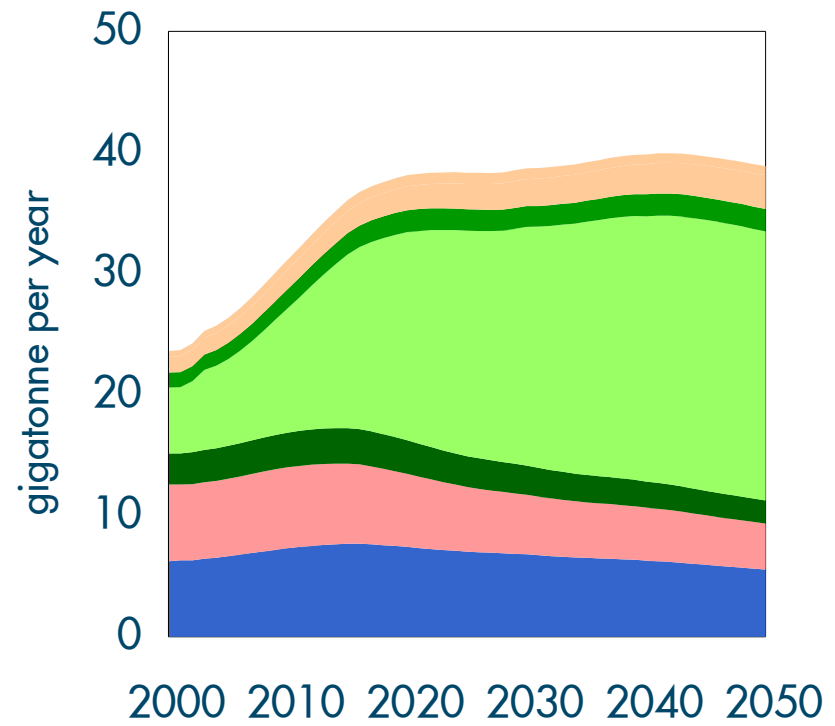
# Scramble – supply focus and late responses

## Total primary energy demand



- Oil
- Coal
- Gas
- Nuclear
- Biomass
- Wind
- 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

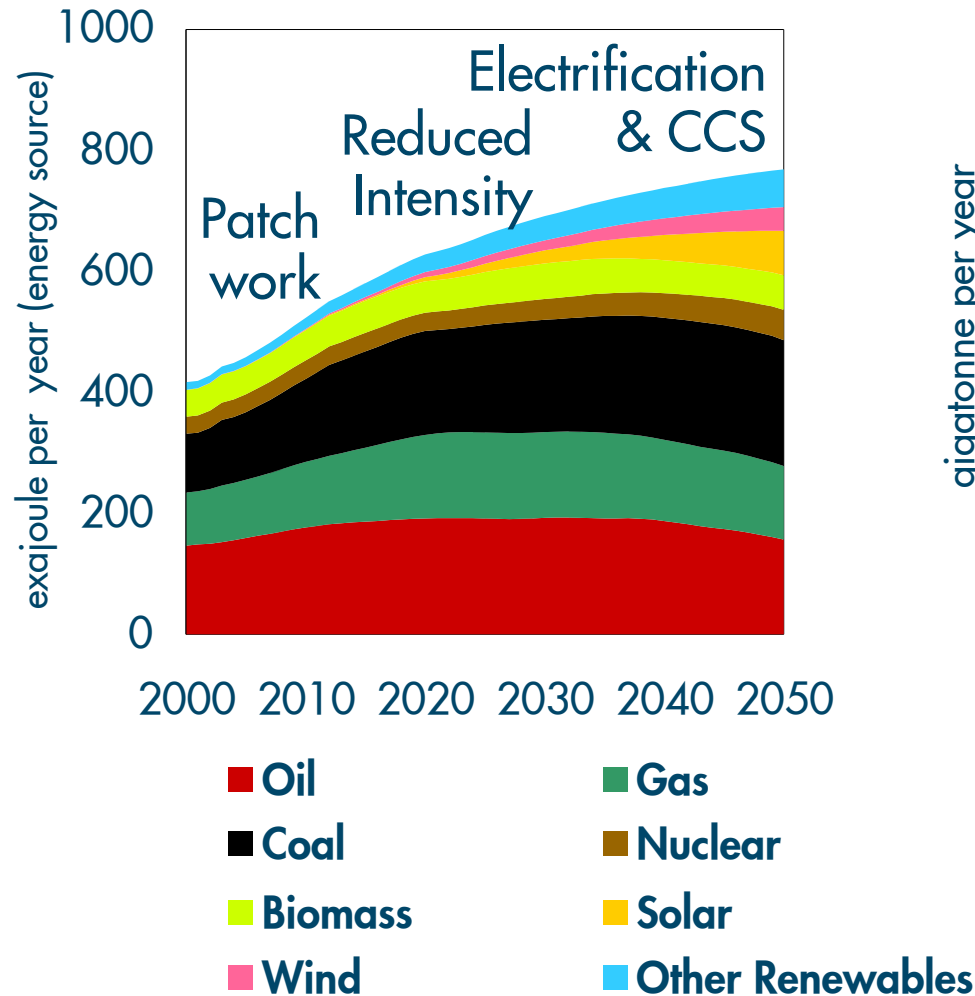
Sources: Shell International BV and Energy Balances of OECD and Non-OECD Countries©OECD/IEA 2006



