



Oil Export Changes and Their Effects on Oil Producing Countries: A Case Study of Saudi Arabia

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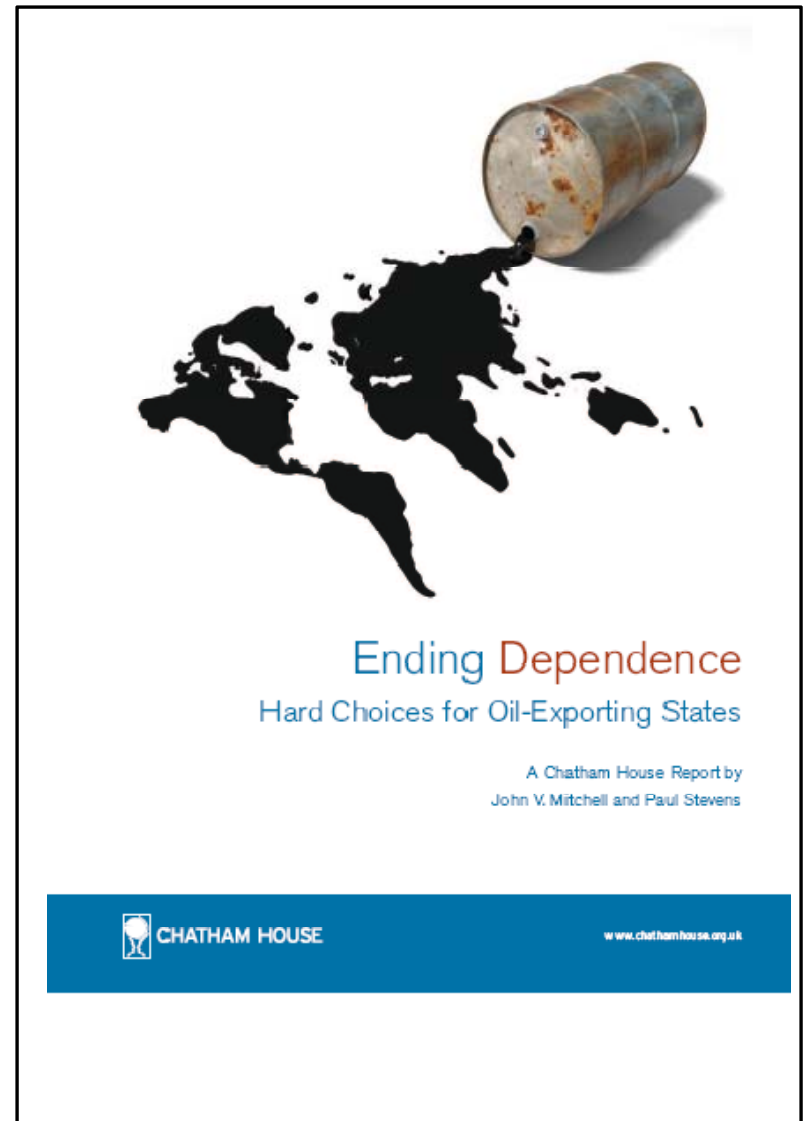
Outline

- The underlying concept – Depletion, Development and Dependence
- Some rough results
- The case of Saudi Arabia –more sophisticated results
- Solutions to the Saudi Arabian problem and their barriers
- Appendix: Assumptions for the Saudi Scenarios

