Reflections on the impact of developing an oil & gas industry on society

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Main topics

- The Norway experience
- The African experience

Issues:

- A historic perspective
- Price volatility
- Managing the sector
- Jobs & national participation
- Industry
- Reflections

A historic perspective

Impacts

- The rise or fall of empires
- The Nobel Peace Prize
- The success or failures of industries
- The prosperity or poverty of people

Governed by:

- Global oil price
- National management

Historic oil price

- The oil price in January 1861?
- By the end of 1861?
- Three years later?
- Today?

Answers:

USD 10/barrel

10 cents/barrel

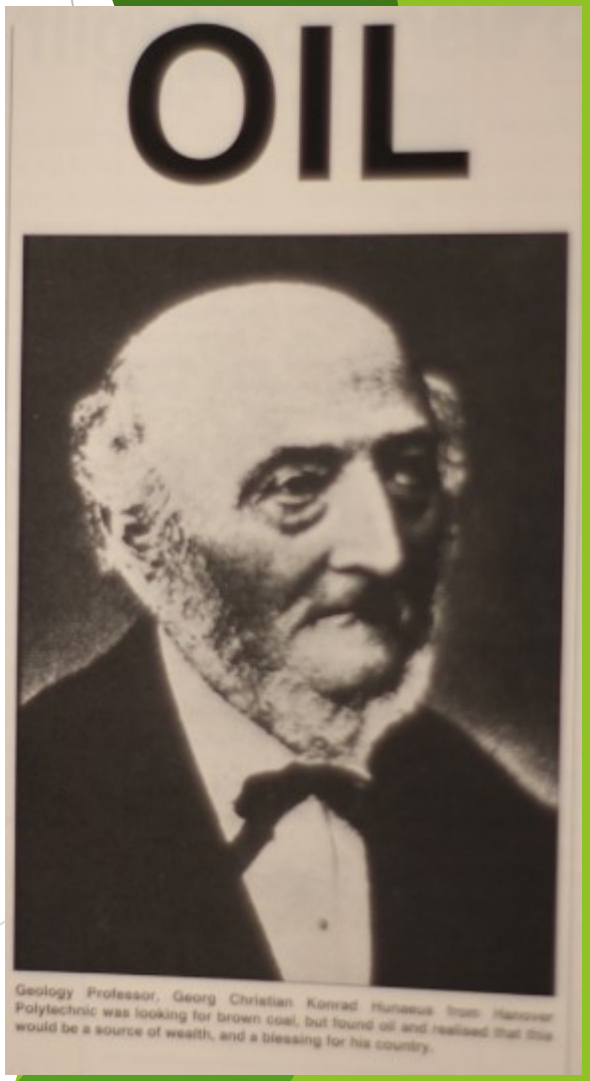
USD 13,75/barrel

USD 64/barrel

A little oil history

The first oil well?

- Often referred to as the Drake Well, after Colonel Edwin Drake,drilled outside Titusville, Pennsylvania in 1859.
- It began an international search for oil, and in many ways eventually changed the way we live.
- But the first oil well drilled was the Wietze well in Germany in 1858 supervised by Professor Georg Konrad.
- The Wietzer fields produced around 80% of German oil during the oil boom around 1910.
- The field was closed down in 1963

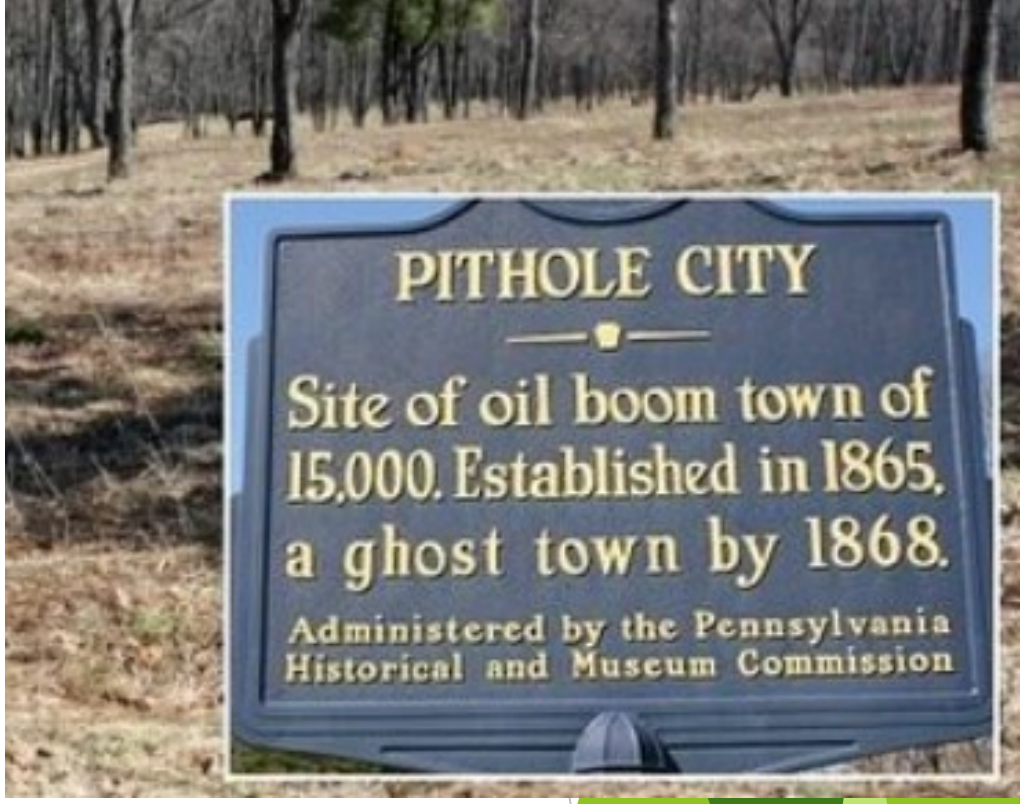


The rise of Pithole

- First well in January 1865
- By June there were 4 flowing wells, producing 2,000 bpd
- Land speculations seemed to know no bounds
- One farm which had been virtually worthless was sold for USD 1,35 early 1865 and resold for USD 2 million in September.
- And by September, what had been nothing, became a town of 15,000 people
- Businesses (and liquor sales) boomed as none had seen before
- Infrastructure, banks, more than 50 hotels, post and telegraph offices, newspapers and much more…

