

Sustainable Energy Futures Annual Conference 2015

Energy Development Policy



#SEFAC15

energy futures lab

Energy Policy Development

Group 1

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What are the
opportunities for
energy policy
improvement?

POLICY LEVELS



INTERNATIONAL POLICY

**Geopolitics of Oil and Gas
Energy Security**



NATIONAL POLICY

**Energy Planning in Morocco
UK and Shale Gas**



REGIONAL POLICY

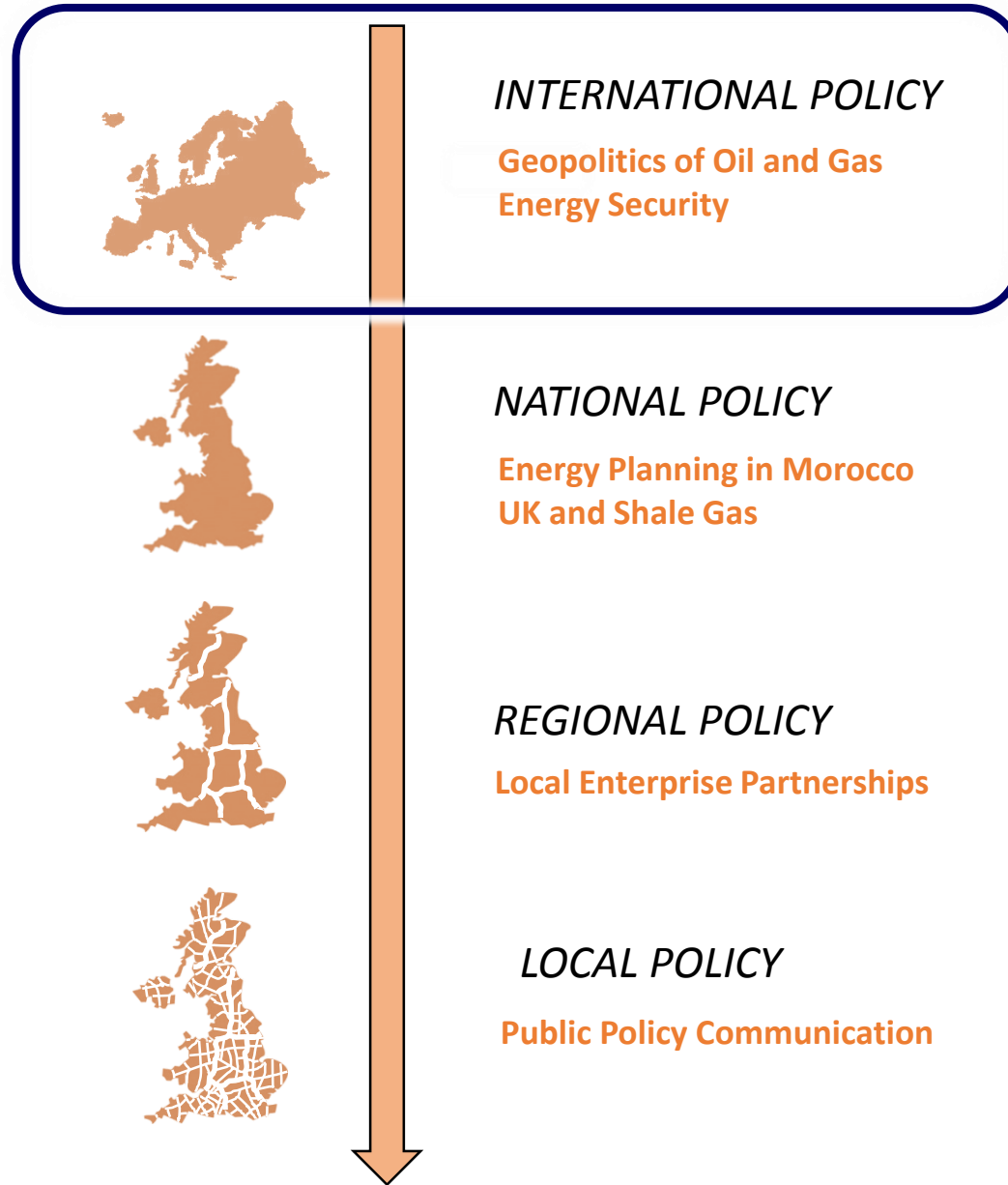
Local Enterprise Partnerships



LOCAL POLICY

Public Policy Communication

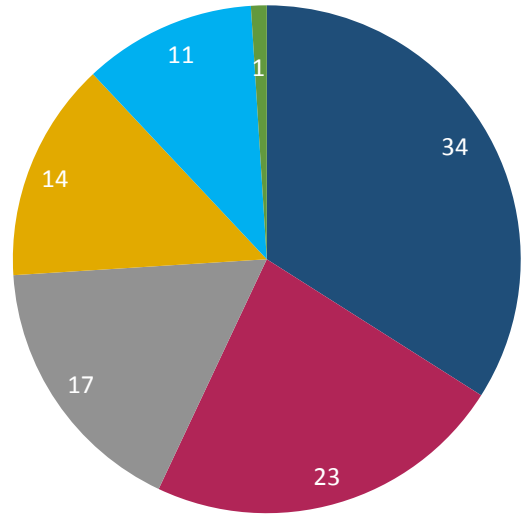




Europe's gas supply: dry gas stays important

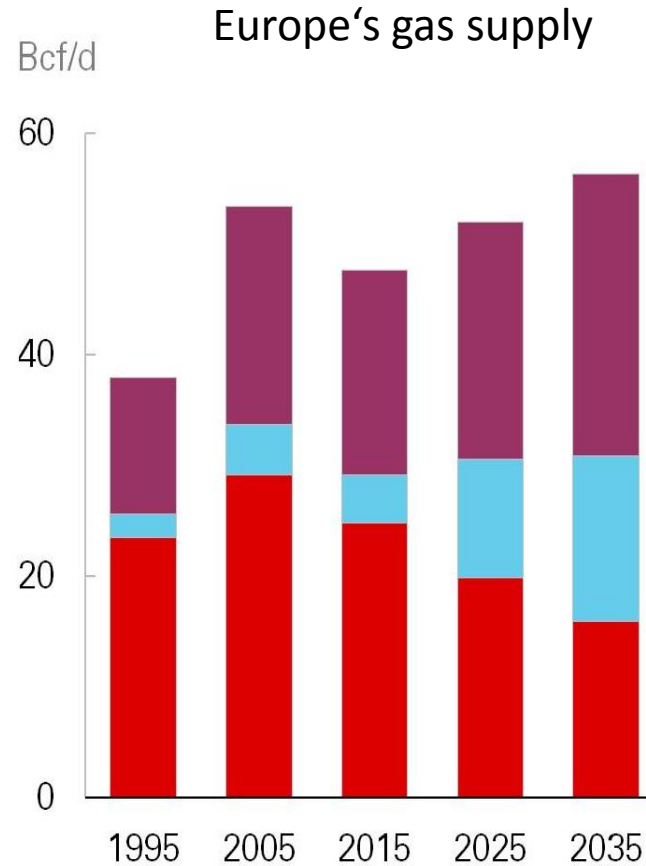


