



# FUTURE ENERGY

## OPPORTUNITIES AND CHALLENGES

Leaders for Nature  
Energy Master Class  
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## Black Gold

3 large spoonfuls of crude oil =

8 hours of human manual labour

“It’s as if each of us had a team  
of slaves working for us for  
next to nothing.”

(Colin Campbell)



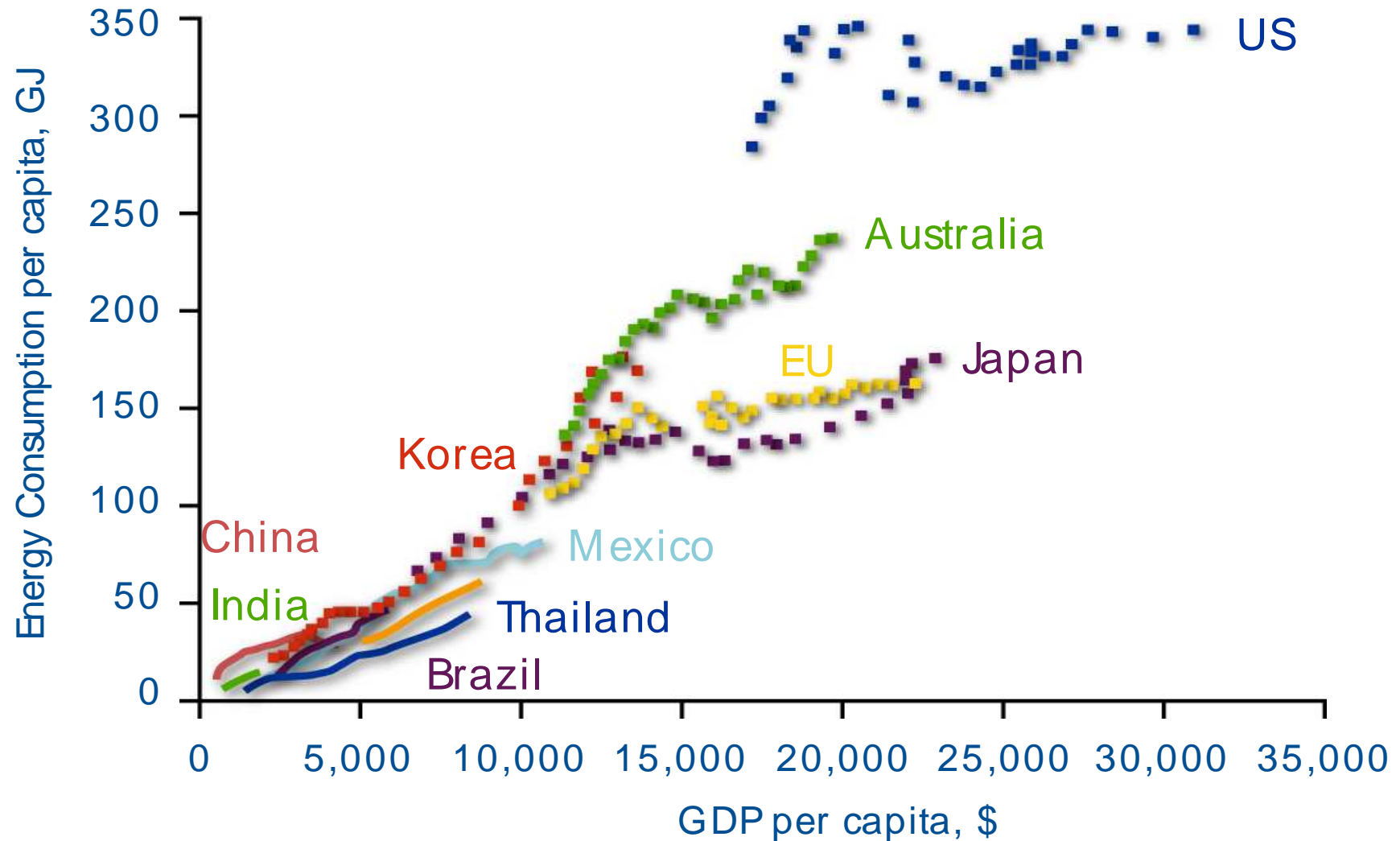




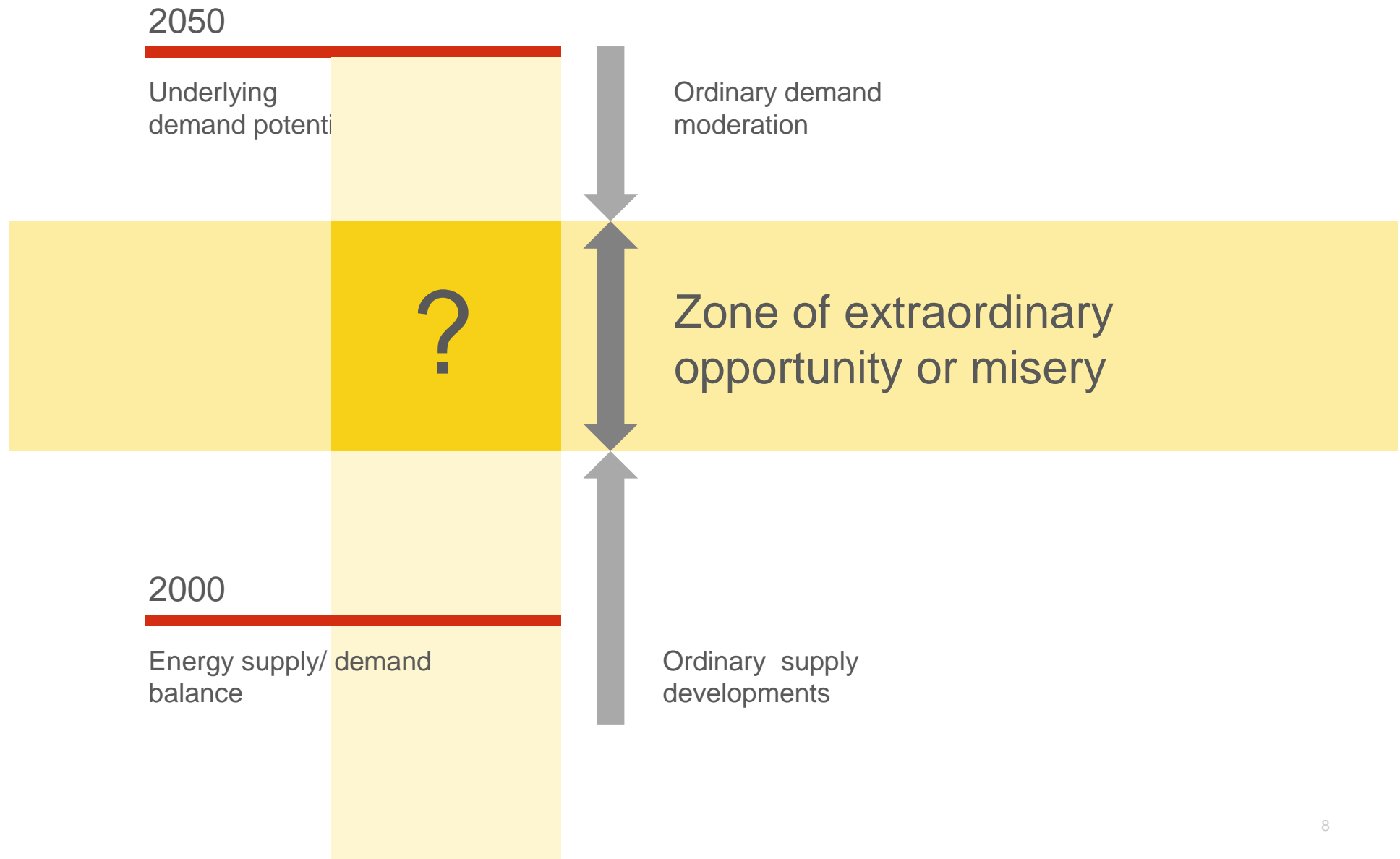


# FUTURE ENERGY DEMAND

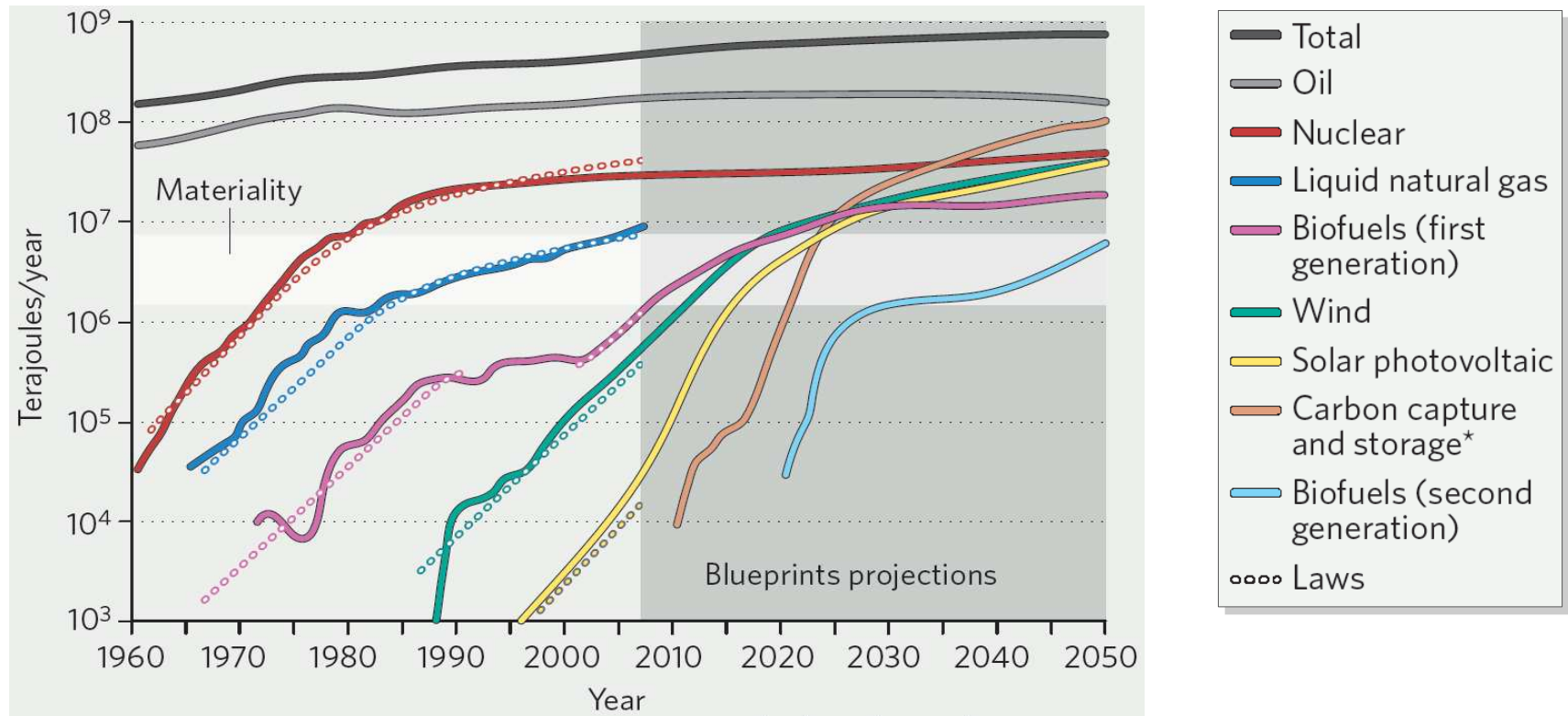
