CHATHAM HOUSE

www.chathamhouse.org.uk

Assessing practical energy intensity targets for GCC Countries

01 May 2012
Dubai

Felix Preston
Will Blyth

Energy, Environment and Resource Governance
Chatham House – Royal Institute of International Affairs

With an energy intensity approach, the focus is on decoupling economic growth from domestic energy consumption

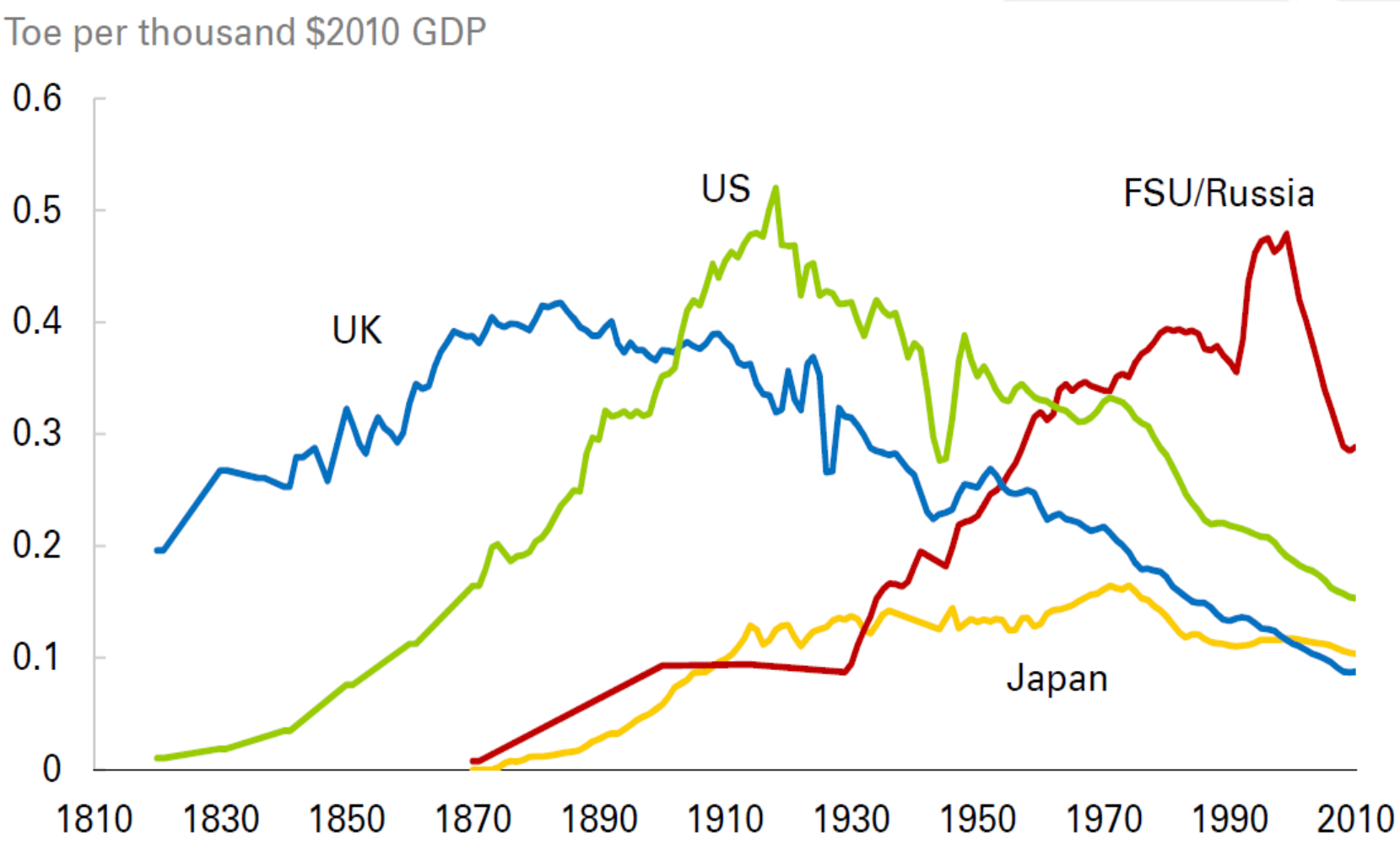
$$\text{Energy intensity} = \frac{\text{Energy demand}}{\text{Economic output}}$$

