

# Energy in transition - navigating through uncertainty



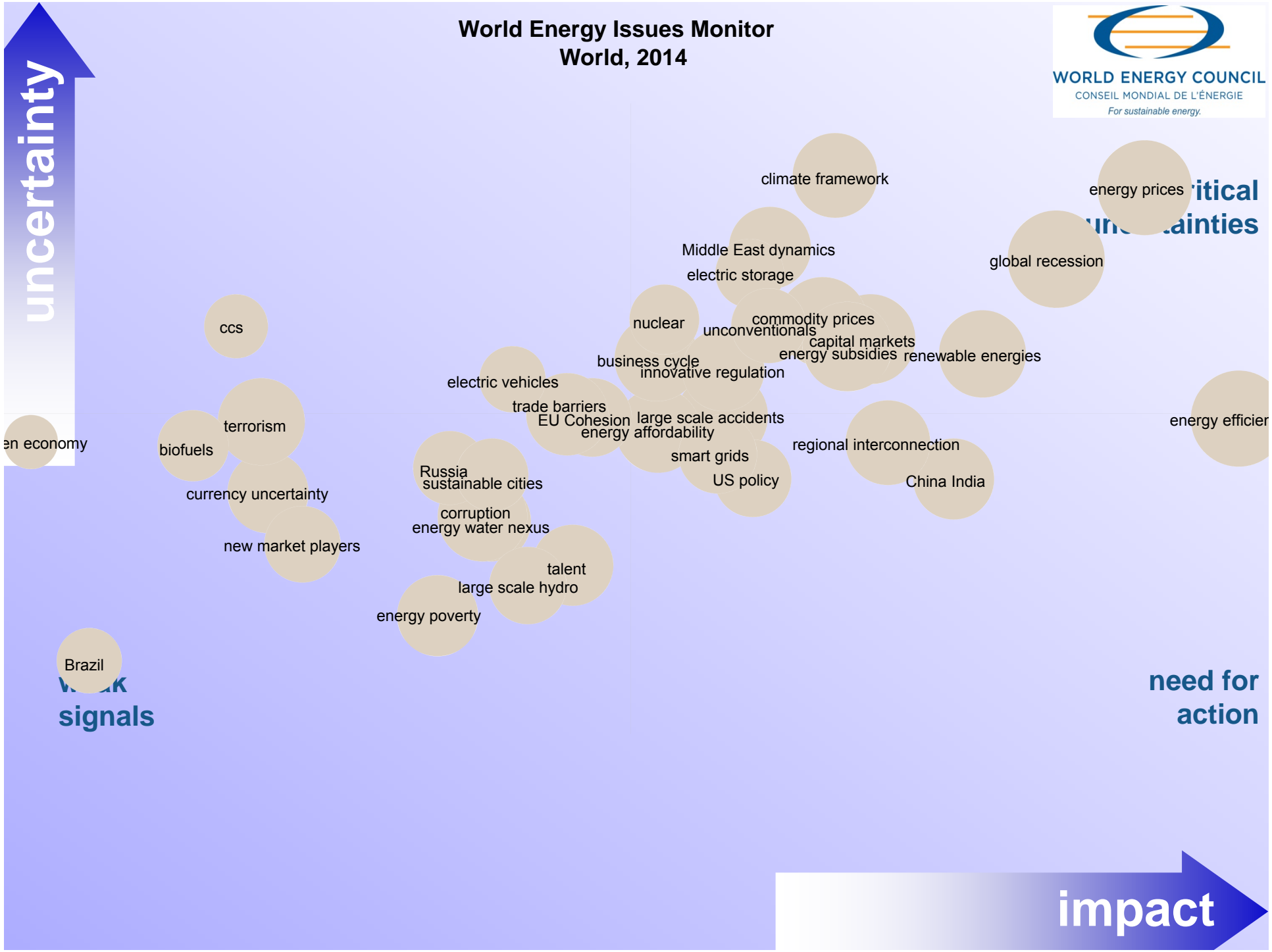
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**Secretary General & CEO**  
**World Energy Council**