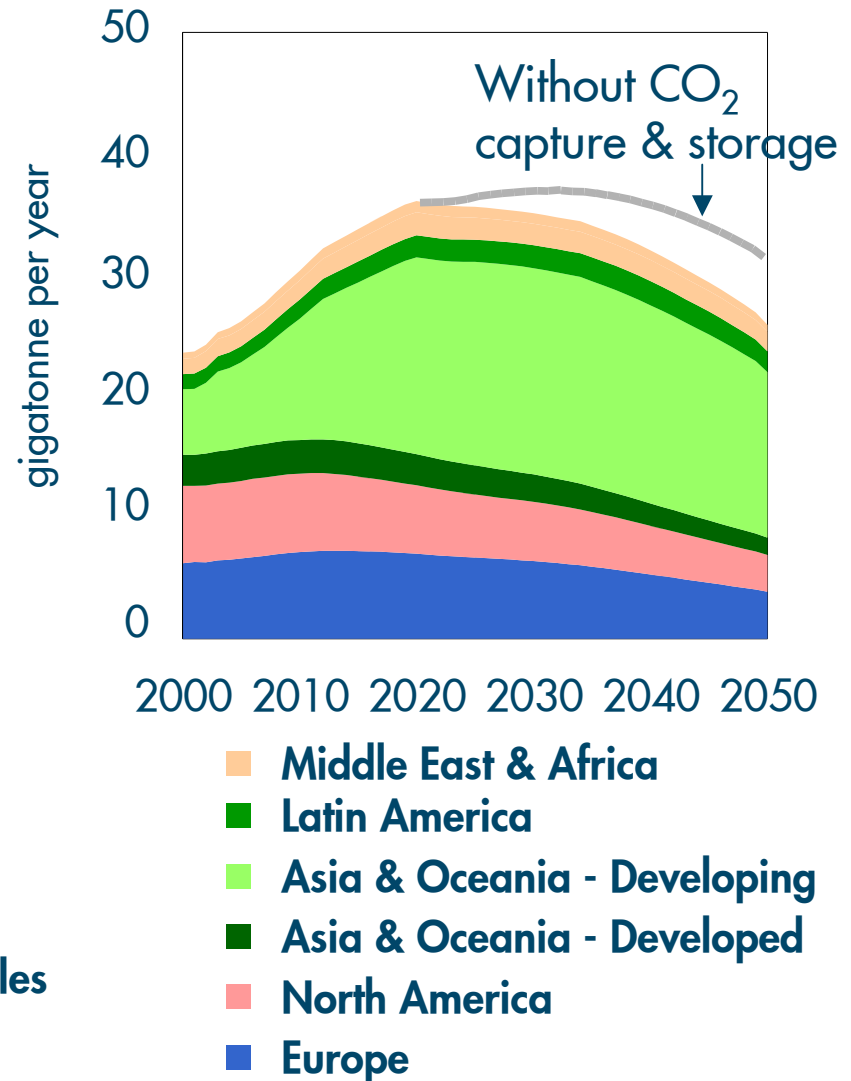
BLUEPRINTS

# Blueprints – multi-focus and early actions

## Total primary energy demand



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