Aim is to decouple economic growth from energy consumption, not to slow development

Energy Intensity (EI) is affected by changes in both energy demand and GDP which adds policy uncertainty but…

…An EI approach is suitable for phases of industrial development and demographic change

Energy intensity is traditionally understood as a bell shaped curve, reflecting development phases



Source: BP

The shape of the curve tomorrow is strongly influenced by policy and investment choices today

- Japan in particular showed that policy choices, technology developments and consumer preferences can have a strong impact on the shape of the curve – could EI be used as a framework by others?
- Countries that are industrialising today are able to learn from the experience of others – new technologies, practices, policies – this means faster rates of EI improvement should be possible.
- Long lifespans of infrastructure, buildings and industrial technologies mean that choices today will have an impact on the shape of the curve for decades to come – especially true of countries in the process of rapid urbanisation, industrialisation and with growing populations.

Energy and carbon intensity is an increasingly popular policy framework

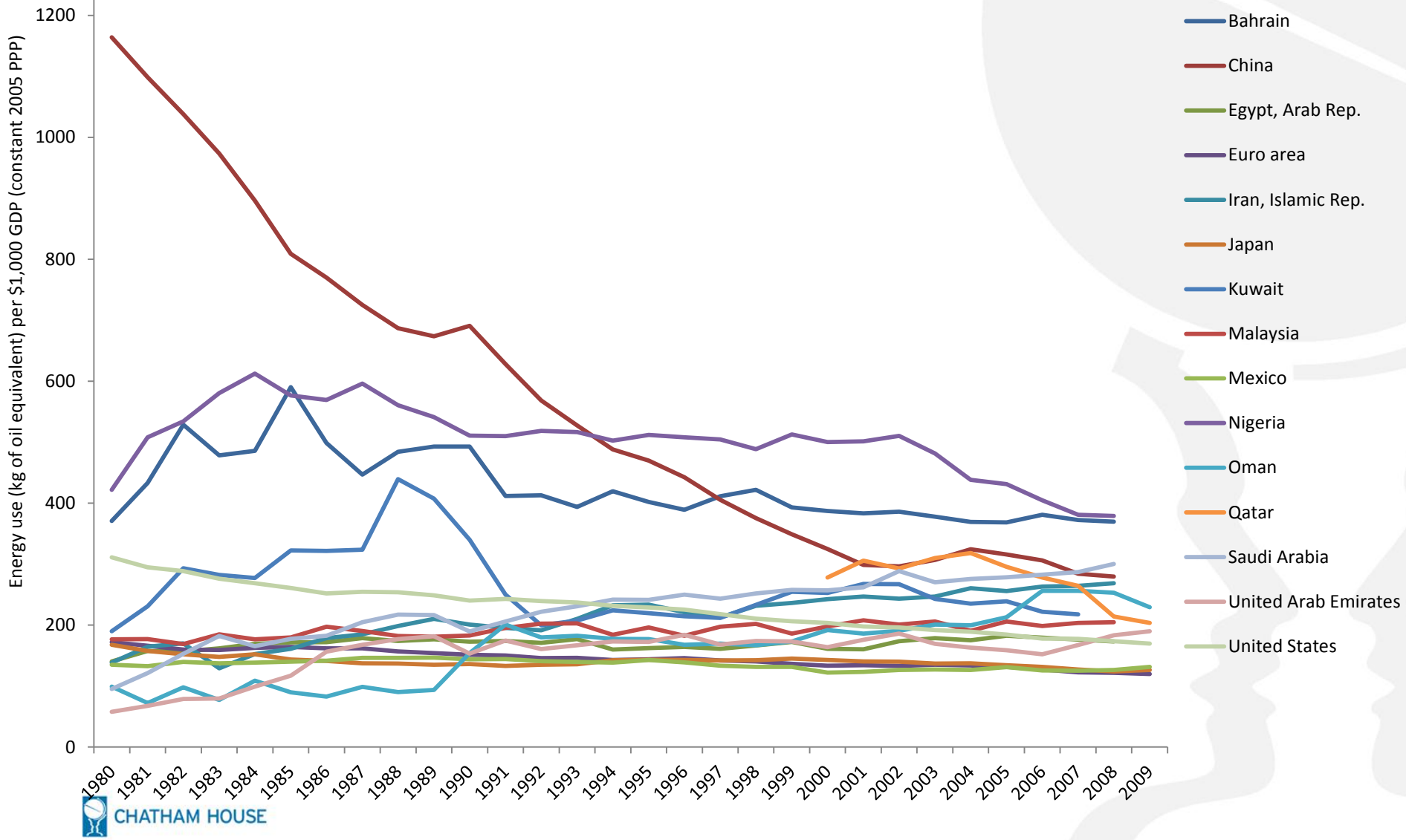
Countries

- China (40-45% CI by 2020 – 2005 baseline)
- India (20-25% CI by 2025 – 2005 baseline)
