



# The Dilemma of Oil Depletion

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## Oil depletion – what should oil be for?

- Production and revenues from the oil sector tend to support the rest of the economy
- Dilemma is about what oil is for
  - To produce now or later?
  - To use at home or to sell abroad?
- Race to strengthen other economic sectors before oil runs out

# The Ending Dependence Study

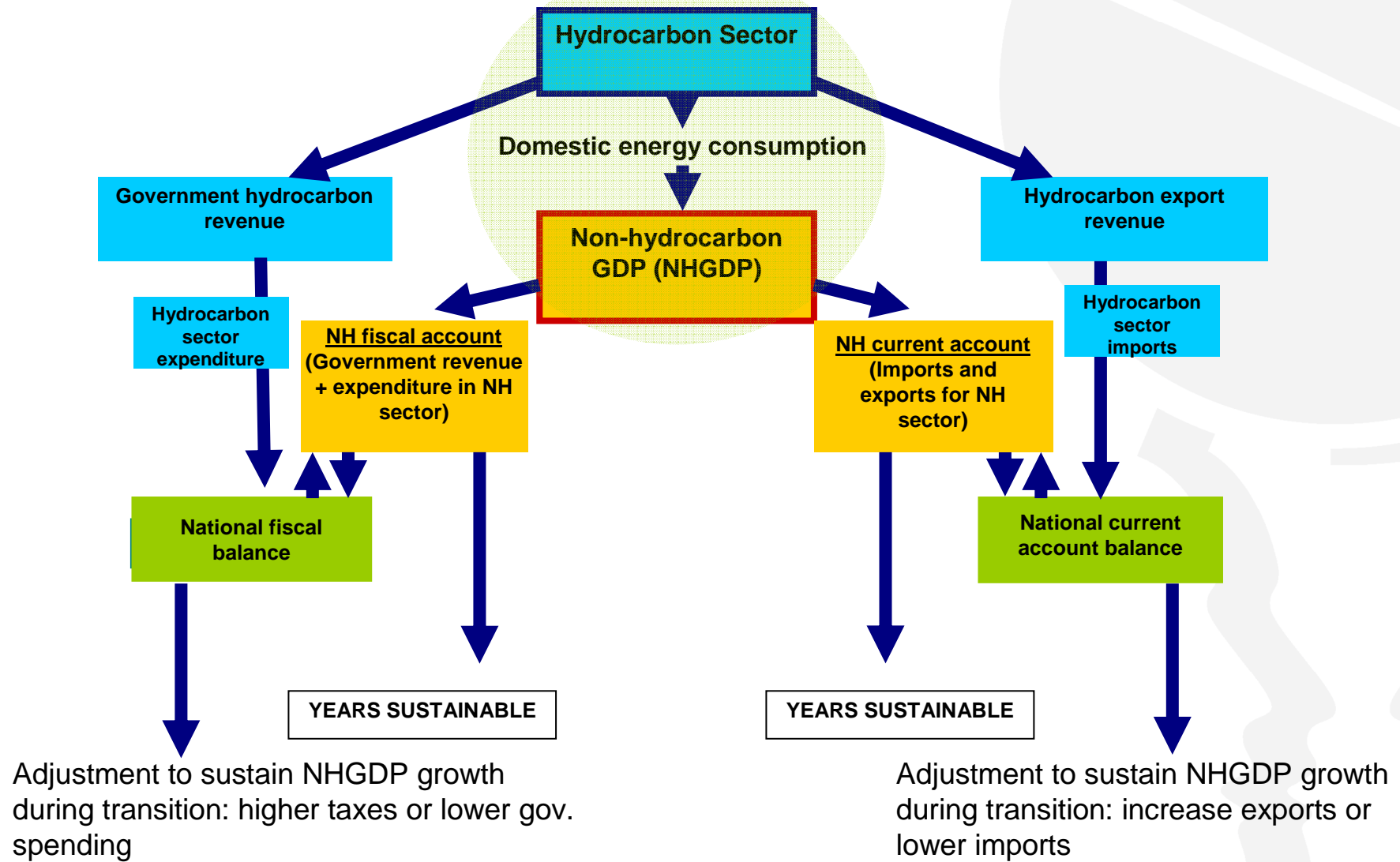
- Study of 12 hydrocarbon-exporting countries
- Simulations of depletion and effect on the economy on “business as usual” assumptions
- Workshop with ministry and national oil company representatives on ability of countries to manage the transition to lower dependence



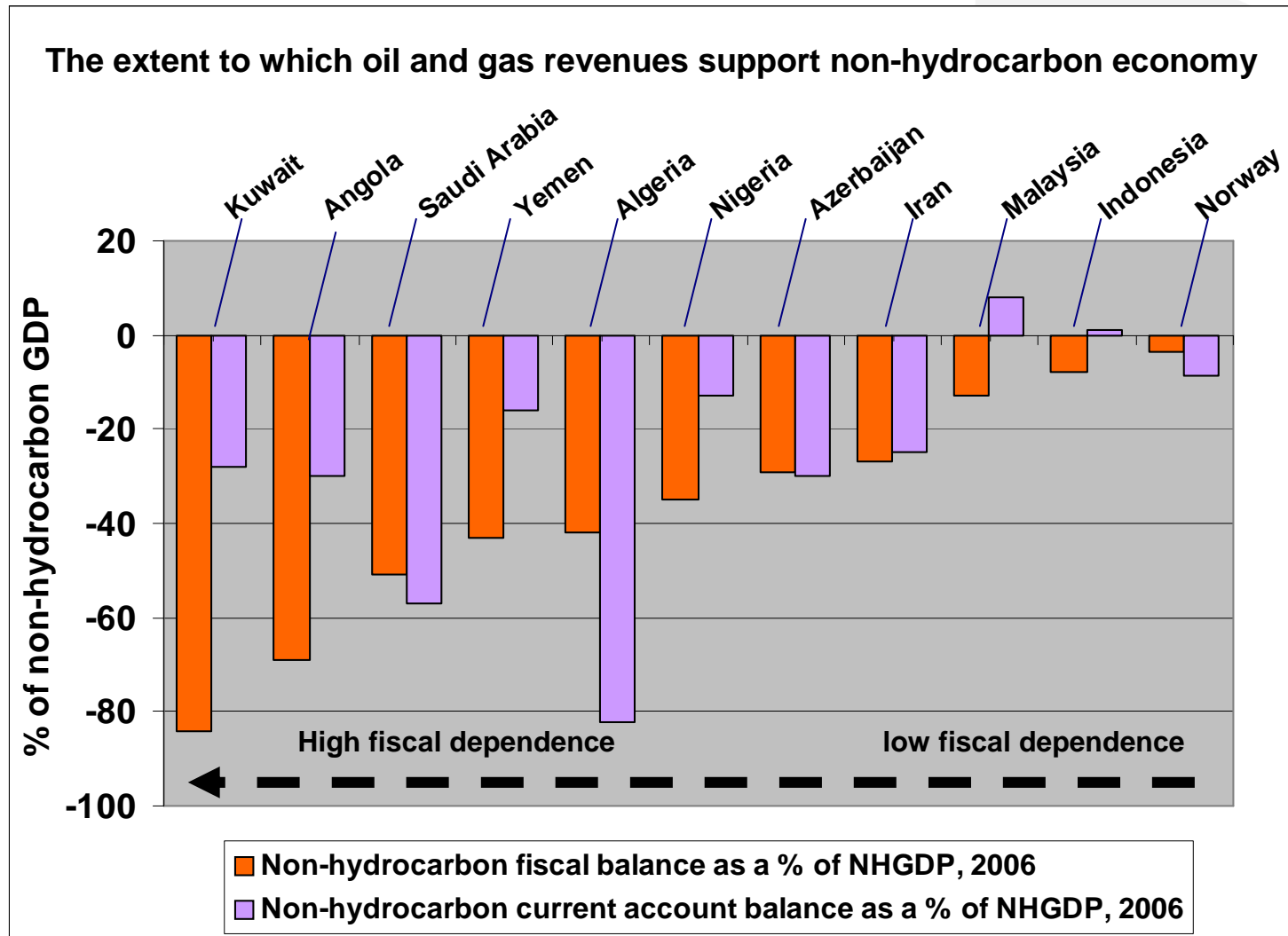
Ending Dependence  
Hard Choices for Oil-Exporting States