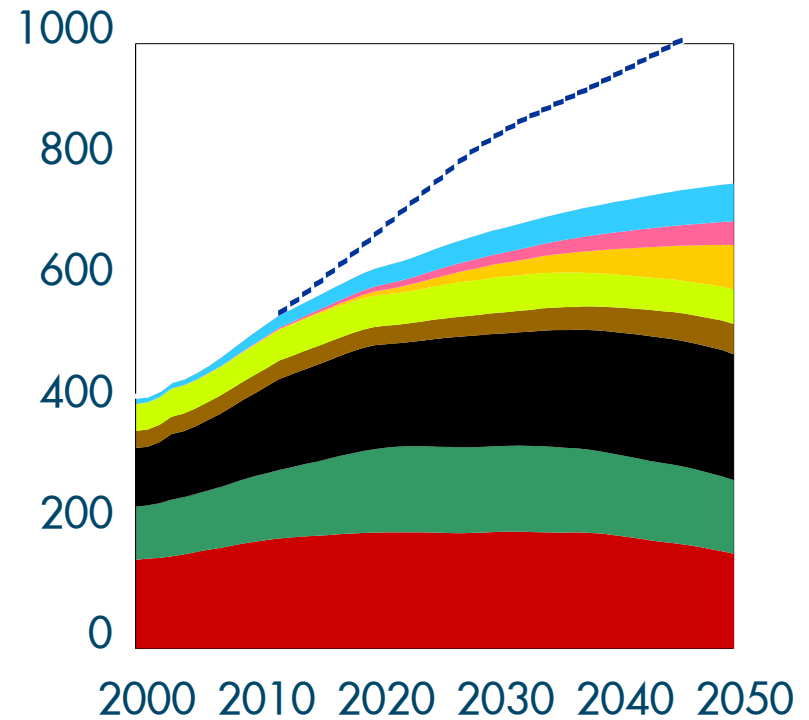
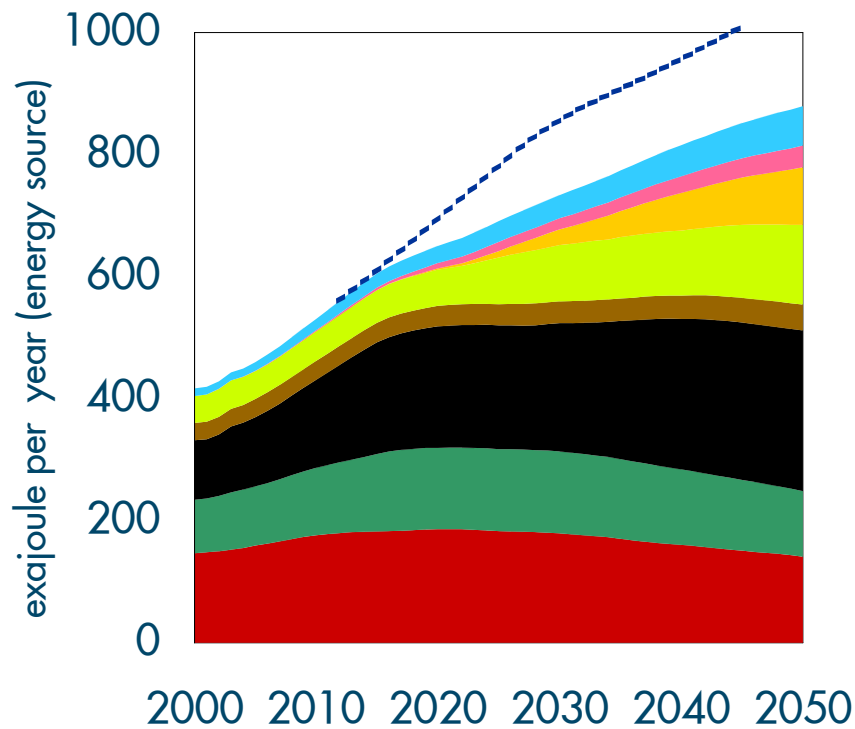


Sources: Shell International BV and Energy Balances of OECD and Non-OECD Countries©OECD/IEA 2006