The underlying concept: 'Ending Dependence' project

http://www.chathamhouse.org.uk/files/11844_0708oildependence.pdf

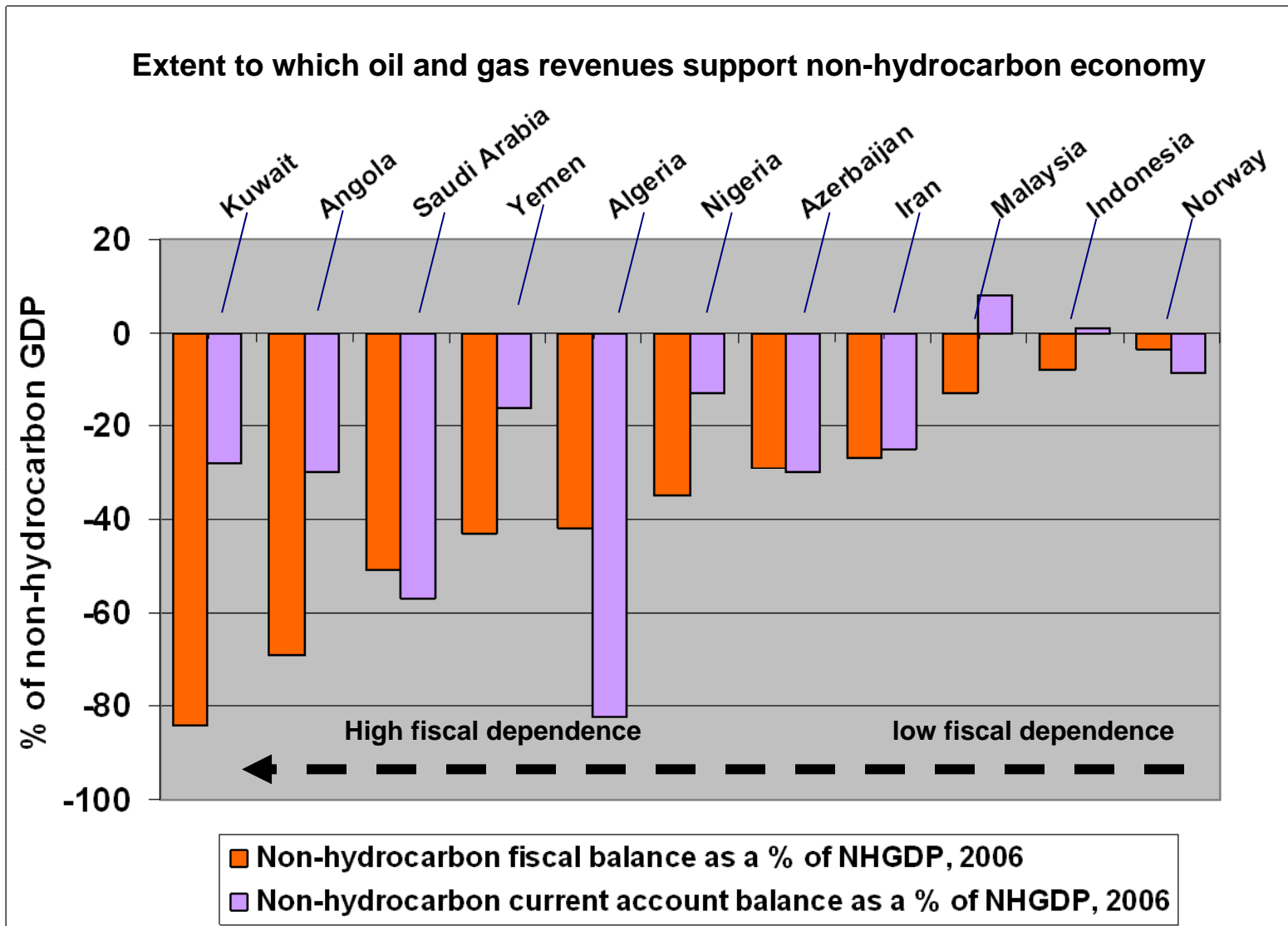
- Study of 12 hydrocarbon-exporting countries:
Indonesia, Malaysia, Norway, Algeria, Nigeria, Angola, Azerbaijan, Kazakhstan, Timor Leste, Iran, Kuwait, Saudi Arabia
- Simulations of depletion and effect on the economy of “business as usual” assumptions
- Workshops with ministry and national oil company representatives on ability of countries to manage the transition to lower dependence



The underlying concept and the challenge facing oil-exporters

- **The key point for government as “owner” of the oil,**
Oil revenue is not income
It is simply reshuffling the country’s asset portfolio
- Sustainability means using the revenue to replace the “lost” element of the asset portfolio (oil and gas) with alternative assets (development)
- Dependence = the extent to which spending in the non-hydrocarbon economy must be covered by hydrocarbon revenues
 - Non hydrocarbon fiscal deficit
 - Non hydrocarbon current account deficit

A snapshot of oil and gas revenue dependence in selected countries



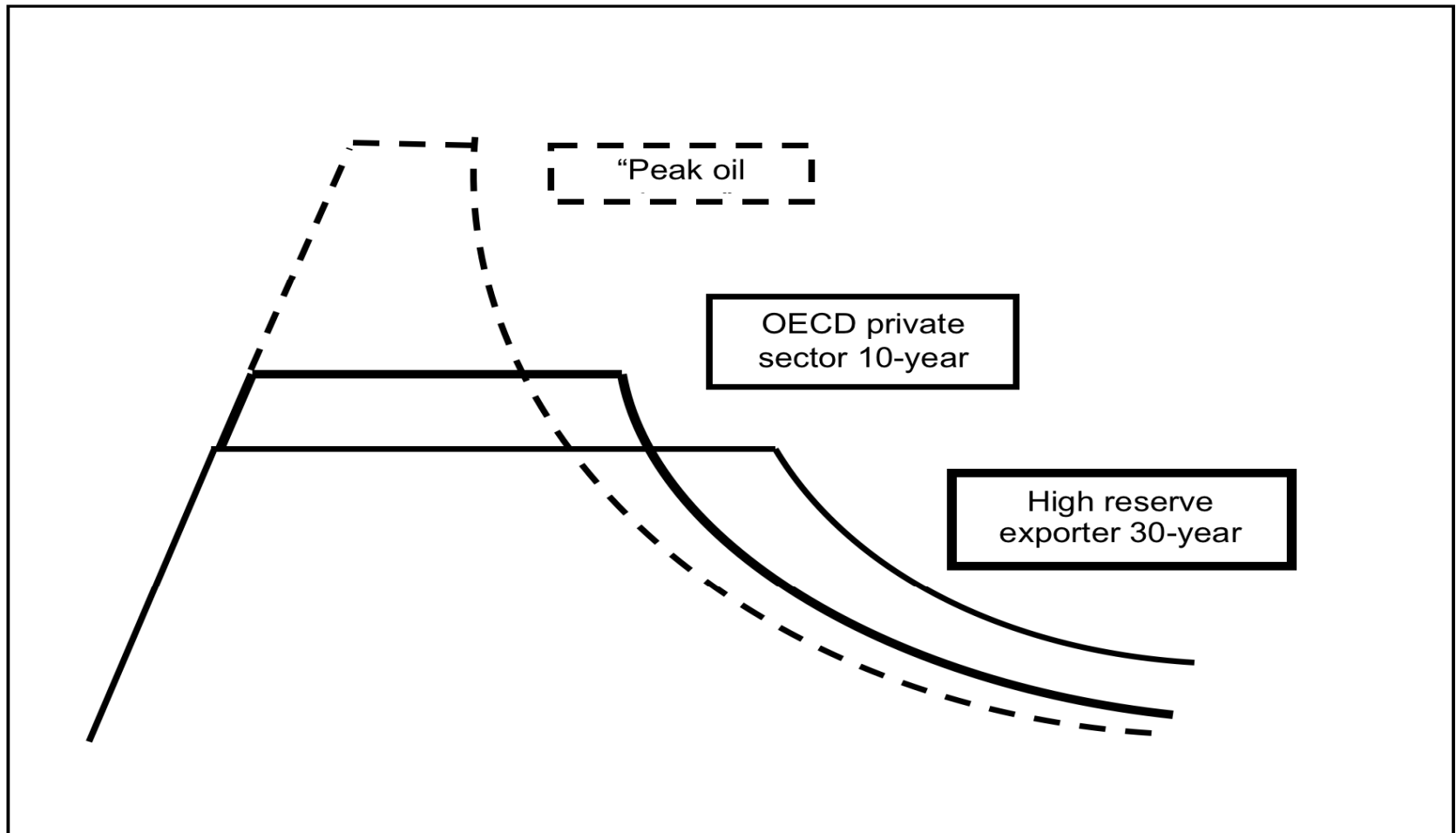
The underlying concept and the challenge facing oil-exporters – domestic energy use

