



## UNDERSTANDING RESOURCE SCARCITY: THE STRESS NEXUS



**NAME REDACTED**

Shell's Energy Course for Whitehall: 20 July 2012

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# Signals & Signposts - A SNAPSHOT

Intensified  
economic cycles  
and an end to 'The  
Great Moderation'

Heightened  
political  
instability

We have entered an

*'era of volatile transitions'*

Significant  
demographic  
transition –  
urbanisation

New political  
relationship  
building – a *mini-  
lateral* world

Defined and  
challenging  
planetary  
boundaries

## Energy drivers and the zone of uncertainty

**2050**

Underlying  
demand  
potential

Ordinary  
demand  
moderation



**Zone of extraordinary  
opportunity or misery**

**2000**

Energy supply/  
demand balance

Ordinary  
supply  
developments

## WATER-ENERGY-FOOD NEXUS

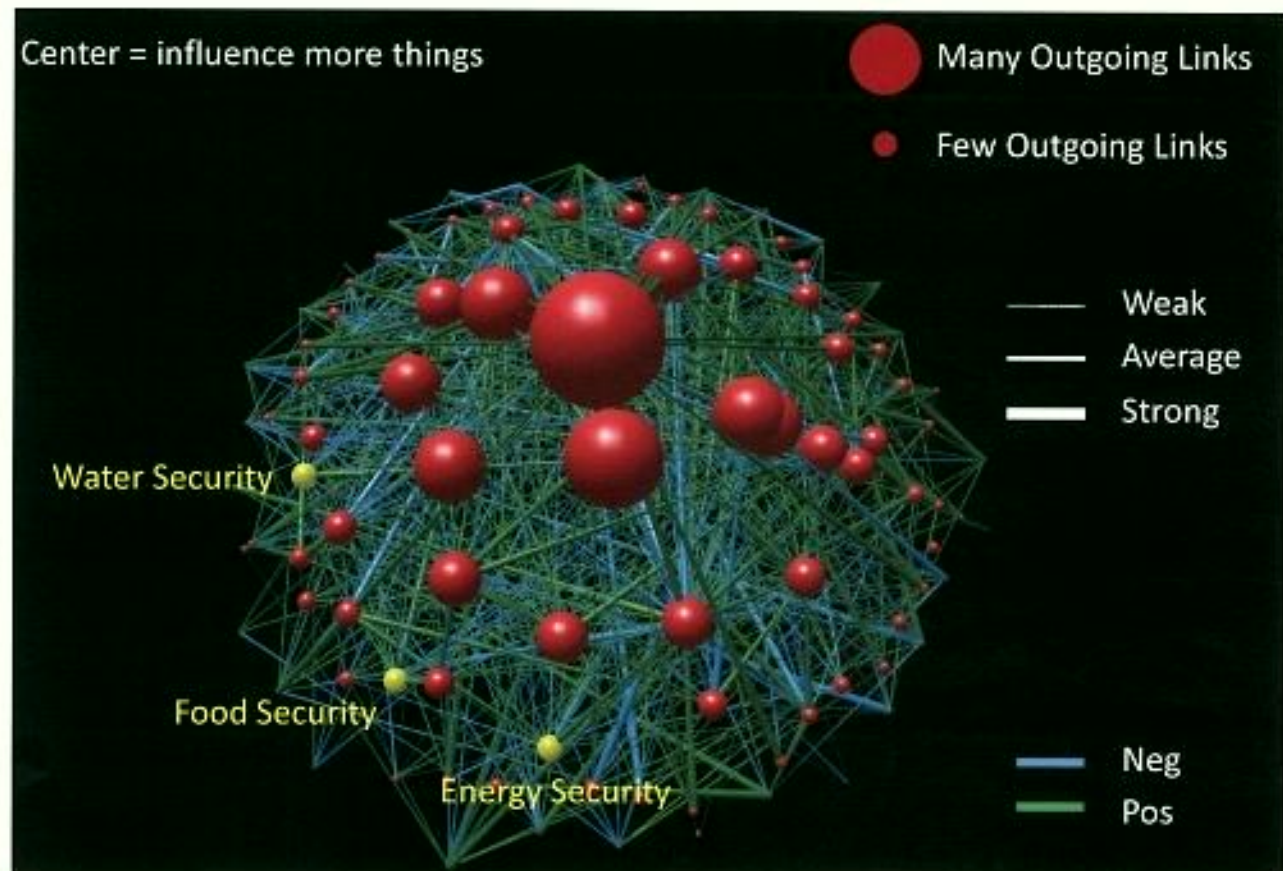


% Increase in demand by 2030



## MAPPING THE NEXUS

- Network analysis to map the Nexus
- Identified subset of critical issues/hotspots
- Two strongest levers:
  - Sustainable Urban Design
  - Emissions regulation/carbon pricing



