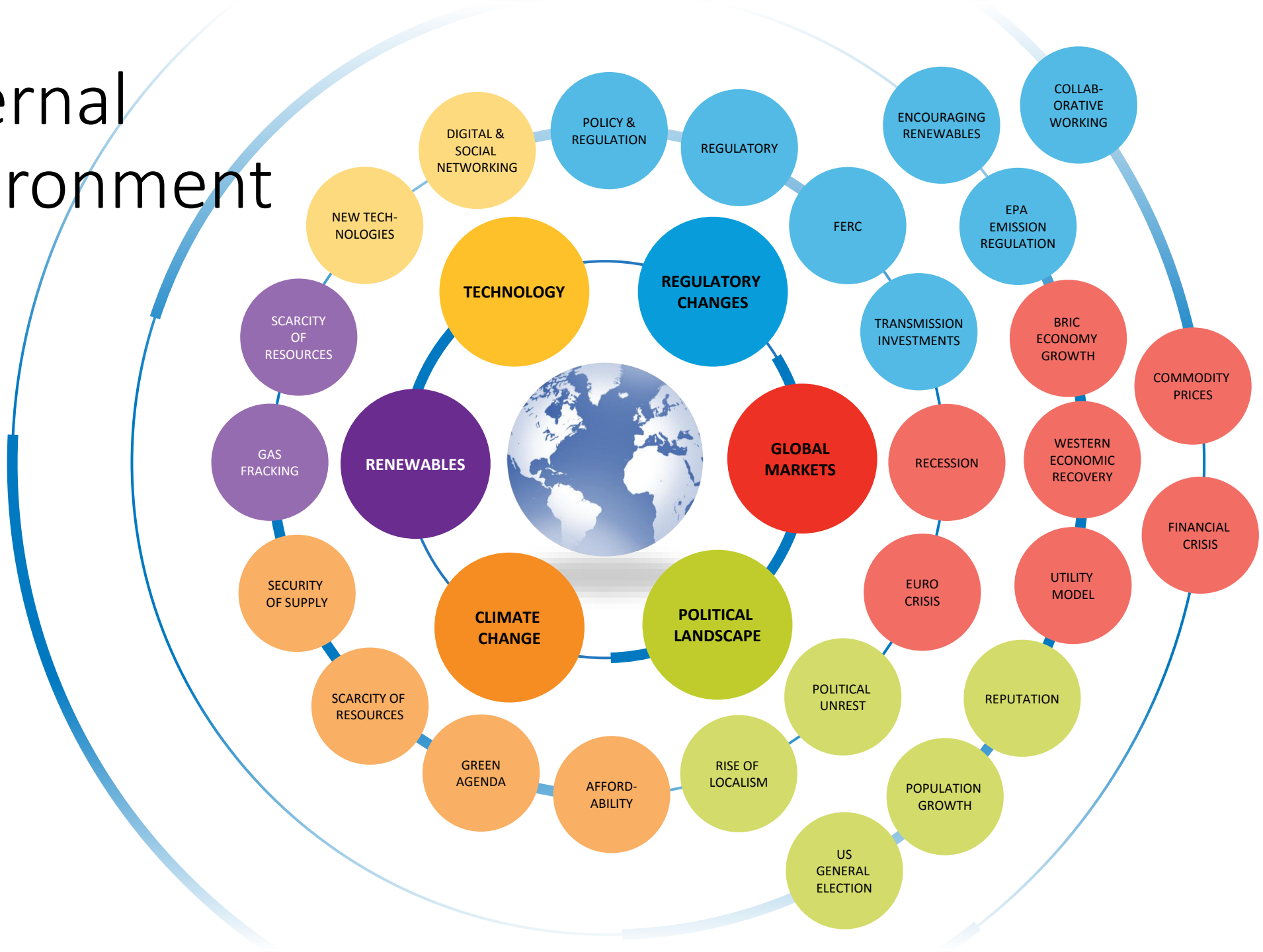
Steve Holliday

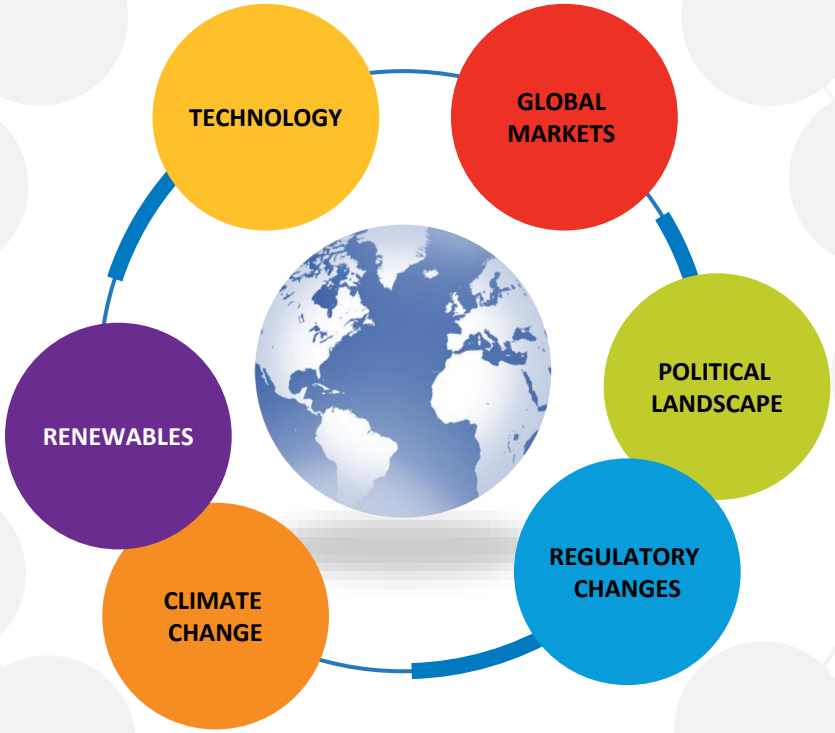
Annual Fuellers lecture

2016