- Rising domestic oil and gas consumption will speed up resource depletion, eventually constraining the amount available for export and thus essential revenues
- There is a race to strengthen other economic sectors (i.e. economic diversification) before oil runs out but there is also a need to **rein in domestic fuel consumption in order to prolong the timeframe for transition**

Outline

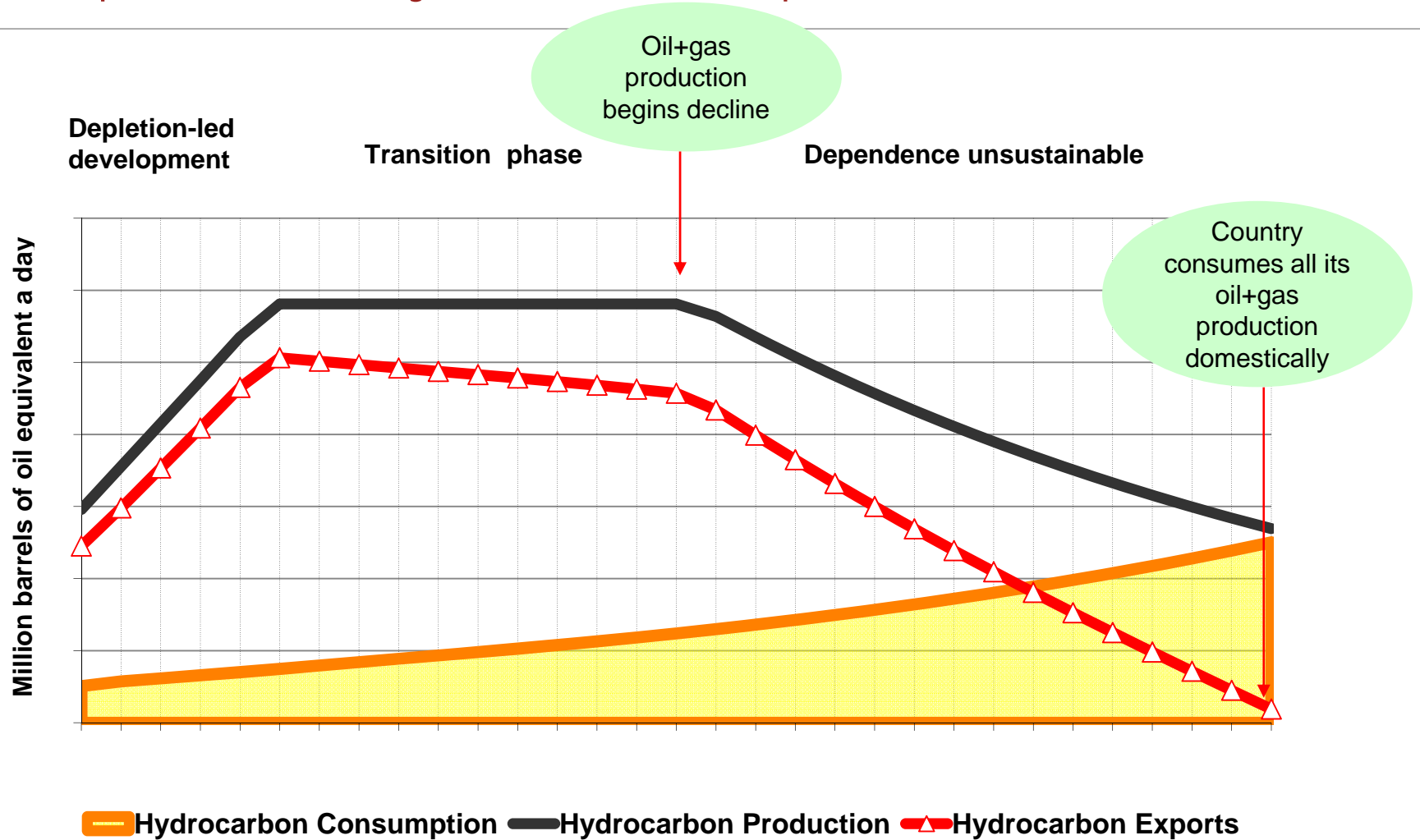
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Production profiles