EU-28 Energy Mix [%] Primary Energy Consumption



- Petroleum and Products
- Gas
- Solid Fuels
- Nuclear Heat
- Renewables

Eurostat, May 2014



- Net pipeline imports
- Net LNG imports
- Production

BP, Energy Outlook 2035

Europe increasingly dependent on gas imports

Russia biggest exporter of natural gas

Pipelines are negotiated by the 'strong'

Pipeline alternatives



Transit disputes

- Ukraine: 2006, 2008, 2009
- Belarus: 2004, 2010
- Moldova: 2006

→ Transit avoidance

Legislation fails



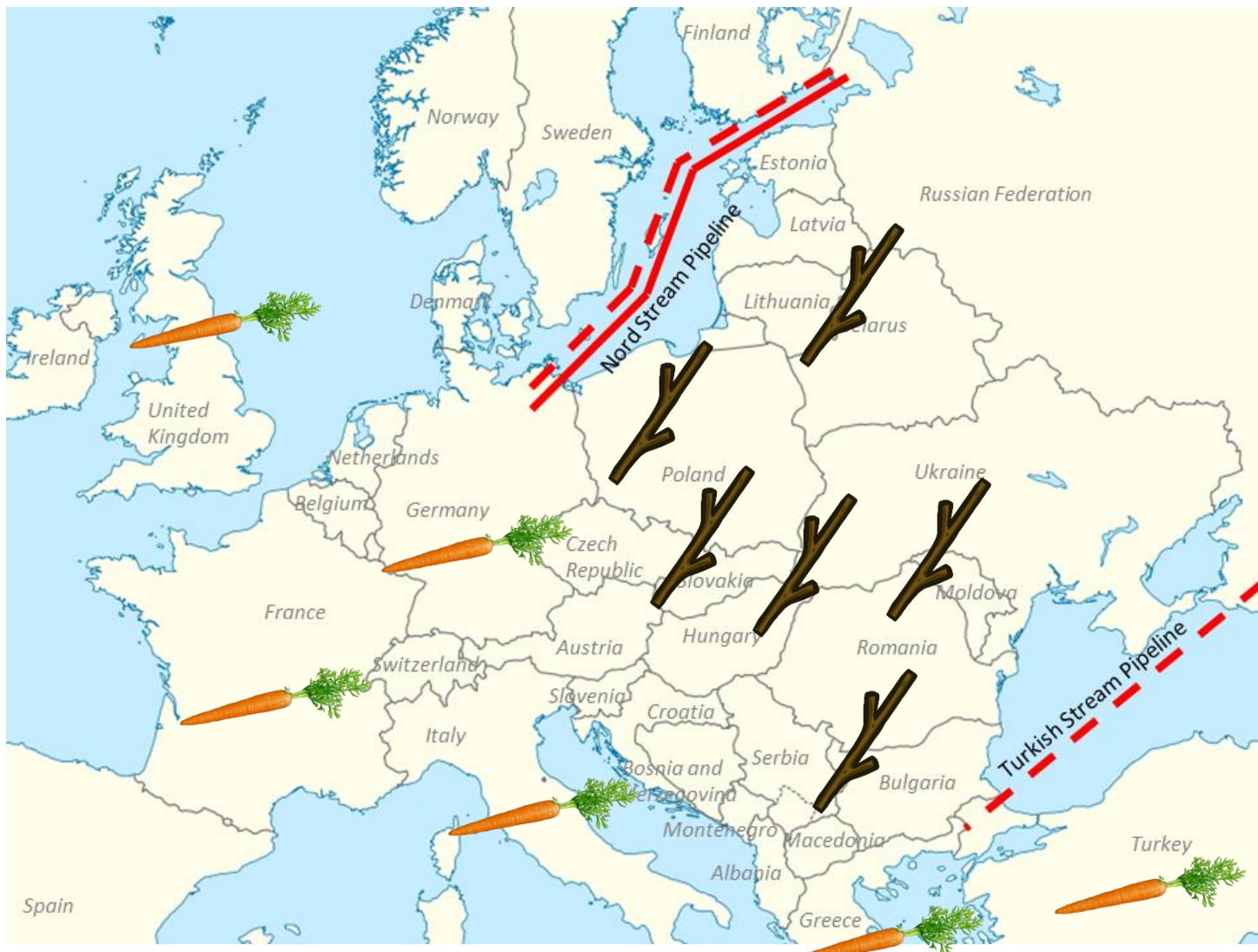
Some **major energy exporters** did **not** sign the Energy Charter Treaty
→ Russia, Nigeria, Venezuela

