

Energy in transition - navigating through uncertainty

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Secretary General & CEO
World Energy Council

Geneva, 19 November 2014
UNECE Sustainable Energy Week

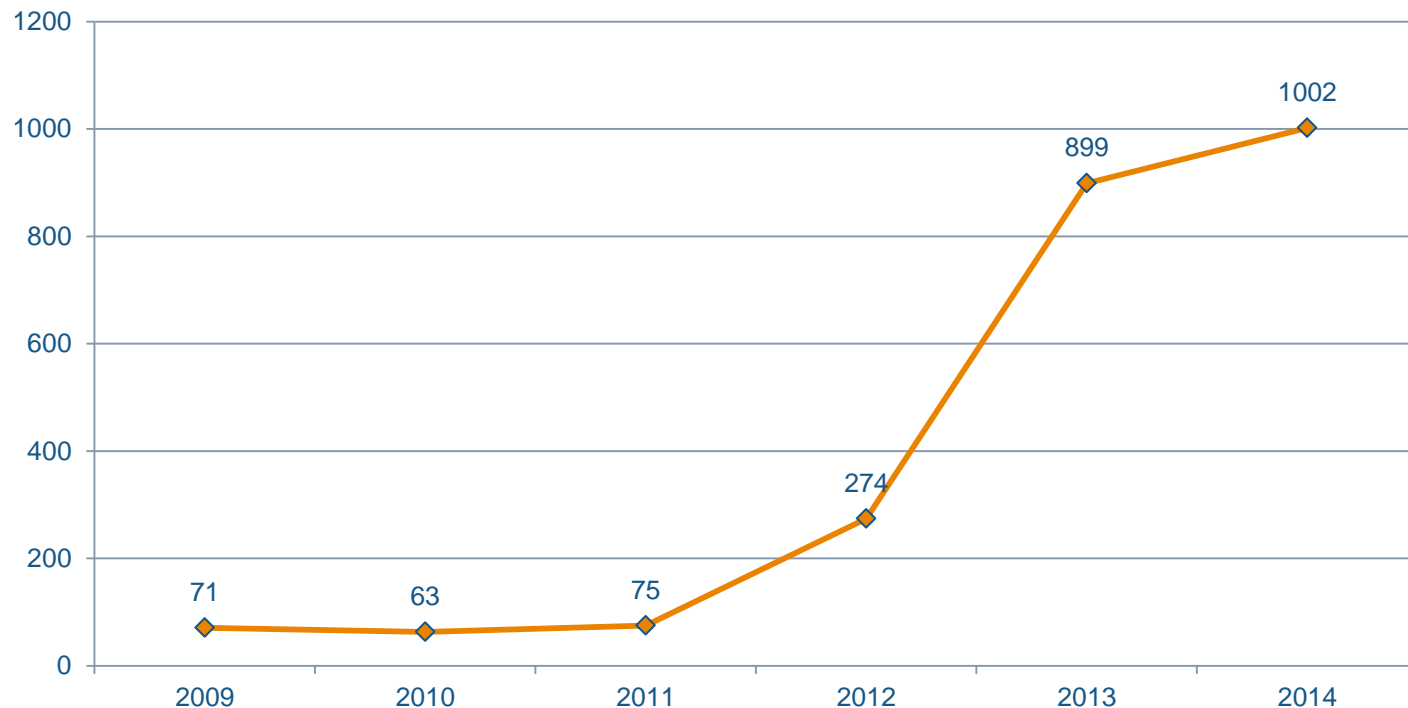


twitter:
@chwfrei

2014/15 Issues Survey - responses

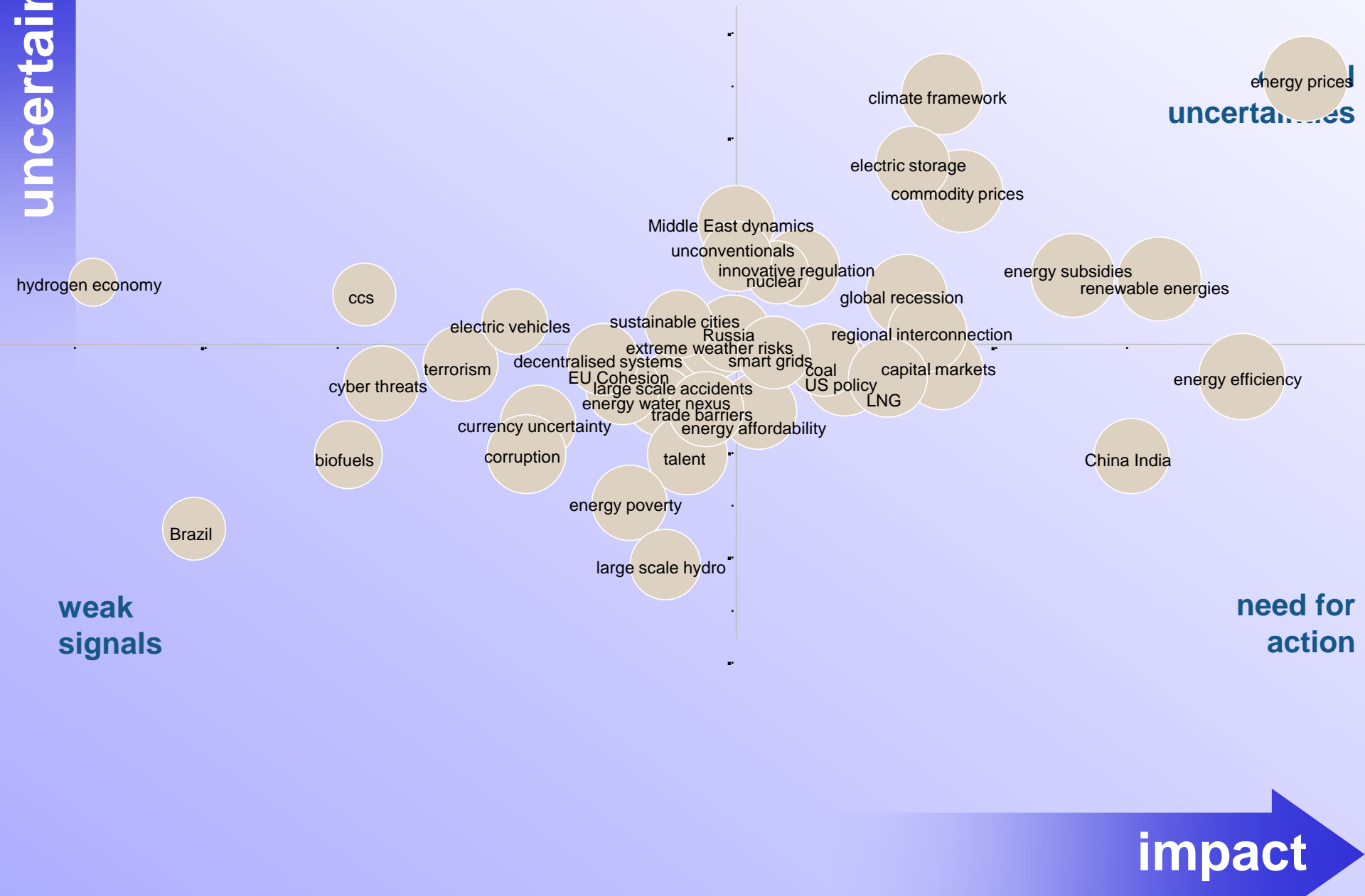
- ▶ Over 1000 total responses
- ▶ (including >100 Future Energy Leaders)