## New models of partnership needed to address the Nexus

### ■ GLOBAL AND LOCAL

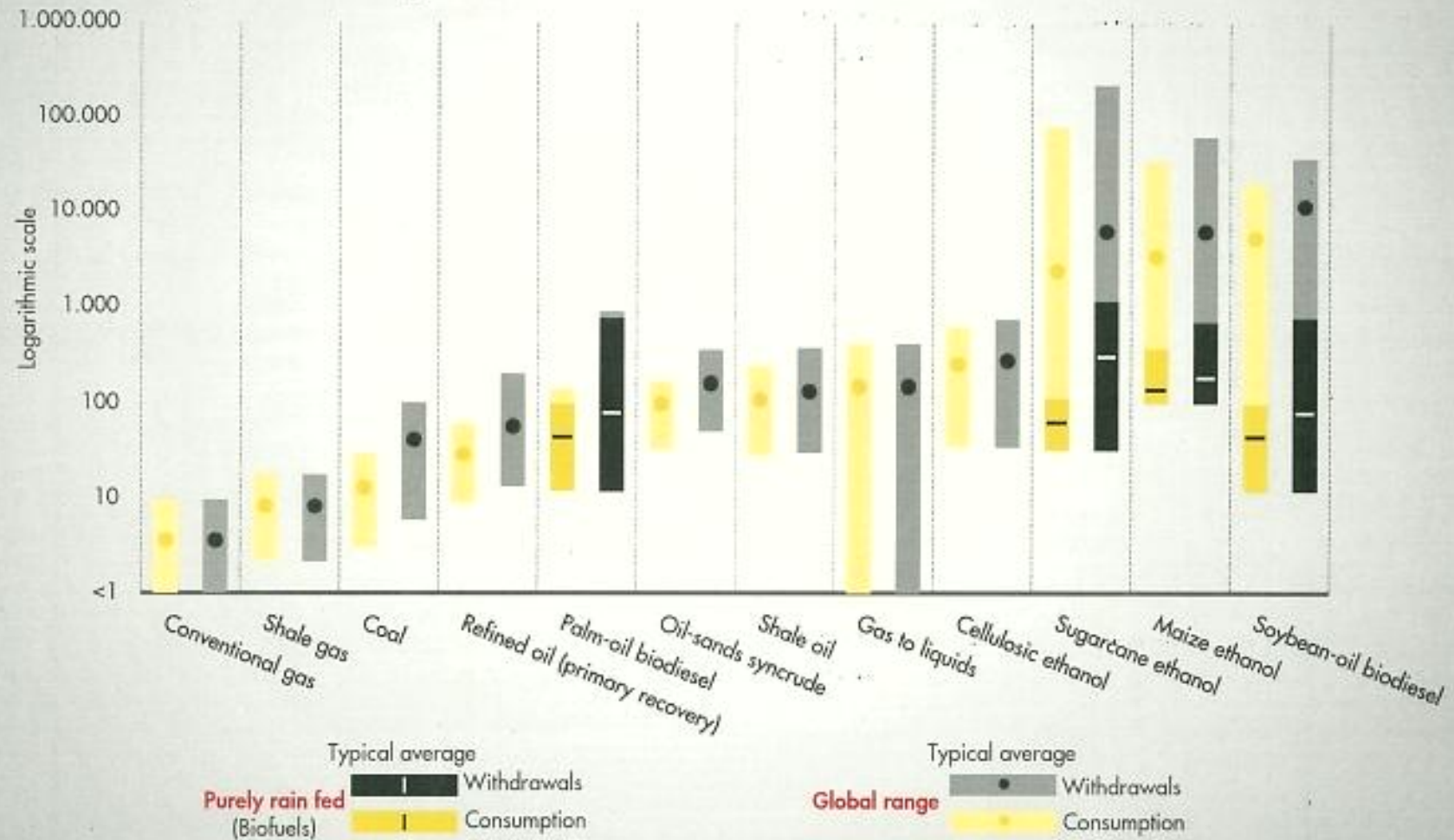


# WATER USE FOR ENERGY



## SHELL ANALYSIS OF WATER USE IN ENERGY PRODUCTION

Freshwater intensity (litres/GJ Low heating value)