Santa Cruz, Bolivia  
**August 20, 2014**



*twitter:*  
**@chwfri**

# World Energy Issues Monitor World, 2014



uncertainty

impact

critical uncertainties

weak signals

need for action

an economy

energy efficient

ccs

climate framework

energy prices

Middle East dynamics

global recession

electric storage

nuclear

commodity prices

unconventionals

capital markets

business cycle

energy subsidies

renewable energies

electric vehicles

innovative regulation

terrorism

biofuels

currency uncertainty

new market players

Russia sustainable cities

corruption energy water nexus

talent

large scale hydro

energy poverty

trade barriers

EU Cohesion

large scale accidents

energy affordability

smart grids

US policy

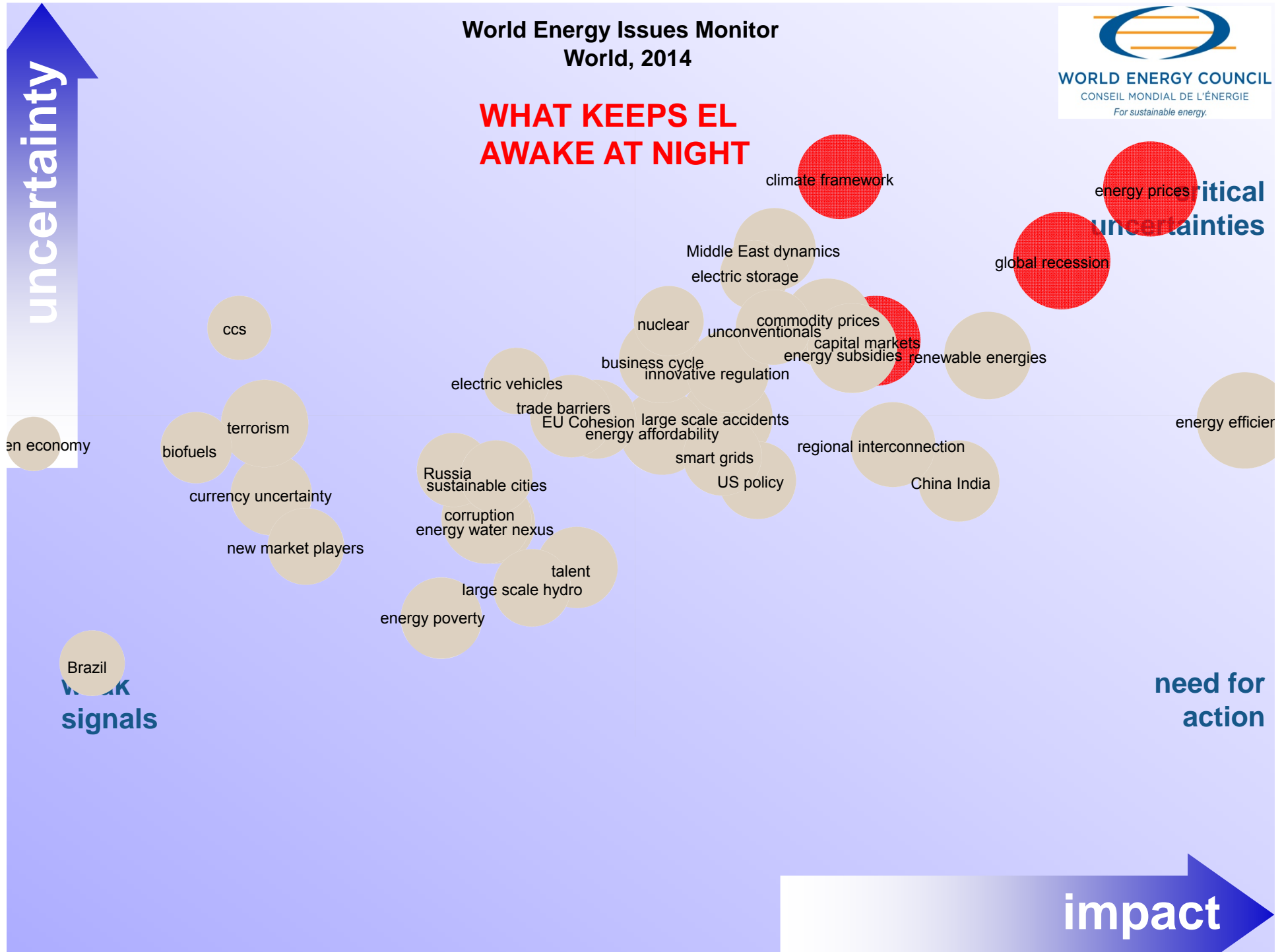
regional interconnection

China India

# World Energy Issues Monitor World, 2014



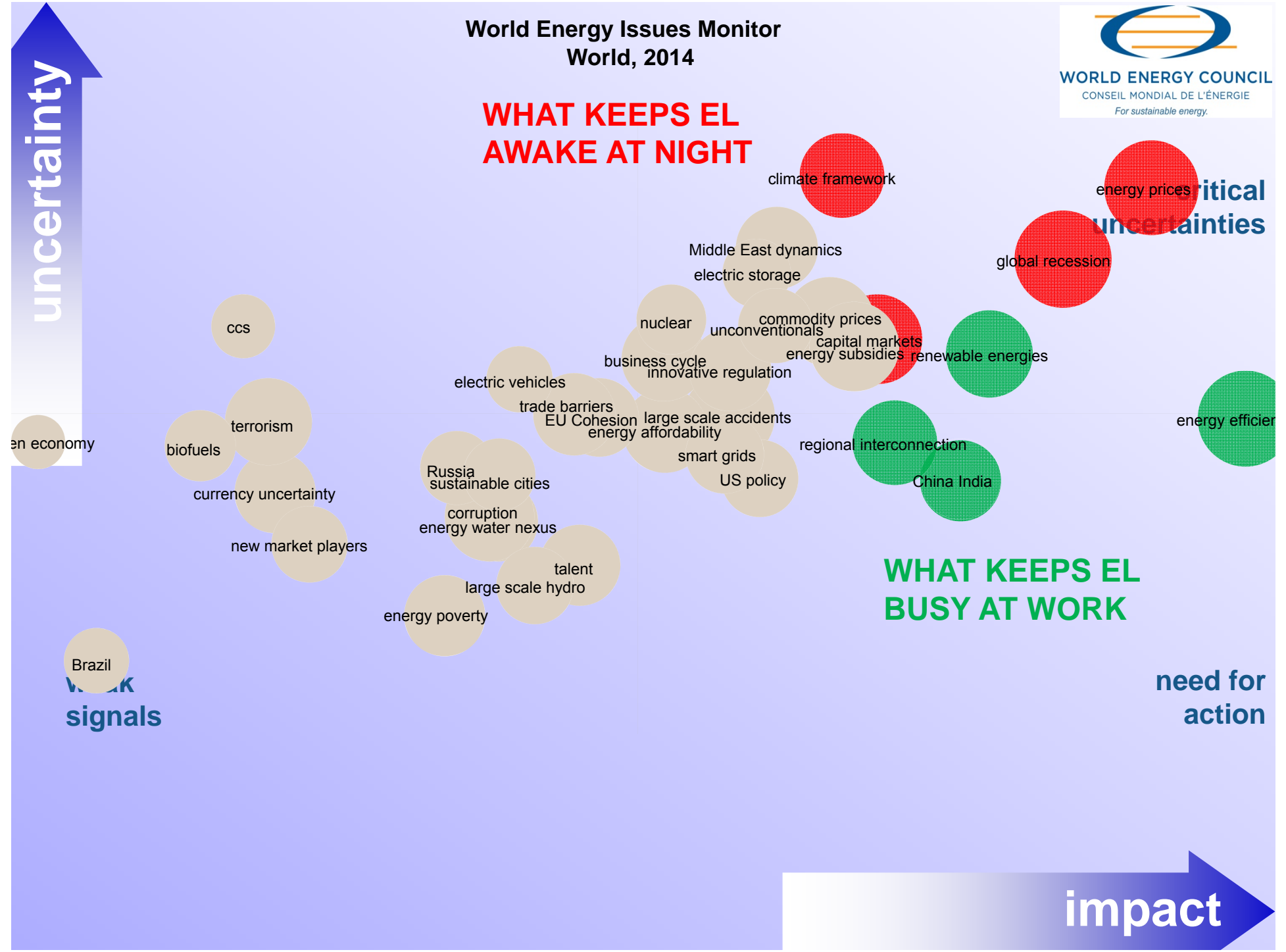
## WHAT KEEPS EL AWAKE AT NIGHT



# World Energy Issues Monitor World, 2014



## WHAT KEEPS EL AWAKE AT NIGHT



uncertainty

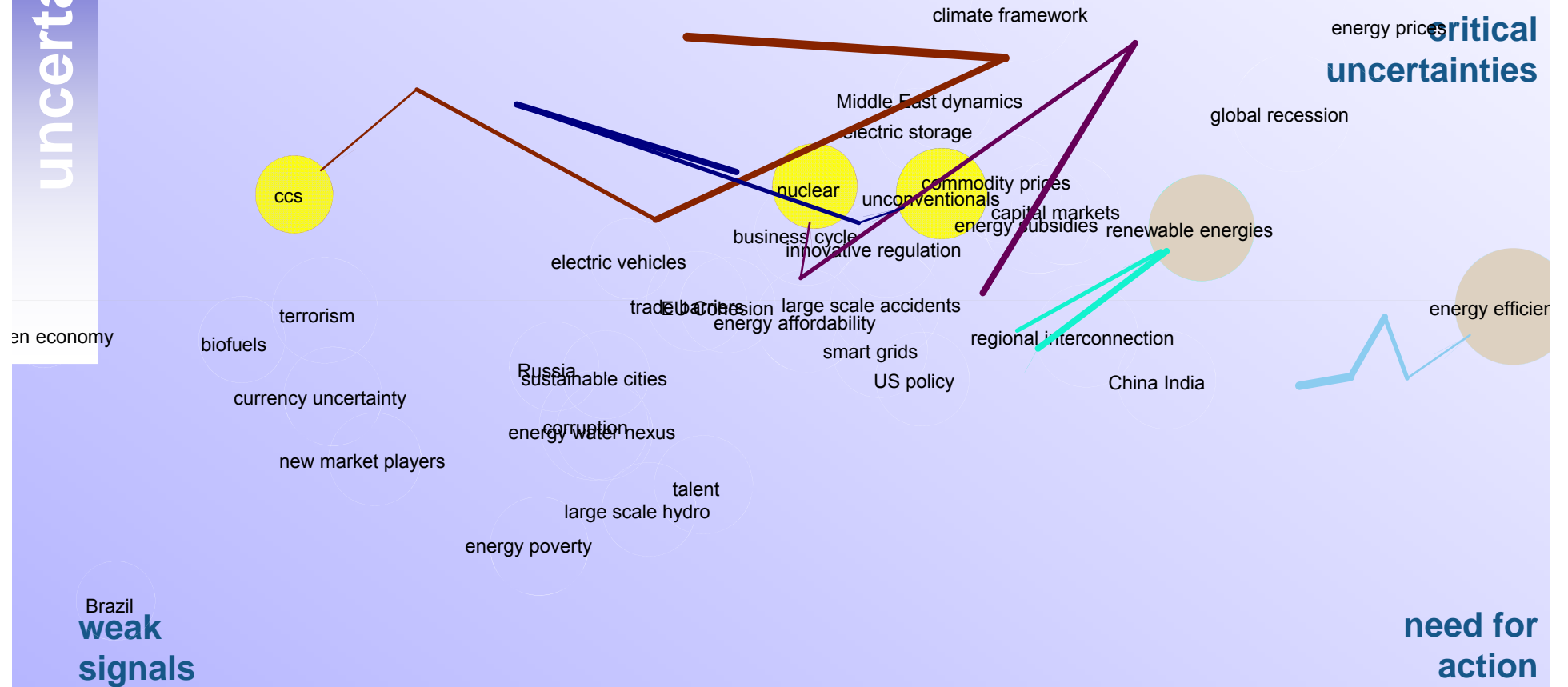
## WHAT KEEPS EL BUSY AT WORK

need for  
action

impact

uncertainty

# World Energy Issues Monitor World, 2014 time tracking



impact

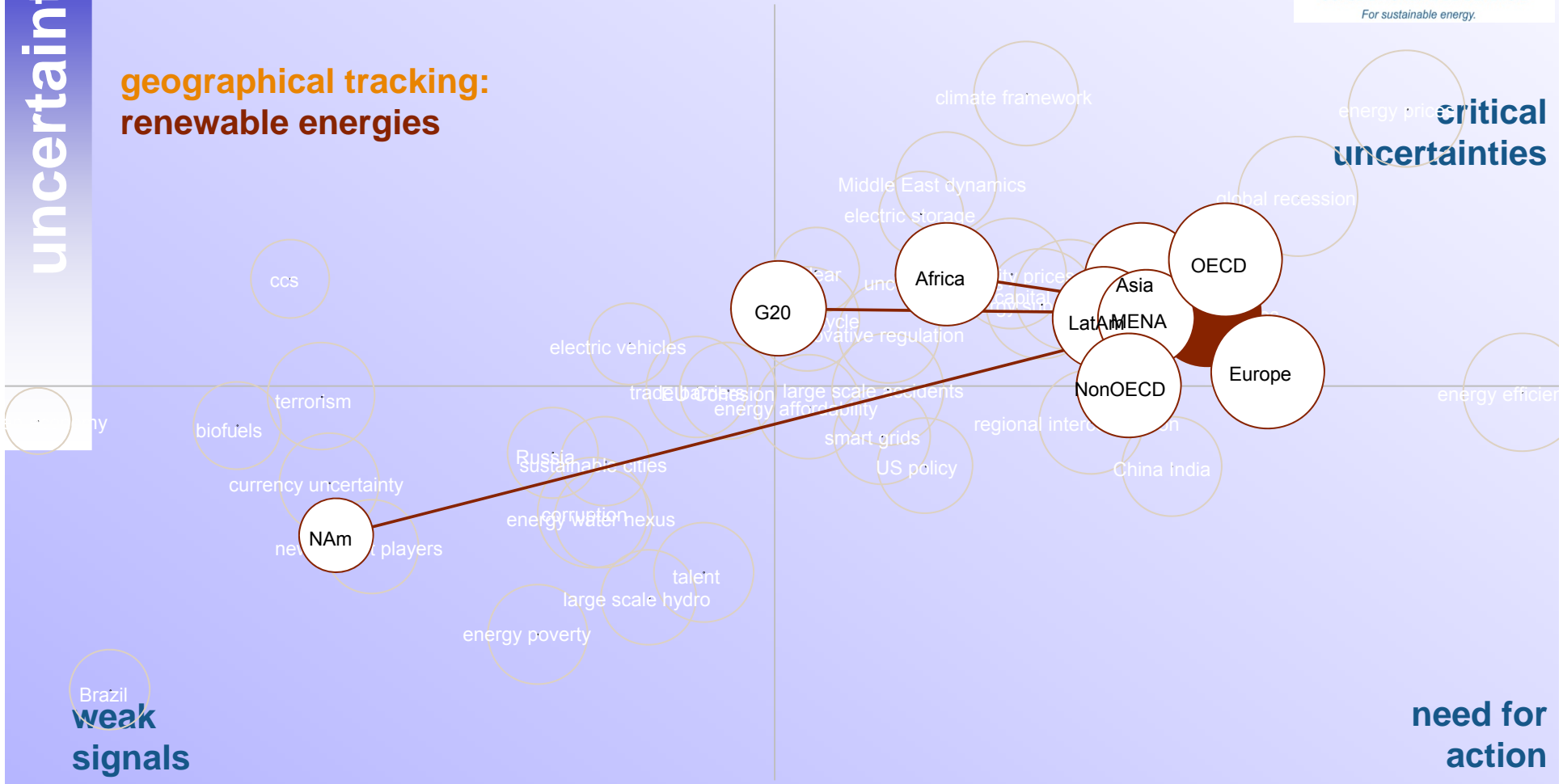
# World Energy Issues Monitor World, 2014