A Chatham House Report by  
John V. Mitchell and Paul Stevens

# Measuring dependence and impacts of depletion

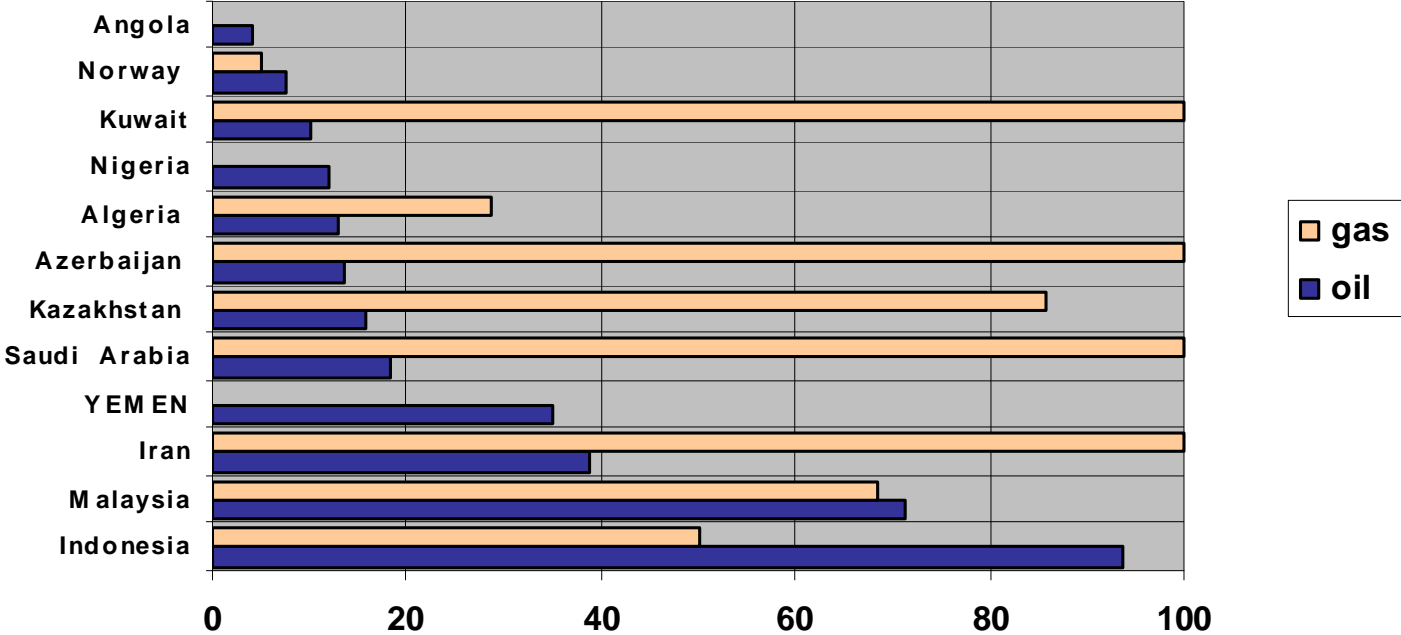


## Comparing economic dependence on hydrocarbons

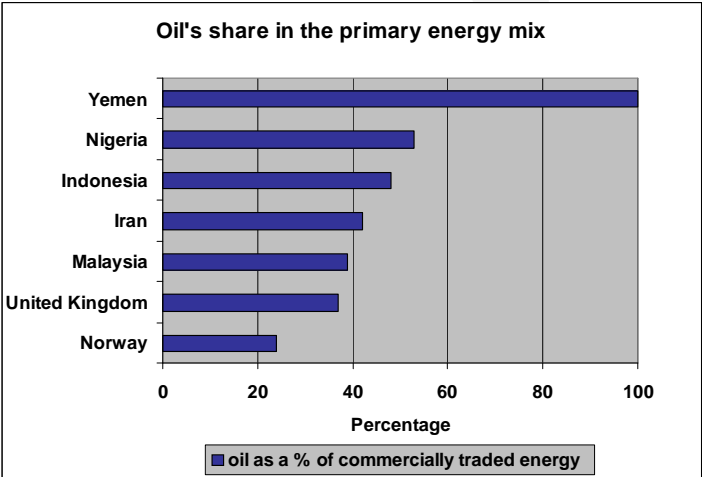


# The constraint of domestic oil and gas use...

% of oil and gas consumed domestically

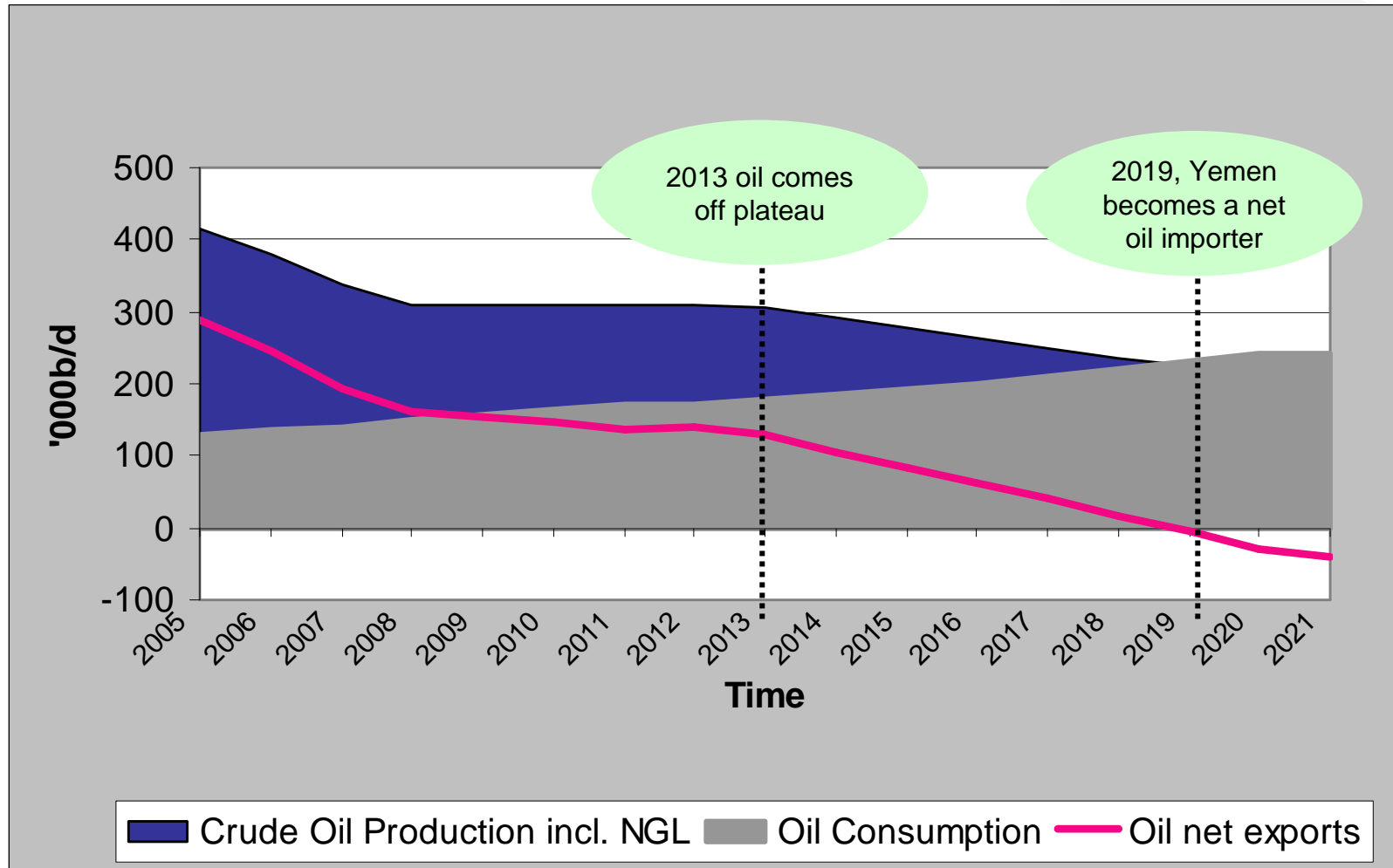


Source: Chatham House data, BP, EIA statistics for 2006



Source: BP Statistical review June 2008 for 2007; EIA Country Reports: Yemen (updated October 2007 – number for 2005); EIA Country Report: Nigeria (updated May 2009 – number for 2006)