## CLIMBING THE ENERGY LADDER



# THE ZONE OF UNCERTAINTY



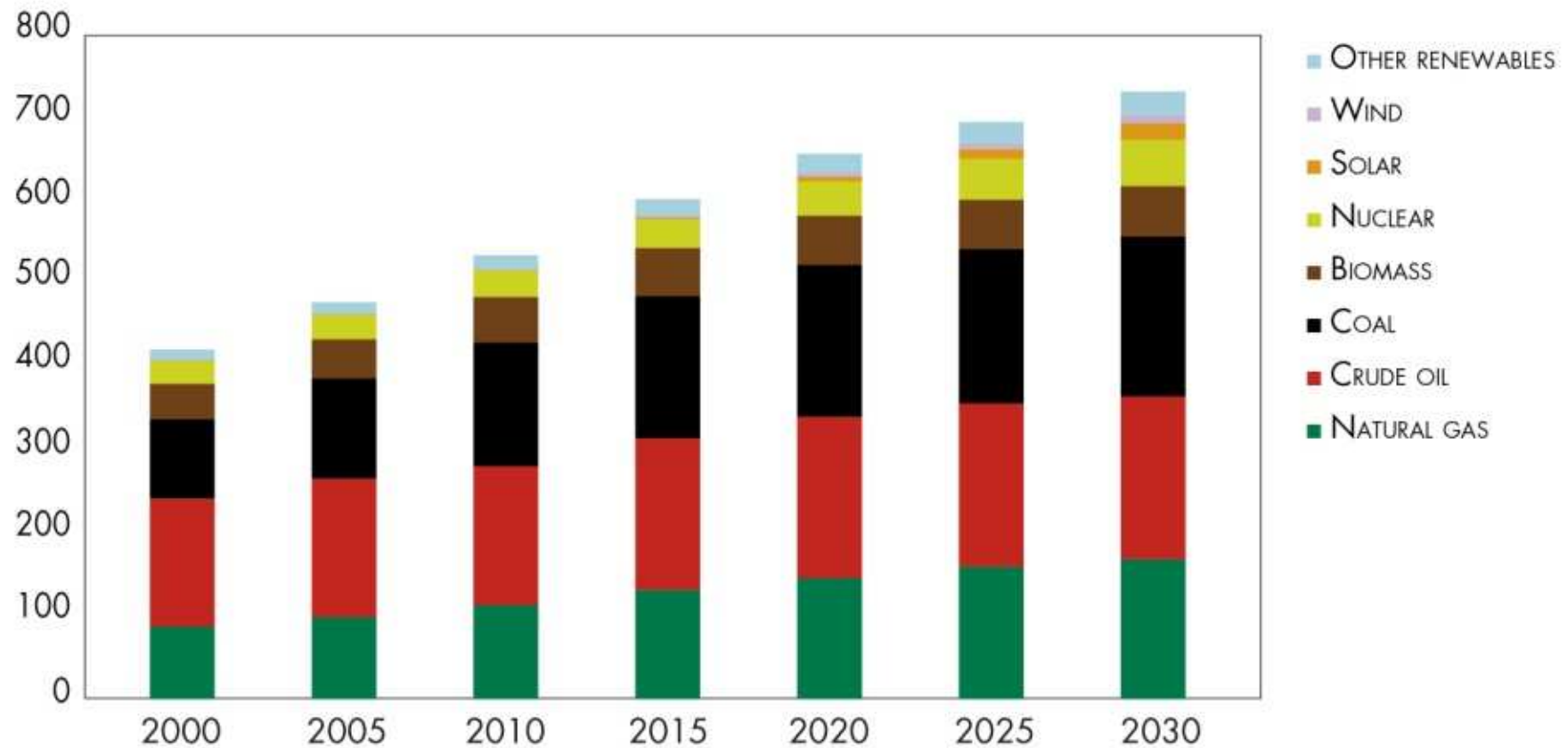
# “LAWS” OF ENERGY TECHNOLOGY DEPLOYMENT



- There are physical limits to the rate at which new energy technologies can be deployed. Therefore structured government intervention is needed to drive technology change and support progress in the demonstration phase.
- All forms of energy will be needed over the long term.