External environment



External environment



lets celebrate

nationalgrid

COP21

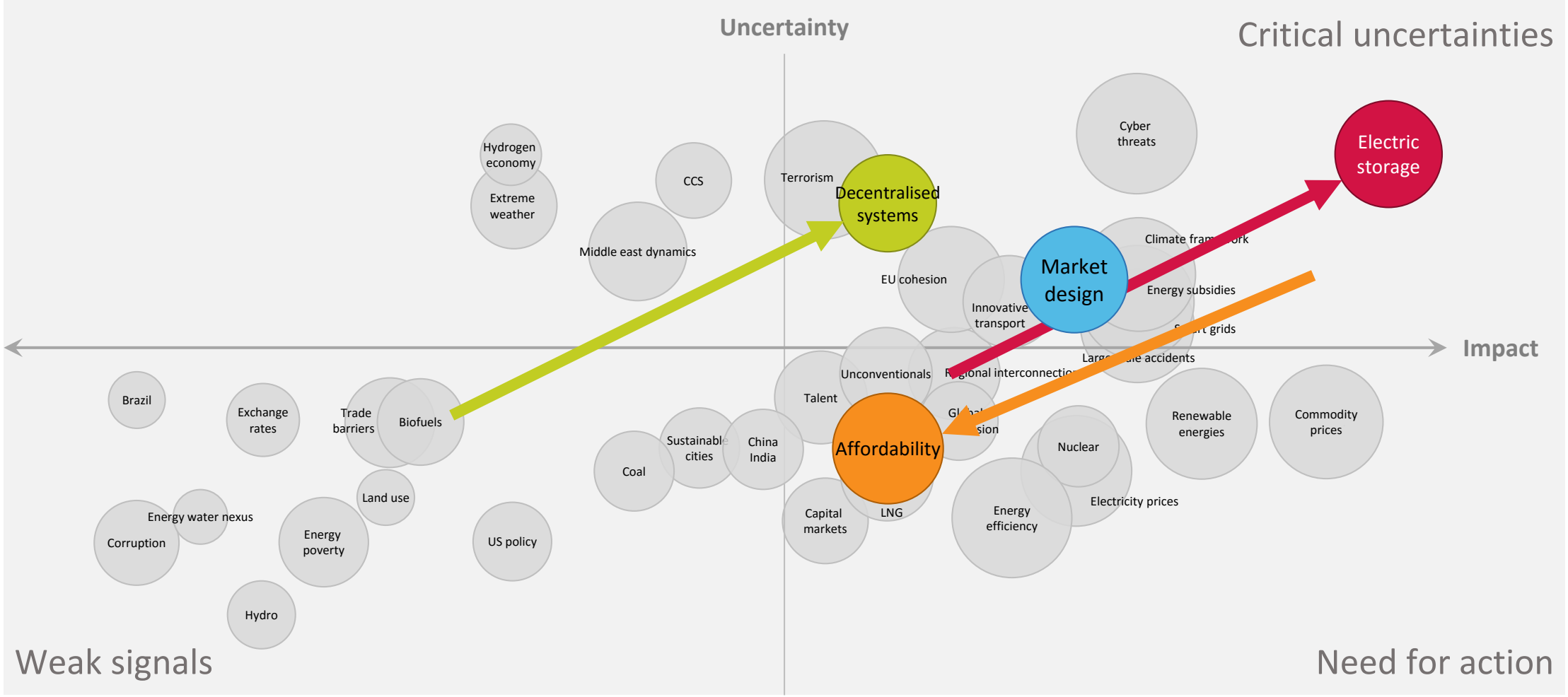