The fall of……

- A few months later the oil production abruptly gave out – just as quickly as it had begun.
- By January 1866, only a year from the first discovery, thousands had fled the town for new hopes and opportunities
- Pithole returned to silence and to the wilderness
- A parcel of land that sold for USD 2 million in 1865 was auctioned for USD 4,37 in 1878



The Nobel Prizes

The Will

- In 1888 the Oil King of Baku, Ludwig Nobel died 57 years old
- Some newspapers confused the Nobel brothers and instead reported the death of Alfred.
- Reading his own premature obituaries, Alfred was distressed to find himself condemned as the «dynamite king», a merchant of death who had made a huge fortune by finding new ways to kill.
- He rewrote his will, leaving his money for the establishment of the Nobel prizes

The rise of Royal Dutch

- Jean Baptiste August Kessler, born in 1853, was sent to the swampy jungle of Sumatra to lead the oil exploration campaign there.
- He arrived at the drilling location in 1891 with 80 Chinese men, and experiencing extremely difficult working conditions.
- On February 28, 1892, a «roar of a mighty storm» announced the first oil.
- The Dutch flag was raised, and Kessler and the crew toasted the future prosperity of Royal Dutch.
- Royal Dutch was in business. Within two years, Kessler had increased production sixfold, and Royal Dutch had finally become profitable.

Managing the Sector

Success factors

- Managing expectations
- Patience
- Persistence
- Be realistic
- Finding the right balance
- Finding the right partners
- Timing

Managing expectations

«Oil rarely has a significant knock-on benefit for the local economy?»

True or false?

Managing expectations

Paul Collier in Kampala 2013;

«Oil is an overly capital intensive sector. There are no jobs.»

Jeffery Sachs about East Timor in Dili 2011;

«You can grow faster than China and be like Singapore in a few years»

Oil revenues and spending

- A crucial point concerns the link between the oil revenues to the government, and the spending of these revenues
- Many oil-rich countries, like Venezuela and Nigeria, and to some extent Norway, have experienced boom-bust cycles induced by fluctuations in the oil price

Managing the revenues

For Venezuela, the oil booom of the year 1973-1974 was the modern equivalent of El Dorado

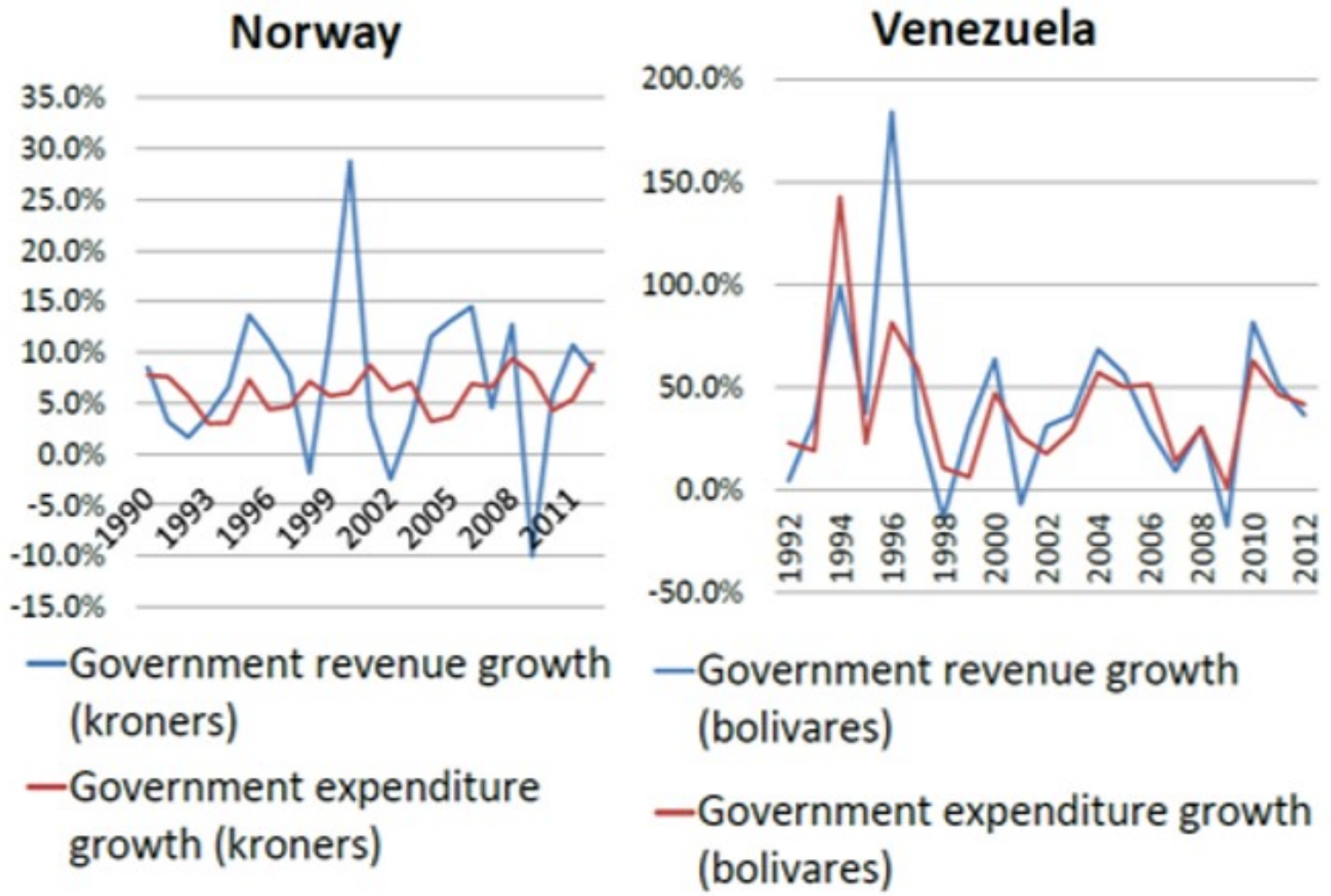
«*We are going to change the world*»