Total Issues Survey Responses: 6 years



uncertainty

World Energy Issues Monitor World, 2014/15

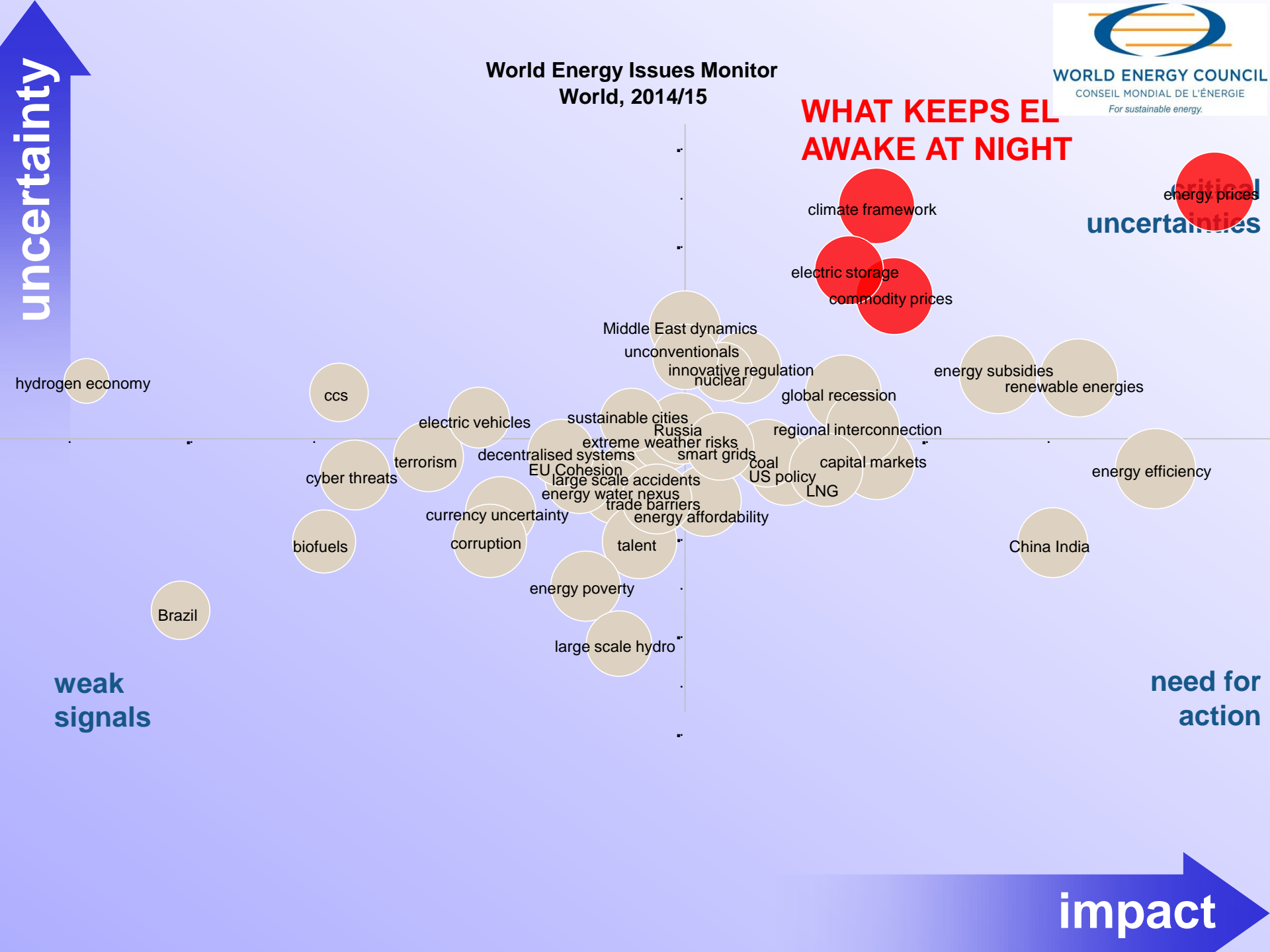


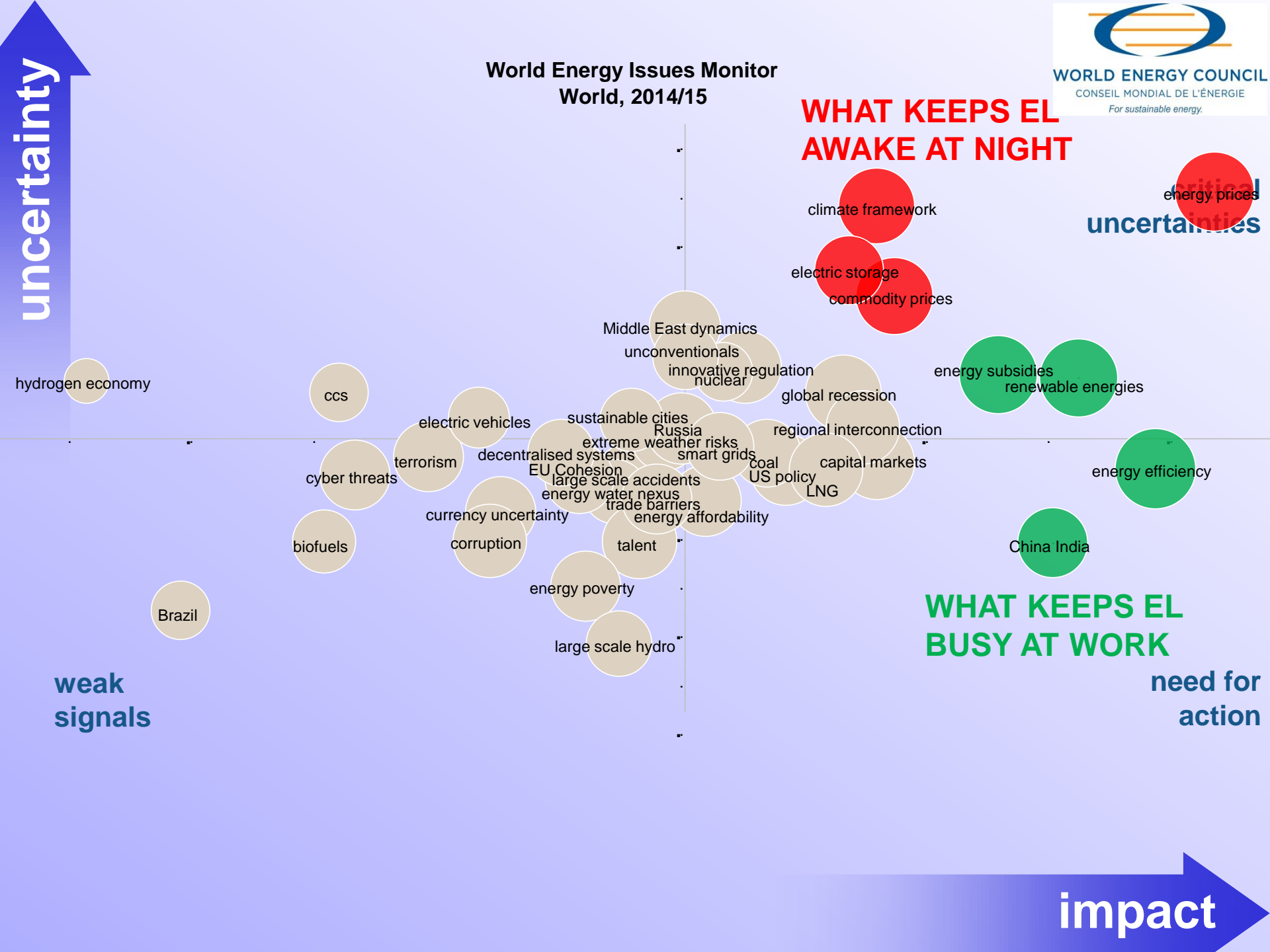
uncertainty

weak
signals