64GW new wind

144 countries renewable goals

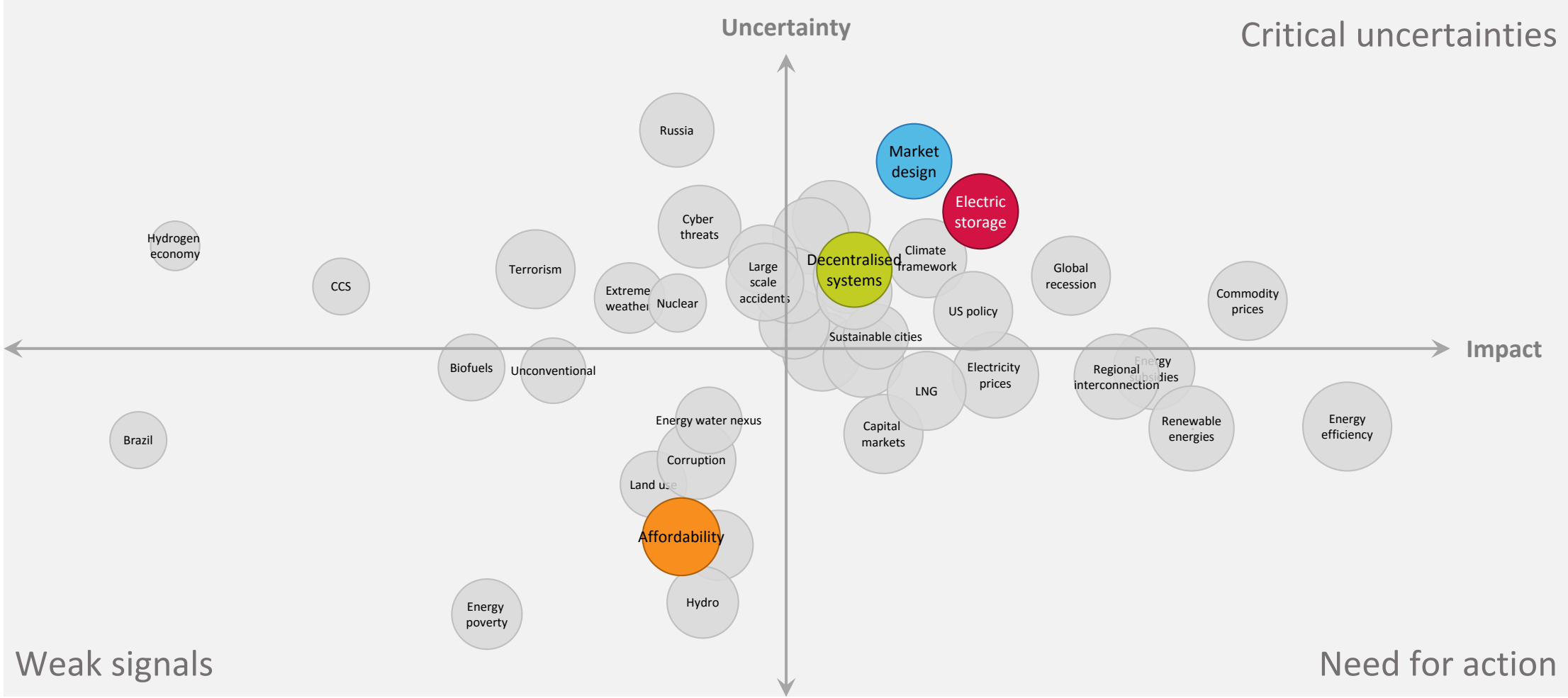
Global solar capacity increase by 30% in 2015