Carlos Andres Perez

President of Venezuela

1974-1979 & 1989-1993

Managing volatile revenues

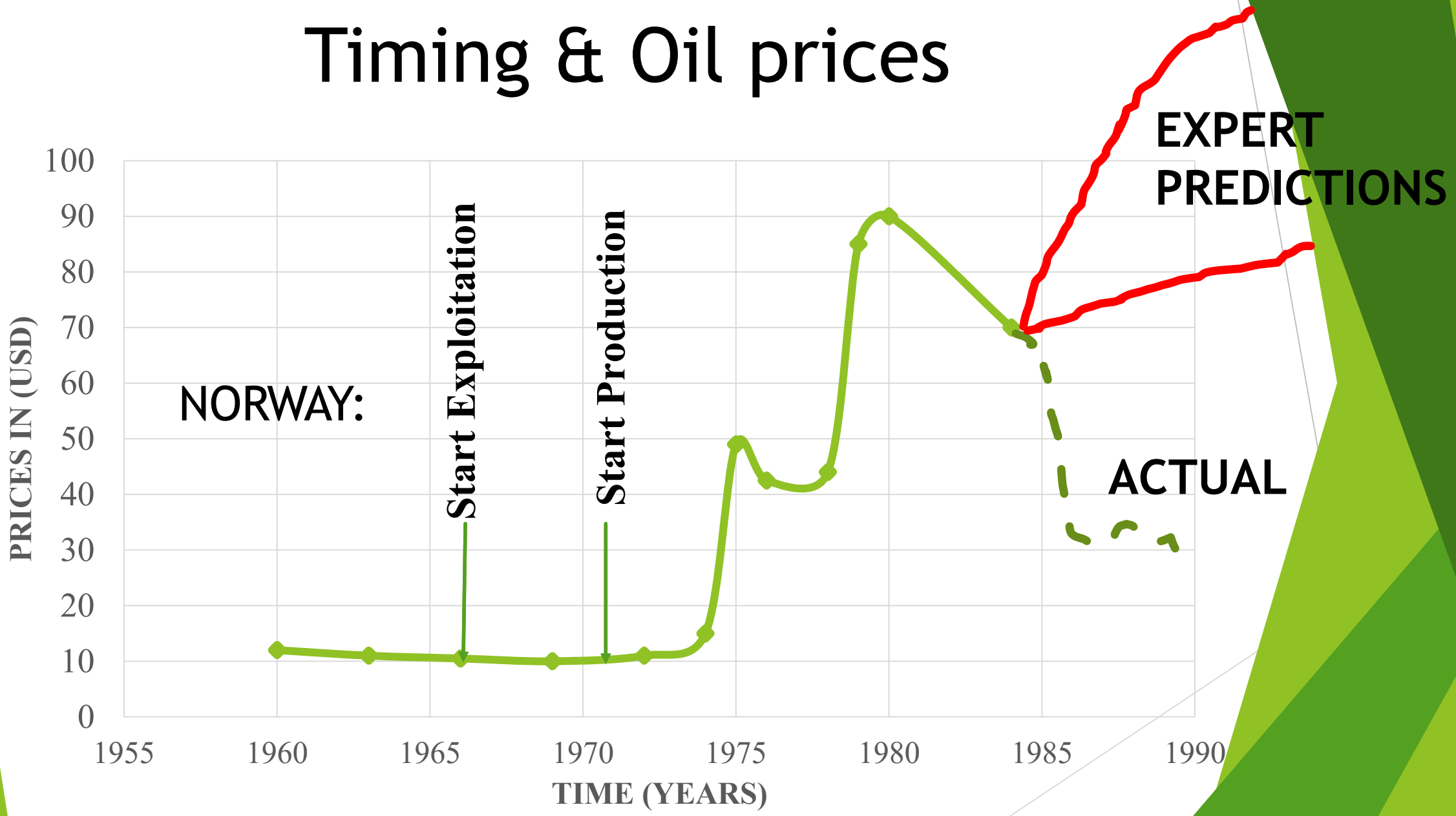


Oil Prices

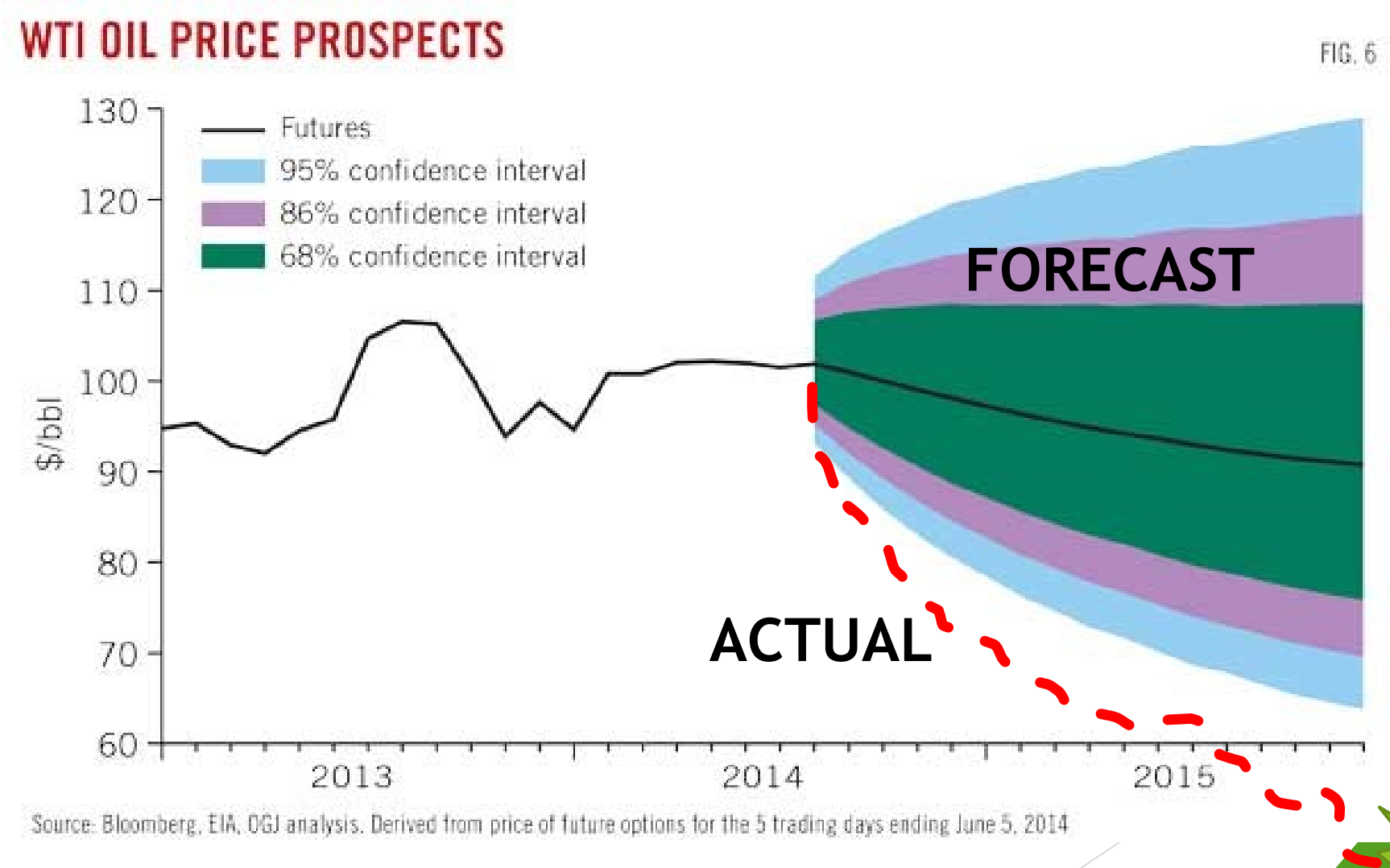
Be patient – plan for long

- Oil prices have shown high fluctuations over the past 50 years
- About every 10 years +/- there is an «oil crisis»
- And every time the experts fail to predict it