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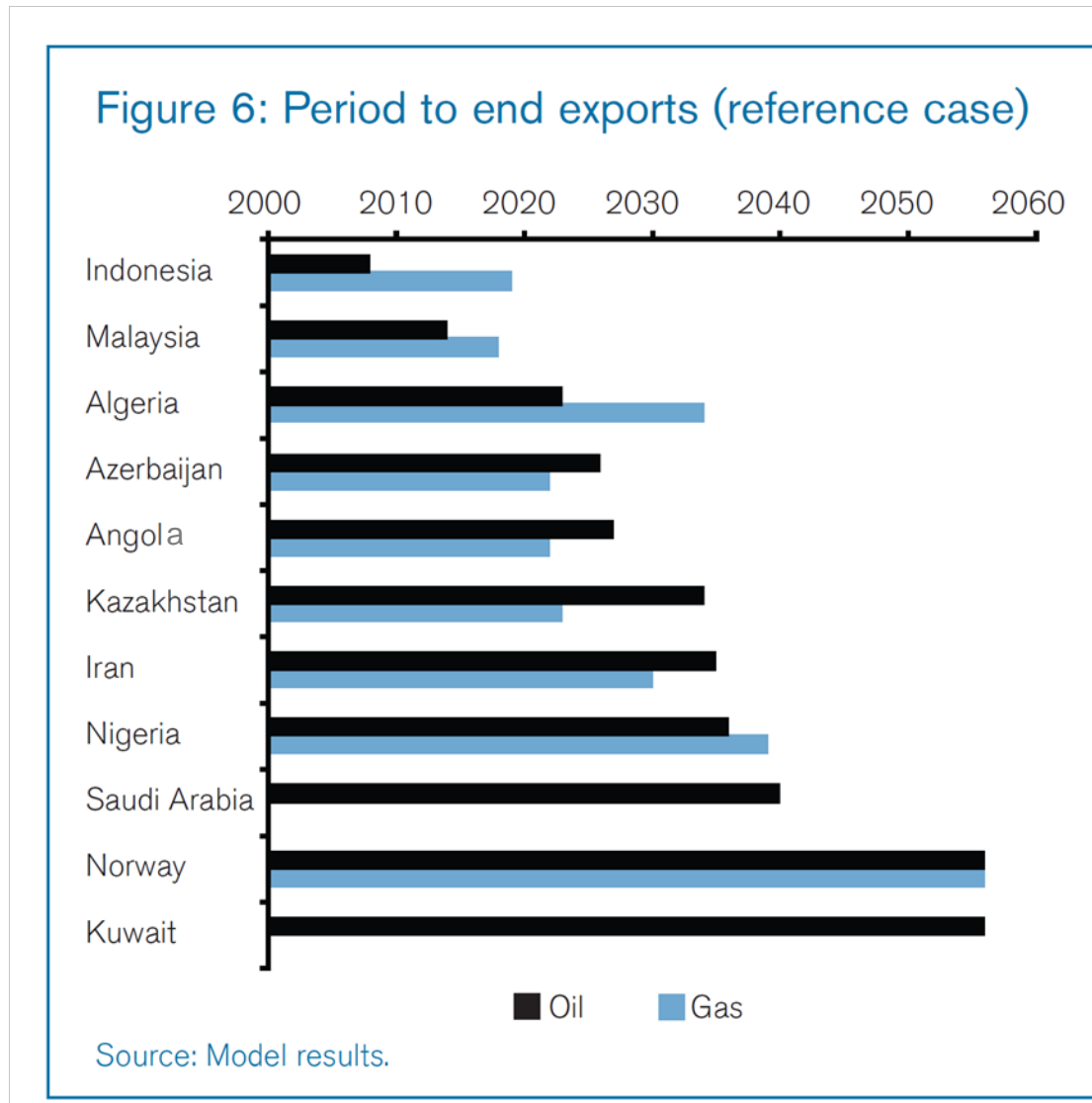
Example of a timeframe for transition in a country dependent on hydrocarbons exports