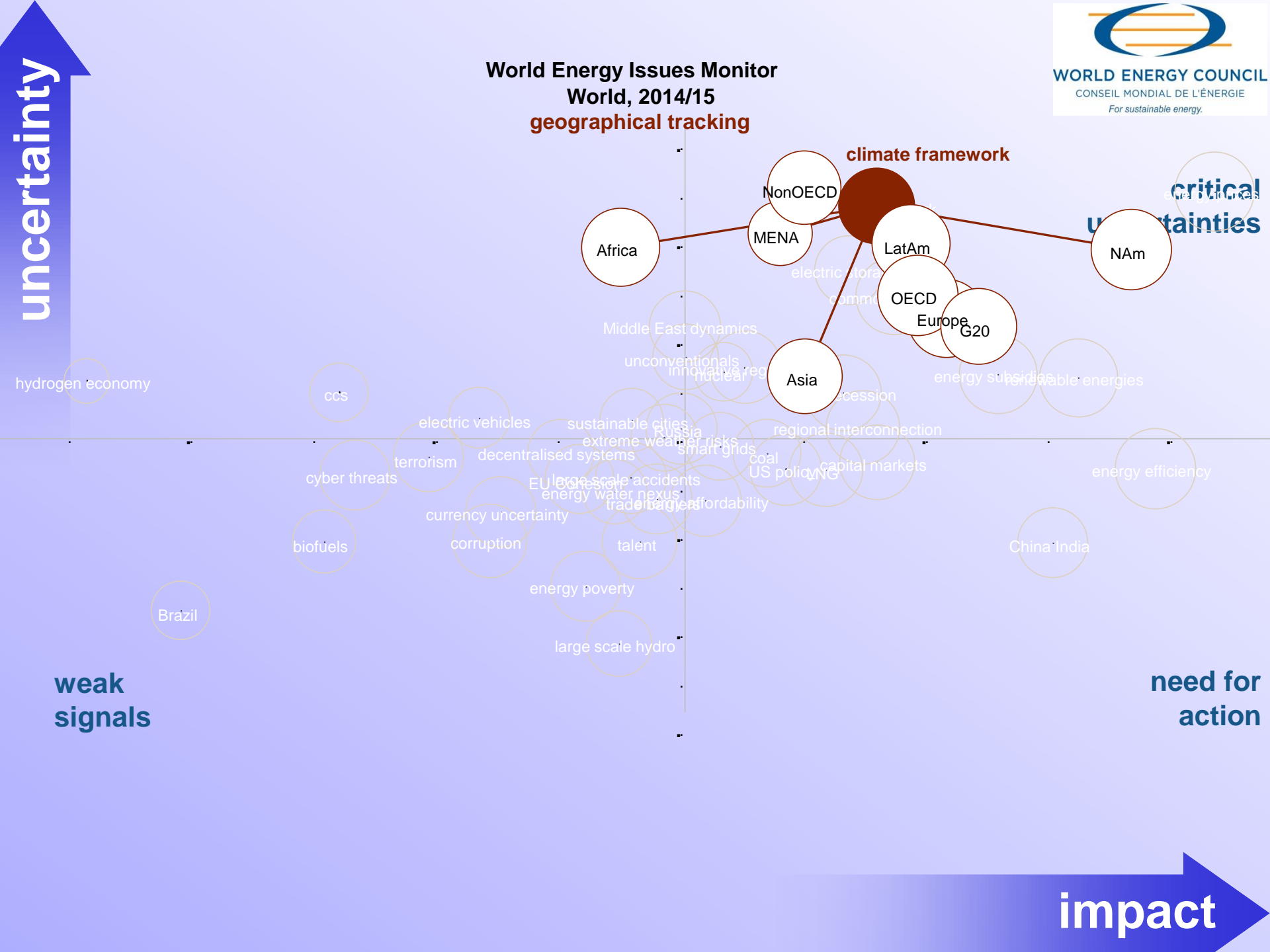
need for
action

impact





World Energy Issues Monitor World, 2014/15 geographical tracking



uncertainty

critical uncertainties

weak signals

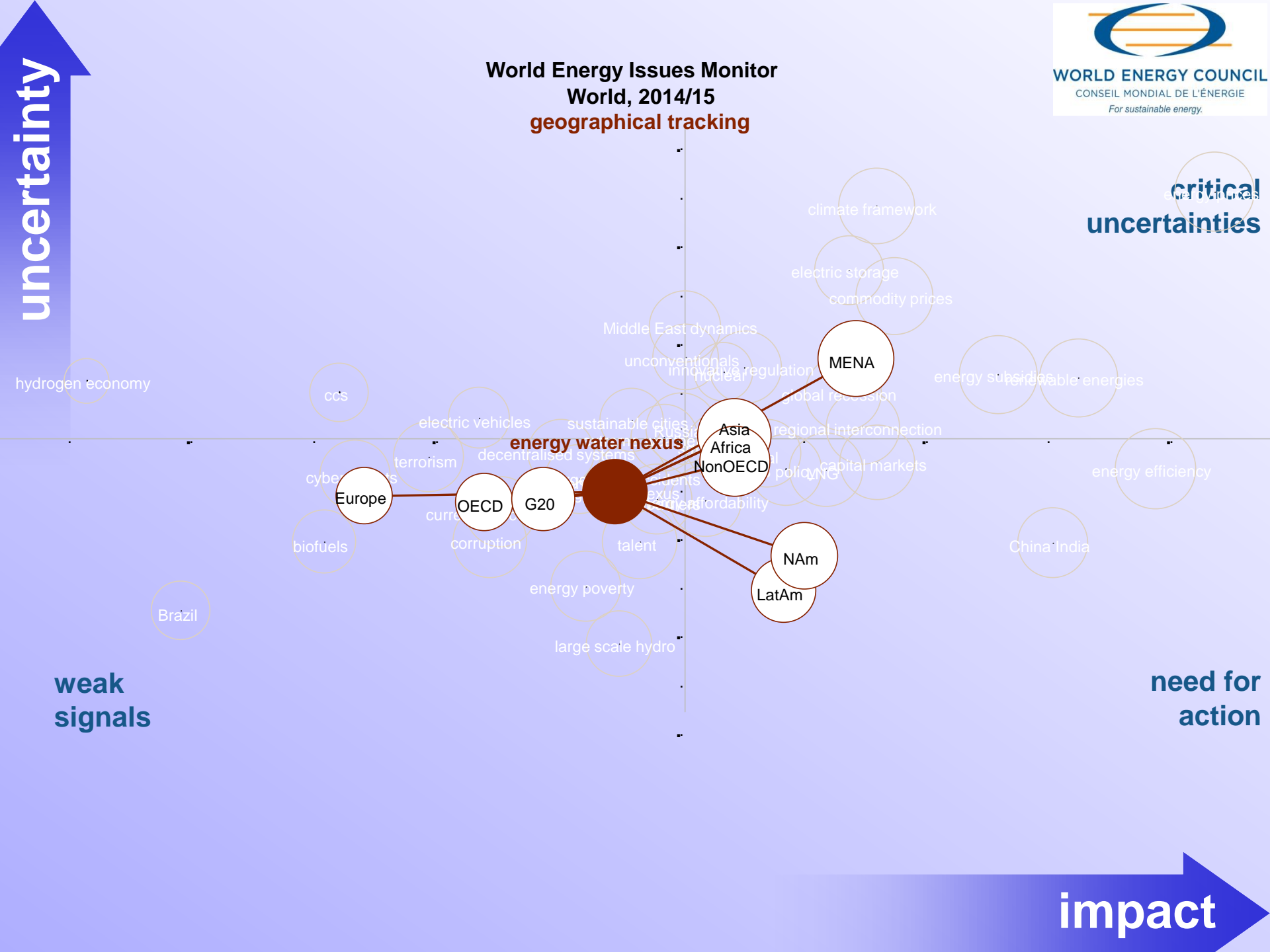