Renewables 50% of new generation

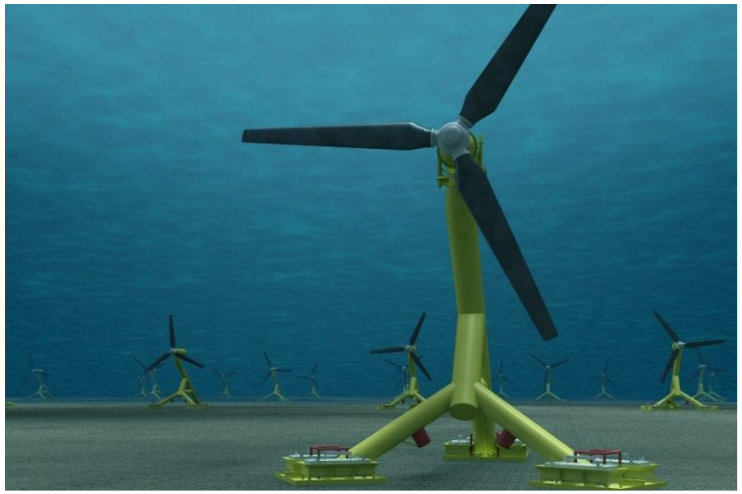
What keeps UK energy leaders awake at night?



What keeps Global energy leaders awake at night?