Even when signed, the treaty was often **not applied**
→ Ukraine hinders gas transit in 2009, no dispute settlement, no criticism

European Commission uses legislation as **political and bargaining tool**
→ Gazprom can only use 2/3 of the Nord Stream Pipeline (Third Party Access)

Lack of trust leads to **inefficiencies** and **overcapacities** in the gas market

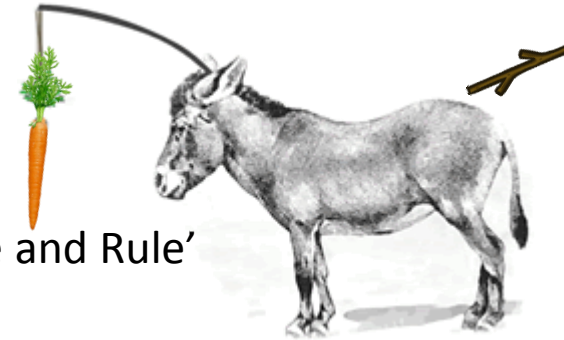
Transit avoidance pipelines: unnecessary and problematic



High investment costs
Loss in transit revenues
Higher end customer prices



Environmental impacts



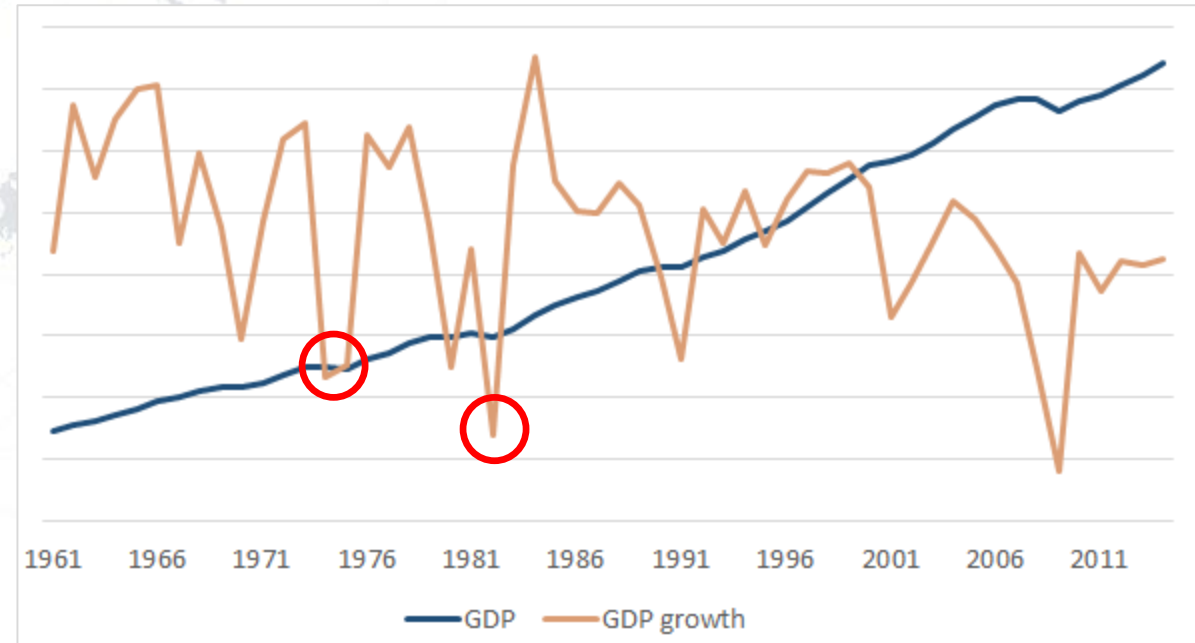
'Divide and Rule'

The importance of energy security

Why energy security?