- Brazil (36.1 – 38.9% CI by 2020 – ref scenario baseline)
- South Africa (12% CI by 2015 – reference scenario baseline)
- Sweden (20% EI reduction by 2020 – 2008 baseline)
- APEC countries (40-50% CI by 2035 – 2005 baseline)

Businesses

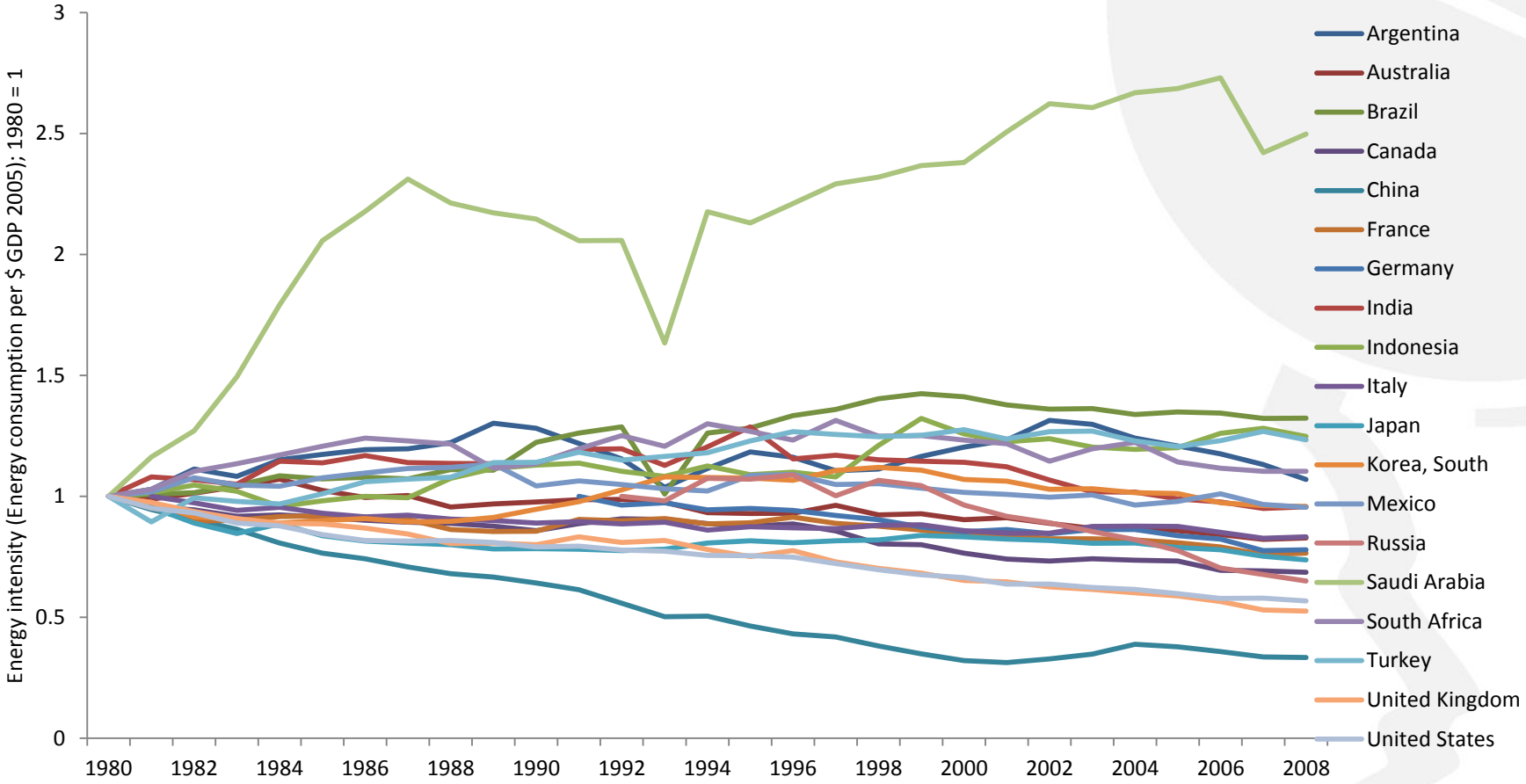
- Anglo American (15% EI by 2014 – 2008 baseline)
- ArcelorMittal achieved a 7.3% reduction in EI across US operations in 2010 versus 2009
- Unilever (manufacturing EI 25% by 2012 (2004 baseline)
- Alcan (10% EI by 2010, 2005 baseline)
- BT group (80% CI by 2020, 1997 baseline)
- 32 firms in US agreed to improve EI by 25% over ten years in 2009 – e.g. Intel, Volvo Trucks, Dow Chemicals, AT&T