# A potential depletion profile for Yemen

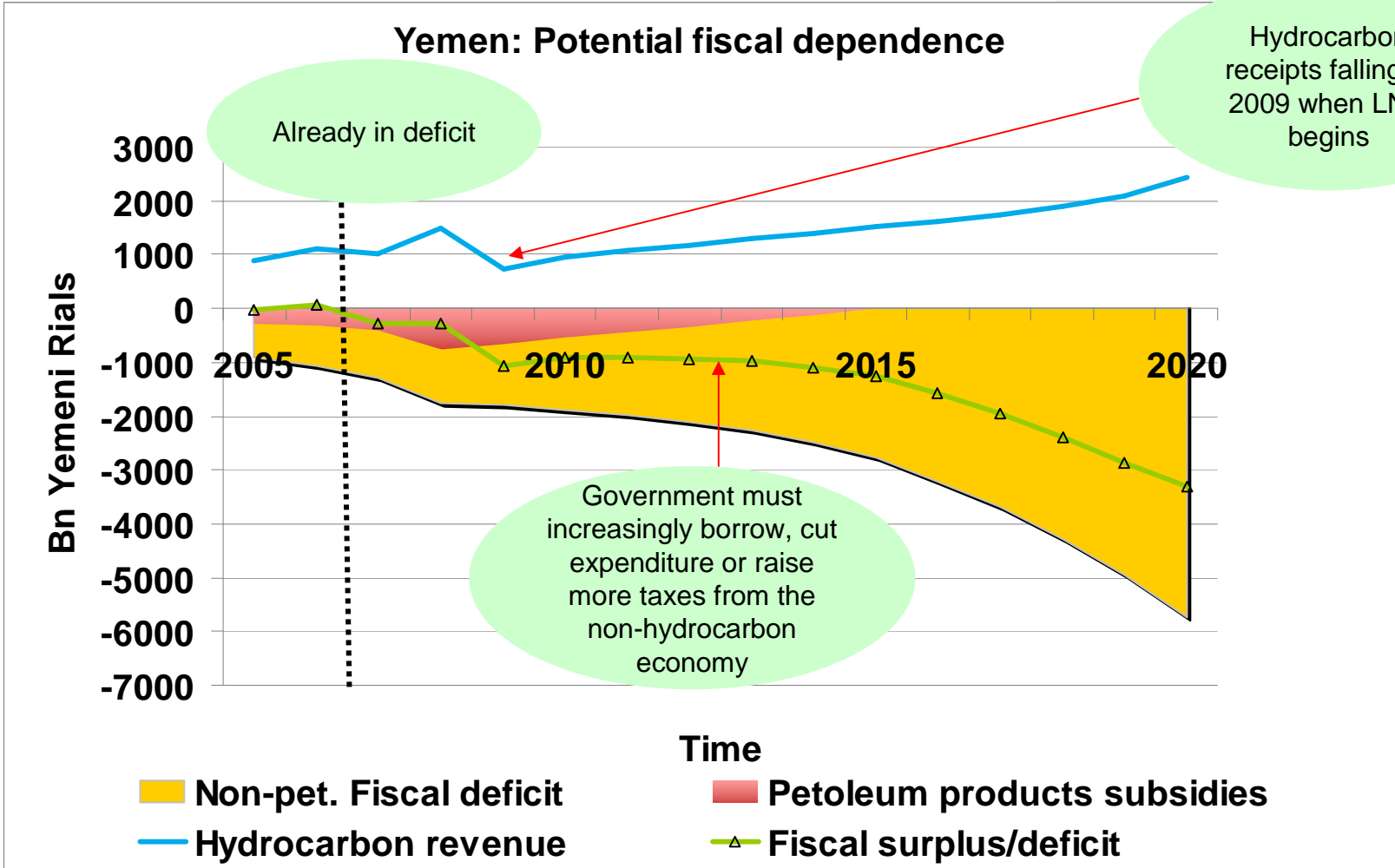




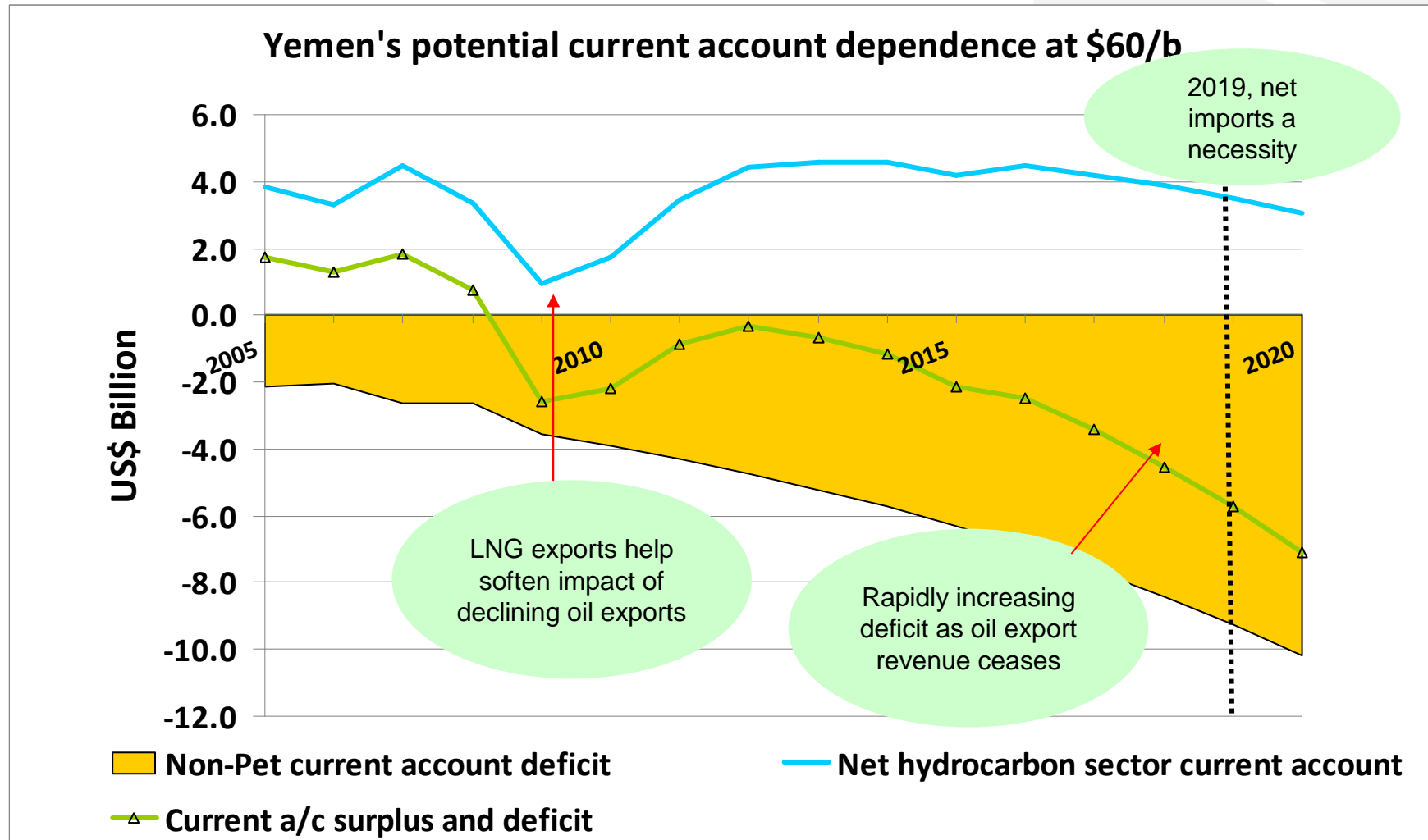
## **This is based on several assumptions**

- No new reserves of oil are brought onstream
- The necessary investment to sustain plateau oil production from current reserves has already been made
- Domestic oil consumption grows at around 5% in line with GDP - reduces a little 2012 – 2016 due to gas
- Gas gradually provides a growing share of Yemen's energy needs from 2012 when the Marib CCGT electricity generator comes online
- New refinery capacity by 2015 to refine domestic oil for Yemen's fuel needs until 2019
- Production is 5% of remaining reserves and production can stabilize for a few years before declining