# Comparing the scenarios: global energy mix

## Scramble

## Blueprints



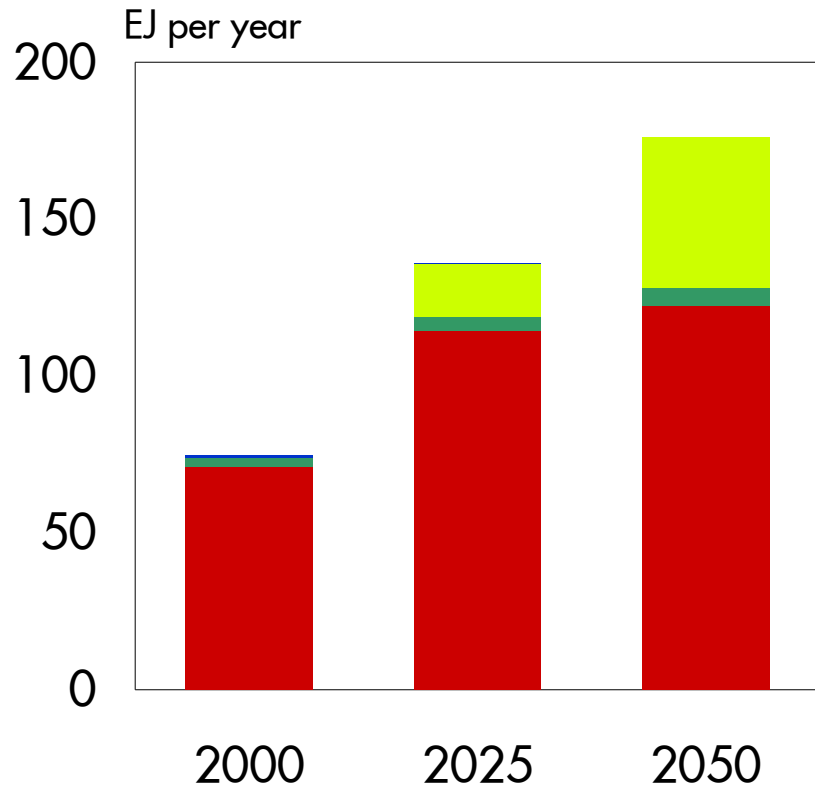
■ Oil 
 ■ Gas 
 ■ Coal 
 ■ Nuclear 
 ■ Biomass 
 ■ Solar 
 ■ Wind 
 ■ Other Renewables

..... Hypothetical extrapolated "Business as Usual"

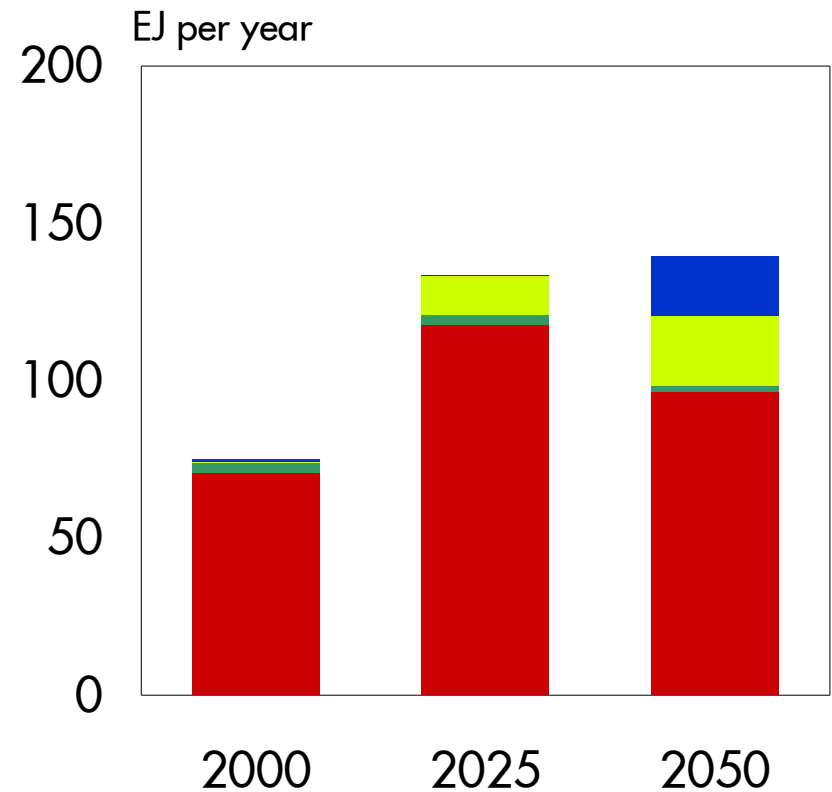
# At sector level - what this means for Transport Fuel