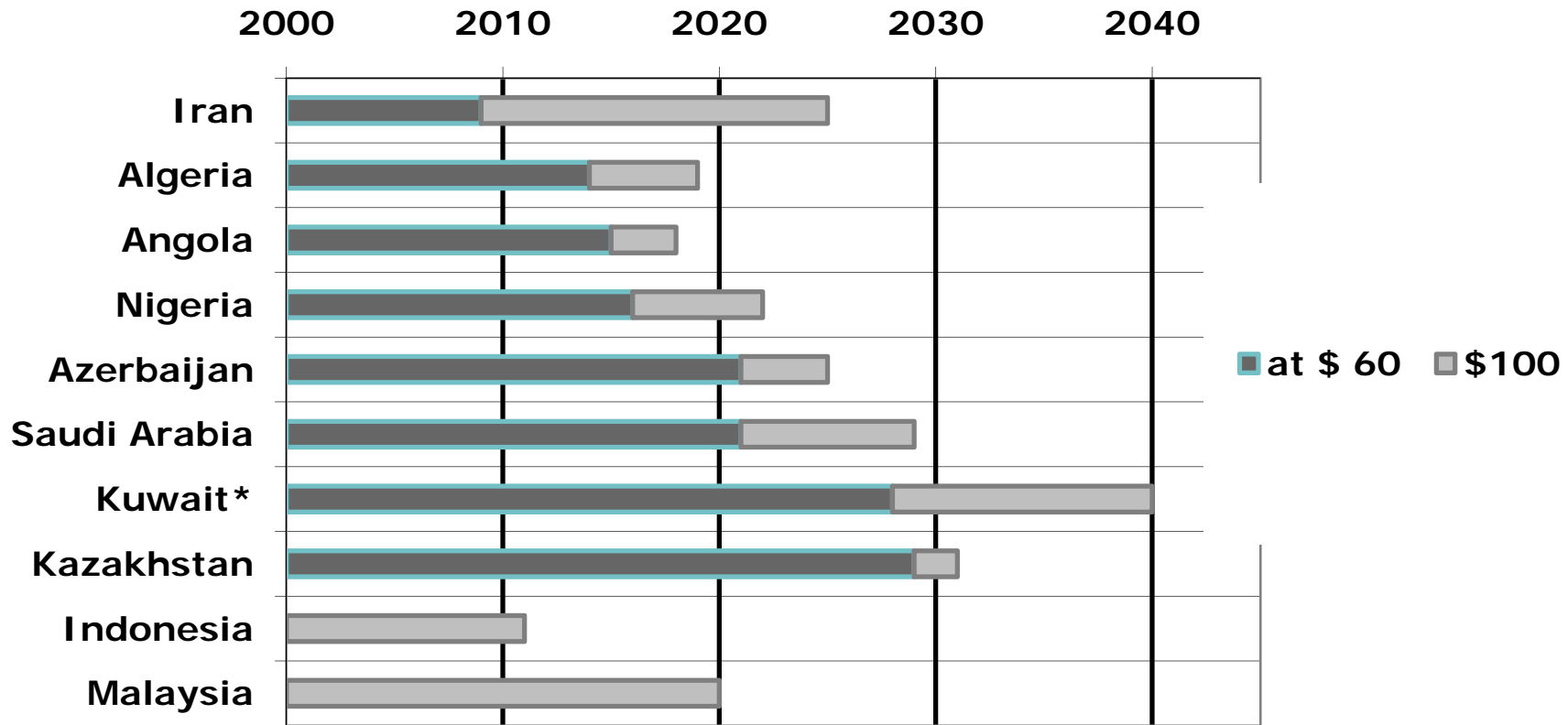
Caveats for the simulations

- This is NOT a complete oil forecast
- The results are MODEL results: rough data roughly treated