What rate of EI reduction might be considered ambitious? International experience suggests that improvements of 2-3% per year are achievable, especially during a phase of industrial upgrading



CHATHAM HOUSE

Long-run averages tend towards 1.5 – 2% in developed countries - but opportunities for more rapid improvements in short to medium term?



Energy Intensity may be a helpful framework for GCC countries specifically because…

GCC governments already recognise the importance of taking action on energy efficiency

Adopting an EI framework could help…

- Coordinate national action within GCC countries
- Allocate responsibility among key agencies, regions
- Learn from experience of neighbouring countries with some similarities but of course also differences (a common approach but with differentiated targets)
- Communicate actions being taken by GCC countries on energy efficiency to the rest of the world

Experience shows that a clear EI policy framework could help… Save energy, attract investment, create jobs

BUT the approach might need to be tailored to different GCC countries, especially the major energy exporting countries

An appropriate EI target would be: ambitious enough to make a significant positive impact on domestic energy consumption; feasible to implement; affordable

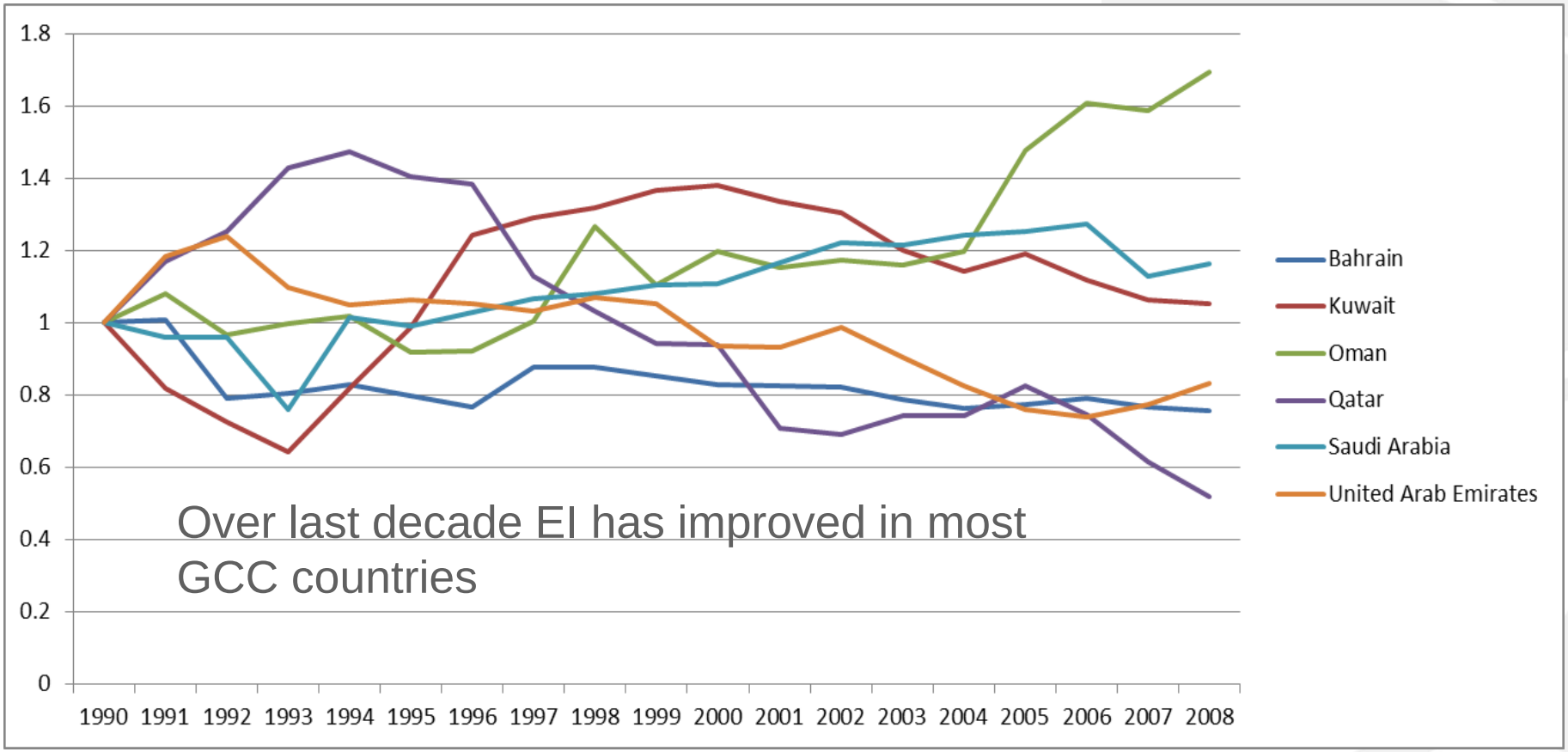
Political context

- Institutional capacities and coordination
- Development situation; resource endowment; economic structure etc
- Willingness of leaders to pursue domestic action and further GCC cooperation

Technical questions have significant impact on the selection of an appropriate EI target

- Use GDP? Adjust for oil price fluctuations? PPP or current prices?
- Use non-oil GDP as the key indicator?
- Exclude feedstock i.e. TPES minus non-energy use?

Varying experience of EI across the GCC (sensitive to choice of baseline year!).