Liquid-based fuels



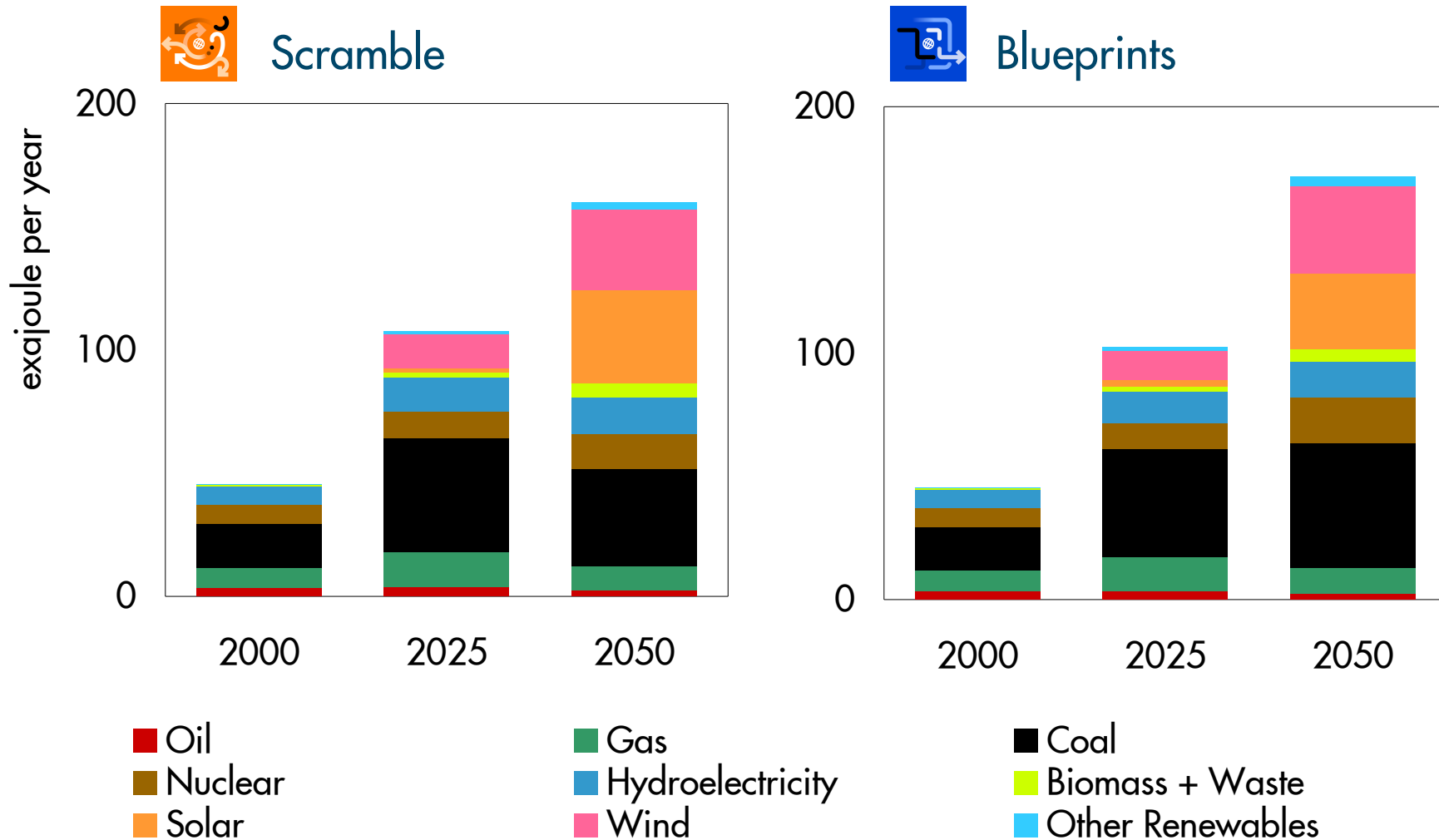
Electric vehicles



■ Liquid fuels fossil-derived   
 ■ Gaseous hydrocarbon fuels   
 ■ Biofuels   
 ■ Electricity<sup>#</sup>