Some rough results: The period to end of exports



Time to end of fiscal surplus



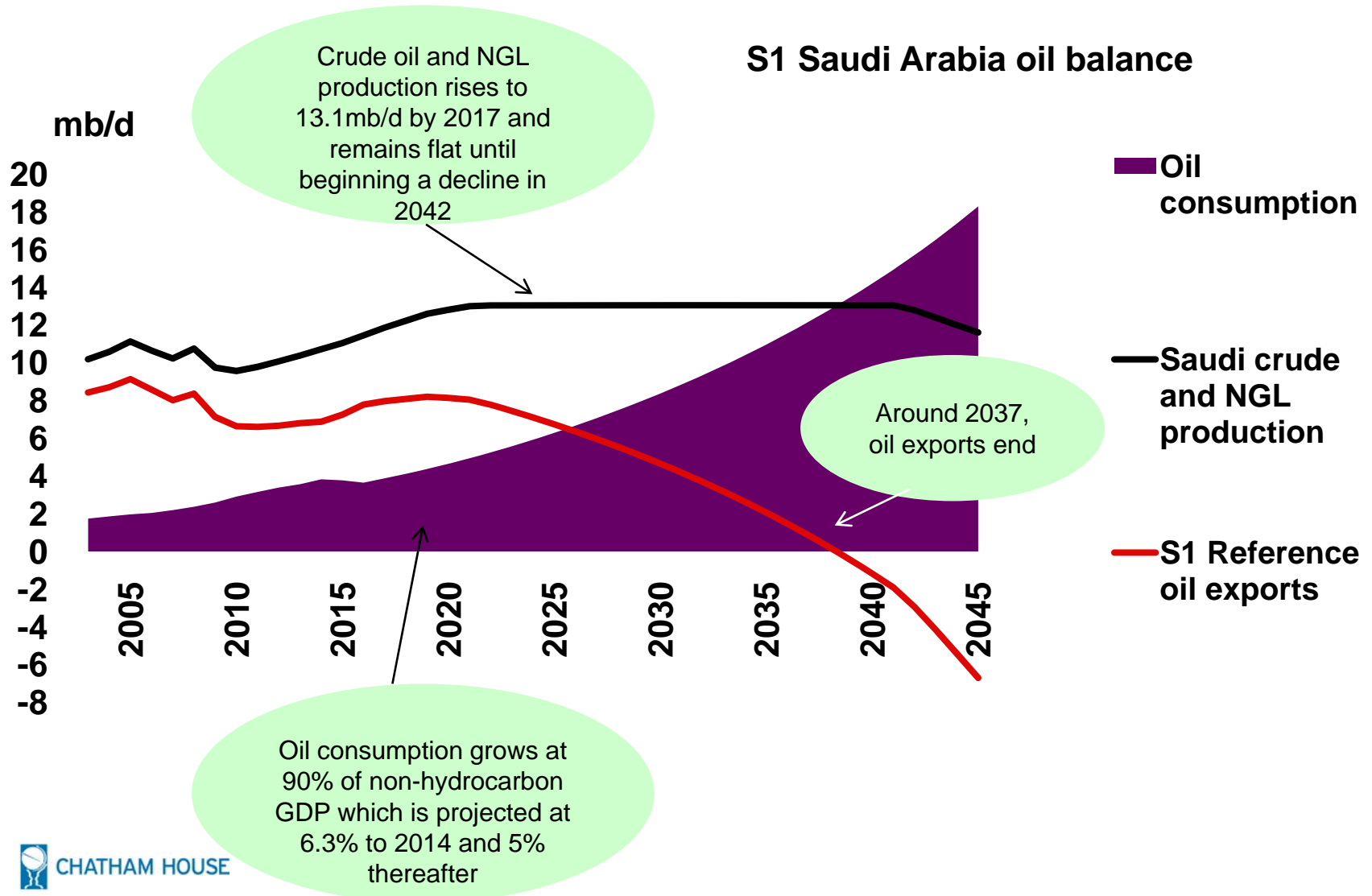
*before contribution to funds

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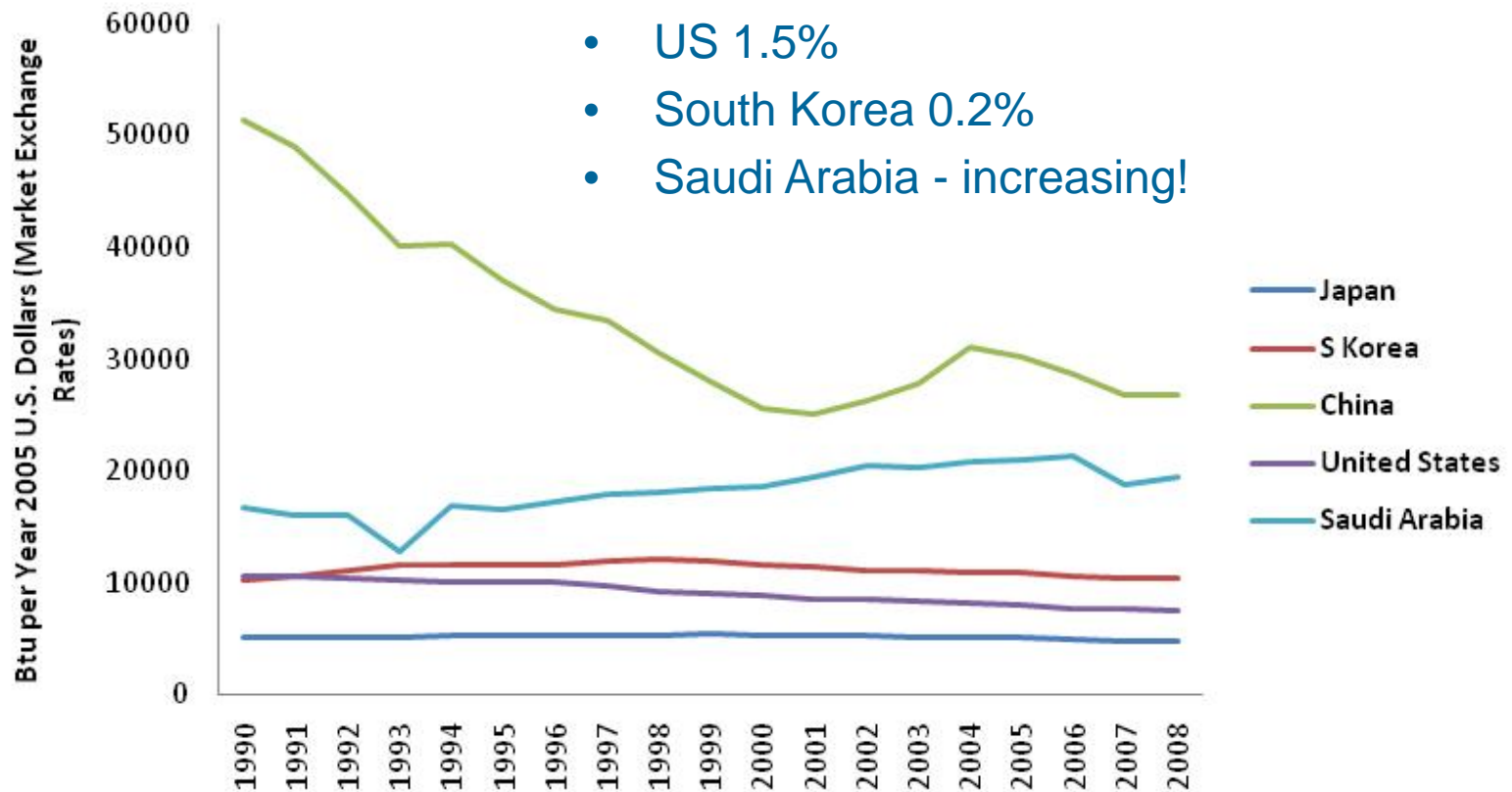
Saudi Arabia becoming a net oil importer by 2037



Key Question: How significant are energy efficiency measures in prolonging exports?