- Economic development and the demand for energy are inextricable
- Every national economy is exposed to **physical and economic** risks associated with energy supply
- Therefore energy security is of critical importance in the formation of national energy policies

Energy crisis, 1973 and 1979



Supply disruptions, price shocks

Equilibrium of economy is altered

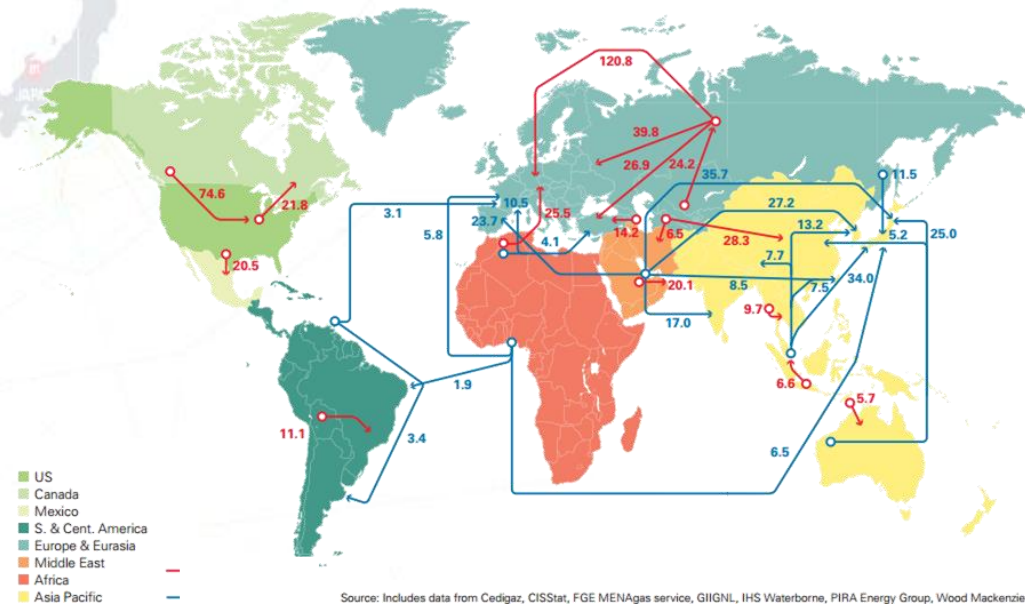
Economy experiences economic loss

Negative impacts

Existing methods are inadequate for the assessment of energy security in the region

Unique state of economic development

Increasingly integrated global economy



Source: Includes data from Cedigaz, CISStat, FGE MENAgas service, GIGNL, IHS Waterborne, PIRA Energy Group, Wood Mackenzie.

→ LNG → Pipeline gas

The development of a methodology

Address limitations of existing methods

- Devise a regional approach in order to provide **critical comparative analysis**
- Determine a universal, but flexible, concept for national energy security and apply a systems of systems approach to allow for an **equitable assessment**
- The systems of systems approach is based on the aggregation of **indicators** for national energy security





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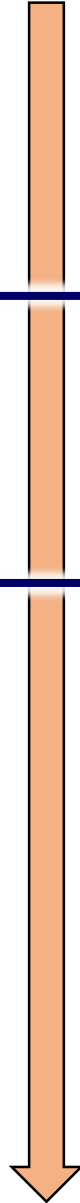
REGIONAL POLICY

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But really...

CO₂ emissions!!!

A case study of energy policy that does not meet national needs

SUSTAINABILITY IN MOROCCO = ???



Coal and CSP key to energy strategy but potentially poor choices

Performance index:

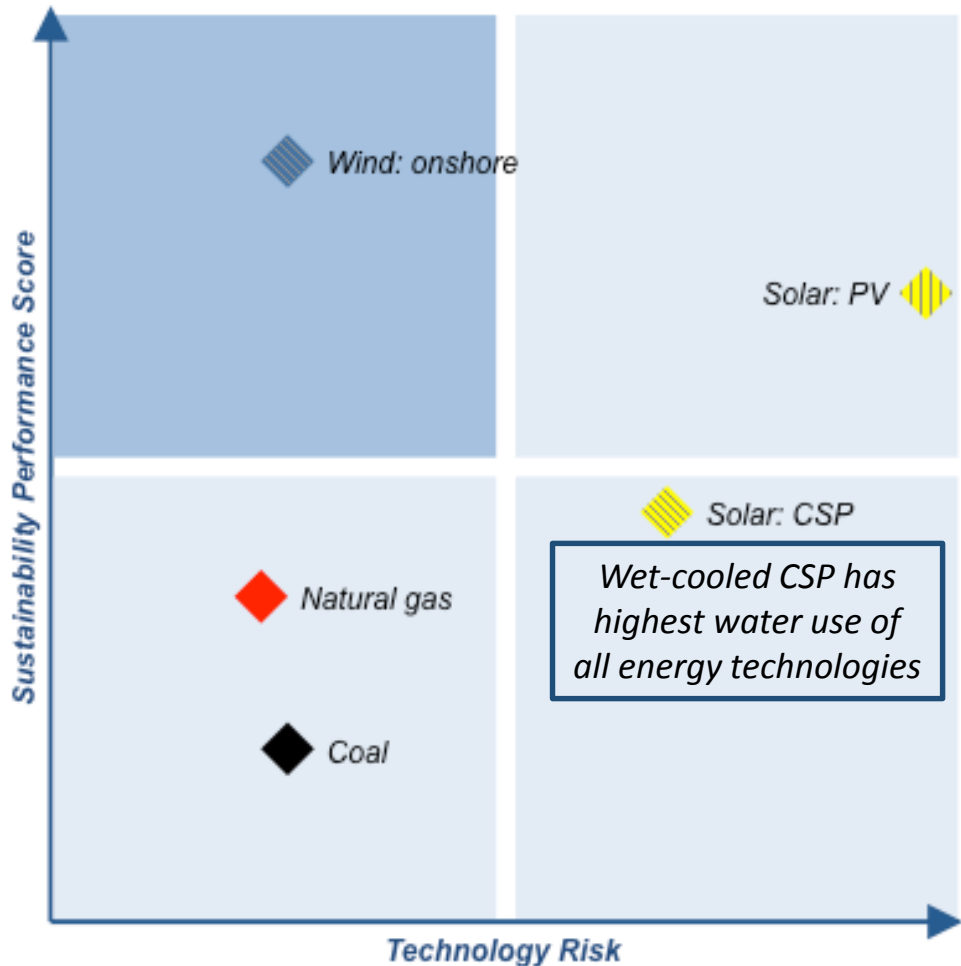
Generation technology	Sustainability Performance Indicators (SPIs)						
	LCOE [\$ /MWh]	Fuel Cost [\$ /toe]	Availability Factor [%]	Economic Value Add (Domestic)**	Associated Employment [#FTE years/GWh]	Water Use [m3/TJe]	Carbon Footprint [tCO2eq/GWh]
Solar: CSP	128-146 (Richts 2012)	0	24.3-36 (Richts 2012; Galeazzi & Bourg 2009)	2	0.23* (Lucas & Ferroukhi 2011)	118-2180* (Mekonnen et al. 2015)	8.8-63* (Schlömer et al. 2014)
Solar: PV	96-103 (Richts 2012)	0	19.6-26 (Richts 2012)	3	0.87* (Lucas & Ferroukhi 2011)	6.4-303* (Mekonnen et al. 2015)	18-180* (Schlömer et al. 2014)
Wind: onshore	52-65 (Galeazzi & Bourg 2009)	0	29-35 (Salvatore et al. 2013; Galeazzi & Bourg 2009)	7	0.18* (Lucas & Ferroukhi 2011)	0.2-12* (Mekonnen et al. 2015)	7-56* (Schlömer et al. 2014)
Wind: offshore	147-367* (Salvatore et al. 2013)	0	32-42* (Salvatore et al. 2013)	8	0.18* (Lucas & Ferroukhi 2011)	0.2-12* (Mekonnen et al. 2015)	8-35* (Schlömer et al. 2014)
Hydropower	50 (Galeazzi & Bourg 2009)	0	5-50 (Galeazzi & Bourg 2009; ONEE 2013)	1	0.27* (Lucas & Ferroukhi 2011)	0.3-850* (Mekonnen et al. 2015)	1-2200* (Schlömer et al. 2014)
Coal	45-61 (Galeazzi & Bourg 2009)	122-184 (Galeazzi & Bourg 2009)	85 (Galeazzi & Bourg 2009)	4	0.11* (Lucas & Ferroukhi 2011)	79-2100* (Mekonnen et al. 2015)	740-910* (Schlömer et al. 2014)
Oil	80-100* (Hadian 2013)	317-502 (Galeazzi & Bourg 2009)	85 (Galeazzi & Bourg 2009)	4	0.11* (Lucas & Ferroukhi 2011)	214-1190* (Mekonnen et al. 2015)	657-866* (World Energy Council 2004)
Natural gas	58-90 (Galeazzi & Bourg 2009)	317-529 (Galeazzi & Bourg 2009)	85 (Galeazzi & Bourg 2009)	4	0.11* (Lucas & Ferroukhi 2011)	76-1240* (Mekonnen et al. 2015)	410-650* (Schlömer et al. 2014)
Nuclear	91-147* (Salvatore et al. 2013)	15.4 (Galeazzi & Bourg 2009)	85-92 (Salvatore et al. 2013; Galeazzi & Bourg 2009)	9	0.16* (Lucas & Ferroukhi 2011)	18-1450* (Mekonnen et al. 2015)	3.7-110* (Schlömer et al. 2014)

*not Morocco specific ** Qualitative indicator derived from technology value chains



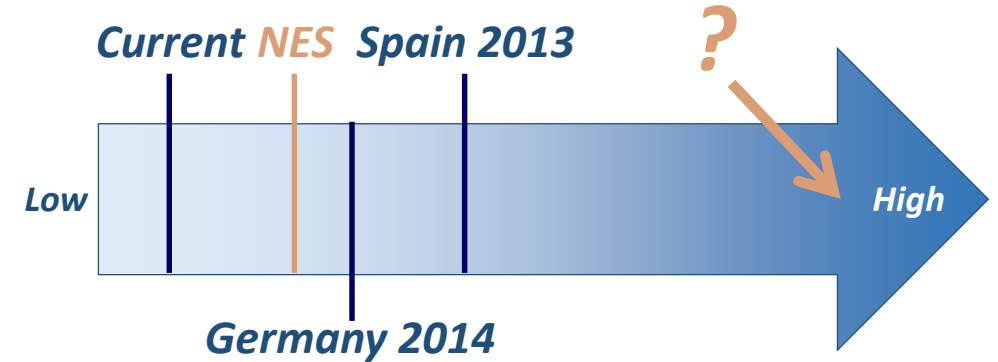
Success of energy policy should be measurable → portfolio analysis!