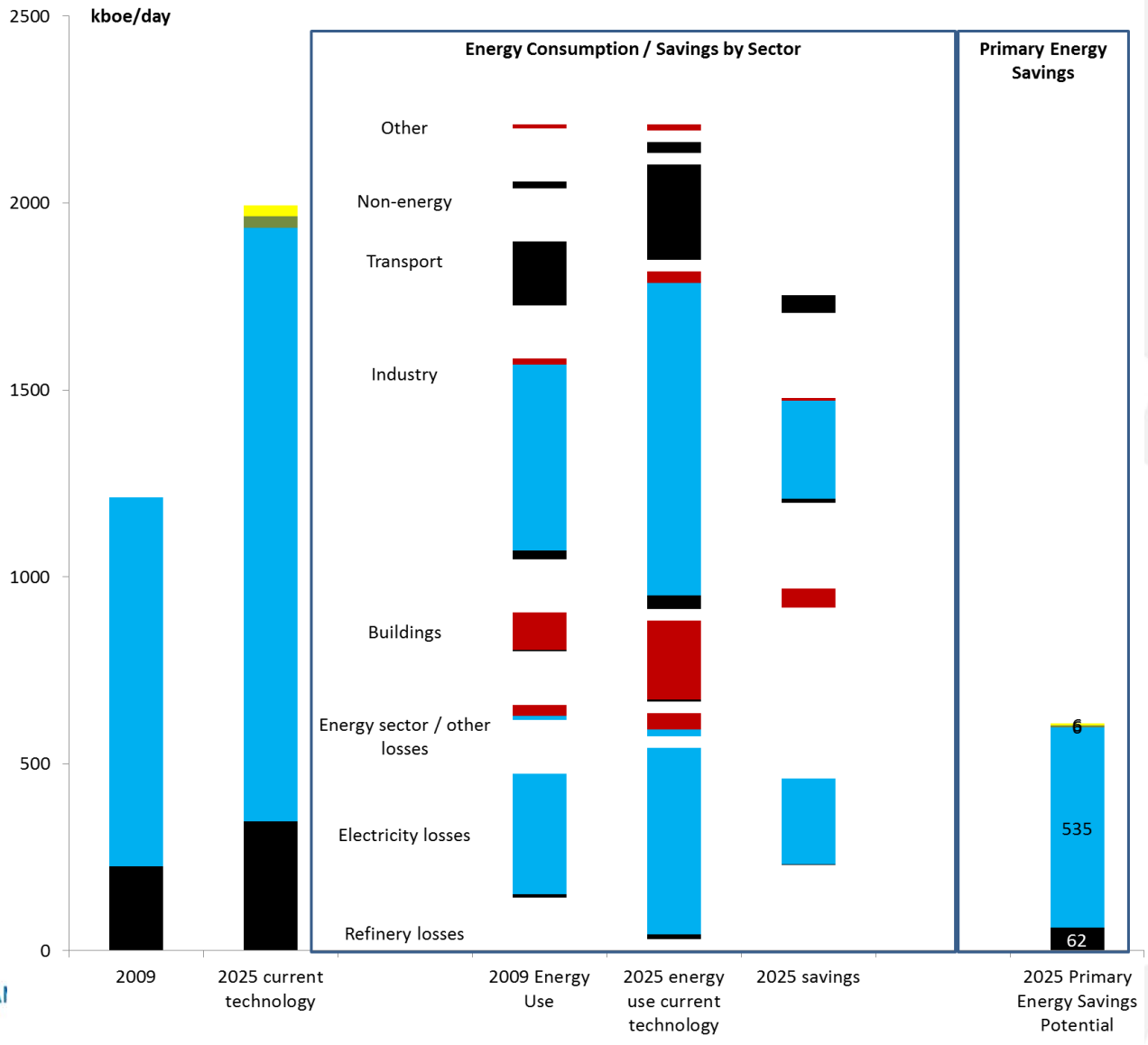
Based on Total Primary Energy Consumption per Dollar of GDP (Btu per Year 2005 U.S. Dollars (Purchasing Power Parities)). Source: US EIA.

1 = 1990

This project has been developing a tool for evaluating EI improvement potential for GCC countries.