Technology changes



future energy scenarios

nationalgrid

Consumer Power

Gone Green

No Progression

Slow Progression

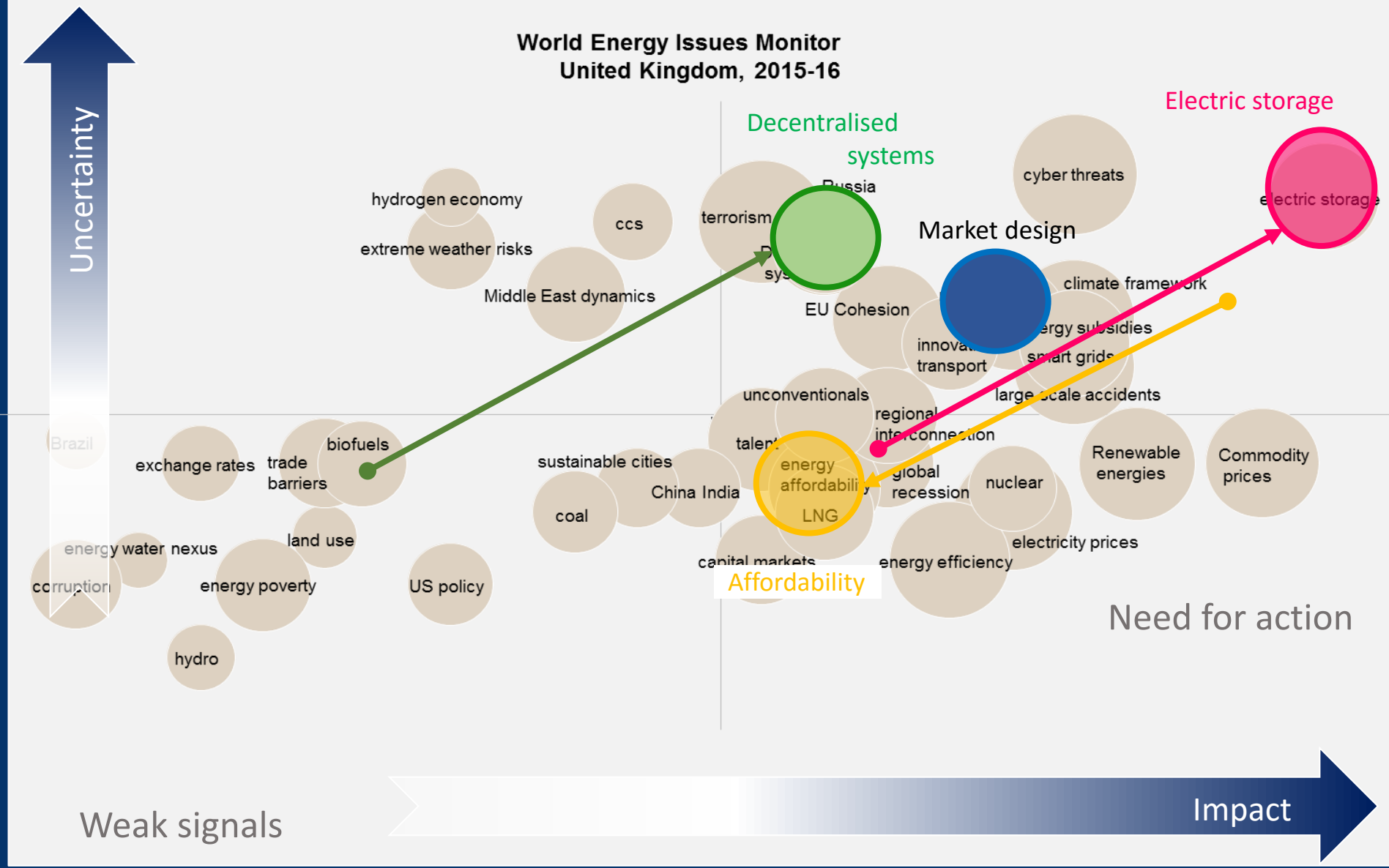
Policy keys to the future?