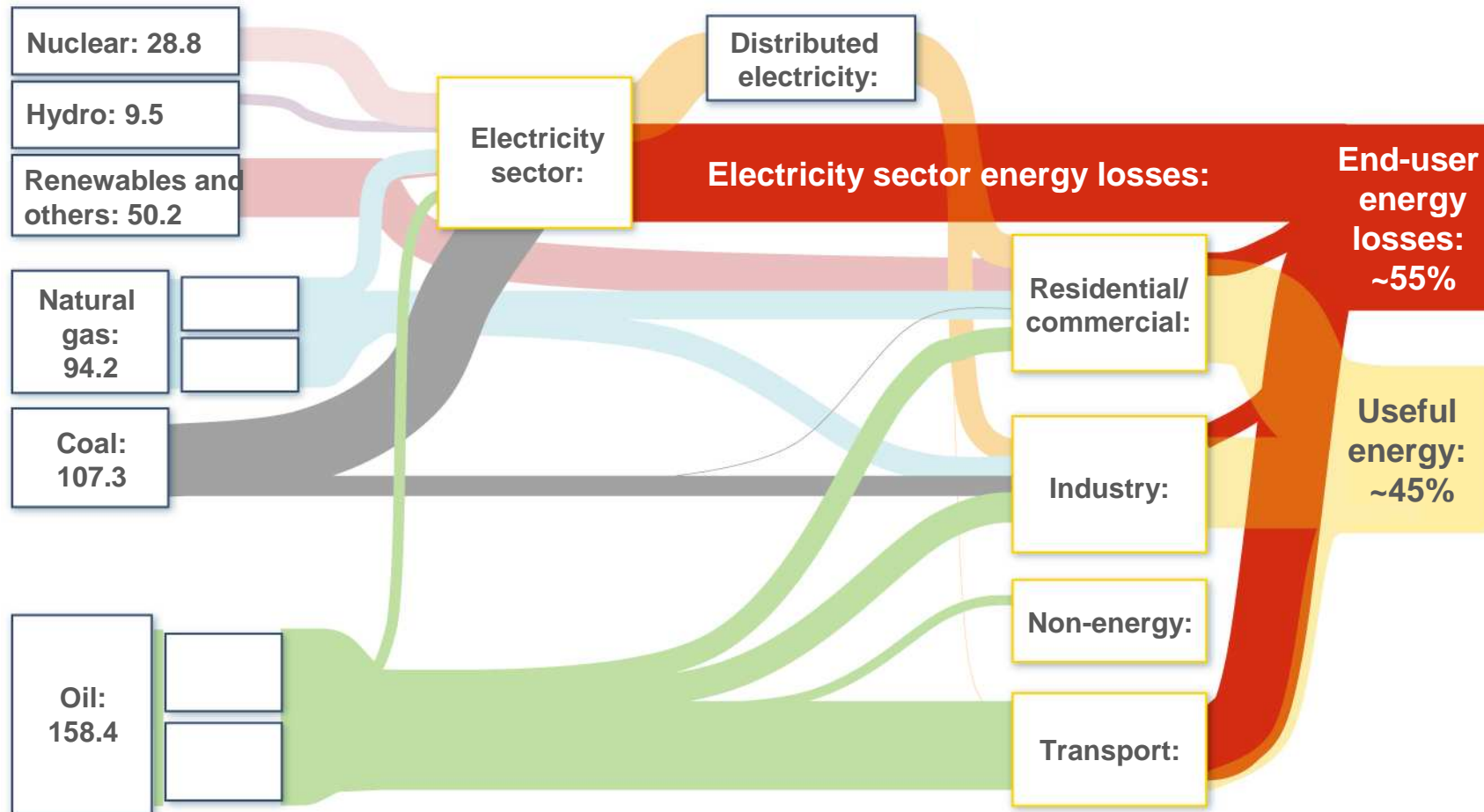
# WORLD – TOTAL PRIMARY ENERGY SUPPLY

EJ Exajoules per year



# THE WORLD ENERGY FLOWS

## EFFICIENCY POTENTIAL



Approximate calculations based on data from IEA, plus energy balances of non-OECD countries 2002–2003

Units EJ

# HOW DO WE MOVE FORWARD?

## SHELL ENERGY SCENARIOS TO 2050

### SCRAMBLE

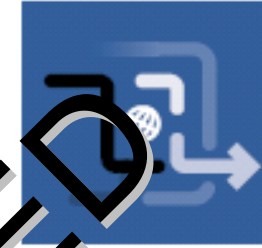


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Policymakers pay little attention to more efficient energy use until supplies are tight. Likewise, greenhouse gas emissions are not seriously addressed until there are major climate shocks.