# At a sector level - what this means for Electricity (power generation)

Electricity - Total final consumption by energy source

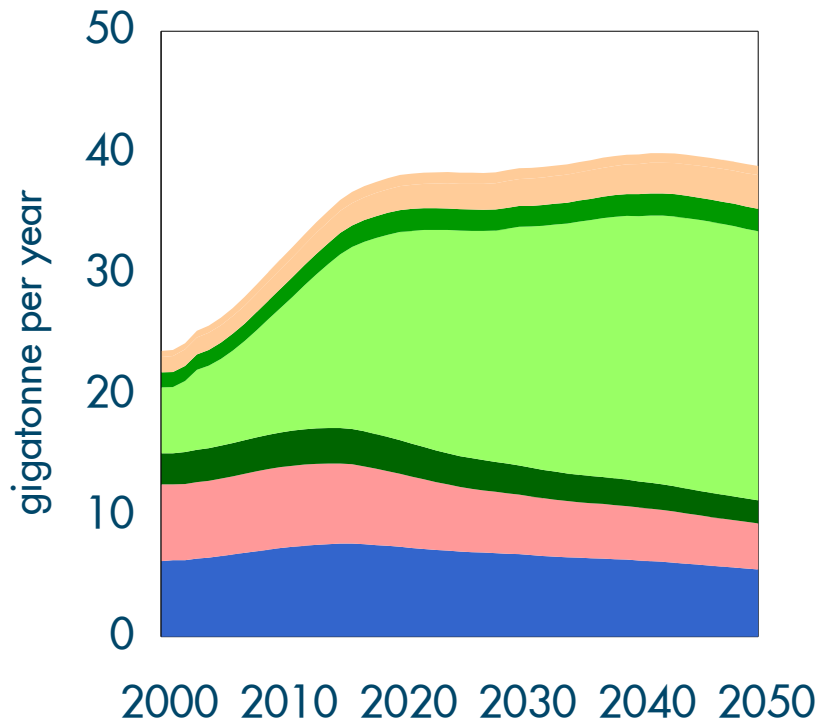


Source: Shell International BV and Energy Balances of OECD and Non-OECD Countries □ OECD/IEA 2006

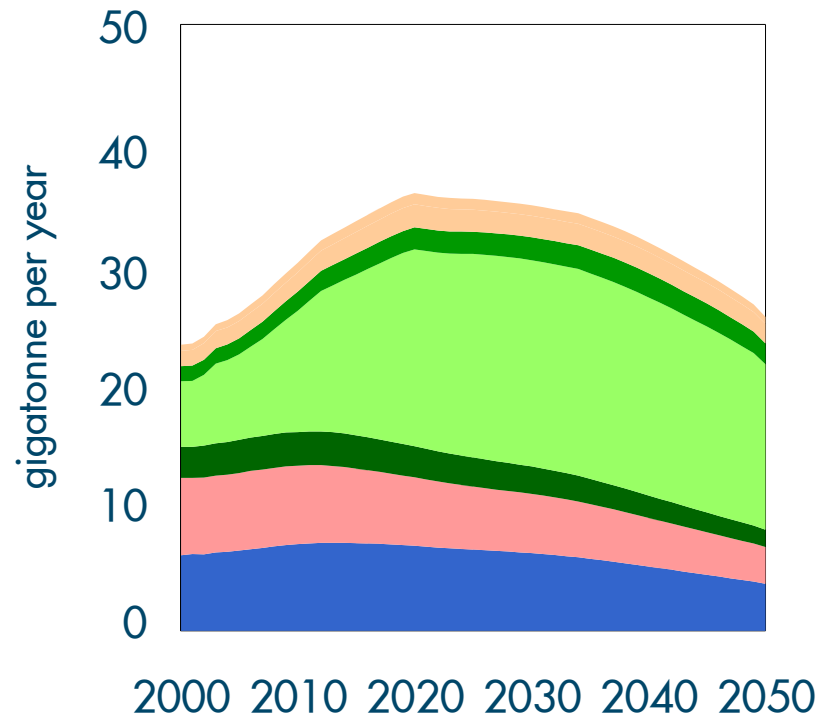
# Implications for direct CO<sub>2</sub> emissions from energy