uncertainty

**geographical tracking:  
renewable energies**

**critical  
uncertainties**

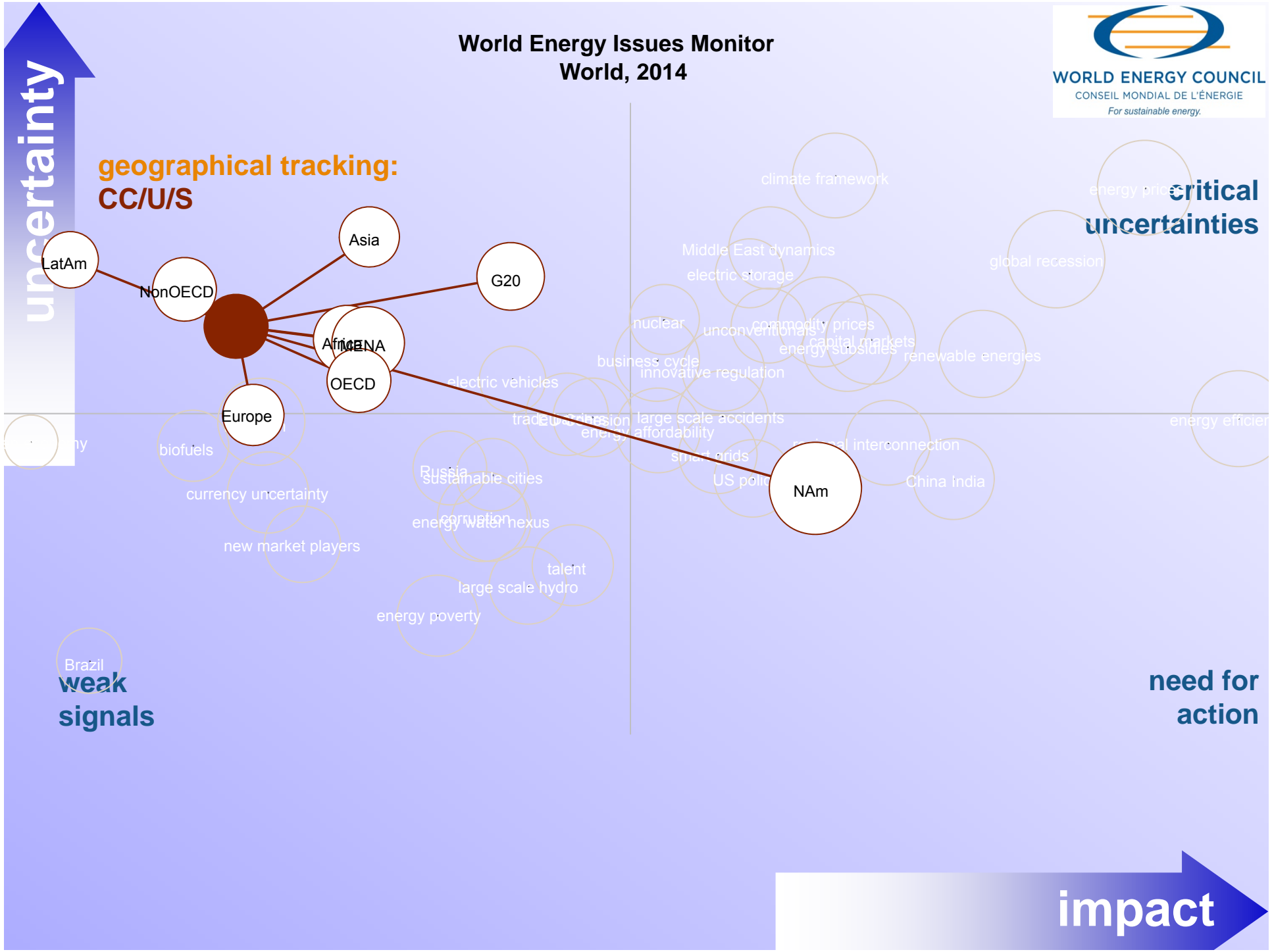


Brazil  
**weak  
signals**

**need for  
action**

impact

# World Energy Issues Monitor World, 2014

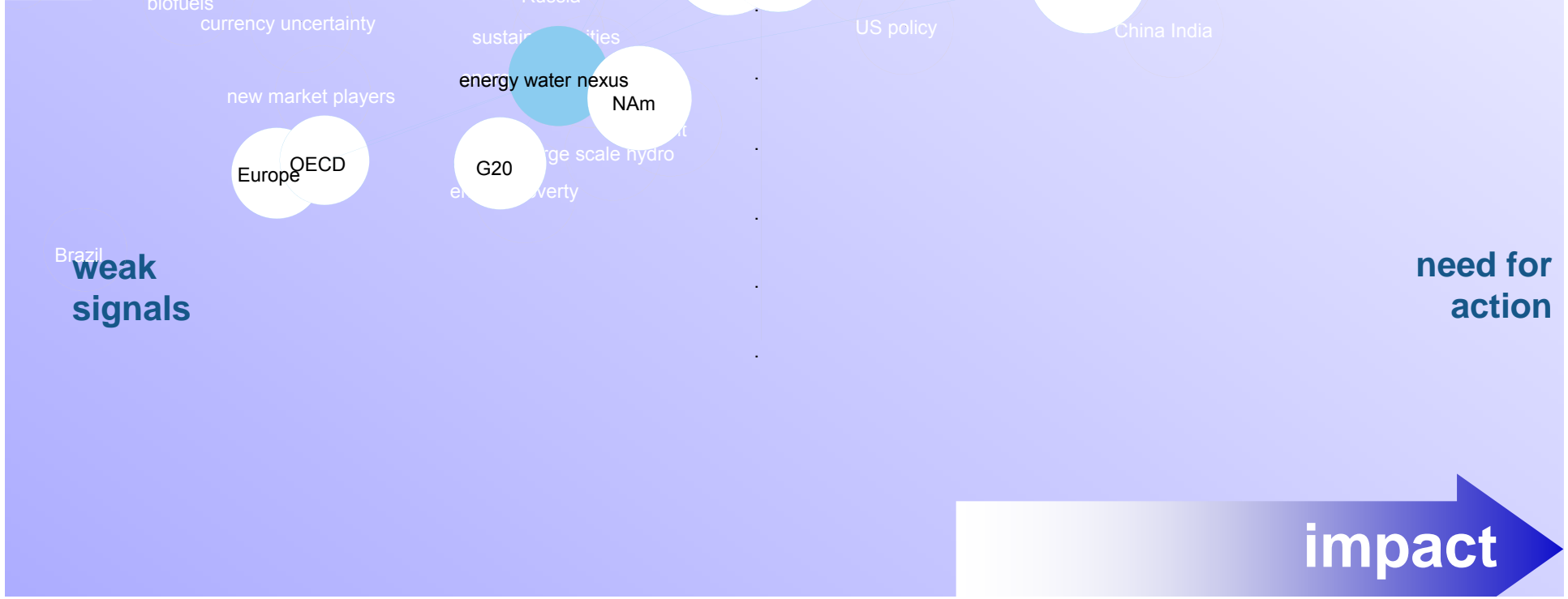


# World Energy Issues Monitor World, 2014

**uncertainty**

**geographical tracking:  
energy-water nexus**

**critical  
uncertainties**



- ccs
- terrorism
- biofuels
- currency uncertainty
- new market players
- Europe
- OECD
- G20
- Russia
- sustainable cities
- energy water nexus
- NAm
- large scale hydro
- poverty
- Asia
- business cycle
- electric vehicles
- transport
- NonOECD
- MENA
- US policy
- US scale