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### BLUEPRINTS



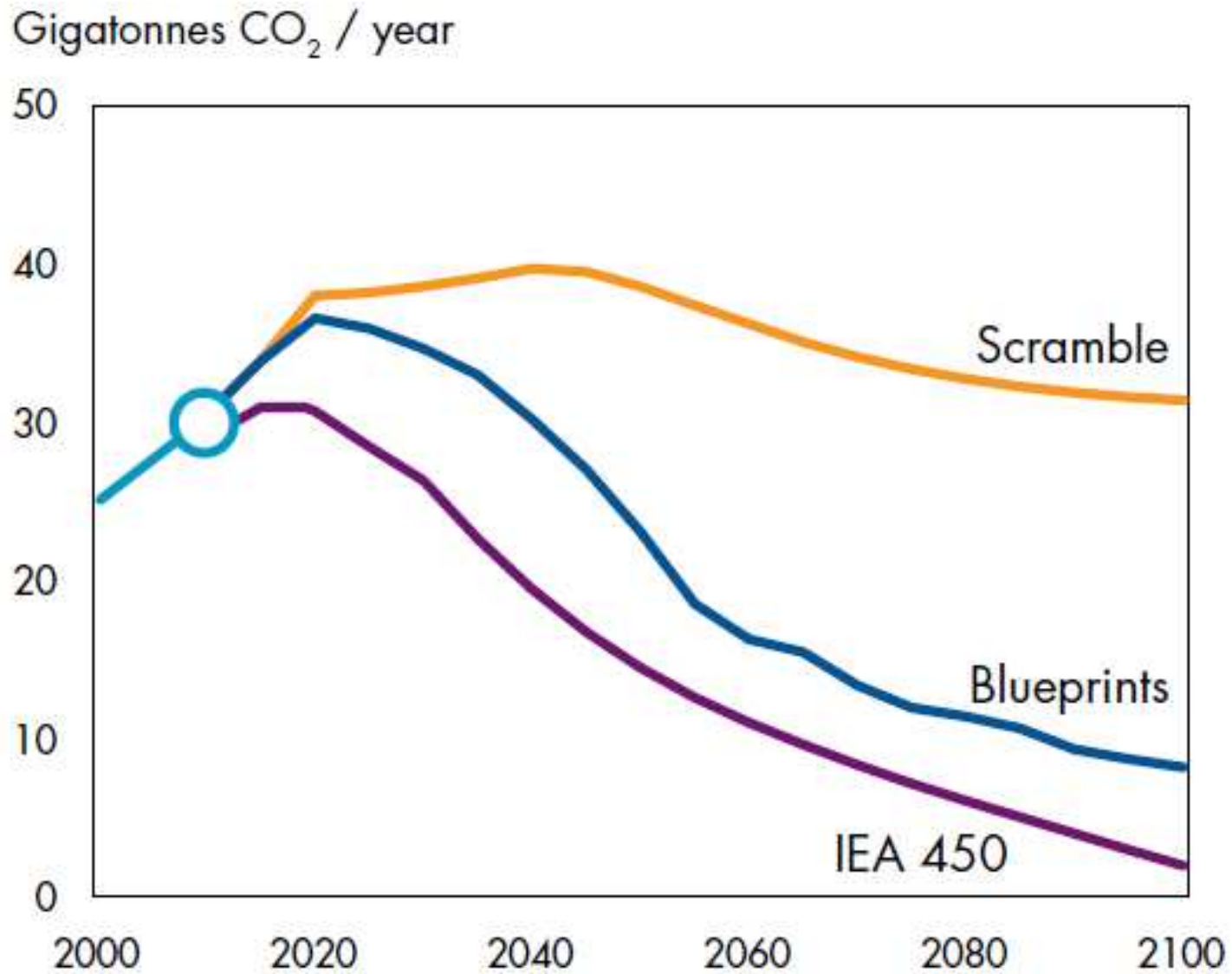
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Growing local action begins to address the challenges of economic development, energy security and environmental pollution. A price is applied to a critical mass of emissions giving a huge stimulus to the development of clean energy technologies, such as carbon dioxide capture and storage, and energy efficiency measures. The result is far lower carbon dioxide emissions.