1. Stability of approach
2. Transparency
3. Focus on delivery not principles
4. Flexibility
5. 80/20 policy decisions

World Energy Issues Monitor 2016 preview

UK Movement since 2014

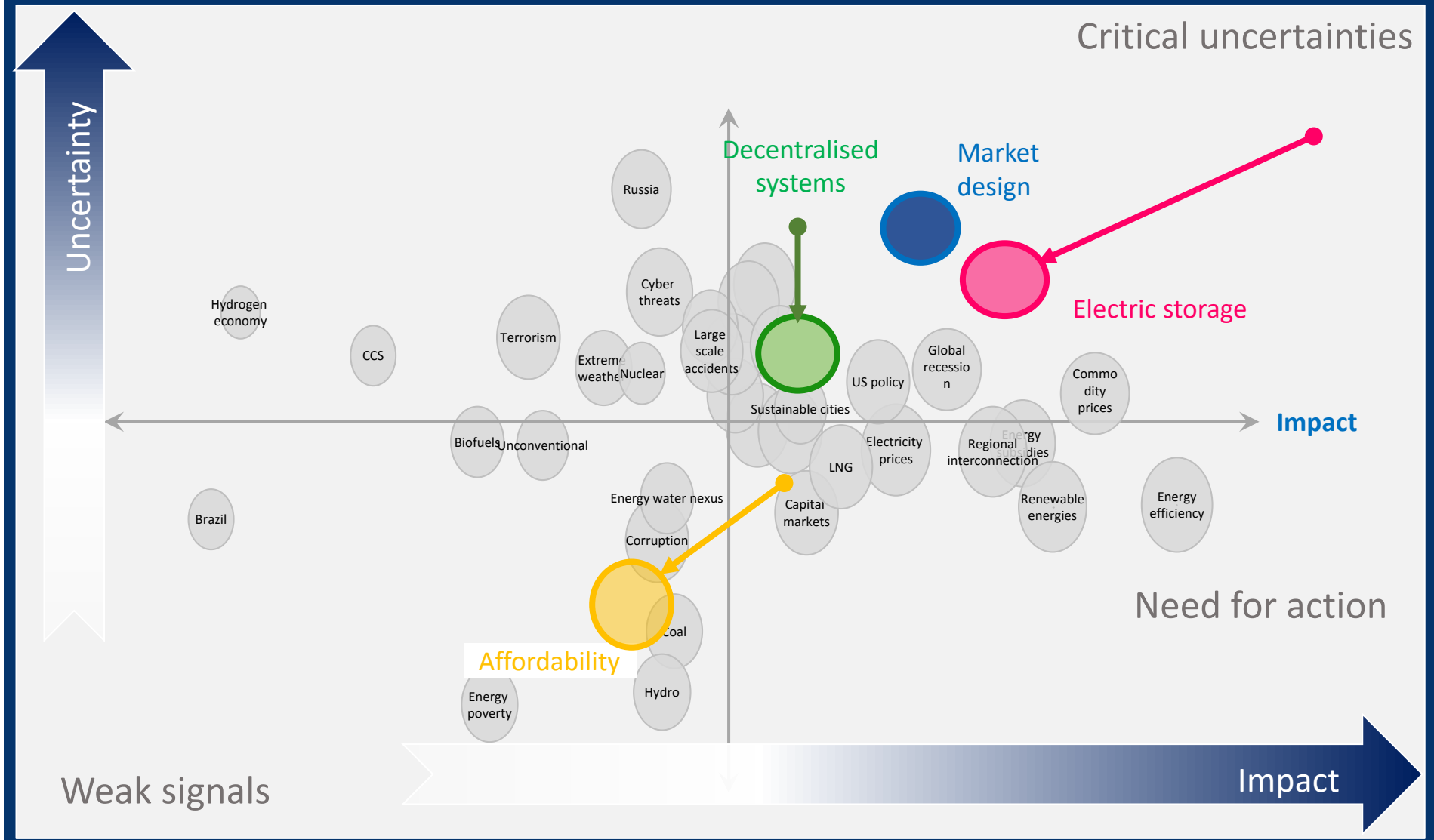
nationalgrid



World Energy Issues Monitor 2016 preview

World view

nationalgrid



Fuellers' Annual Lecture – 6th September 2016

Introduction

Thank you for the opportunity to talk to you this evening.

A huge thank you to the Worshipful Co of Fuellers for inviting me to give the 12th Annual Energy Lecture - humbled to be among a distinguished list of those who have previously delivered this lecture

Having recently stepped down as CEO National Grid I have reflected on my 38 years working in the sector.

This is a career that has delivered so much for me and it has been a huge privilege to be part of this industry, and an enormous responsibility as CEO of National Grid for the last 10 years

I reflect on having been at the heart of one of the most dynamic and important industries, filled with passionate people and I am excited, almost as much as I've ever been by the opportunities in front of us.

Setting the context

In preparing for my final management conference as CEO I recently looked back over the big macro trends that have influenced our business;

As a business National Grid operates in both the UK and the US and interestingly, the external influences I saw 5/10 years ago are subsets of the 4 same headings:

- **Global Markets,**
- **Political and regulatory landscape,**
- **Climate Change & Renewables,**
- **Technology**

That same list masks an enormous amount of variation that has taken place, and undersells the ever increasing pace of change.