- smart grids
- regional
- Africa
- China India
- US policy
- electric storage
- nuclear
- unconventionals
- innovative re
- energy subsidies
- renewable energies
- LatAm
- China India
- climate framework
- Middle East dynamics
- global recession
- commodity prices
- capital markets
- energy efficiency



**WORLD ENERGY COUNCIL**  
CONSEIL MONDIAL DE L'ÉNERGIE

Project Partner:  
**Paul Scherrer Institute**



# World Energy Scenarios

# WEC Scenarios

## Deriving the scenario stories

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

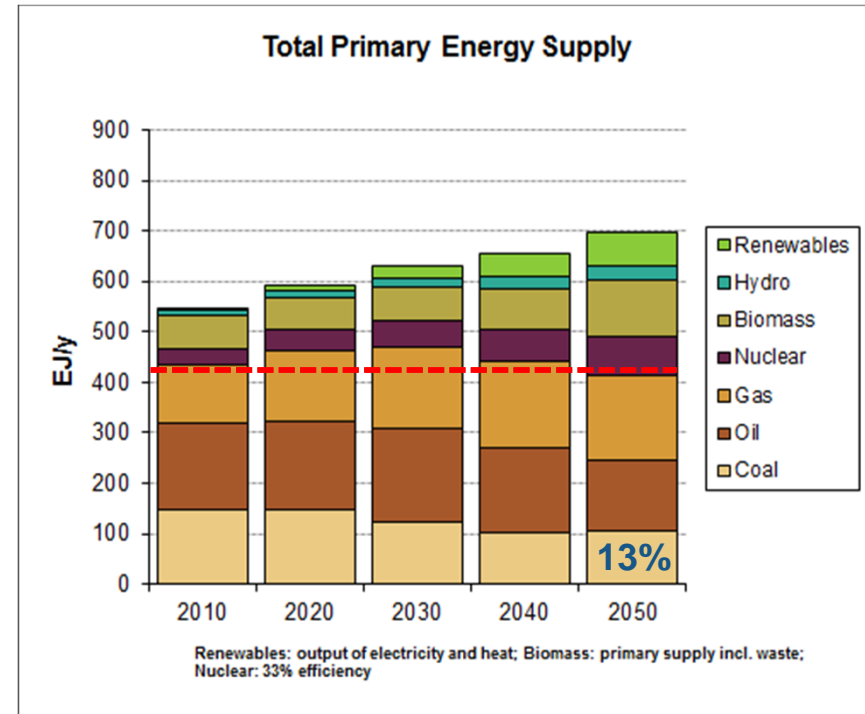
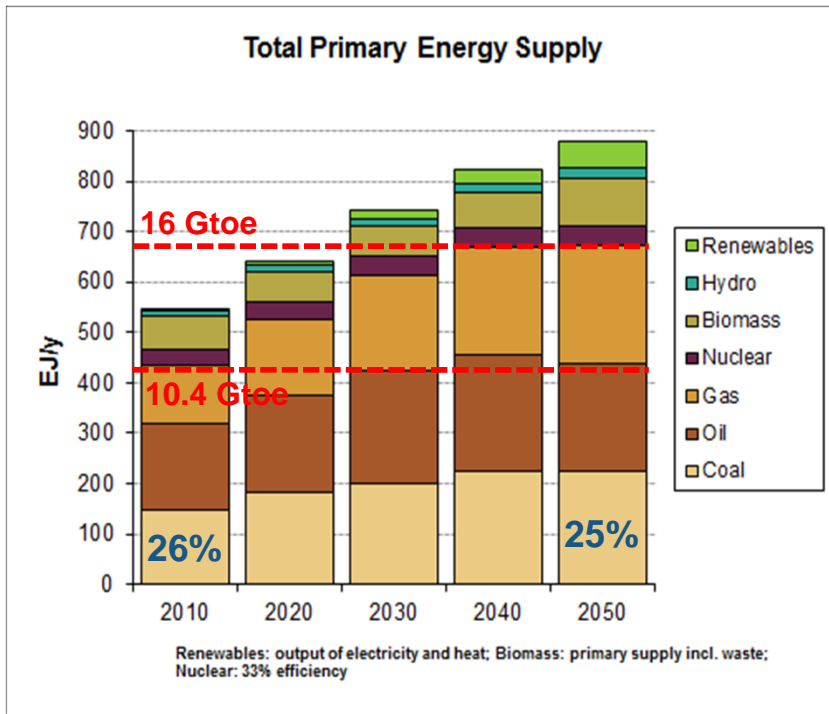
### **Jazz:**

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.