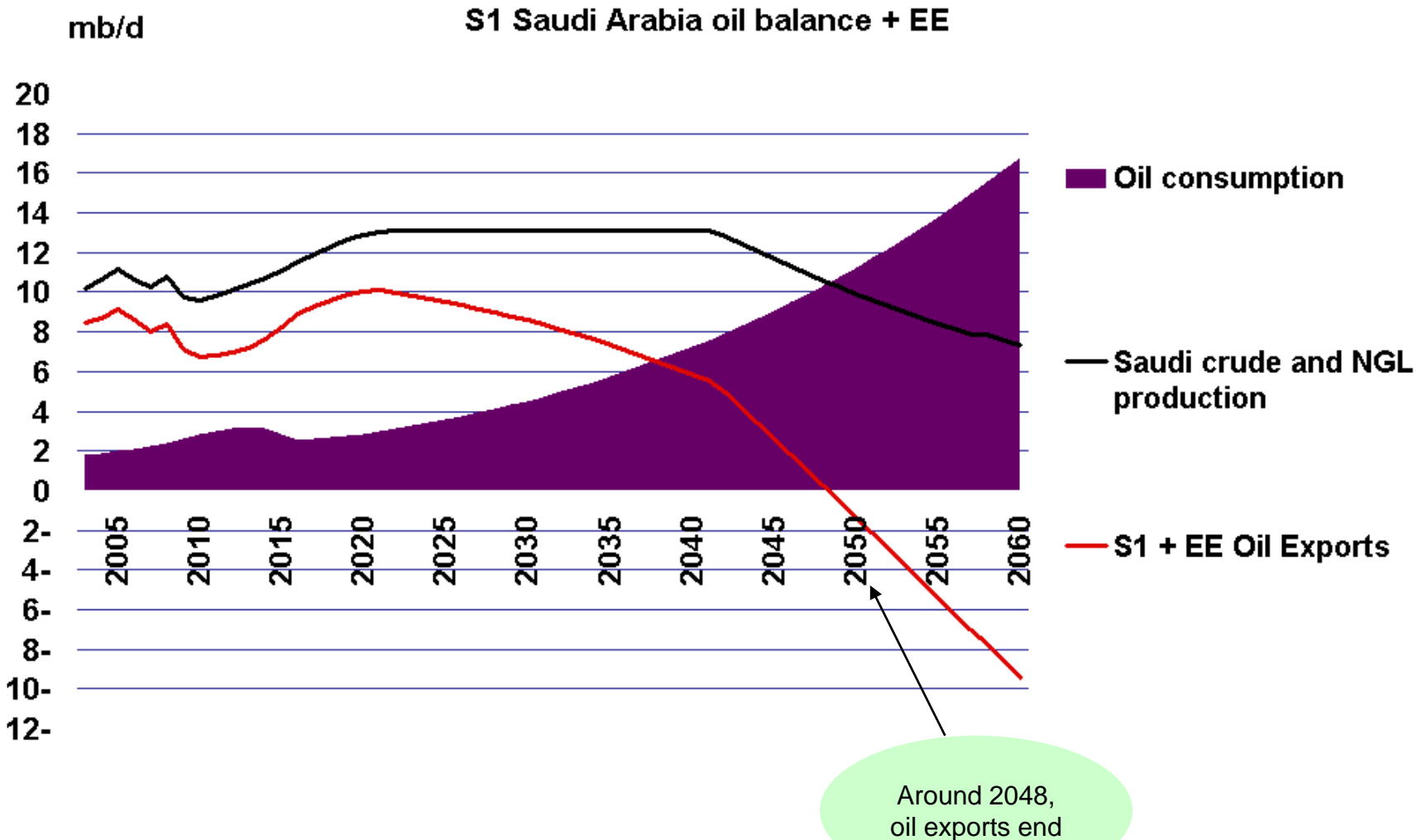
Energy Intensity improvements

- China, 3.1%
- US 1.5%
- South Korea 0.2%
- Saudi Arabia - increasing!