So let me reflect on some of these recurrent themes

Global markets

We have seen incredible growth in some economies such as China. The pace of change has been extraordinary. But global financial markets are clearly still very fragile and the threat of recession across the world continues to lurk. Of course global commodity markets have been through huge shifts on major metals and of course the massive shift in oil and gas pricing driven fundamentally by the US shale revolution

Political and regulatory landscape

During my time as CEO I have worked with 6 UK Secretaries of States with responsibility for energy, and 3 different Departments.
In the US I've worked with 8 different governors, across New York, Rhode Island and Massachusetts.

Change is a fundamental constant and as for the future I want to return to this point later…

Climate Change/Renewable Energy

Less than 10 years ago when I spoke about renewables I was talking about the future potential of renewable energy, large scale deployment was still to be tested. Technology advances and rapid deployment has amply demonstrated their potential, and perceptions of renewable energy have thankfully shifted considerably. Last year I celebrated COP21…the Paris agreement was an extraordinary milestone, 196 countries signing up. 144 with renewable priorities and 100 have established targets. $100bn to developing nations and a new stretch aspirational target of 1.5^0c

Population growth and growing middle classes will drive demand for resources – renewable and non-renewable. By definition the latter is technically finite

As we all know renewables are really happening…US, Europe and China are leading but next year will we see Australia, Argentina and Iran all building to compete

Renewables accounted for over 50% of new global generation in 2015, with wind, solar and hydro all dominating. At the end of 2015 that was equivalent to 27.7% of the world's generating capacity and able to supply almost 23% of global power

Recent figures from the UK show renewables share of electricity generation was 23.5% up 5.9% from the same period in the previous year

Global wind installed last year was 64 GW of new generating capacity, 60 GW onshore. In Europe 15 GW was installed, an increase of 33% and Germany has now overtaken UK for offshore wind. Wind is anticipated to achieve parity in 50 countries

Global installed solar capacity in 2015 was 56.8GW - a 30% increase from 2014. This came from Utility PV 33GW, Commercial 15GW, Residential just over 8GW and CSP at 0.3GW

It's estimated that in Europe and North America a home or business installs solar every 2 minutes. With solar costs down by 75% that trend is set to continue with the new solar

projections in the US market adding 8GW per year to 2020, China adding 13GW/year and Europe at 10 GW/year – despite falling oil and gas prices. Many were shocked to see an increase of 66% in the UK to 10GW in just over a year. 13% of peak load

It wasn't long ago that I regularly had to listen to those who said this level of renewables was an impossibility!

Transitions are often uncomfortable and bumpy and we are in the midst of nothing less than a revolution in the provision of our energy with reports of major fossil fuel plant closures and subsequent concerns around GB supply margin

Given the Trilemma of security, affordability and sustainability balancing the energy system isn't easy but changing priorities doesn't help. UK gas prices are down 50% from 2 years ago, US gas prices are down $7.20 to $1.80 in 10 years. But affordability is only one dimension.

The World Energy Council released their annual World Energy Issues monitor in March this year and it shows what's on industry leaders' minds from around the world and breaks down the data region by region and compares the outcome with previous years.

This year there were 4 major changes for the UK:

- Affordability - down
- Decentralised systems - up
- Electric storage - up
- Market design - appears for the first time

And from a World position we can see that the responses weren't very different:

Battery storage is set to transform the renewables industry as battery costs have gone down 50% in 6 years and alongside Musk's Tesla Powerwall, Nissan launched only a few weeks ago this offers the possibility of a radically different model of locally generated energy supported by storage, interconnection and demand response assisted by smart metering and intelligent applications

'Local' is the key word politically and a flavour of our times

My other theme was of course "technology".....

What we know is that the pace of change and development of potentially disruptive technology is currently extraordinary. What were once stable, some would say boring and

predictable, energy networks, are now becoming playgrounds for dramatic innovation and new ideas

So, what does all say about our future energy mix?

Technology vs technology arguments aren't always helpful.

There is no right or wrong answer and there are a wide range of potential pathways

Each year National Grid produces our Future Energy Scenarios.

The latest of these proposed 4 scenarios:

- Gone green
- Consumer power
- No progression
- Slow progression.