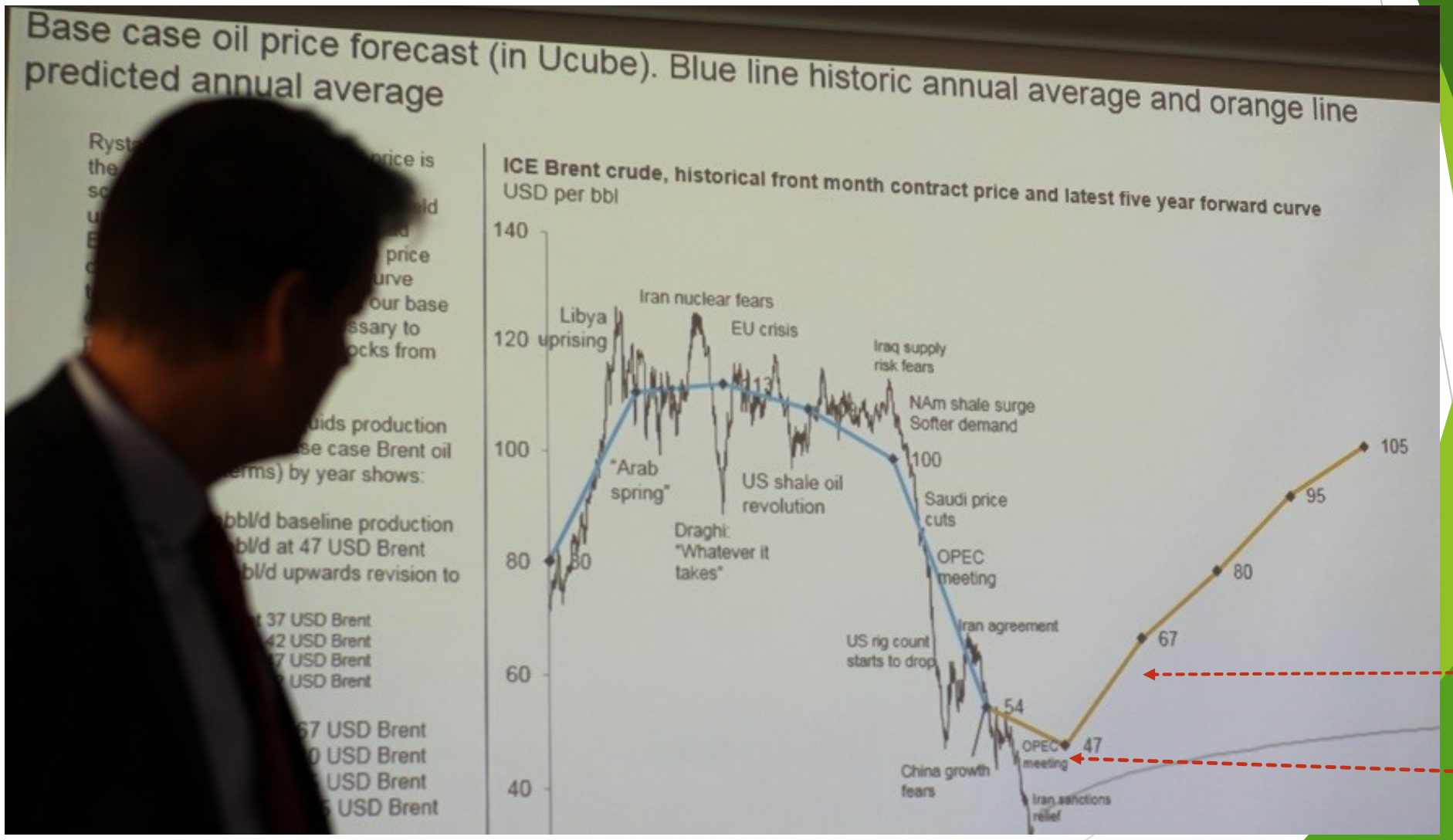
Timing & Oil prices



30 years on;
«Experts» forecast oil price again



SPE Meeting 10.03.16: Forecasting Oil Price



Average last week; USD 63

Average 2016; USD 46

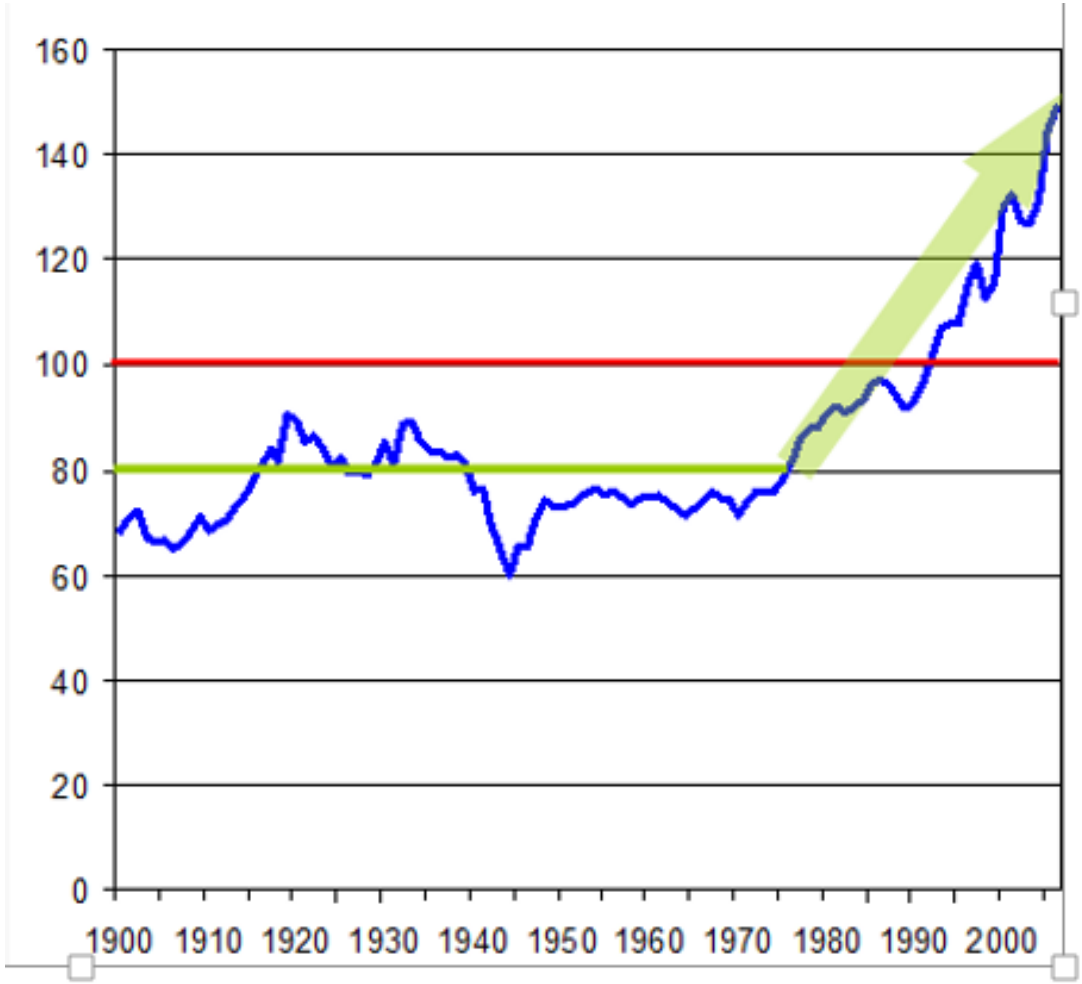
Norway – a history of abundant resources