TECHNOLOGIES – SUSTAINABILITY VS. RISK



Technologies have ranges of performance for every indicator which introduces technology risk in stochastic decision-making

PORTFOLIO SUSTAINABILITY



PORTFOLIO ANALYSIS OFFERS POLICY INSIGHTS

- Formulate **concrete policy goals** for water use, economic growth, and domestic employment associated with the electricity sector
- **Restrict concentrated solar power** projects to using dry-cooling technologies and consider photovoltaic projects
- Build **natural gas** power plants **instead of coal**-fired plants

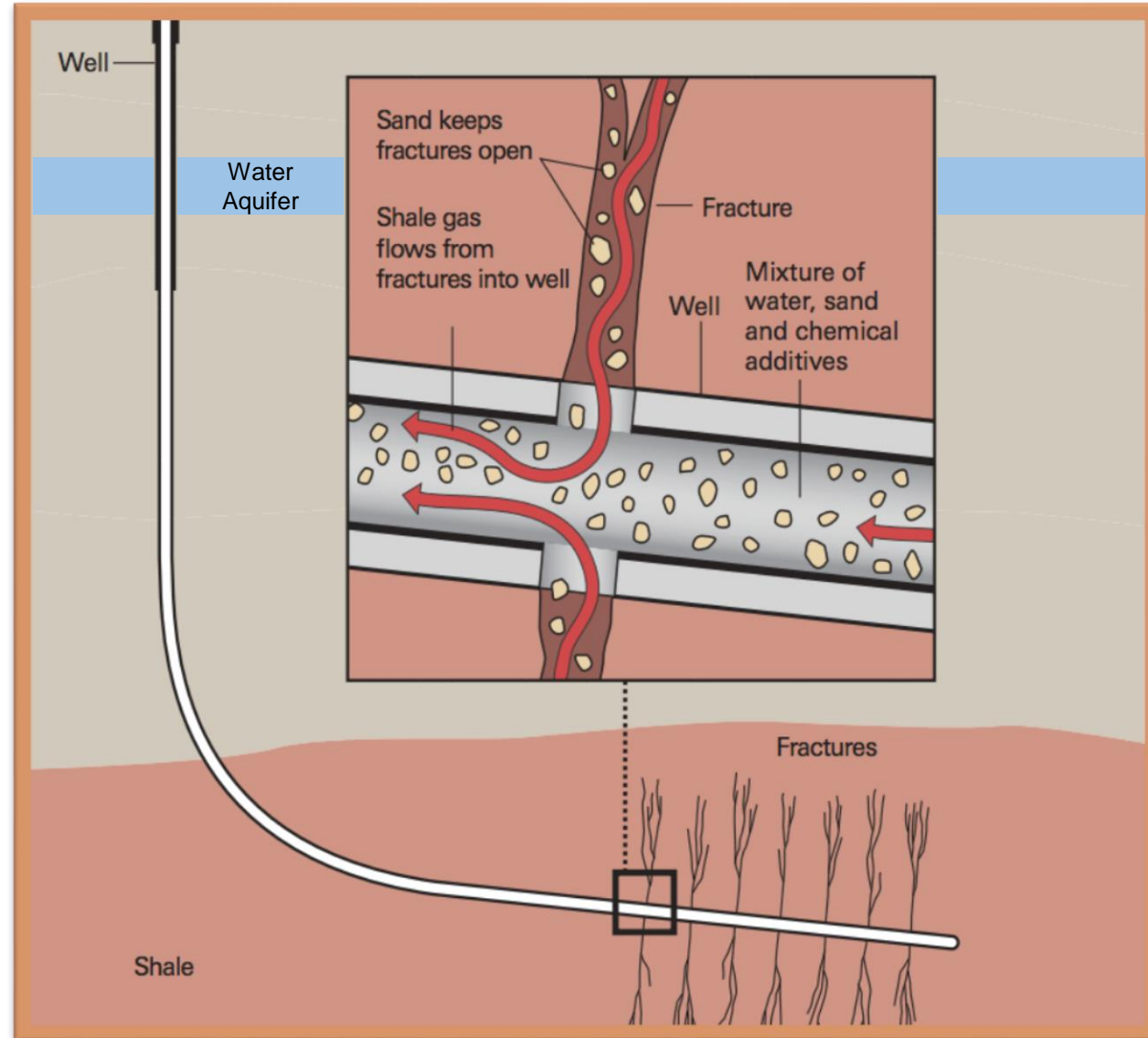
The Shale Gas Resource

Natural Gas

- Domestic cooking
- Residential and Industry Heating
- Base-load power generation