A few key headlines to consider from those scenarios are:

- Great Britain remains a net importer of electricity in 3 out of 4 scenarios
- The scenarios highlight the increasing operability challenges the electricity system faces.
- Future summers will see periods of low transmission demands due to the increasing amounts of small scale generation.
- Sufficient gas supplies on an annual and peak basis are available in all scenarios despite uncertainty on the source.
- Heat is responsible for around 1/3rd of GB's greenhouse gas emissions.
- This is changing with up to 300k heat pumps installed per year by 2020.
- looking at the impact of electrification total demand goes from 320 TWh/year today, to 385 in Gone green by 2030

Managing Demand

Supply is only half the story and long gone are the days of predicting demand solely based on the viewing habits of the nation. Smarter networks and devices are changing the relationship between energy consumers and suppliers and the challenge now is to exploit the opportunities to radically evolve our energy system, by changing the way we demand and consume

As our world gets smarter and choice increases this relationship will inevitably change, but maybe not the way policy makers believe.....a recent study suggested that US consumers thought about energy for just 8 minutes every year – usually at the point they paid their bill

We do not need to build an ever larger system just to meet the rare peaks of energy demand. We need flexible and agile networks and the ability to flex consumption.

Last summer, National Grid launched a campaign called Power Responsive, in an effort to collaborate with industry to find a better way to encourage smarter consumption of energy. Around 550 organisations have signed up so far but history is not our friend here.

For those of a certain age, the lowering of energy demand to match energy supply invokes the energy crises of the early 1970s and the three-day week. Demand Side Response (DSR) - better described as demand side flexibility - has a vital role to play in the energy evolution. Even at today's small scale of 1570 MW of reserve & response it is already reducing costs across the energy supply chain and security of supply is improved.

For example, National Grid is working with the NHS on DSR.

By being available and for providing electricity, Colchester Hospital earns revenue each year

Another example is Marriott who have signed up 29 of their UK hotels for DSR services where the business is paid to turn down its chillers for air conditioning and fridges at times of high demand.

The future energy or electric system will be so much more flexible than today

I've touched on many of the challenges for the energy industry.....oil and gas face huge cost issues, utilities face technology and policy issues, renewables are losing subsidies

But one of the biggest challenges facing the entire industry and businesses today is that of **trust.**

The 2016 Edleman survey showed there is a widening trust gap between the informed public and the mass population. The 9-point gap that exists today is not a developed vs. developing country issue. It's not an east vs. west issue. This exists across a mix of economies and it is double-digital in several countries such as the United States, India, Mexico, Australia, Brazil and Singapore

Industry needs to prioritize the mass population and in 21 countries energy companies are more trusted than governments hence there is a clear opportunity for business, particularly energy companies, to solve problems when government can't. They need to take the lead, engage and position themselves as drivers of prosperity, pioneers of innovation and creators of jobs.

So what are the building blocks of trust?

In 2014 I was proud to accept the BITC Responsible Business of the Year Award on behalf of National Grid. This was recognition that as a company we understood that we don't just operate as a business in society, we are part of society; impacted by the societal issues and challenges as any other member. This feels very different to the relationship between business and society when I started in the

How we go about this in a responsible way that delivers enduring value to customers, investors, employees and wider society is a critical consideration.

This is way beyond the days of ticking CSR boxes and is a very different mindset for the leadership of the future. Another key challenge ensuring the attraction of the very best talent!

Concluding remarks

It's an exciting time to be part of the energy industry, with new challenges and opportunities for all.

The roles of government policy and regulation will be critical if we are to bring this revolution to the right conclusion.

In the UK RIIO is a real success. Network businesses are, quite rightly, now rewarded as much for the value and service we deliver to customers as opposed to just the ability to manage an asset base. Going forward we need a policy backdrop that delivers…

- Stability of approach
- Transparency
- Focus on what matters and not principles for principles sake
- Flexible
- 80/20 decisions

Industry needs to be quicker and agility is key. Sitting back and waiting for the certainly to evolve is not an option.

This is all about leadership and for the UK this is a major opportunity. We need to step up and be brave .

We must lead.

Thank you.

Steve Holliday

Former Chief Executive Officer National Grid