# Increasing need to borrow to spend on public goods



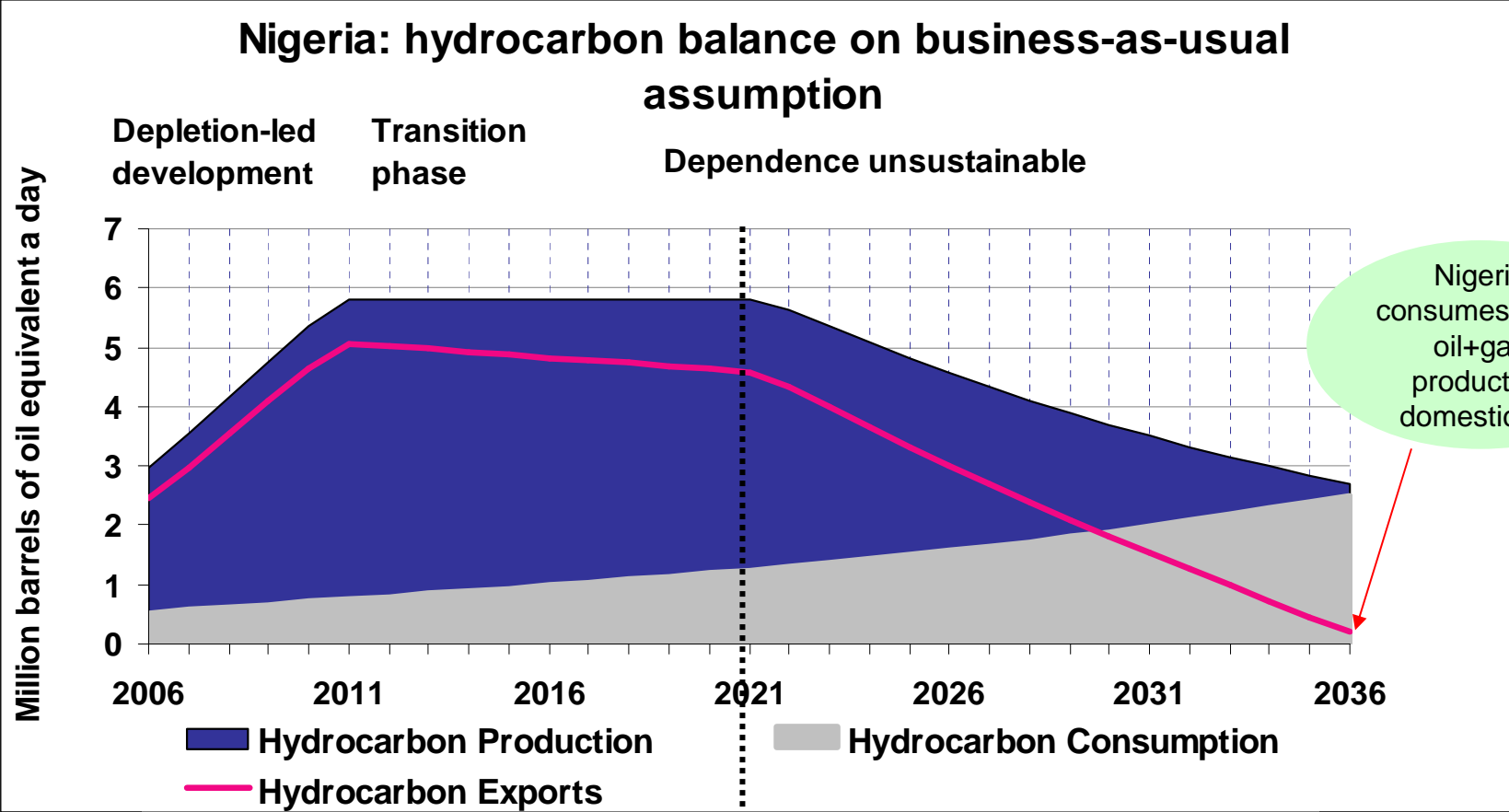
# Increasing inability to pay for imports



## Economic assumptions

- Inflation is projected at 10% for the Yemeni Rial and 5% for the US\$ (dollar oil price is assumed to grow at 5% in money terms) with exchange rates adjusted to compensate
- Subsidies for petroleum products are phased out by 2015.
- Gas production grows from 100,000 boe/d in 2009 to around 205,000boe/d in 2020 and remains flat