- Fisheries
- Hydropower
- Oil and gas
- Fish farming
- Forest
- Mining

Norway – Key Figures Petroleum Upstream

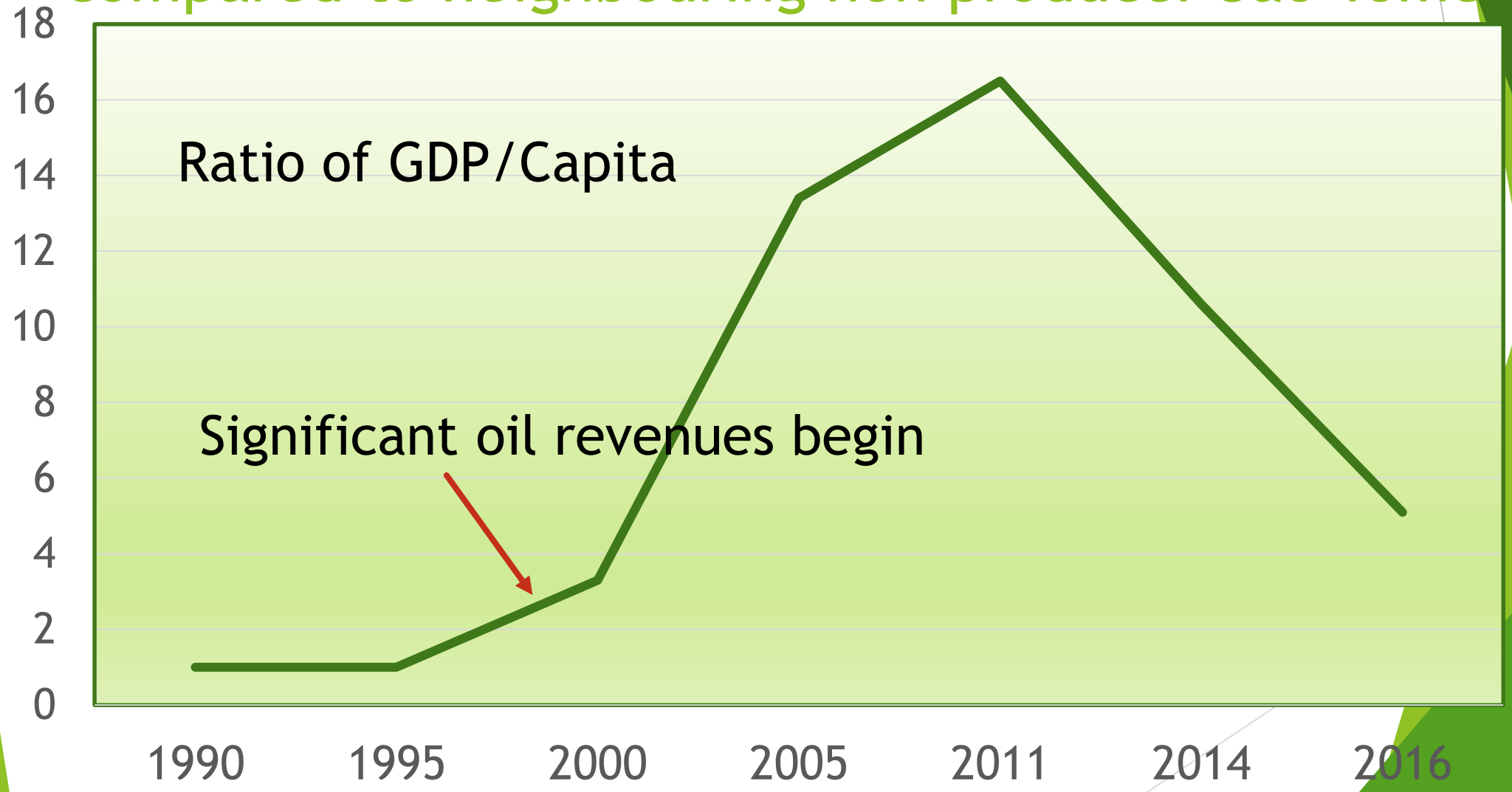
- Largest petroleum producer in in Europe
- 4 mill boepd (gas and oil)
- Produced O&G for 45 yrs
- Currently 80 fields producing
- 20 fields shut down
- 8 new fields approved
- 9,600 km pipelines

Oil revenues; Effects on Norway compared to neighbouring non-producer Sweden



Norways GDP/capita (blue) relative to Sweden (red), per cent

Oil revenues: Effects on Equitorial Guinea compared to neighbouring non producer Sao Tome