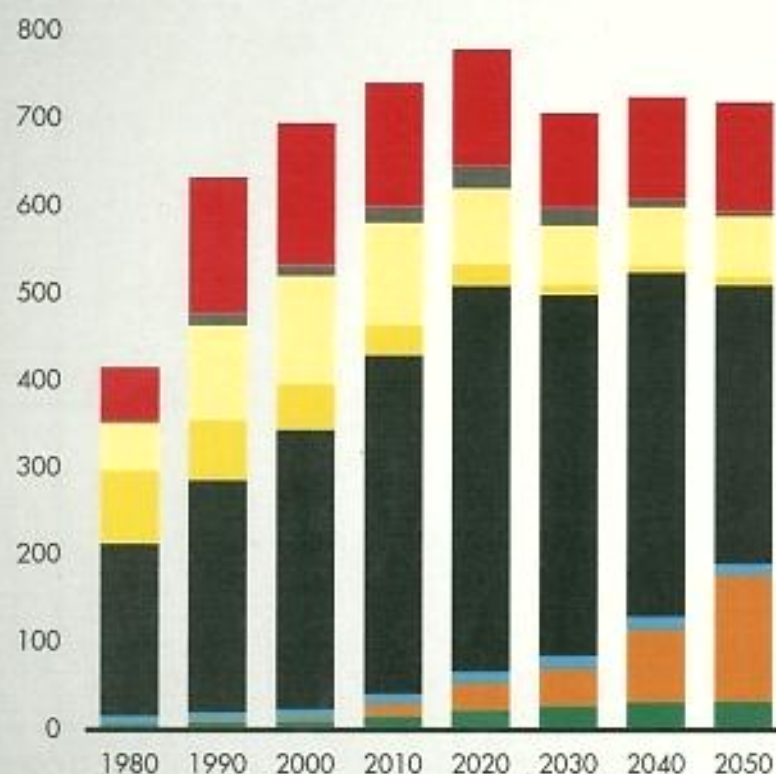


# WATER USE FOR ENERGY



## FRESH WATER WITHDRAWAL FOR ENERGY

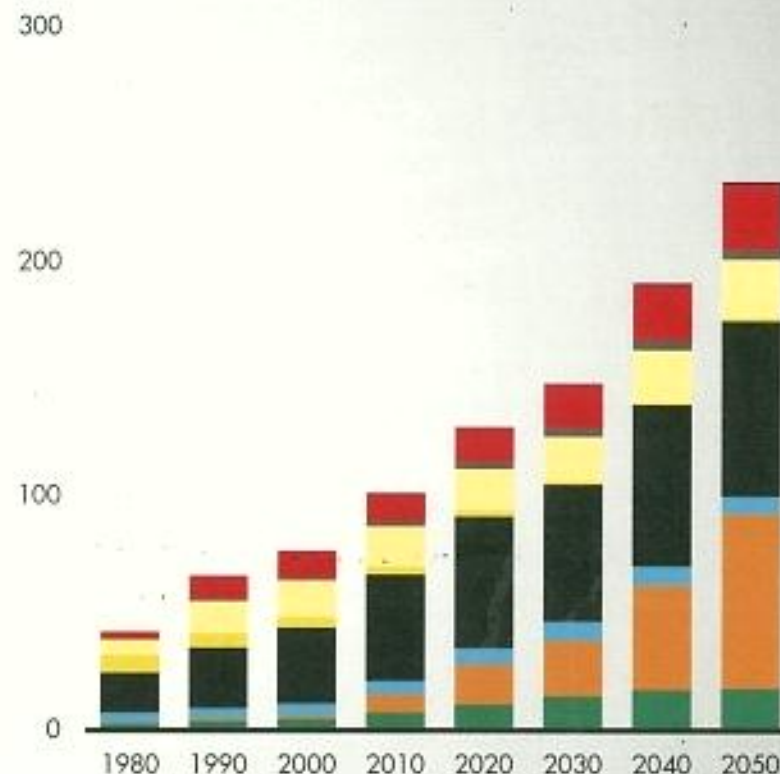
Billion m3/year



■ Fossils production  
 ■ Refining, GTL & CTL  
 ■ Elec. & Heat - Oil  
 ■ Elec. & Heat - Biomass  
 ■ Elec. & Heat - CSP  
 ■ Biofuels production  
 ■ Elec. & Heat - Coal  
 ■ Elec. & Heat - Gas  
 ■ Elec. & Heat - Nuclear

## FRESH WATER CONSUMPTION FOR ENERGY

Billion m3/year



■ Fossils production  
 ■ Refining, GTL & CTL  
 ■ Elec. & Heat - Oil  
 ■ Elec. & Heat - Biomass  
 ■ Elec. & Heat - CSP  
 ■ Biofuels production  
 ■ Elec. & Heat - Coal  
 ■ Elec. & Heat - Gas  
 ■ Elec. & Heat - Nuclear