need for action

impact

World Energy Issues Monitor

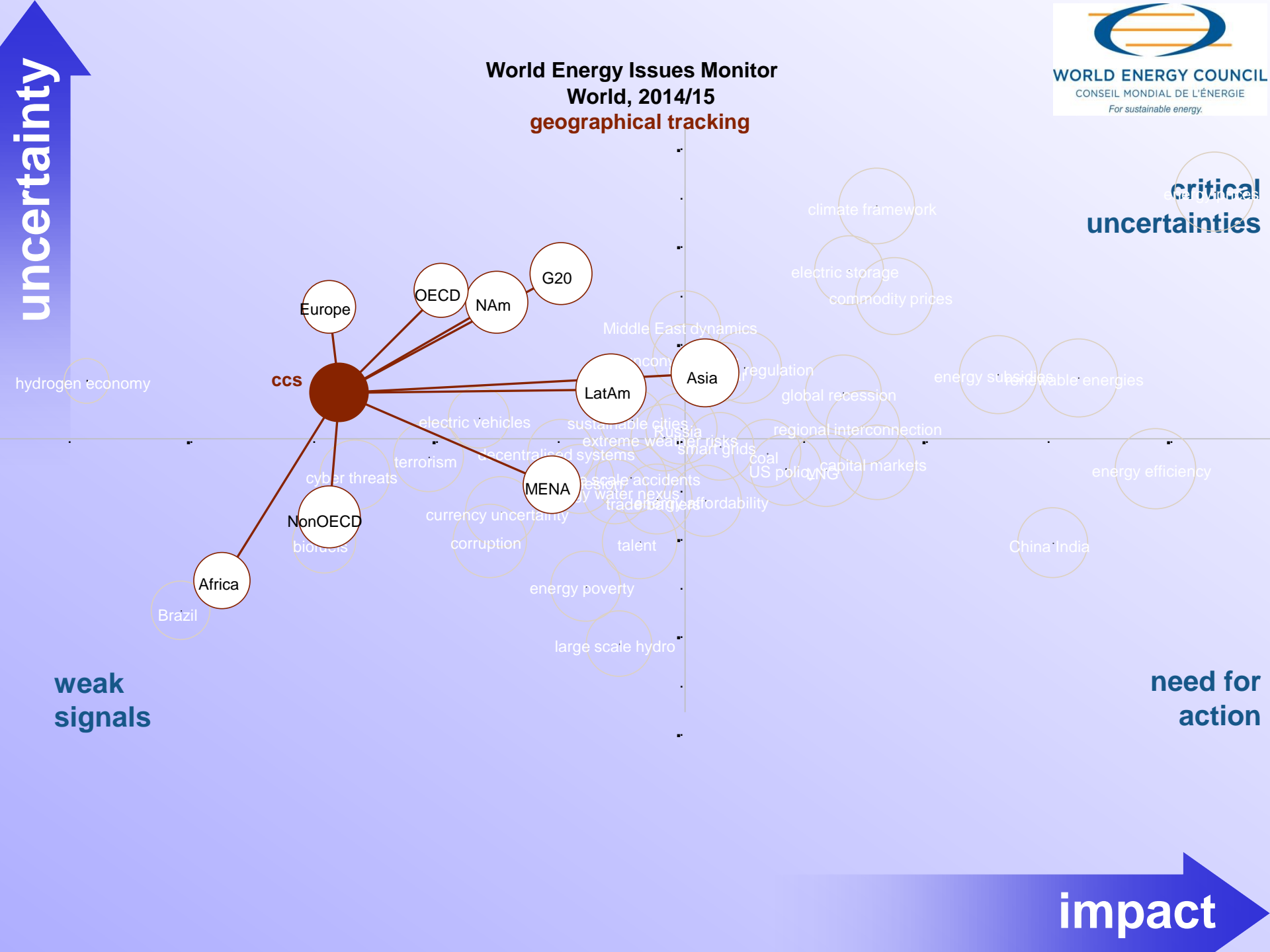
World, 2014/15

geographical tracking

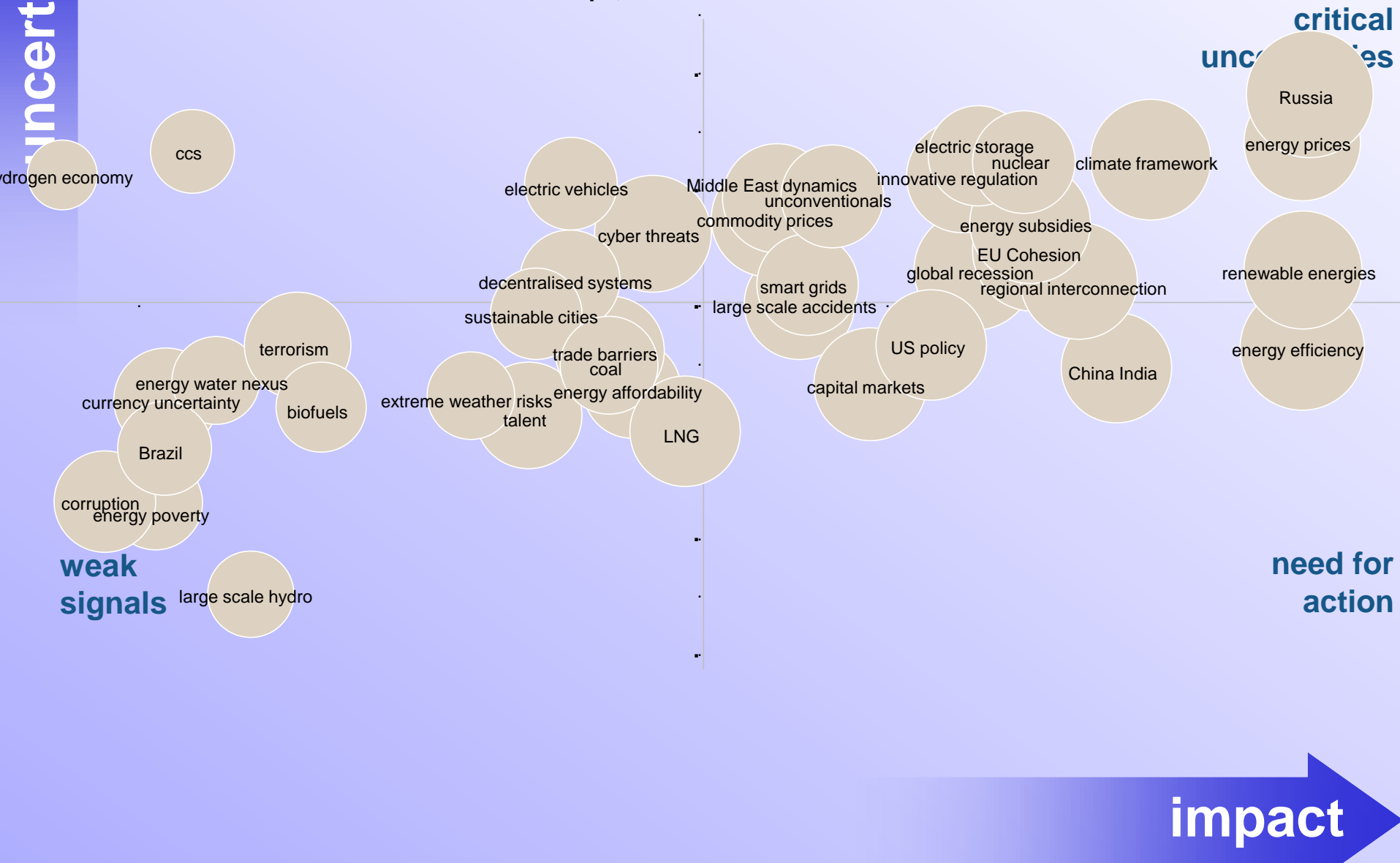


critical
uncertainties