- LNG exports achieve 180,000 boe/d in 2011 and remains flat

# Running down reserves in Nigeria

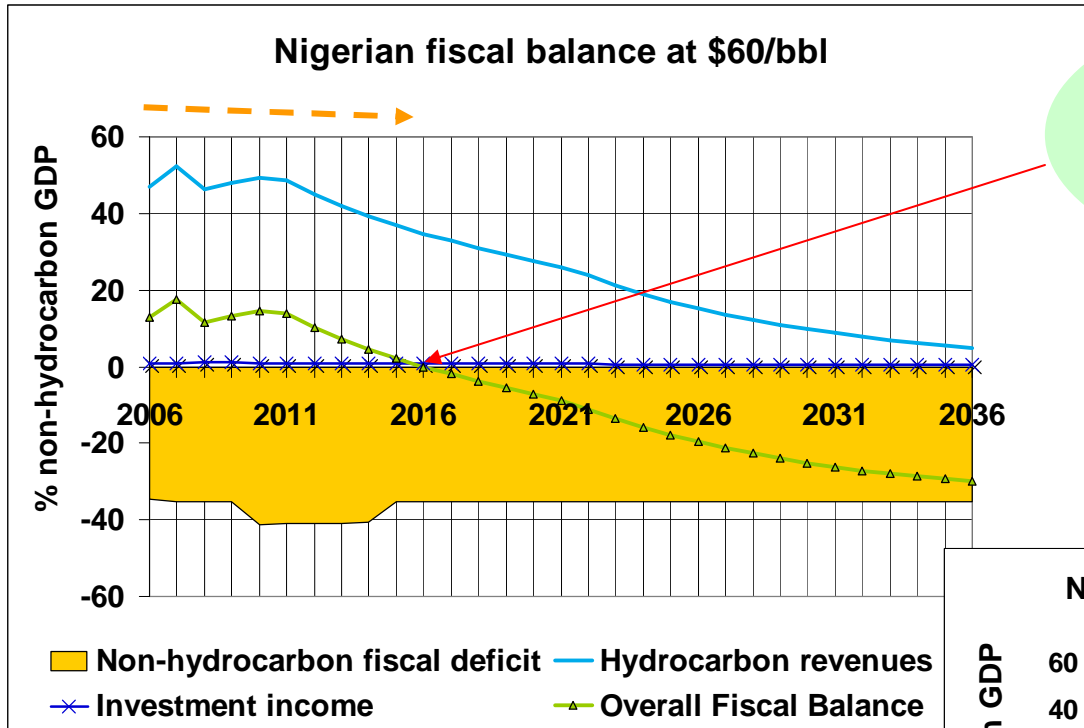


Nigeria consumes all its oil+gas production domestically

Oil+gas production begins decline

Source: Chatham House Resource Depletion, Dependence and Development Country Study: Nigeria, April 2008

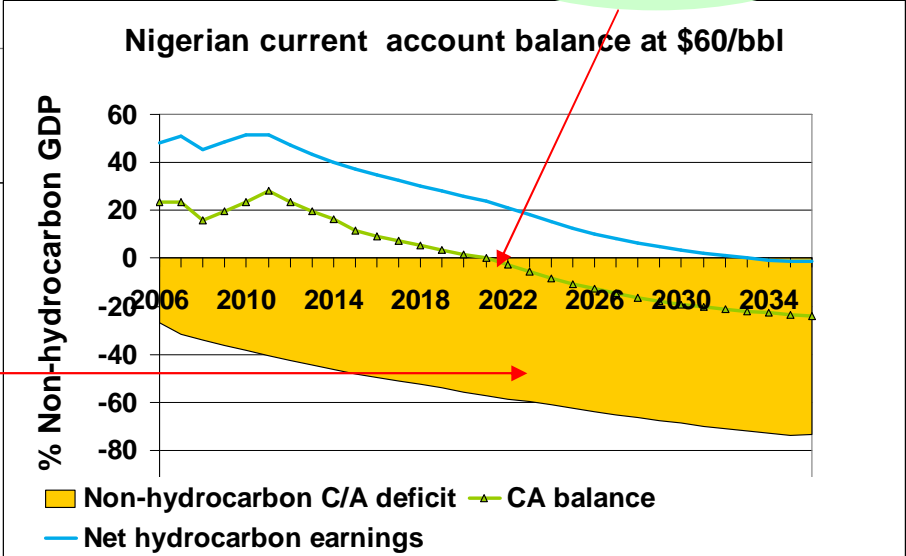
# Without adjustments and reforms...