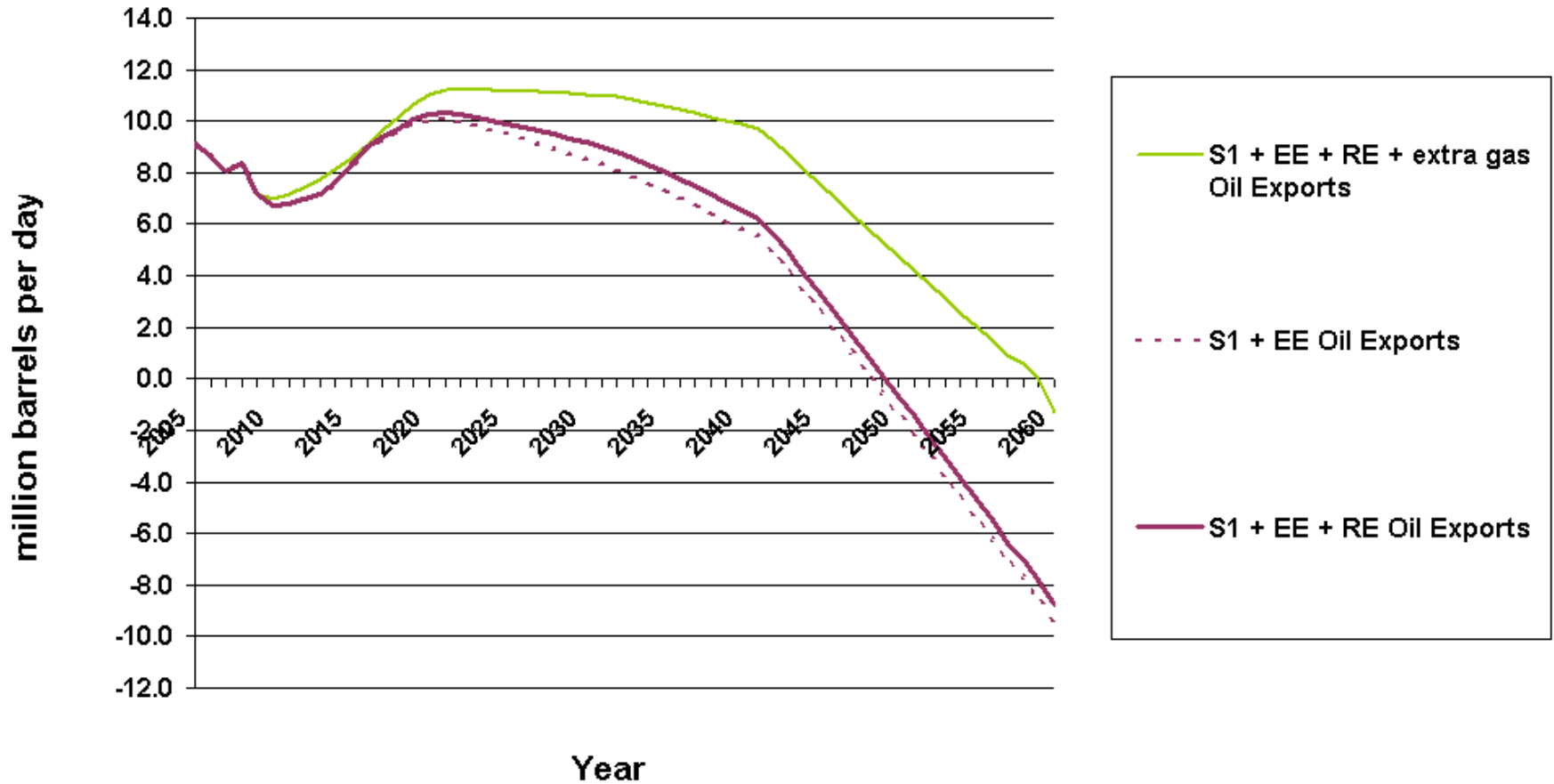
The energy intensity scenario adds about ten years of oil exports!

El Improvements: Assumptions = -3% 2010-2020 -2% 2021-2030 -1.5% 2031-2050



Gas developments (and renewables) can also add another 10 years (see appendix for assumptions)

The Saudi oil balance: S1 + EE + RE + extra gas additions



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The solution is to increase domestic fuel prices
BUT there are constraints

- The “social contract”
 - Long-standing “deal”
 - In the aftermath of “The Arab Spring”???
- The fact that Saudi Arabia’s “low prices” are not subsidies
 - The economic theory – border prices versus long-run marginal cost
 - The gains from WTO accession will not be given up lightly

Thank you for your attention

Appendix – assumptions for the Saudi Scenarios

The basic model for Saudi Arabia based on some assumptions as part of a project within the Kingdom

- Non-petroleum GDP grows 6.3% 2010 to 2014, then 5% from 2015
- Oil price held at \$77/barrel
- Domestic energy consumption grows at 90% of NHGDP
- No new reserves of oil are added, these remain at 264.1bn bbls (2008)
- Oil production follows depletion policy and crude does not exceed 12.5mb/d (13.1 if include NGLs)
- A minimum of 1.5mb/d of crude spare capacity is maintained

Substituting some oil with renewable energy adds a couple more years

The Renewable Energy scenario [RE]:

- Renewable energy is used to generate an increasing share in the national electricity, mix – 10% by 2020, and 30% by 2030, remaining at this level thereafter. (official sources in KSA have indicated a target of 10% by 2020 and these are arbitrary estimates up to 2030)
- Renewable sources displace only oil in the electricity mix
- Oil fired electricity generation uses an average of 1.8mb to generate 1 TWh – this is based on IEA numbers for 2007 and 2008.
- Gas increases in the national energy mix follows scenario in S1

Because gas can alleviate the call on oil in the power sector, the scenarios are sensitive to gas assumptions

In the BAU scenario [S1] shown above:

- Gas reserves follow Saudi Aramco stated aims with additions to 2020 – SA co aim to discover 3-7tcf /y of non-associated gas – hence the addition of the oil equivalent of 5tcf per year in barrels (0.95 billion bbls/y) to 2020
- Gas consumption is only met by domestic production – this follows Saudi Aramco aims to 2015 then holds steady with no R-P constraint
- Additional associated gas is projected at 43% of additional oil and ngl production.
- Oil makes up the additional energy requirement, when gas production ceases to grow.

If more gas is available to the power sector... (the “extra gas” scenario):

- The reserve assumptions are as above but consumption rises at 8% to 2020, then at 3% from then on. This is an arbitrary projection.
- Gas is produced to meet this demand, with no R-P constraint
- **When combined on top of the EE and RE scenario, “extra gas” prologues oil exports until around 2060 – an extra 10 years.**
- **BUT this assumes the gas goes to the power sector WHAT ABOUT DEMAND FOR FEEDSTOCK!**