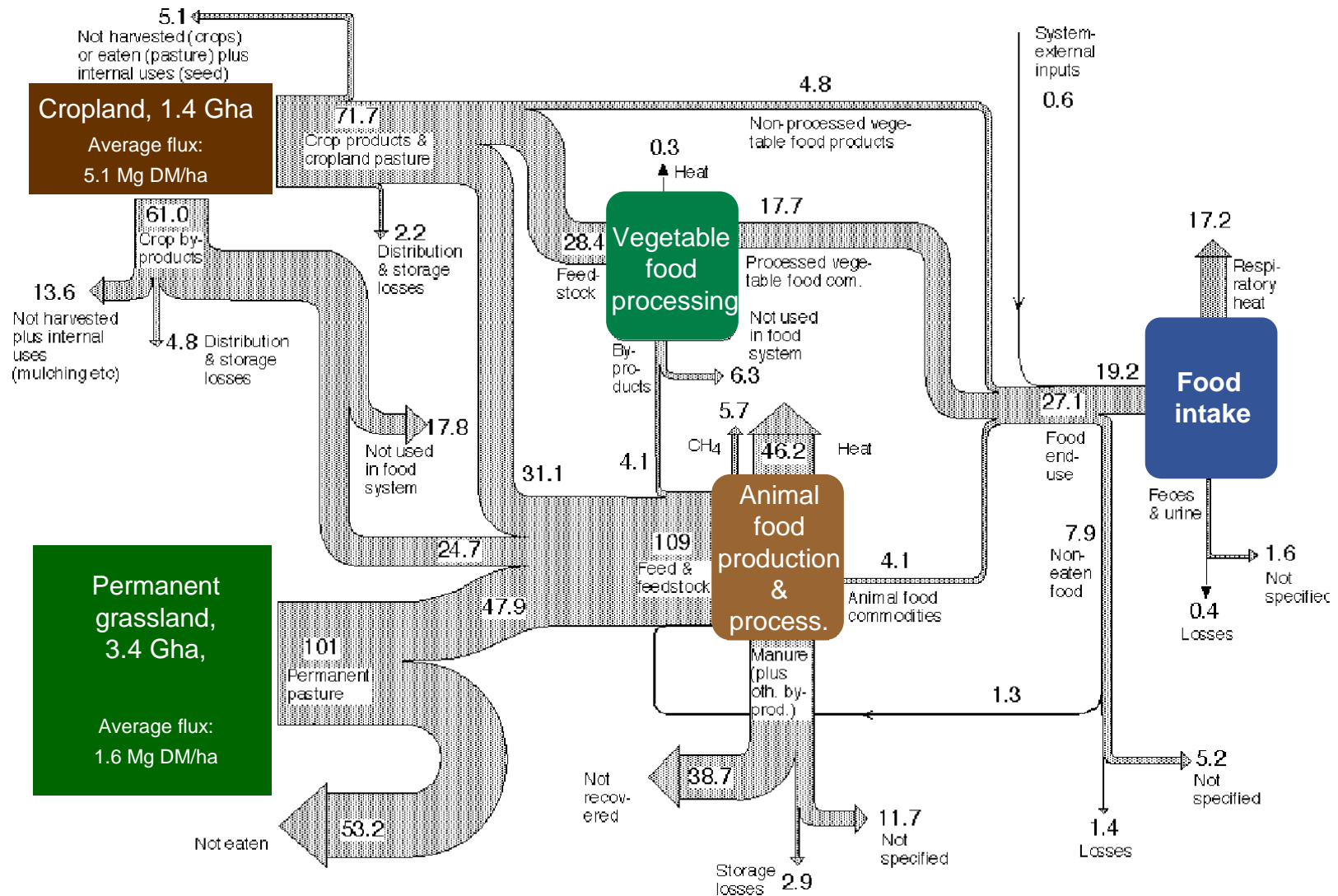
***Regulatory frameworks to encourage lower CO<sub>2</sub> emissions are in place early.***

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# SCENARIOS NOW TO 2100



# THE GLOBAL FOOD SYSTEM



## Water – Food – Energy Nexus

**"It is DIFFICULT to get a man to understand something  
when his SALARY depends upon his NOT UNDERSTANDING IT."**  
Upton Sinclair