2016, Nigeria's hydrocarbon sector receipts can no longer support the NH fiscal deficit

2022, Nigeria's hydrocarbon export earnings can no longer support imports to the rest of the economy

The non-hydrocarbon economy's import trends are unsustainable as oil depletes and consumption rises



## How is Nigeria managing the transition...

- Serious macro economic and monetary reforms since 2004
- Joined EITI and undergoing radical overhaul in increasing transparency – audits of what was happening to crude and revenues showed up huge losses and unaccounted production
- Created an excess crude account to stabilize the economy
- Introduced local content targets to encourage greater national involvement in the oil industry
- Trying to encourage privatisation and reduce fuel subsidies
- 7<sup>th</sup> largest gas producer in the world - plans to increase gas use for domestic power generation but much infrastructure/ investment still needed

## ...but many obstacles to making adjustments

- Nigeria has exhibited classic resource curse symptoms
  - Crowding out, disincentives to private sector
  - Powerful rent-seeking groups
  - Conflict deterring foreign investment
  - Uneven development
- Theft of crude and refined products, fuel pipeline sabotage
- Boom increased dependence on oil sector
- Gas flaring - lack of infrastructure

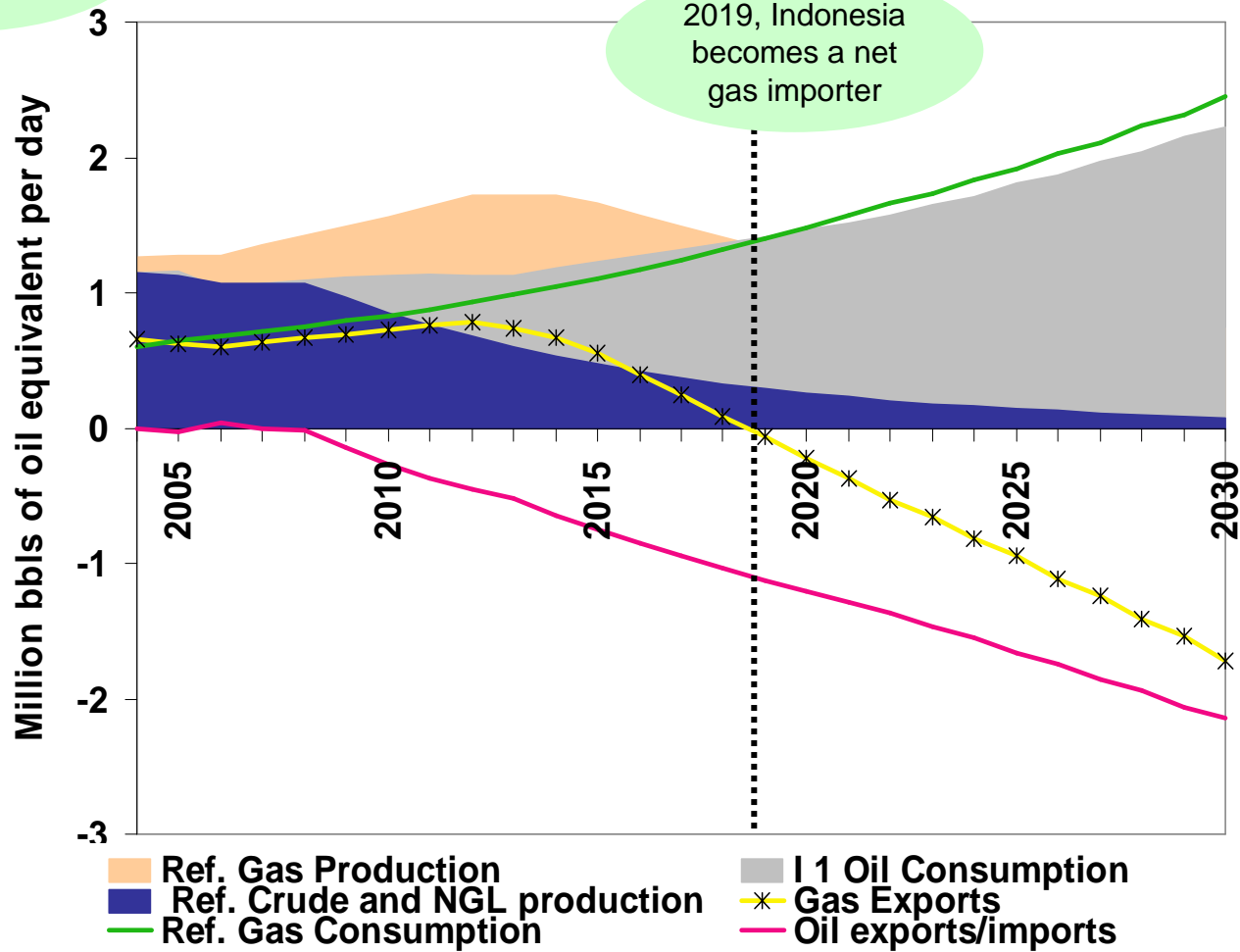


# Some countries are overcoming the depletion problem

2004 Indonesia already a net oil importer

Indonesia - Hydrocarbon balance at \$60/bbl

2019, Indonesia becomes a net gas importer



# In Indonesia...

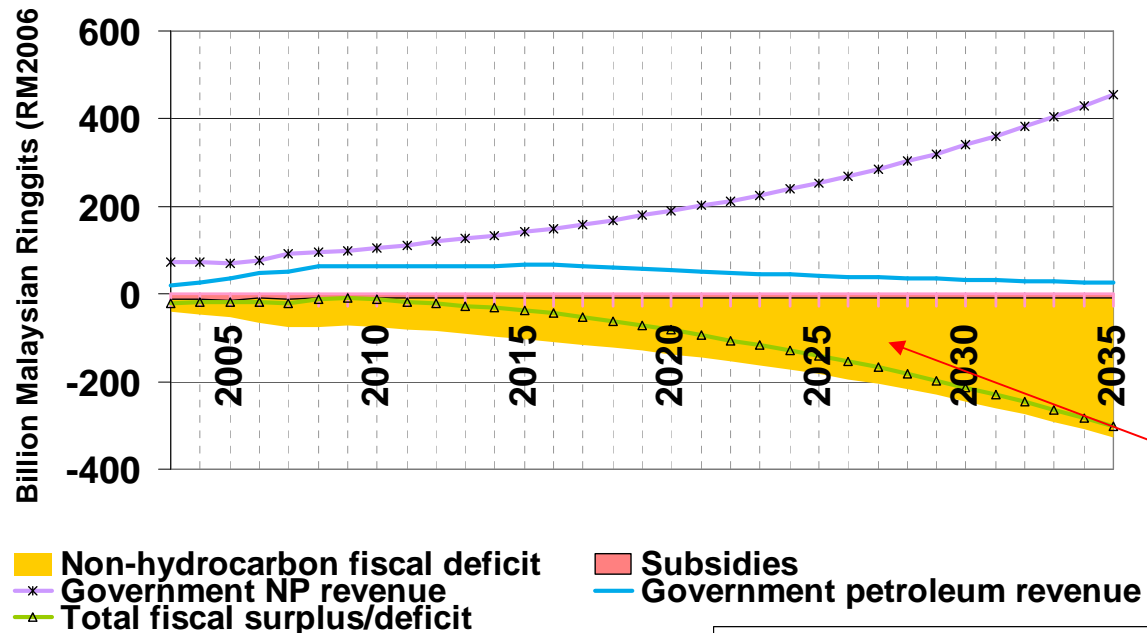
## Challenges

- Large population – 245,000, low per capita energy use but high intensity
- Regional unrest – underdevelopment in oil producing regions
- Became a net-oil importer in 2004
- Sensitivity of fuel prices

## Measures taken

- Facilitated export orientation
- Decentralization – oil producing regions allocated more revenue
- Changing energy mix, capitalizing on indigenous alternatives
- Increasing investment in power generation
- Fuel price rises 2005, 2008
- Long term energy policy as part of development vision

### Malaysia: Federal fiscal balance at \$60

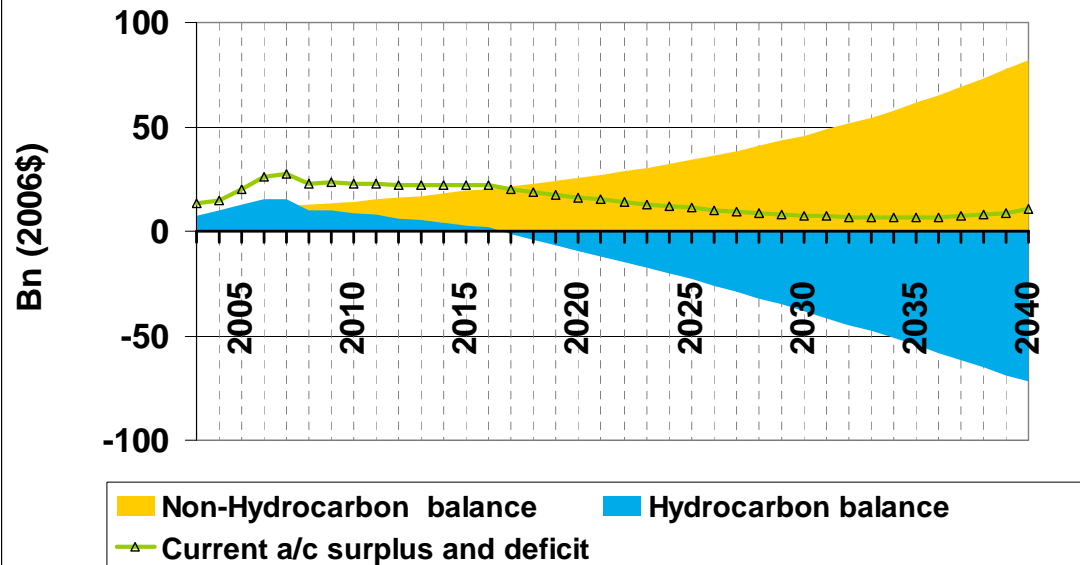


Current government spending trend unsustainable as oil receipts decline

By 2027, need either 60% rise in tax revenue from non-oil sector or 40% fall in gov spending

Increasing hydrocarbon imports after 2016 but non-hydrocarbon exports sustain current account

### Malaysia: Current account



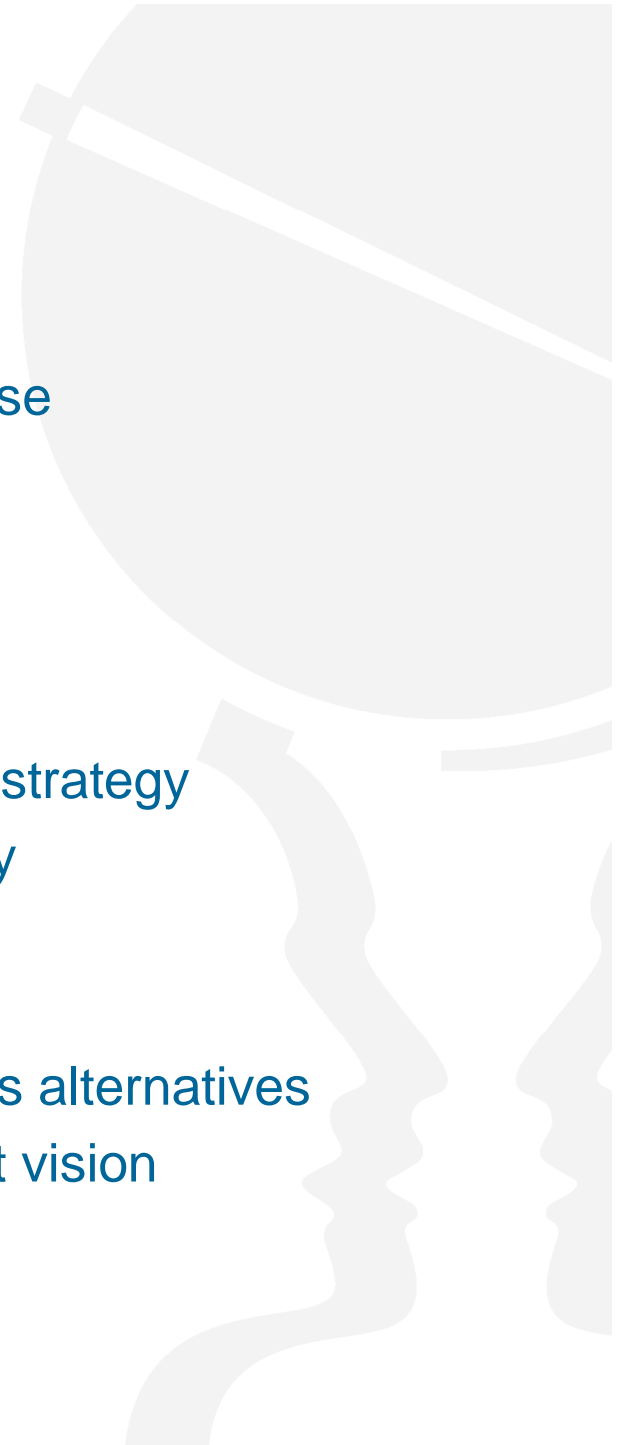
# In Malaysia...