# Global total primary energy supply



## Jazz

fossil fuels: +55%/- 5%

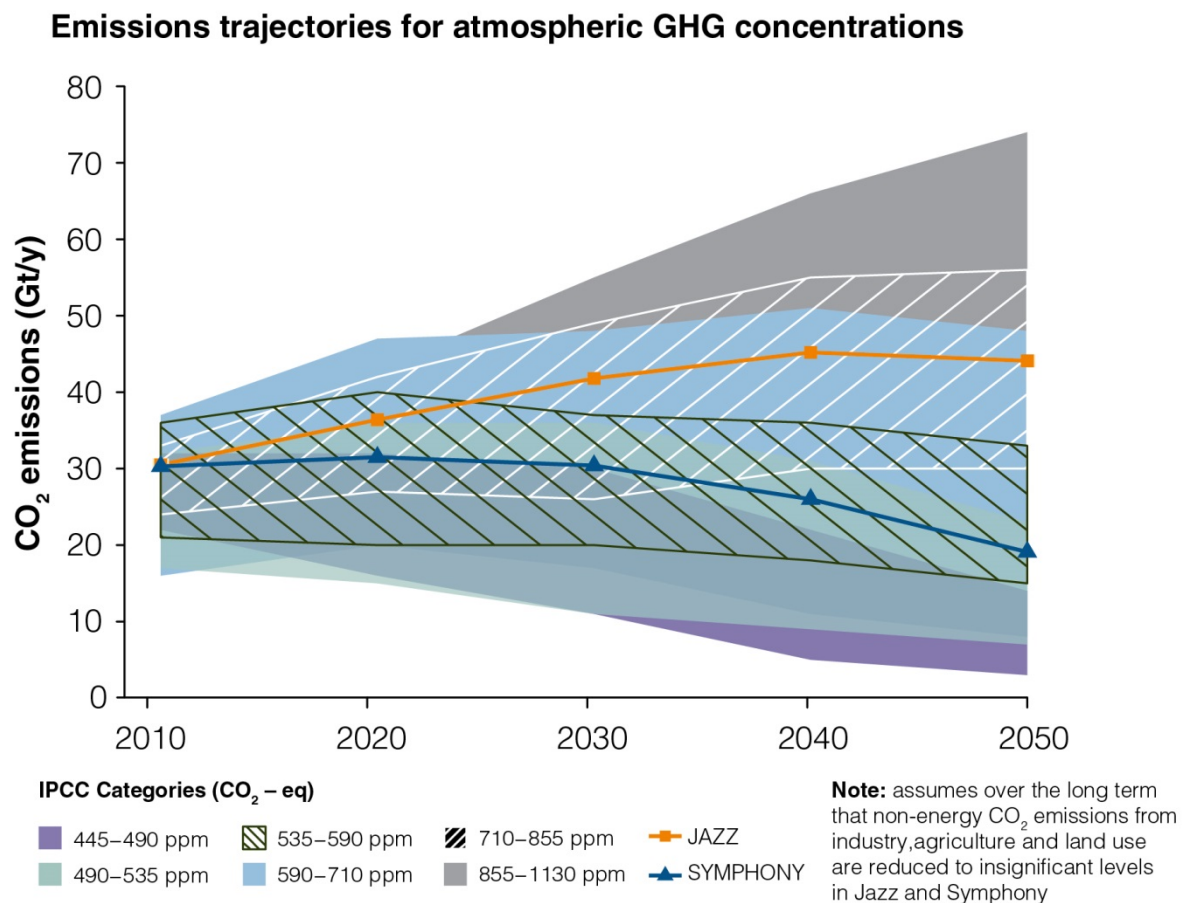
oil: +/- 15%  
natural gas: +100%/+50%  
coal: +/- 40%