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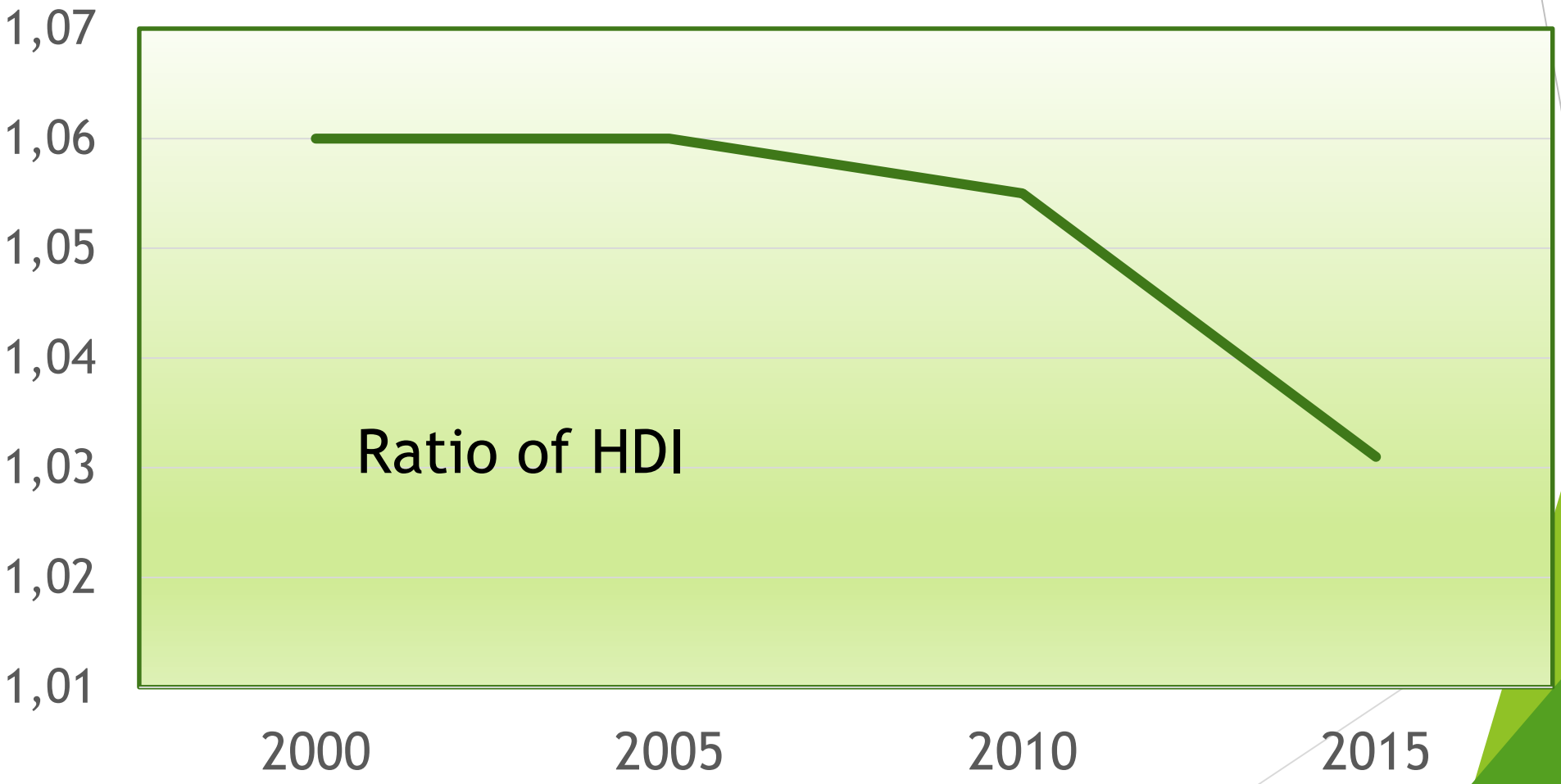
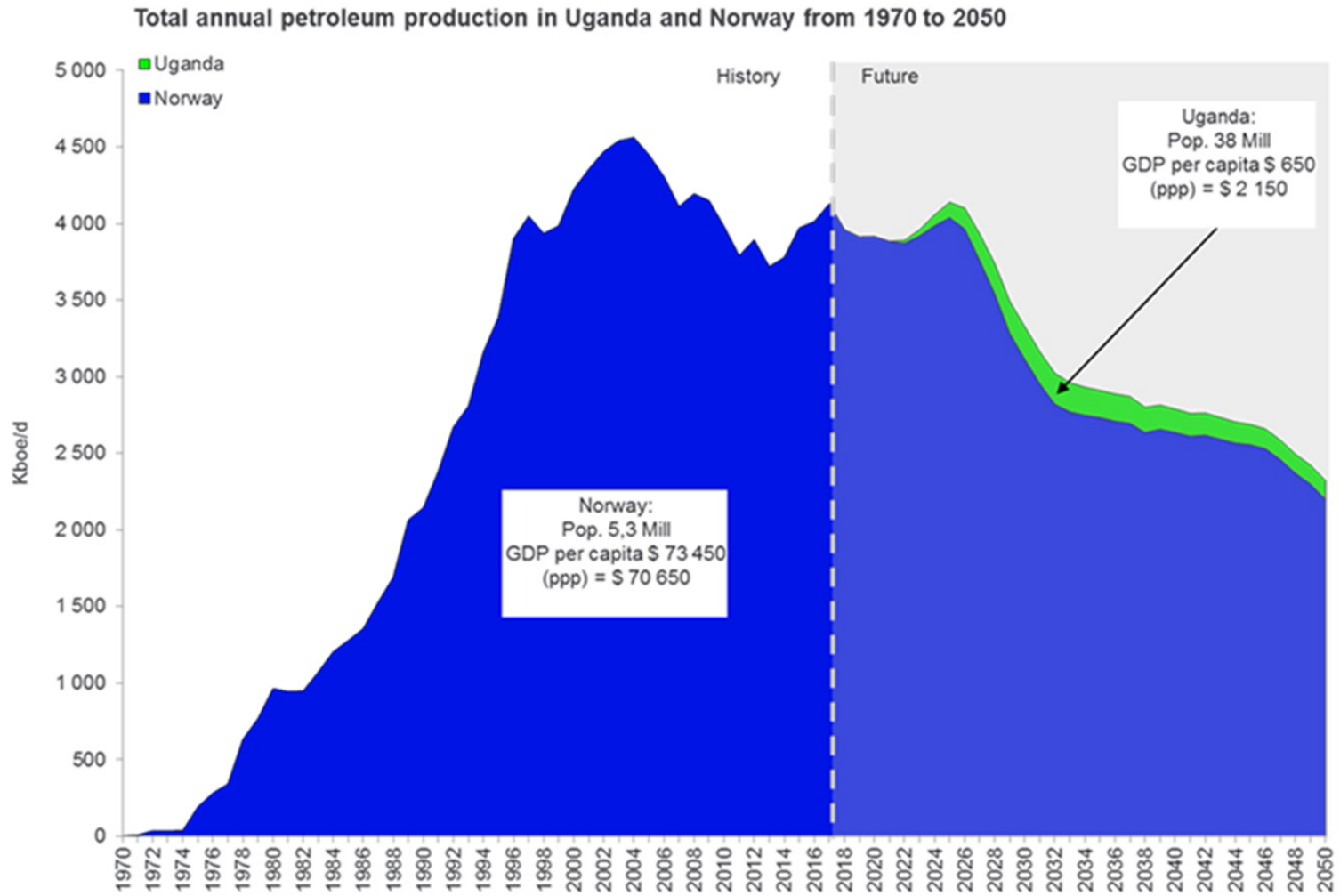