## Challenges

- Smaller population but high per capita energy use
- Subsidized fuel and dependent heavy industry

## Measures taken

- Early policies to reduce dependence on oil
- Insulating NOC to enable long-term investment strategy
- Strong emphasis on knowledge-based economy
- Strengthening institutions
- Large foreign reserves invested internationally
- Changing energy mix, capitalizing on indigenous alternatives
- Long-term energy policy as part of development vision



## Lessons learned from the 12 country studies

Difficulties in managing the transition away from oil-led development are clear:

- Reversing *rentier* practices and a state-heavy economy
- Reforms get stalled when the price is high
- Lack of skilled nationals and technology
- Temptation to focus on and protect heavy industries
- **Political sensitivity of fuel prices**
- **Existing infrastructure and industry geared toward high oil use**

## **X factors for success?**

- Clarity on the role of hydrocarbons in the vision for society
- An emphasis on ever increasing good governance
- A long-term government strategy for diversification
- Creating and insulating zones for international business
- A more efficient system of taxation (and usually increasing taxation)
- **A comprehensive energy policy**

## All countries facing oil depletion need an energy policy

- Cheap plentiful energy supply taken for granted
- No longer cheap marginal barrel
- Depletion demands a rethink
- New reserves possible but must plan without them
- Success stories demonstrate comprehensive energy policy:

electricity, gas and transport fuel

increasing efficiency

industrial linkages

environmental standards

resilient system

# Energy policy goals in Indonesia

- 2005 - Indonesia's Ministry of Petroleum and Mines National Energy Management Blueprint
- Increasing use of domestic coal for electricity generation
- One third of the growth in "other" sources is planned to be bio-fuels
- Planned electrification of trains, increased use LPG + CNG, castor oil
- R&D into new forms of energy

**Energy policy targets: percent of primary fuel mix**

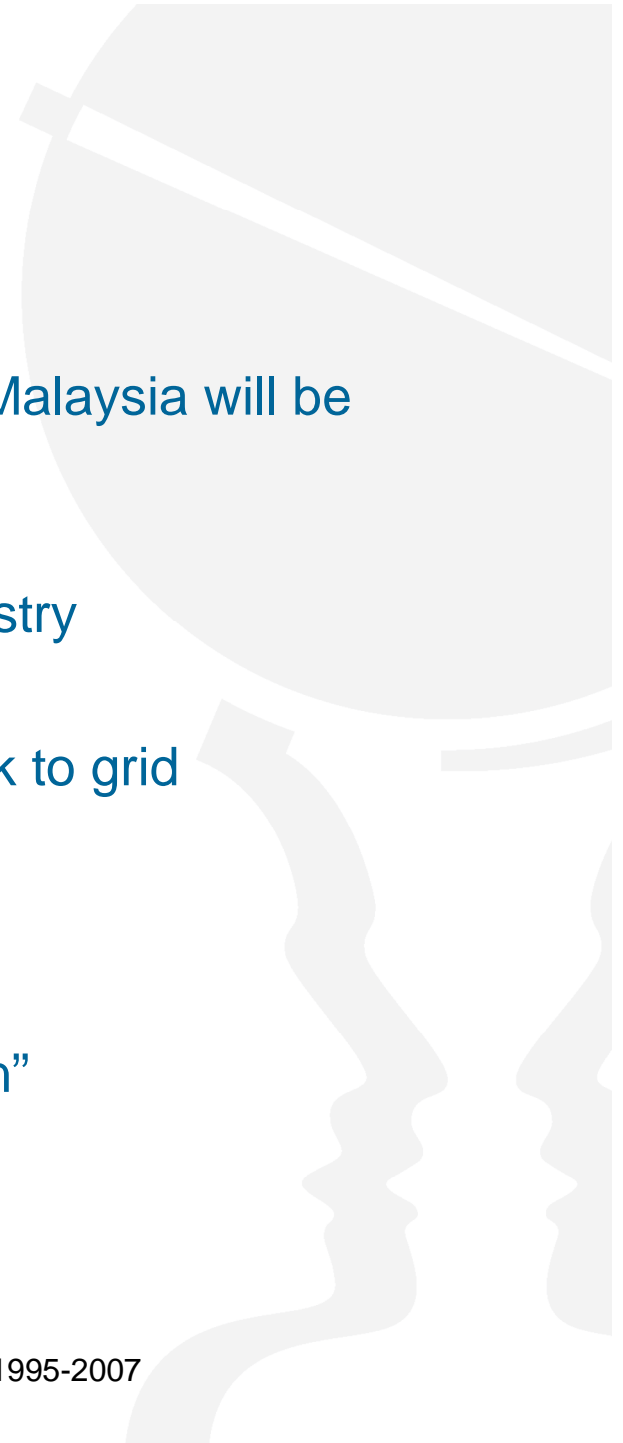
	1970	2007	Business as usual 2025	2025 Target
oil	87.7	51	42	20
gas	6.1	28.6	21	33
coal	neg	15.3	35	30
renewables (hydro, geothermal, biofuels)	6.2	5.1	3	17



# Energy policy goals in Malaysia

## 9th Five Year Plan (2005-10)

- New electricity generating plants in peninsular Malaysia will be supplied by coal
- Increased use of palm oil for transport and industry
- Encouraging small renewable plants to sell back to grid
- Fiscal incentives for RE and EE technologies
- Aims to promote “culture of energy conservation”
- Energy audits of industry to increase efficiency



## Why electricity generation is key

- Frees up more oil for export to smooth the transition
- Greater potential for changing demand structure than with transport
- Improved efficiency and competitiveness of industry with CHP
- Widespread electrification aids development and private sector
- Desalination and distribution
- Resilience – national and local infrastructure, security through diversity

## Observations on Yemen's potential

- In transition period - very short timeframe for change
- New minerals and LNG exports a temporary part of the solution.
- Diversifying its energy mix is the crucial
- Gas substitution really urgent – good prospects once infrastructure in place
- Renewables potential: natural gas, sun, wind, waves and geothermal

## Some questions for discussion

- What are the priorities for Yemen's oil and gas?
- How does long-term energy strategy fit with development policy?
- How to build in resilience?
- How will the current government vision balance:
  - a) the large-scale reconfiguration of power generation from oil to gas and the expansion of the national grid and
  - b) local rural generators run on renewable energy and biomass

# Thank you!

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