Hydraulic fracturing



Fracking Opposition



POLLUTES THE GROUND WATER

CAUSES EARTHQUAKES



STRAINS THE LOCAL INFRASTRUCTURE



INTERFERES WITH LOCAL RESIDENTS WITH NOISE AND POLLUTION



National Interest

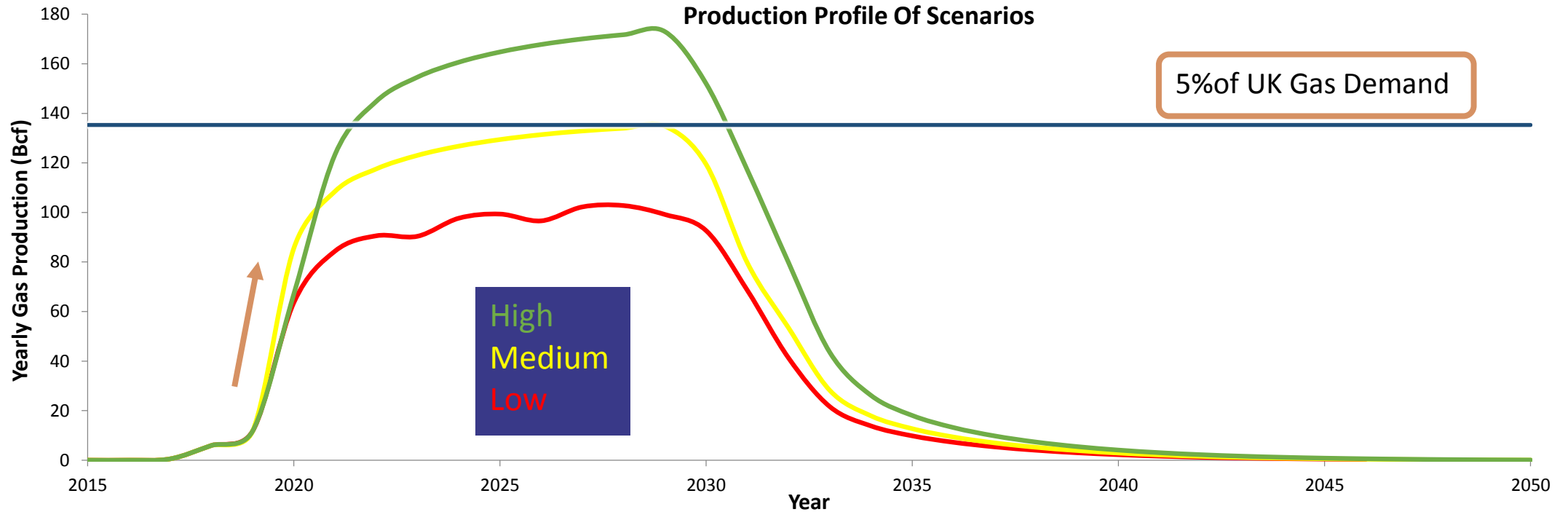


Frack yea

UK National Energy Policy

- Tackle climate change ?
- Ensure Customer Affordability
- Support Growth ?
- Guarantee Fairness
- Energy Security

Looking forward efficiently



Main National Policy Implication

1. Streamline the licencing process
2. Strategic oversight for the development
3. Encourage transparency in industry



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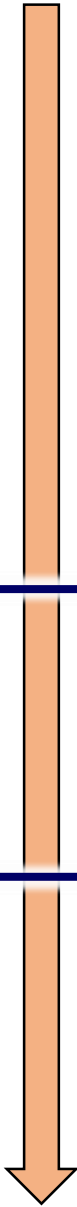
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The Driver: Economic Decentralisation

Need to **rebalance** the UK economy both **sectorally** and **spatially**

Devolution: high on the political agenda

Local authorities

LEPs

Businesses

Central government

Planning



Policing



Powers







Transport



Housing

Local areas

Policy gaps and Pitfalls



The UK needs to **rapidly decarbonise** its energy system but the **role of local entities** has **not** yet been **defined**

Poor alignment between **national** low carbon agendas & **local** low carbon strategic plans

Local authorities have faced **deep budget cuts (37%)** since 2010



Lack of statutory requirement on local authorities to reduce emissions



Abolition of Regional Development Agencies



Excessively centralised energy policy







Frequent changes in national energy policy




Absence of a strategic energy body providing guidance to local actors

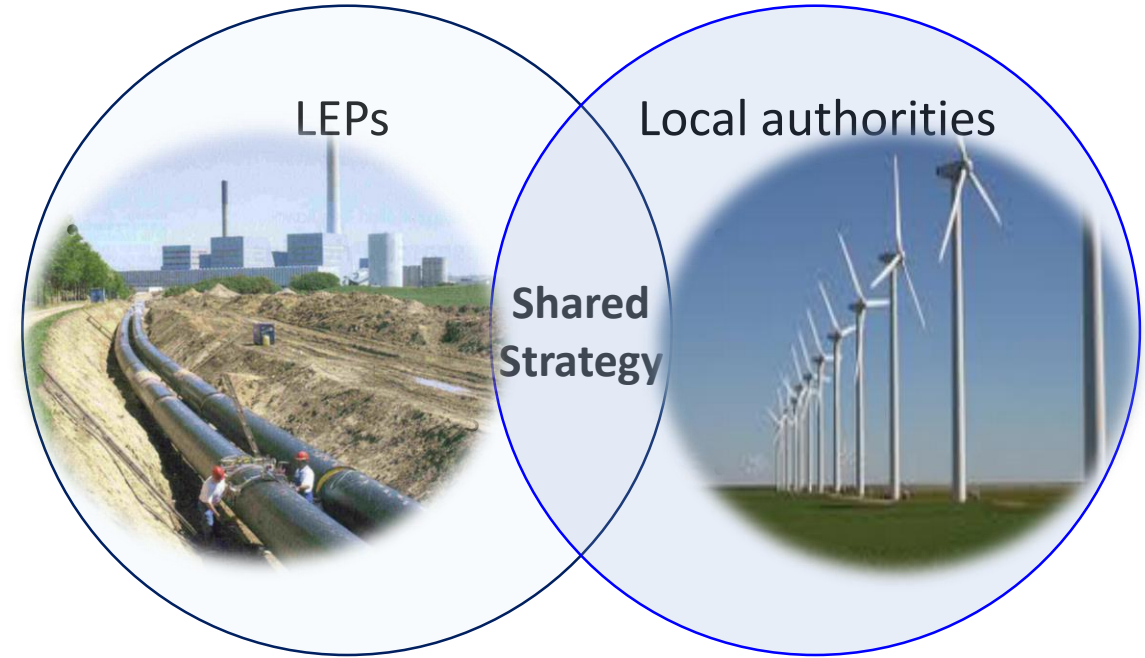
Key Messages







Joint approach between LEPs and local authorities:
Each of the two bodies leading with their strengths