Late reactions



Early actions



■ Europe

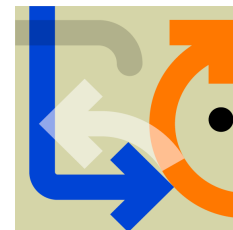
■ Asia & Oceania - Developed

■ Latin America

■ North America

■ Asia & Oceania - Developing

■ Middle East & Africa

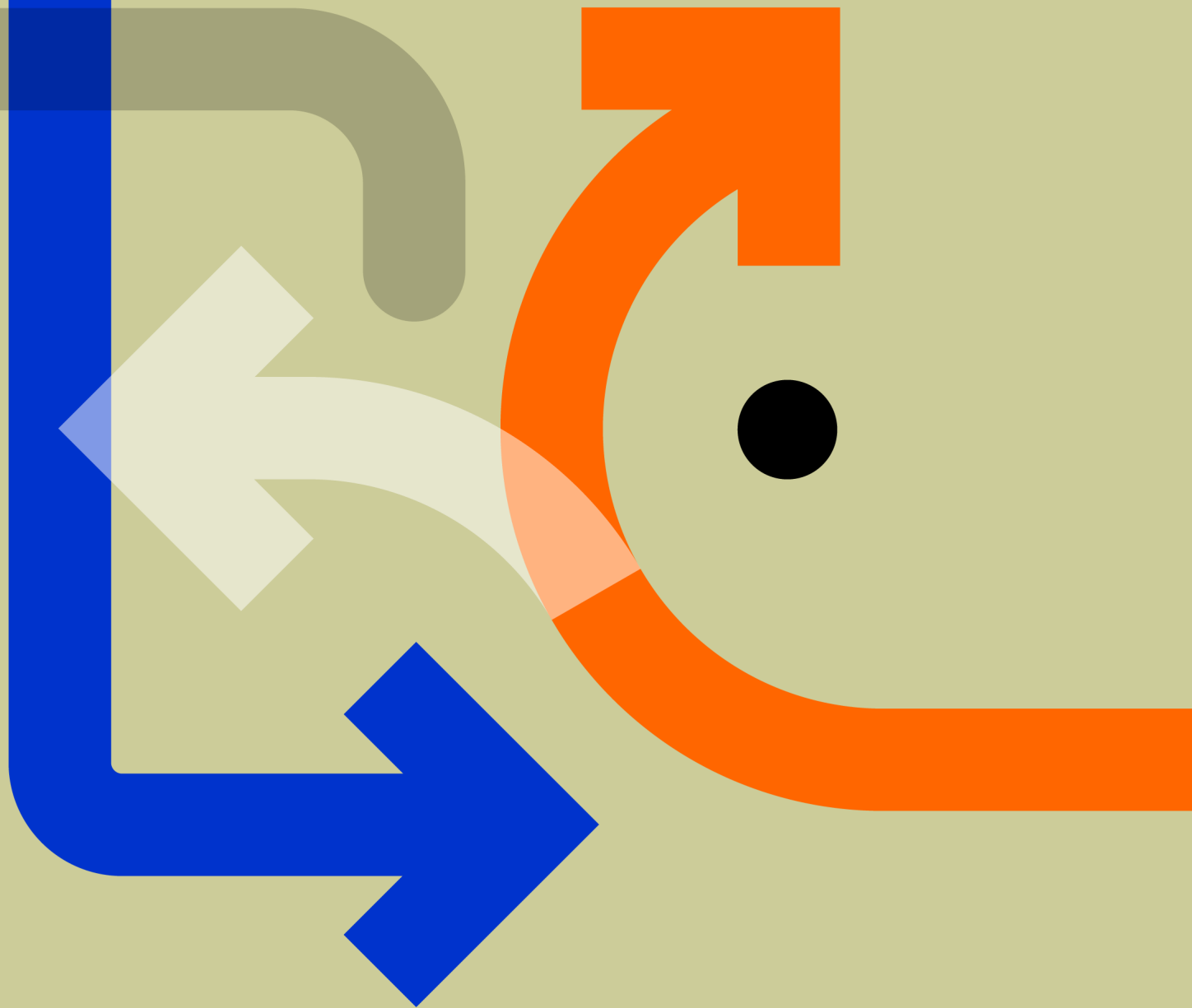


## In summary – what we have learned

- The three hard truths are **very** hard
  - The nature of economic recovery will determine how quickly the pressures become obvious again
- Global transition is both inevitable and necessary
- Technology plays a major role, but no silver bullets
- Political and regulatory choices are pivotal
- The next 5 years are critical

**Tackling all three hard truths TOGETHER is essential for a sustainable future**

# Scramble or Blueprints?



Q & A ?

Q & A ?

Q & A ?