## 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

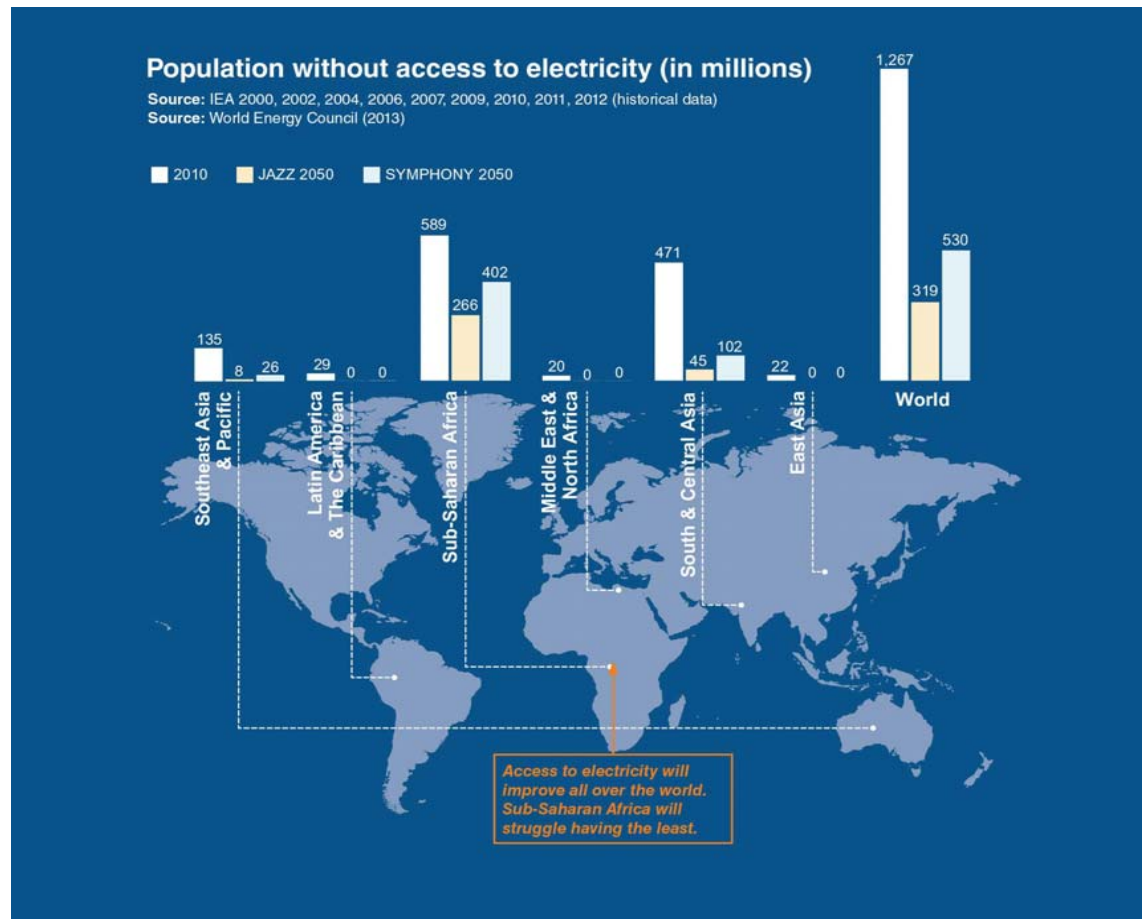
# Resulting CO<sub>2</sub> emissions



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

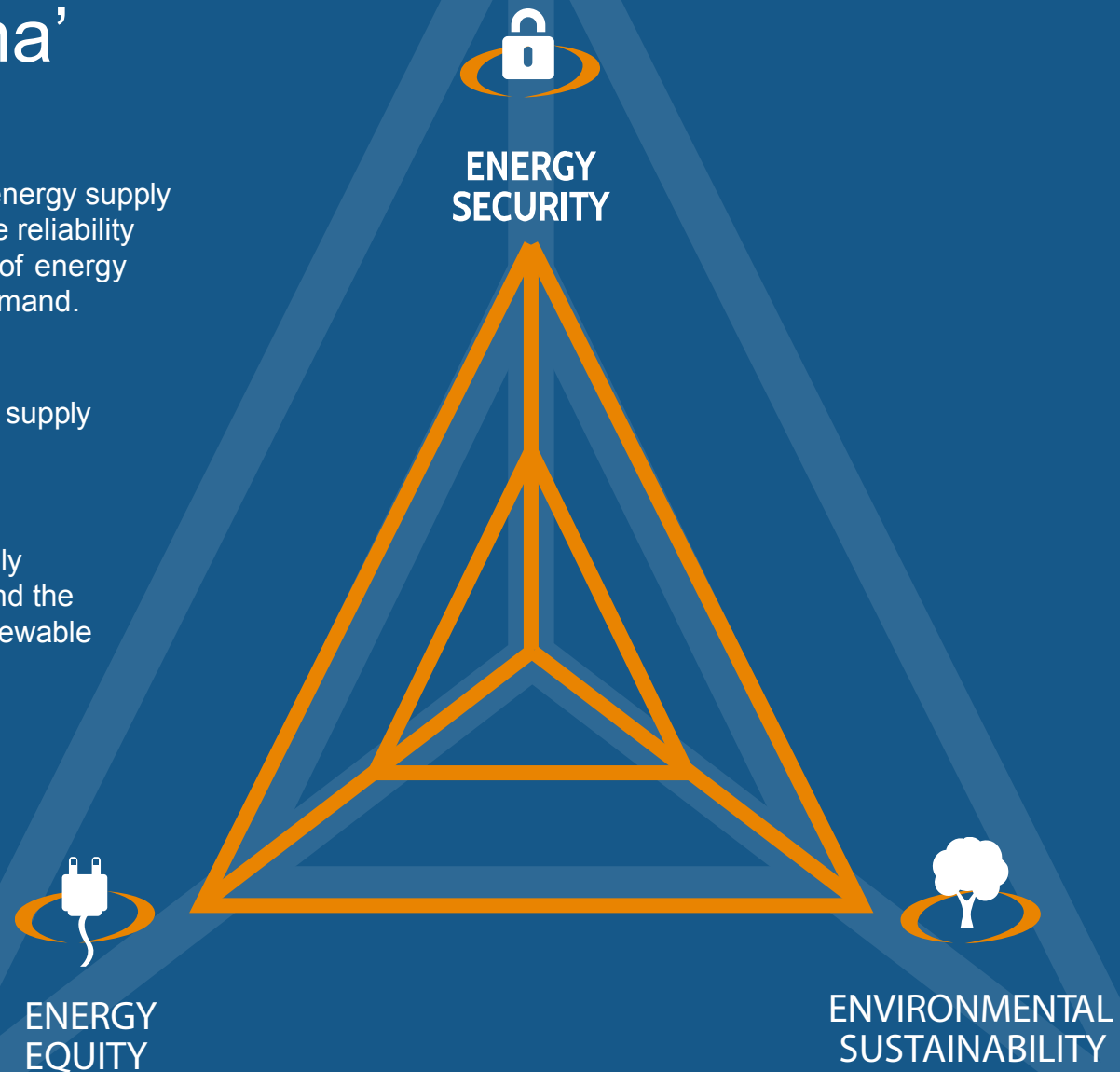
The effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of energy providers to meet current and future demand.