National policy **critical** for the future development of LEPs



-  Effectively **integrate** decarbonisation into devolution
-  Make clear that the **focus** of LEPs is **not** purely **economic**
-  Make additional **funds** available for low carbon projects
-  **No** more **regulation** is required



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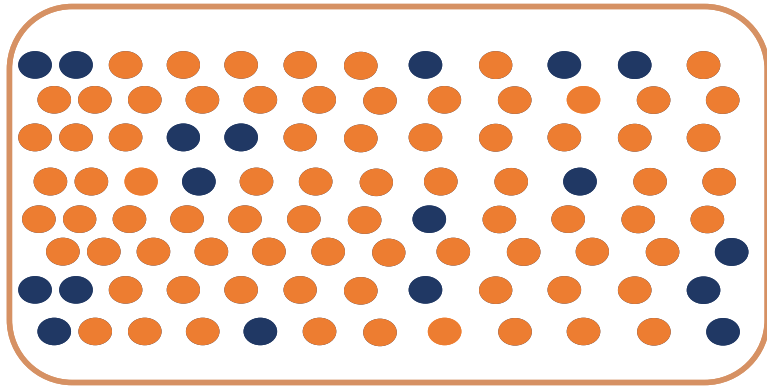


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The climate change disconnect between scientists and the public



97% of scientists say that climate change is happening and that humans are the main influence in the observed warming.

Just **18%** of the UK public are **‘very concerned’** with climate change.

What is the reason for the lack of concern among the public?

Communication plays a part in reinforcing this disconnect and **FRAMES** are important tools in communication.



CLIMATE CHANGE



Local: Policy communication

Climate change framing effects how the public engages with the issue

The collage consists of several panels, each with a label:

- Popular Culture:** A group of people gathered outdoors near a body of water.
- Security:** UN peacekeepers in blue helmets.
- Morality:** Pope Francis speaking.
- Health:** A man wearing a face mask in front of industrial smokestacks.
- Opportunity:** A wide landscape of green fields under a bright sun.
- Political:** Barack Obama speaking at a podium with wind turbines in the background.
- Science:** A polar bear standing on a small piece of melting ice.
- Economic:** Gold coins and a newspaper clipping that says "Prices are going up energy costs".
- Disaster:** A satellite view of a hurricane.



Large framing analysis of UK climate change media coverage

Analysis of **1,257** climate change articles over the past year from **5** major UK newspapers.

theguardian

THE  **TIMES**

Daily  **Mail**

FT FINANCIAL
TIMES

The Daily Telegraph

Example

Headline:

Will YOUR child witness the end of humanity? Mankind will be extinct in 100 years because of climate change, warns expert.

Keywords:

Survival, fate, catastrophic, mass extinction

Frame?

Disaster!

Local: Policy communication

Climate change media framing lacks diversity

This is a problem because...
 These frames **do not** actively engage audiences.
 In using such a **narrow range** of frames, we can't see the **big picture**.

These four frames covered over **90%** of the articles sampled.

Popular Culture

Security

Morality

Health

Opportunity

Political

Science

Economic

Disaster



Local: *Policy communication*

A focus on frames such as '*political*' leads to ineffective policy communication



Local: Policy communication

Multiple frames for multiple audiences

The collage consists of several images with text labels overlaid on them:

- Popular Culture:** A group of people standing outdoors near a body of water.
- Security:** Two UN peacekeepers wearing blue helmets.
- Morality:** A close-up of Pope Francis.
- Health:** A man in a suit wearing a white face mask, with an industrial background.
- Opportunity:** A wide landscape of a green field under a bright, hazy sky.
- Political:** Barack Obama speaking at a podium in front of a wind turbine.
- Science:** A polar bear standing on a small piece of ice in the water.
- Economic:** Gold coins and a newspaper clipping with the text "Prices are 9... energy costs".
- Disaster:** A satellite view of a hurricane.



Poster #1



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**Scenarios for Shale Gas Development
in the UK**

Poster #6



Matthew Ford Gibson **The Role of Media Framing and
Values in the Public Climate
Change Disconnect**

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Thank You!

Poster #2



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**Energy Security in the Asia-Pacific: A
quantitative analysis**

Poster #5



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**Design of sustainable electricity
portfolios for Morocco using a
stochastic MCDM framework**

We Welcome Your Questions

Poster #3



Jenny Cherkasky

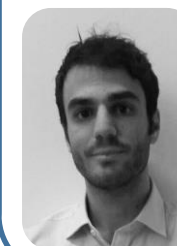
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**The Role of the Energy Hegemony
conceptualisation in providing new
insights on International Relations and
Regional Geopolitics**

Poster #4



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**The role that LEPs may have as
strategic low carbon energy
intermediaries between national &
local government**

Schedule

09:00 - Registration opens

09:30 - Welcome

09:35 - Keynote

10:00 - Energy development policy

10:35 - Wind, tidal and hydro-power

11:05 - Tea and coffee break

11:20 - Market economics

11:55 - Large scale systems

12:30 - Lunch and Poster session

14:30 - Bioenergy

15:05 - Small scale systems

15:35 - Tea and coffee break

15:50 - New technologies

16:20 - Management strategy

16:55 - Closing remarks

17:00 - Drinks reception and poster discussion

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