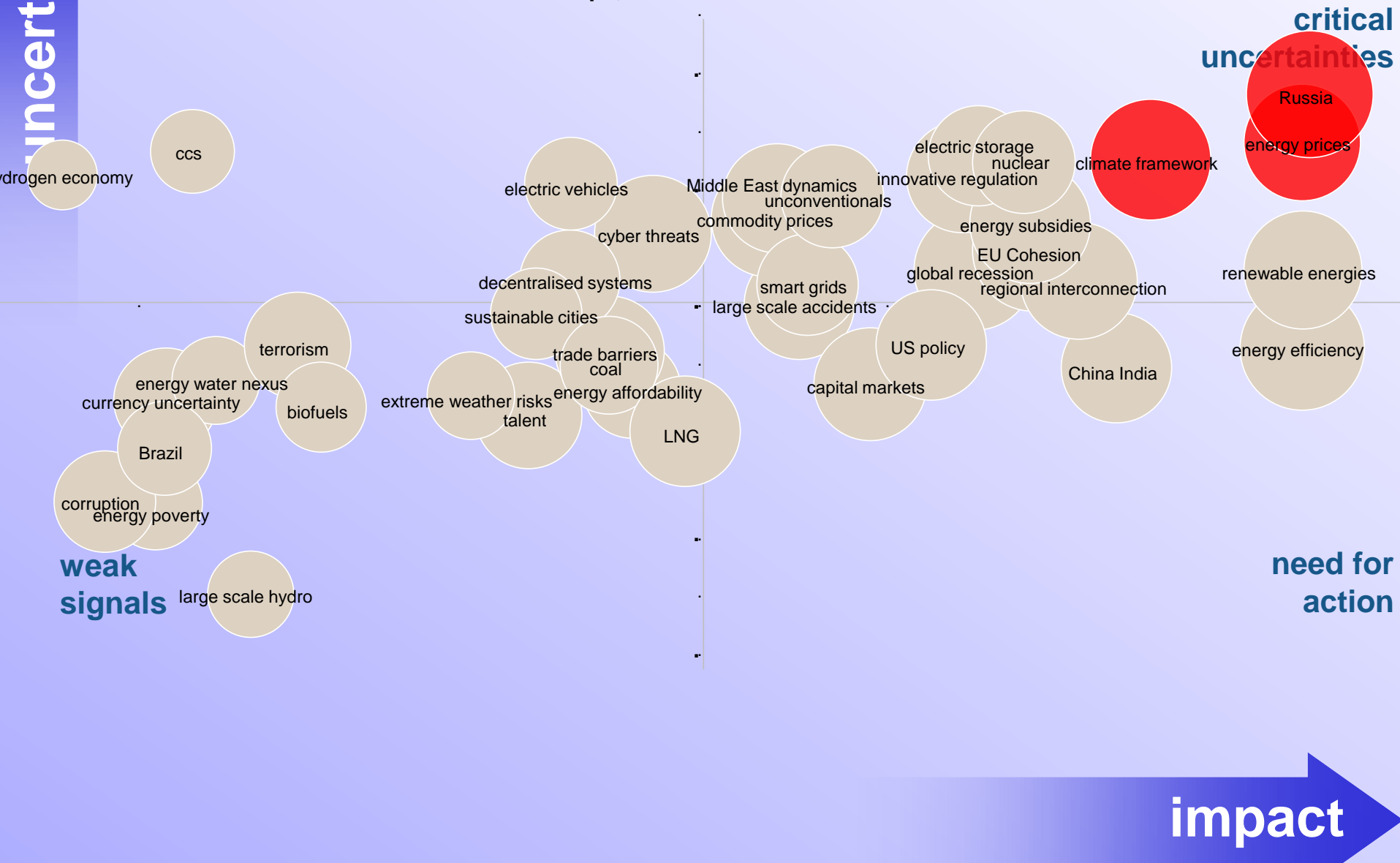




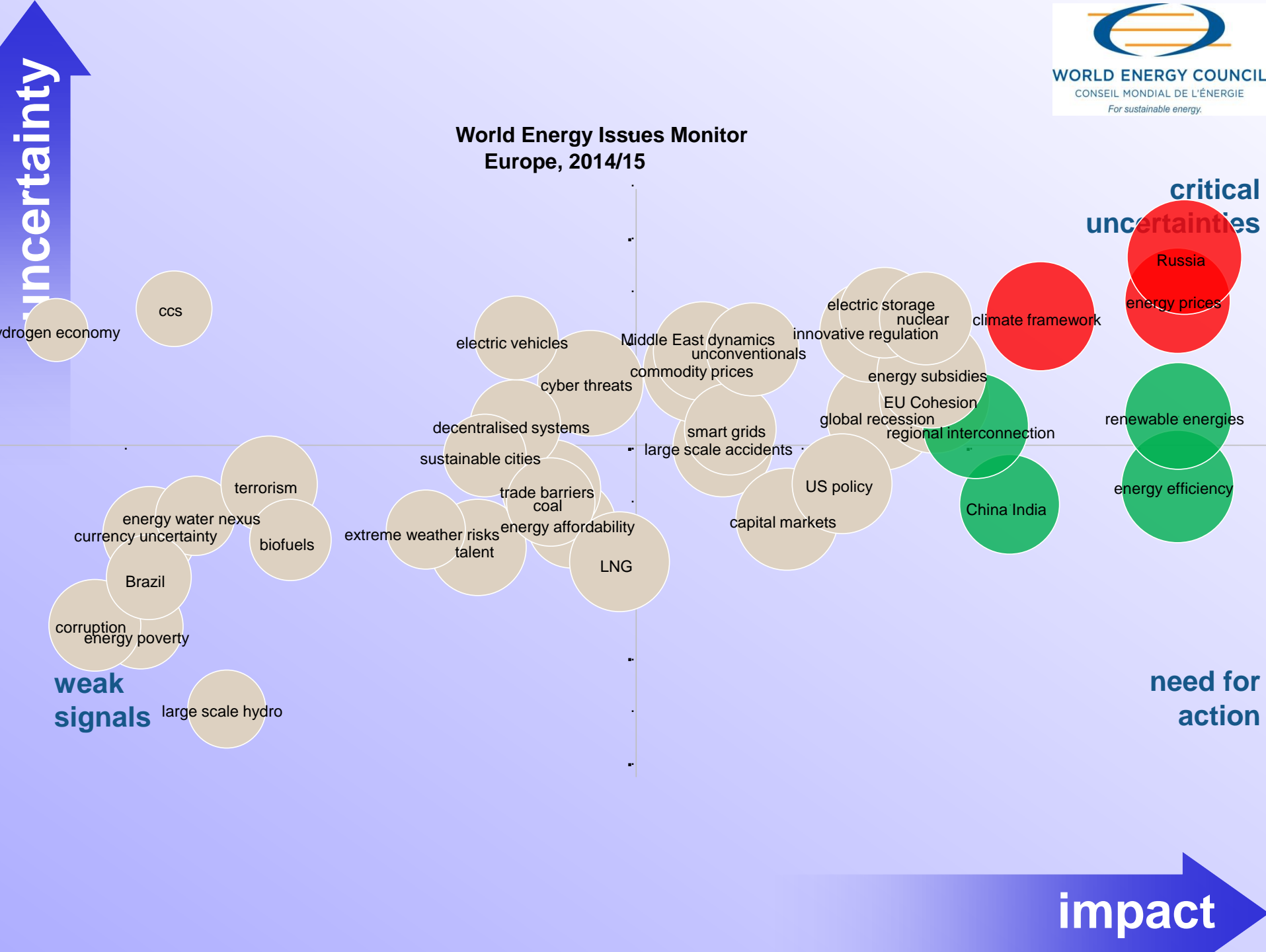
World Energy Issues Monitor Europe, 2014/15



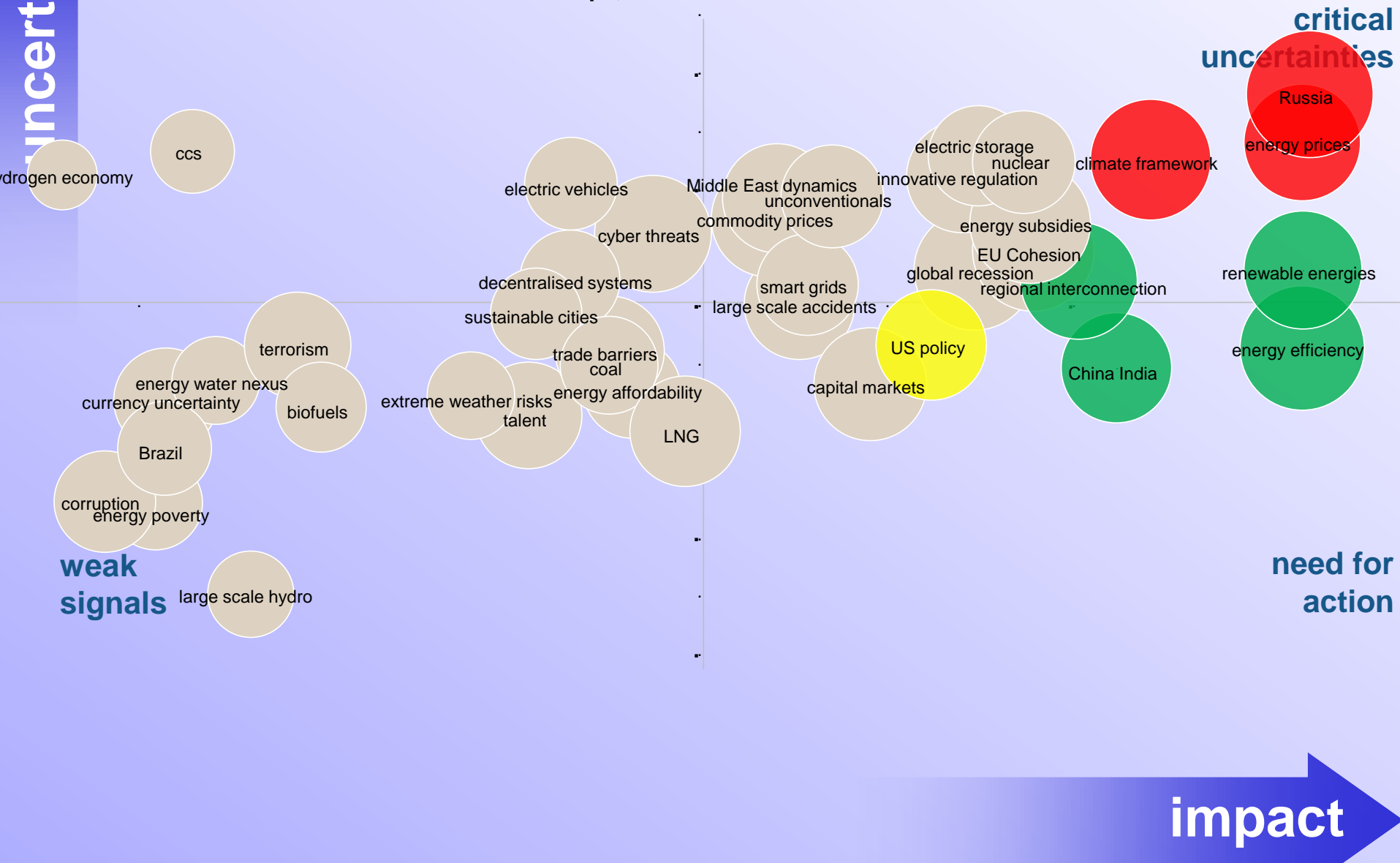
World Energy Issues Monitor Europe, 2014/15