## 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.



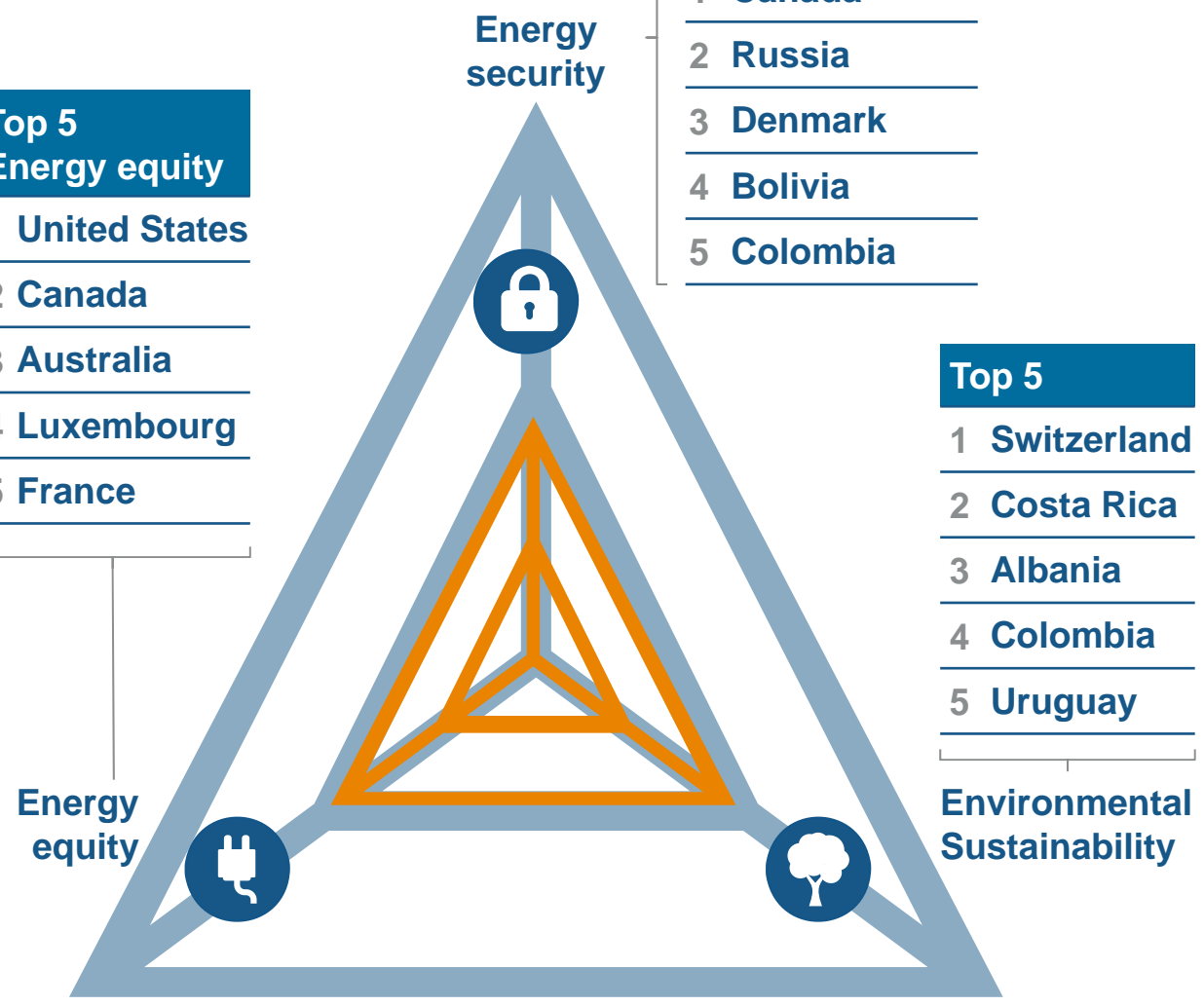
# 5 Top Energy sustainability index

- 1 Switzerland
- 2 Denmark
- 3 Sweden
- 4 Austria
- 5 United Kingdom
- 6 Canada
- 7 Norway
- 8 New Zealand
- 9 Spain
- 10 France

- ### Top 5 Energy equity
- 1 United States
  - 2 Canada
  - 3 Australia
  - 4 Luxembourg
  - 5 France

- ### Top 5 Energy security
- 1 Canada
  - 2 Russia
  - 3 Denmark
  - 4 Bolivia
  - 5 Colombia

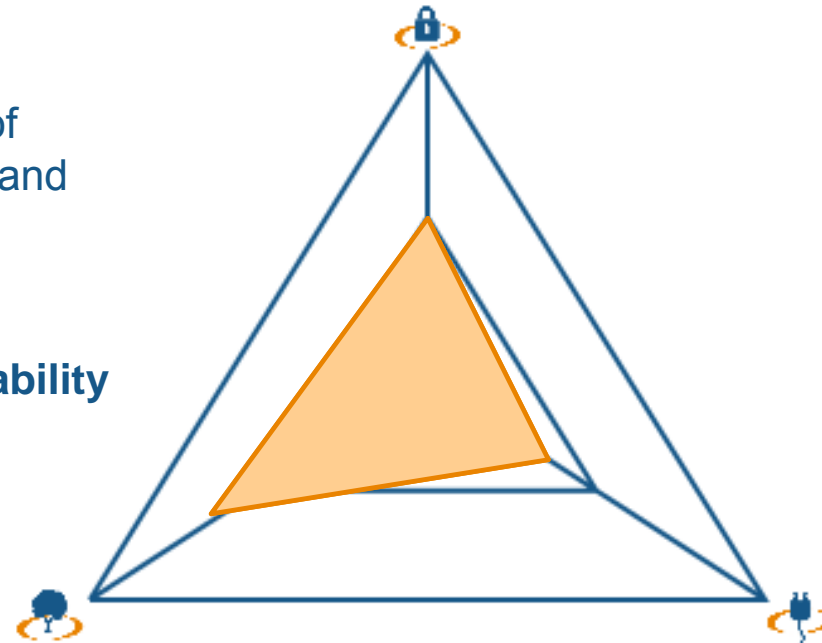
- ### Top 5 Environmental Sustainability
- 1 Switzerland
  - 2 Costa Rica
  - 3 Albania
  - 4 Colombia
  - 5 Uruguay



# Energy sustainability balance Latin America and the Caribbean

Countries in the region see varying levels of success in balancing the energy trilemma, and on average have

- **decent levels of energy security,**
- **weaker energy equity performance**
- **the strongest environmental sustainability of all the WEC regions.**



21	Costa Rica	35	Ecuador	55	Bolivia	98	Trinidad & Tobago
24	Colombia	45	Peru	57	Chile	100	Honduras
26	Argentina	46	Uruguay	61	Guatemala	110	Dominican Rep.
29	Panama	49	El Salvador	74	Paraguay	113	Nicaragua
34	Brazil	50	Barbados	77	Venezuela	121	Jamaica





INDEX RANK

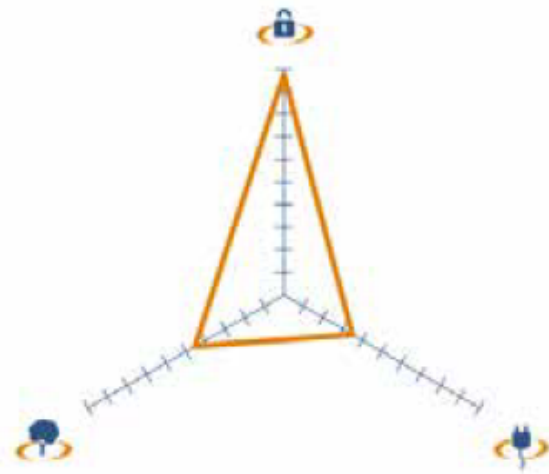
**55**

**BOLIVIA**

BALANCE SCORE

**ACC**

ENERGY SUSTAINABILITY BALANCE



ENERGY SUSTAINABILITY INDEX RANKINGS AND BALANCE SCORE

	2011	2012	2013	Trend	Score
Energy performance	44	53	44	↑	
Energy security	21	21	4	↑	A
Energy equity	82	80	84	↓	C
Environmental sustainability	49	65	71	↓	C
Contextual performance	94	83	86	↓	
Political strength	114	103	100	↑	
Societal strength	110	99	99	→	
Economic strength	54	44	53	↓	
<b>Overall rank and balance score</b>	<b>58</b>	<b>60</b>	<b>55</b>	<b>↑</b>	<b>ACC</b>

# 22<sup>nd</sup> World Energy Congress, 2013, Daegu

“The world’s premier energy gathering”





# 22<sup>nd</sup> World Energy Congress, 2013, Daegu

## “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.**