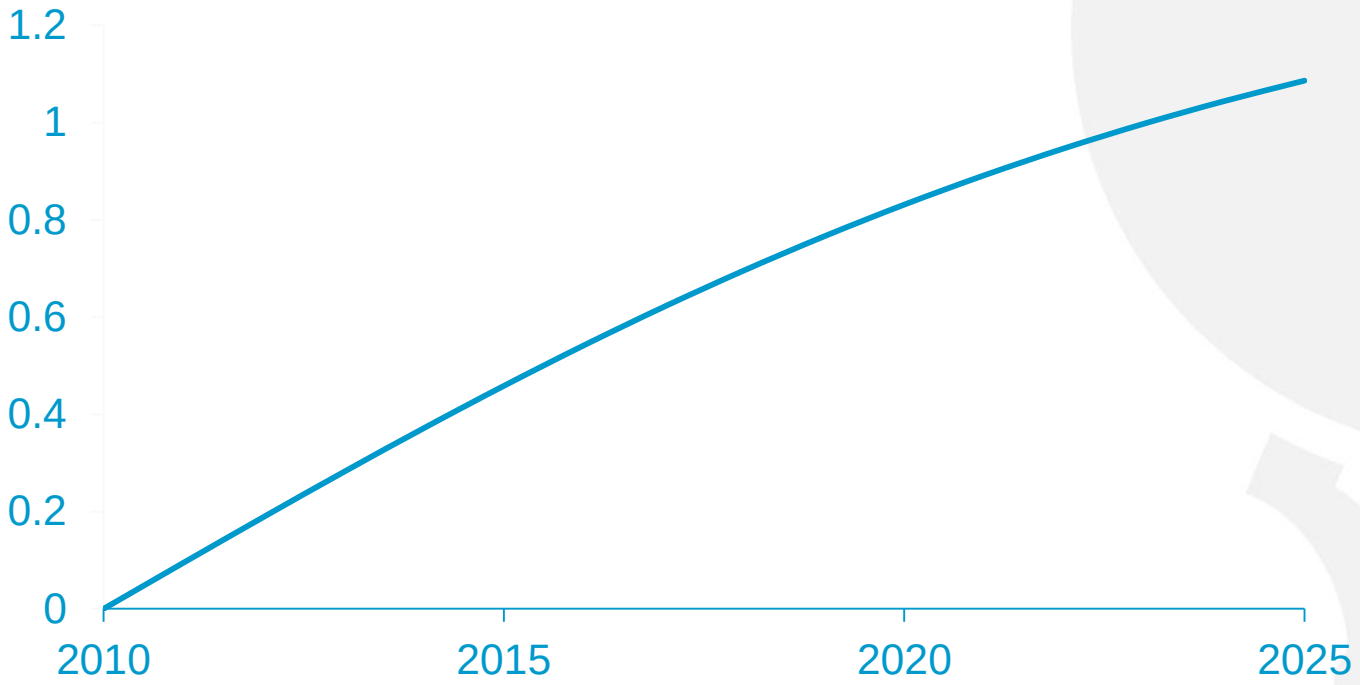
1. Identify key sectors for energy demand (growth) in GCC countries
2. Data collection (international and GCC country efficiency levels in key sectors and rates of EI improvement in selected countries)
3. Comparison: Estimate energy efficiency 'gap' between GCC levels and international standards (now or in future)
4. Translate gap into energy intensity improvement potential (as well as oil consumption avoided and impact on fiscal situation)
5. Identify specific technology options to close gap plus investment, institutional requirements, phasing, lock in *(this is where we are at the moment)*
6. Review potential sources of finance / investment, including carbon markets and climate finance and energy pricing

Using (many!) growth and technical assumptions in key sectors, the tool visualises the energy consumption avoided in 2025