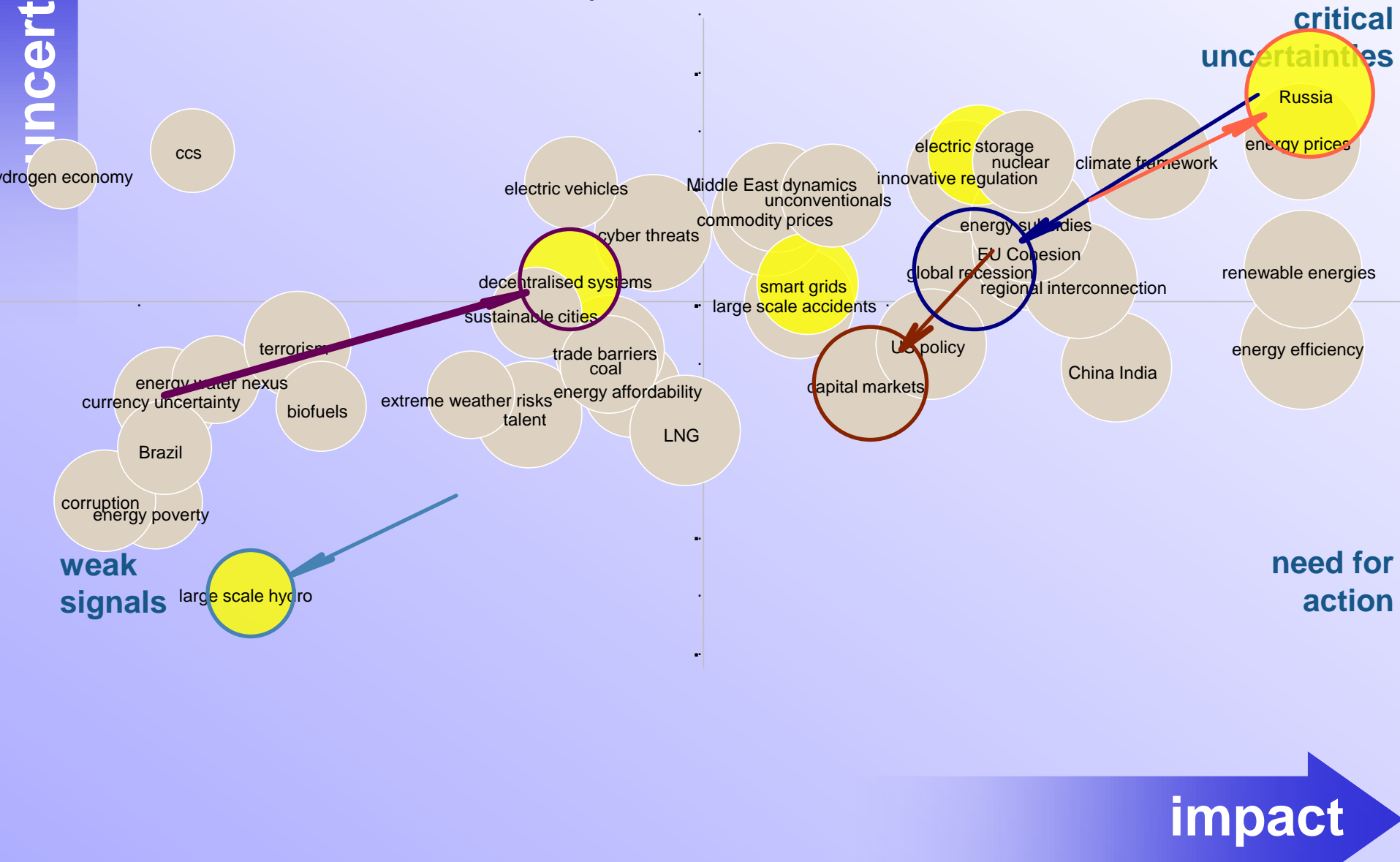
World Energy Issues Monitor Europe, 2014/15



World Energy Issues Monitor Europe, 2014/15



World Energy Issues Monitor Europe, 2014/15



WEC Scenarios

Deriving the scenario stories

Two Scenarios stories, exploratory, different and equally probable rather than good and bad

Jazz:

Market & trade based, consumer driven, decentralized decision making, focussed on access and affordability. achieving growth through low cost energy. Governments facilitate GHG actions.

Symphony:

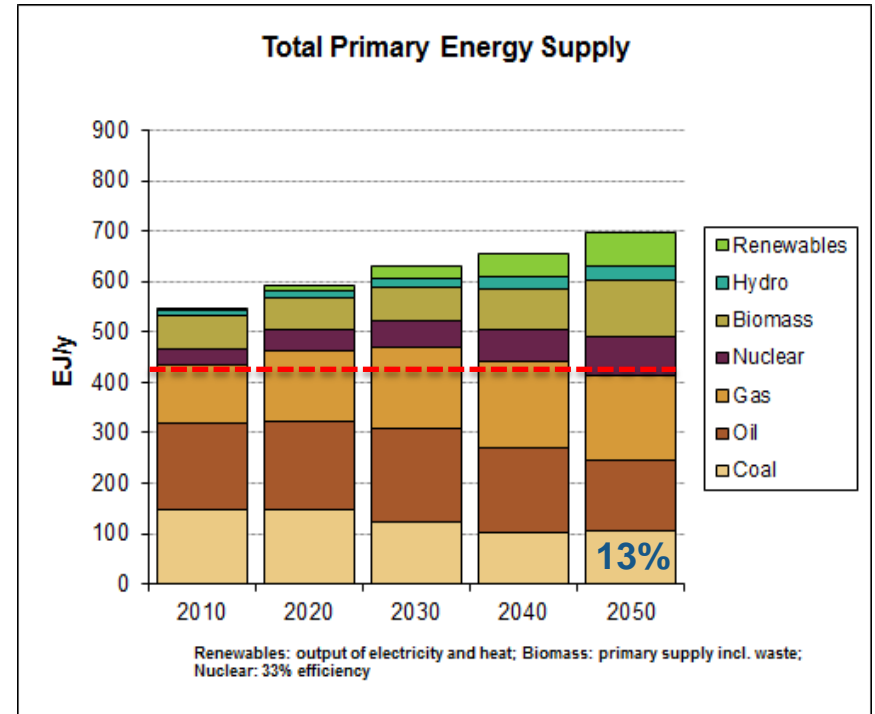
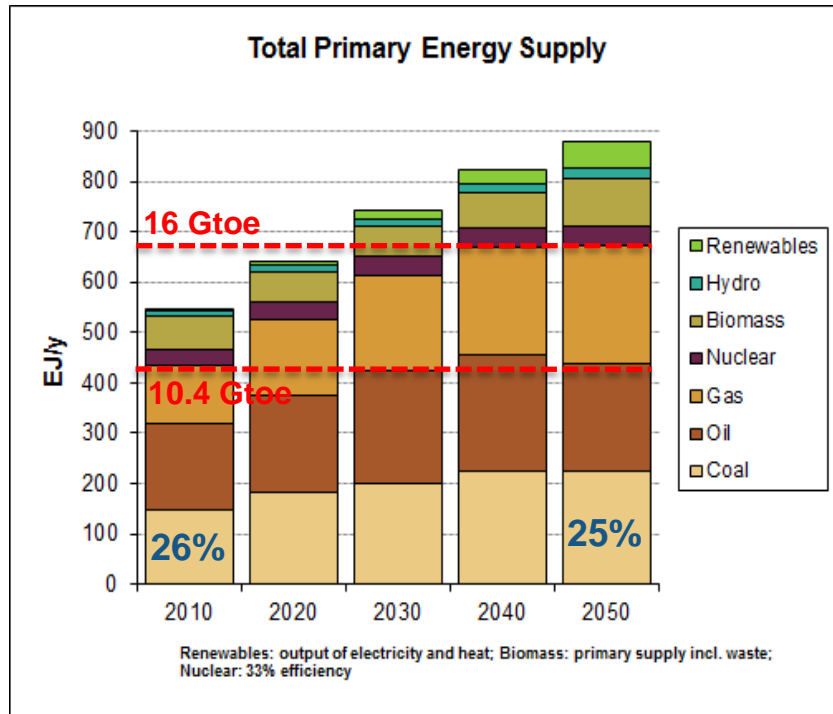
Government led, “orchestrated”, voter driven, focussed on environmental goals and energy security, national and regional measures to increase share of renewables in energy mix. Binding international agreement on GHG emissions.

Storyline and quantification assumptions

	Jazz	Symphony
GDP growth	Higher (3.54% pa CAGR, PPP)	Lower (3.06% pa CAGR, PPP)
Population	Lower (2050 = 8.7 billion)	Higher (2050 = 9.3 billion)
Efficiency/ Intensity	Increasing (-2.29% pa (primary, PPP))	Increasing more strongly (-2.44% pa (primary, PPP))
Climate policy	Limited Prices (2050): 23-45 USD/tCO ₂	Stronger Prices (2050): 75-80 USD/tCO ₂
Resources	Better access to unconventionals	More expensive unconventionals
Technology support	Limited; energy choice based on free markets	support for nuclear, large hydro, CCS and renewables
Technology innovation	Further development of CCGT decentralized power (SPV)	Focused R&D programs (esp. CC(U)S, solar PV)

Up to 12-13b?

Global total primary energy supply



Jazz

fossil fuels: +55%/- 5%

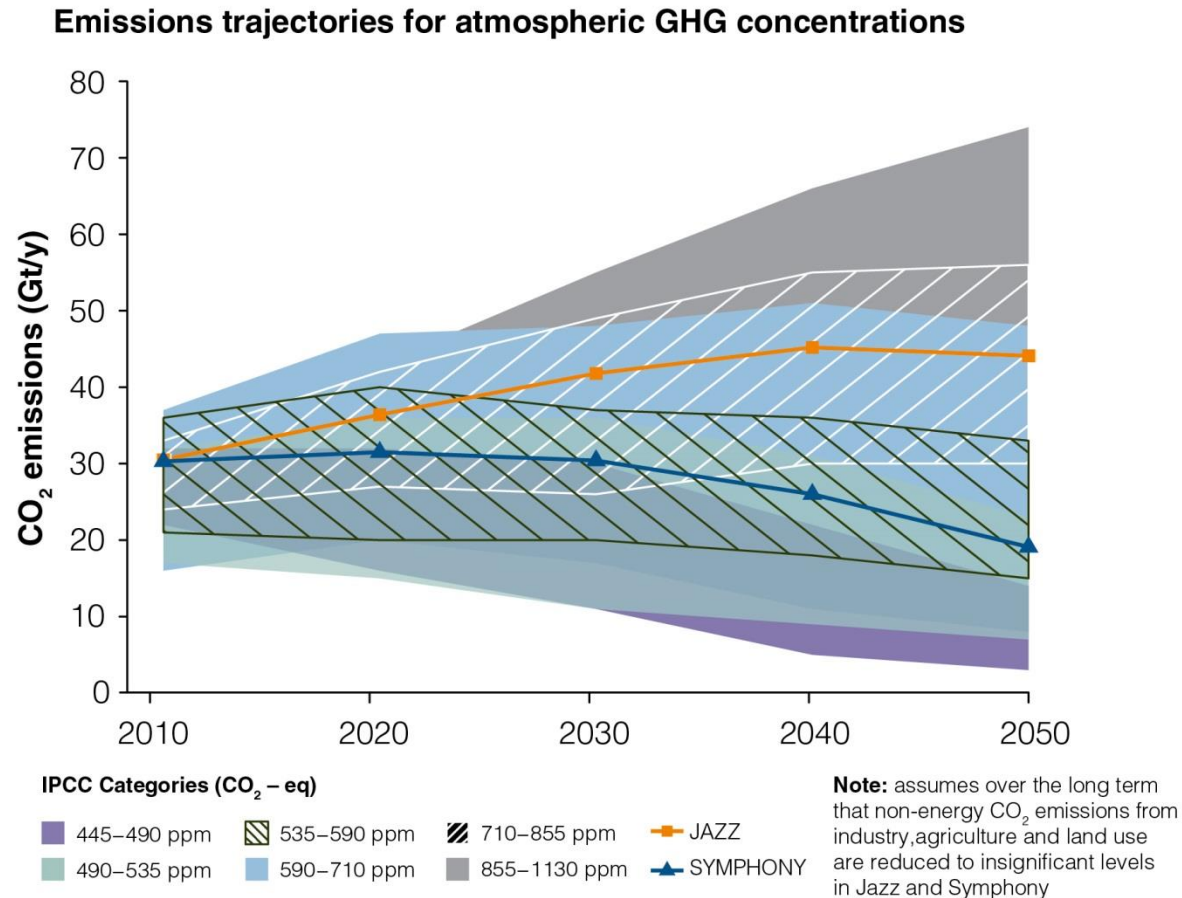
oil: +/- 15%
natural gas: +100%/+50%
coal: +/- 40%

Symphony

Upstream liberalized;
technology development,
supply surge/more producers
Coal remains dominant in some regions

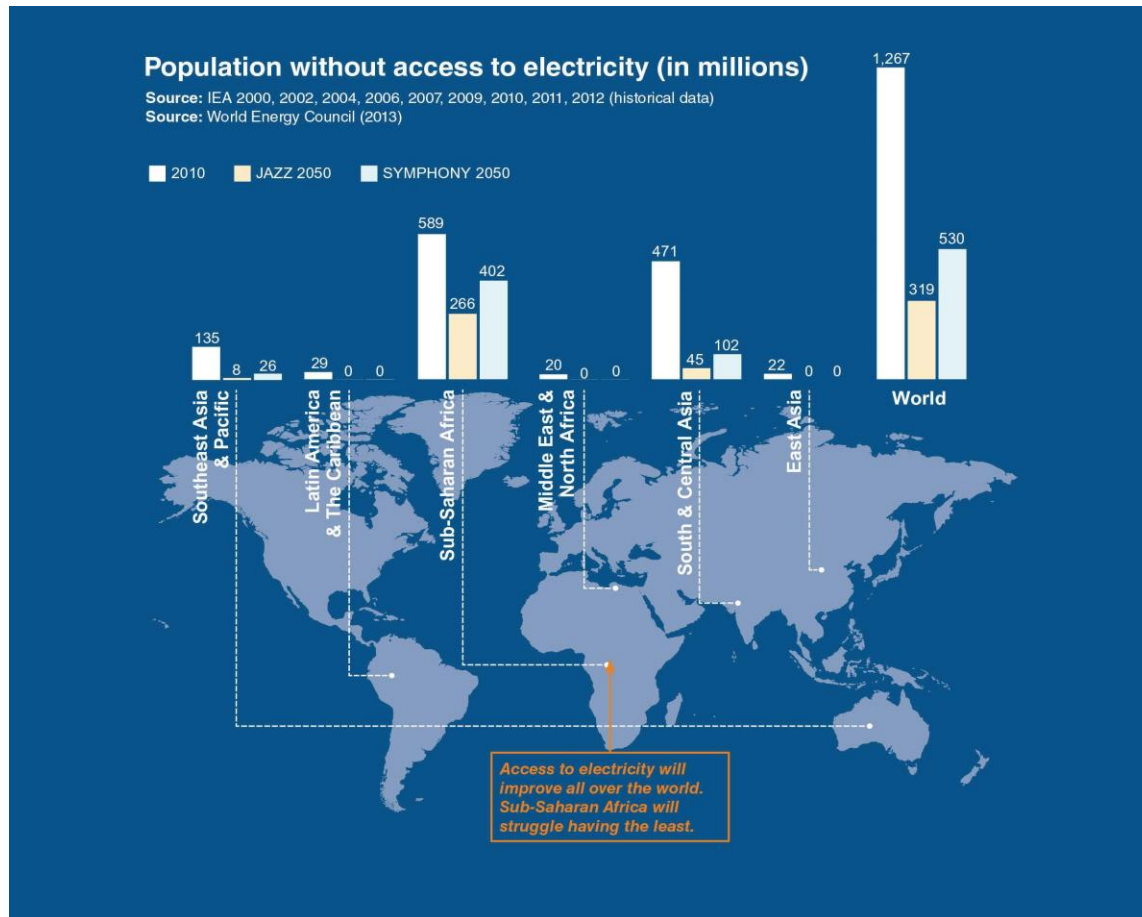
Tighter supply (lower E&P)
Higher infrastructure costs
Energy security drives reduced fossil use

Resulting CO₂ emissions



The global economy will be challenged to meet the 450 ppm target without enormous economic costs

Access to electricity in 2050



JAZZ:

- 310 million without access in 2050

SYMPHONY:

- 530 million without access in 2050

Balancing the 'Energy Trilemma'

Energy Security

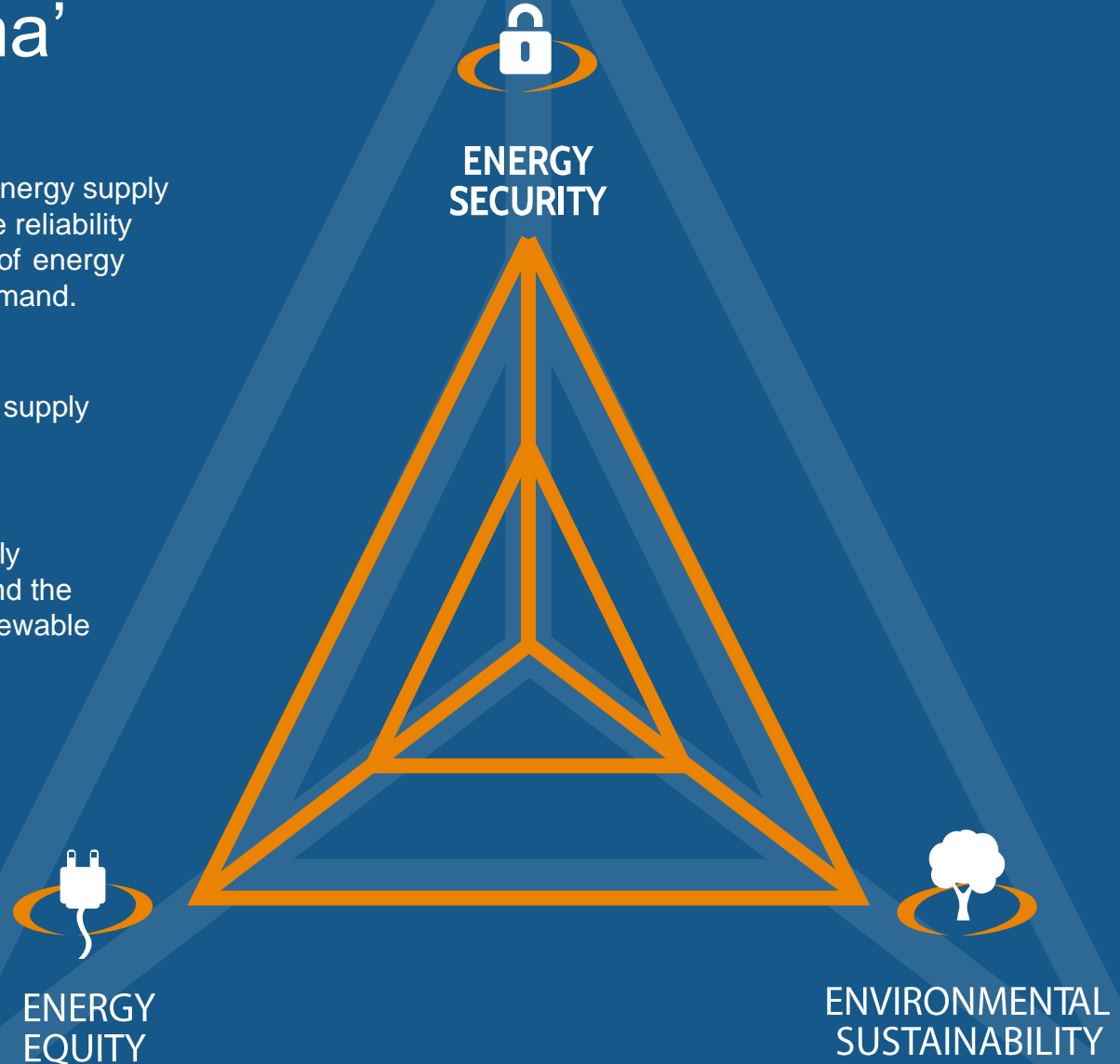
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.