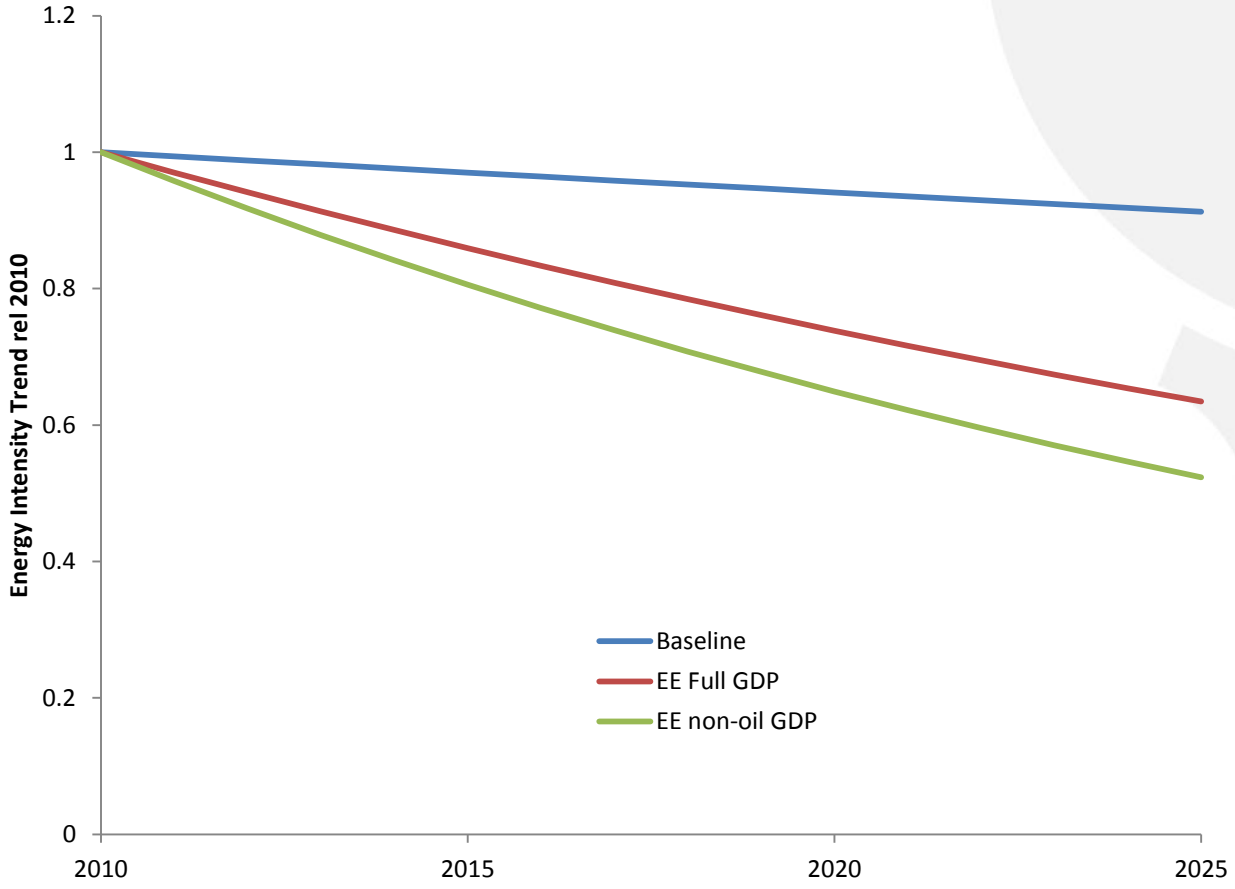
CHATHAI

Calculates annual energy savings out to 2025 (mboe/d)…



2025	
Oil saving potential mboe/d	0.73
Gas saving potential mboe/d	0.39
Total energy savings vs baseline %	21%

And displays the impact on EI. This could also be used to track progress over time.



The tool could be the starting point for countries to identify appropriate targets and prioritise action

No national energy policies that deal with domestic energy use in the GCC - governments recognize this and several country or emirate initiatives are working to establish DSM or energy conservation programmes

Could use tool to:

- Align entities over reporting on baseline data and projections
- Propose practical national energy intensity improvement targets and sectoral conservation or efficiency targets
- Explore potential impact of action in different sectors etc.
- Make comparisons regionally and internationally
- With further work: use the tool to communicate progress

Questions

- Are similar models already being used?
- Would an alternative energy intensity measure be useful for oil-exporters?
- Implications for GCC wide application?

Savings identified in this project are just the tip of the iceberg!

More EI improvements available through…

- Shift in industrial structure towards higher value products / sectors
- Retrofitting of existing buildings and efficiency of commercial buildings
- Waste heat from power plant and industry
- DSM / peak shaving – to address part-load loss in power generation and less efficient peaking plant
- More efficient patterns of urbanisation
- Accelerated shift to public transport
- Behavioural change (e.g. driving less, buying smaller vehicles, cooling houses less, less water use than expected)
- Unexpected technology shifts (e.g. to electric vehicles)
- Savings on the remaining 25% of energy demand
- Smart technology – e.g. building services

All the savings in the calculation are achievable with today's technology