Energy Equity

Accessibility and affordability of energy supply across the population.

Environmental Sustainability

Encompasses the achievement of supply and demand side energy efficiencies and the development of energy supply from renewable and other low-carbon sources.



Balancing the 'Energy Trilemma'

Energy Security

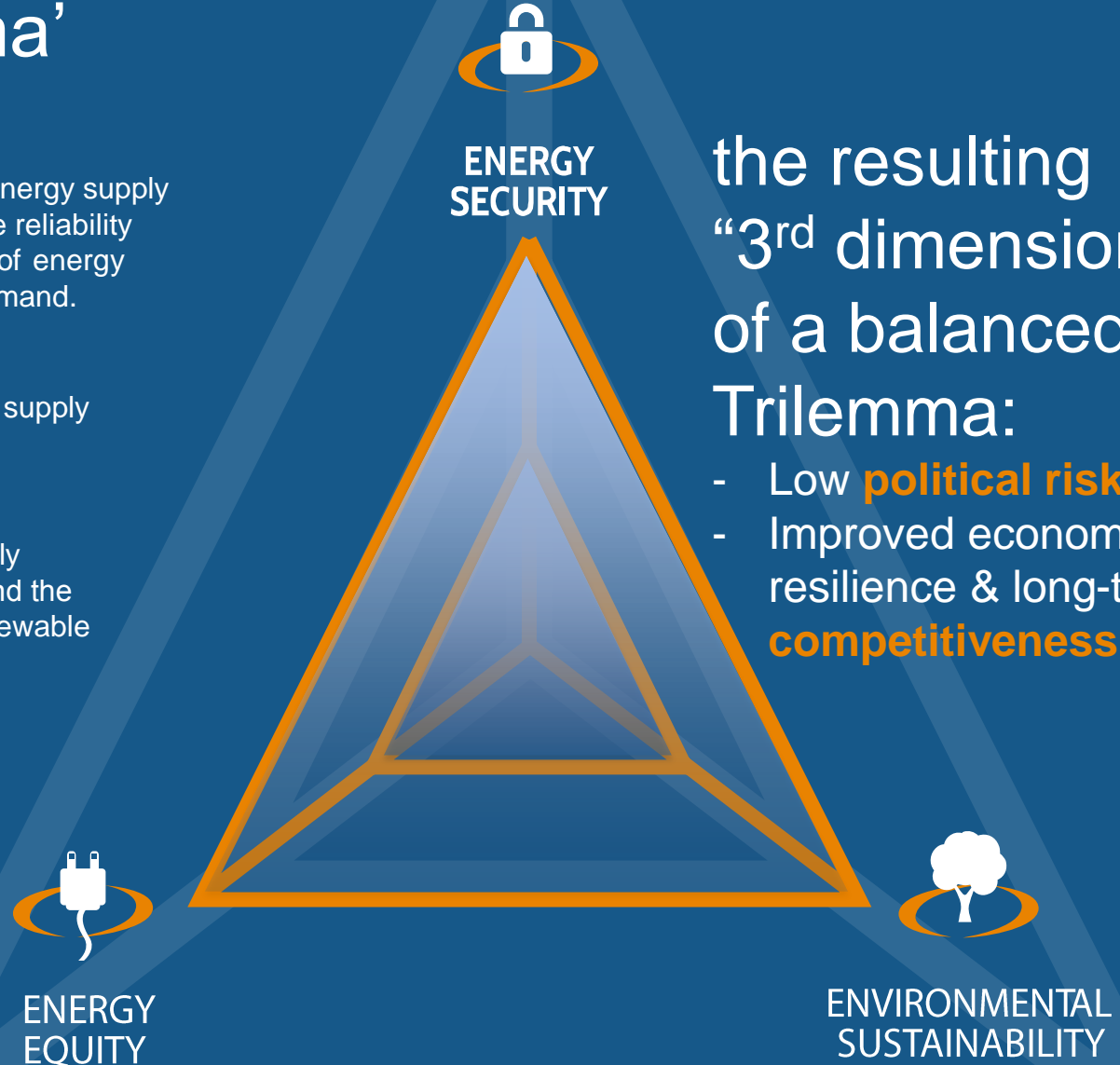
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the resulting
“3rd dimension”
of a balanced
Trilemma:

- Low **political risk**
- Improved economic resilience & long-term **competitiveness**

BALANCE SCORE

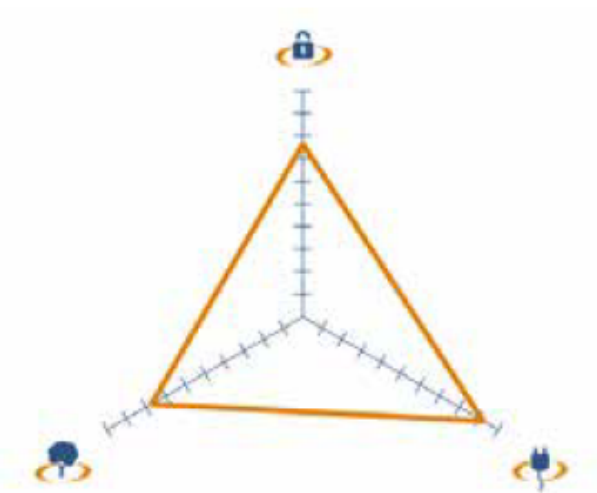
ABB

INDEX RANK

11

GERMANY

ENERGY SUSTAINABILITY BALANCE



ENERGY SUSTAINABILITY INDEX RANKINGS AND BALANCE SCORE

	2011	2012	2013	Trend	Score
Energy performance	9	8	10	↓	
 Energy security	23	24	31	↓	B
 Energy equity	14	13	11	↑	A
 Environmental sustainability	32	31	30	↑	B
Contextual performance	14	13	13	→	
 Political strength	16	16	16	→	
 Societal strength	19	18	18	→	
 Economic strength	24	26	24	↑	
Overall rank and balance score	10	8	11	↓	ABB

22nd World Energy Congress, 2013, Daegu

“The world’s premier energy gathering”



“The world’s premier energy gathering”

► 7 Myths

- **M1: Global energy demand will flatten out. Reality: Energy demand will double by 2050**
- **M2: Peak Oil. Reality: No shortage for fossil fuels in sight.**
- **M3: Demand growth will be fully met by new clean energy sources. Reality: The contribution of fossil fuels to the global energy demand is still growing in absolute terms.**
- **M4: We can reduce global GHG emission by 50% by 2050. Reality: Even in the best case we will see a near doubling of GHG emissions compared to 1990 levels.**
- **M5: Current business models and markets are delivering. Reality: Current designs are unable to cope with the increasing renewable shares, decentralised systems, or growing information architecture.**
- **M6: Current programmes will deliver universal energy access by 2030. Reality: On current paths, 320..530 million people will still be without electricity in 2050.**
- **M7: On a global scale capital is cheap and abundant. Reality: Capital is extremely sensitive to perceived political and regulatory risks. Lack of agreement between investors and governments on nature, price, and value of risks related to energy infrastructure makes capital flow elsewhere.**