Norway vs. Uganda Oil Production

Set the expectations right – Uganda vs. Norway



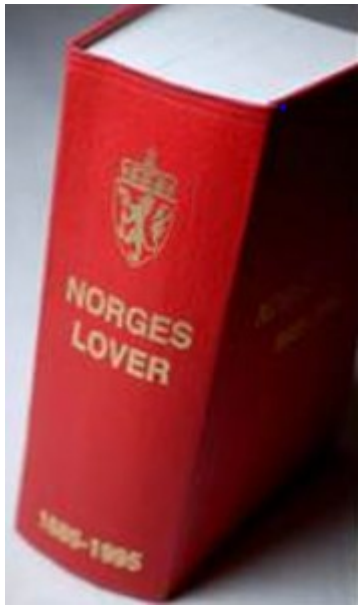
Local Content

Local content is the **share of employment** – or of **sales** in the sector – locally supplied at each stage of the chain (WB, July 2013)

- National participation comprise national suppliers (**Local content**) and national investors in operations (**National oil companies**)
- The two forms of participation **ENHANCE EACH OTHER**

Norway – its first petroleum law

«..local suppliers shall have preference given they are competitive in price, quality and schedule..»



The law is not enough

- Almost no effect on the first major developments
- Implementation required «with force»
- The authorities will not have capacity to implement in detail
- The Norwegian oil companies ensured implementation

Norway’s local content approach

- The industry moved rapidly to take part in the new emerging industry. Went into joint ventures with international companies
- Government policy was «go slow» compared to neighboring UK and Denmark
- «Norwegian content» was a tender evaluation criteria. Norway declared a local content target of 70% but never made this objective compulsory to licensees
- IOC’s contribution to society through technology transfer, job creation, training, R&D programs was a success criteria in licensing

Approach to technology development

- Oil companies told to include R&D initiatives in their offers in the bidding rounds
- R&D costs could be deducted against the tax
- 50% of R&D related to individual licenses to be carried out in Norway
- Many «Good-will Agreements» were signed between oil companies and Norwegian institutions

Local content – how it developed

20 years after oil discovered:

- Norway had managed to create a vibrant national oil industry
- The policy of slow licensing had given the local industry time to catch up with international levels and to even take the lead in some fields

40 years after oil discovered:

- Norwegian export of petroleum goods & services was 3% of the total GNP and 20% of the total export.

Norway; jobs in the oil sector

- The O&G sector contribues little to direct jobs
- The O&G sector is more important when it comes to demand for investment goods
- The demand from the O&G sector constitutes about 12% of the GDP in Norway
- About 8% of Norwegian employment is directly or indirectly associated with the demand from O&G activities

Norway; jobs in the oil sector

- **The oil companies employs around 25,000, and contributes with around NOK 300 billion in taxes**
- **Investments and operations in the oil & gas sector contributes to around 143,000 jobs and NOK 32 billion in taxes**
- **Norwegian supplier's exports contributes with 74,000 jobs and 28 billion in taxes**
- **Norway would nevertheless had significant tax revenues and employments also without an oil & gas industry**
  - The O&G indutry is the most important in Norway contributing to a significant part of tax revenues and employment.
  - However, it would not have been a catastrophy to the Norway economy if oil and gas had not been discovered,
  - A study concludes that the unemployment in Norway would have been around 3% higher without the petroleum resources,

Jobs and production

- The relation between production (1,1 billion barrels in 2010) and employment in the Norwegian sector is 105,000 (Menon & Iris 2011)
- Directly employed by oil companies for this production is 17,700

Norway; finding the balance

- It was a clear goal that Norwegian companies should take part and have key roles in operations
- It was also clear that this required sufficient competence and qualifications
- The costs and risks associated with giving key roles to under-qualified companies were not tolerated
- The difficult balance was achieved by letting IOC's lead in the beginning, whilst ensuring government control and Norwegian participation

Norway needed expatriates

Why did Norway suceed?

- ✓ Efficient governance
- ✓ Well developed institutions
- ✓ High level education and research
- ✓ Norway was sceptical to the oil age
- ✓ After the first large discoveries, the mood changed to caution in issuing new licenses
- ✓ The aim was to give the economy and society **time to master and adapt** to the new industry

Industry development Norway

- 4% of world o&g production goes to petrochemical industry, the rest to energy
- Oil from Norway piped to UK. NGL separated from the oil at Teeside and shipped to East Norway (Bamble).
- The dry gas transported in pipeline to Germany.
- Saga Petrokjemi East Norway started in 1974 with 2,500 people engaged in 1977. NGL refined to ethylen for plastic production.
- Production of 520,000 tonnes of ammonia (Yara AS) used to make fertilizers. Most exported

BBC 16.7.14; Norway to develop fish food from captured carbon dioxide

Petrochemical Industry Development Norway

- Hydro Polymers produces PVC at Herøya
- Hydro Polymers produces chlorine at Rafsnes
- Polyestyren (EPS) is produced in Ålesund
- Polyethylen and prophylen is produced by Borealis and Borstar
- Statoil produces methanol at Tjeldbergodden

Not a large number of jobs, around 15,000; but the products are vital for jobs in other industry sectors, agriculture and aquaculture.

Industry development Norway

Kollsnes Industrial Park (1995)

- ✓ CNG used for buses, taxis & heating
- ✓ Fish farming
- ✓ GE and Kværner test stations for turbines
- ✓ Shell test station for fuel cells

Uganda

The Uganda approach

- Companies in the O&G sector are expected to facilitate participation of Ugandans (Nat. O&G Policy 2008)
- The Petroleum Act 2013 requires Contractors to give preference to goods and services available in Uganda
- The Petroleum Act provides for training of Ugandans by the licensees and their Contractors in all phases of petroleum activities.
- The Act also provides for technology transfer, and requirements for oil companies to train Ugandans either locally or abroad
- Compliance with the local content requirements is a condition for renewal of licenses and permits

MAKE IT HAPPEN!

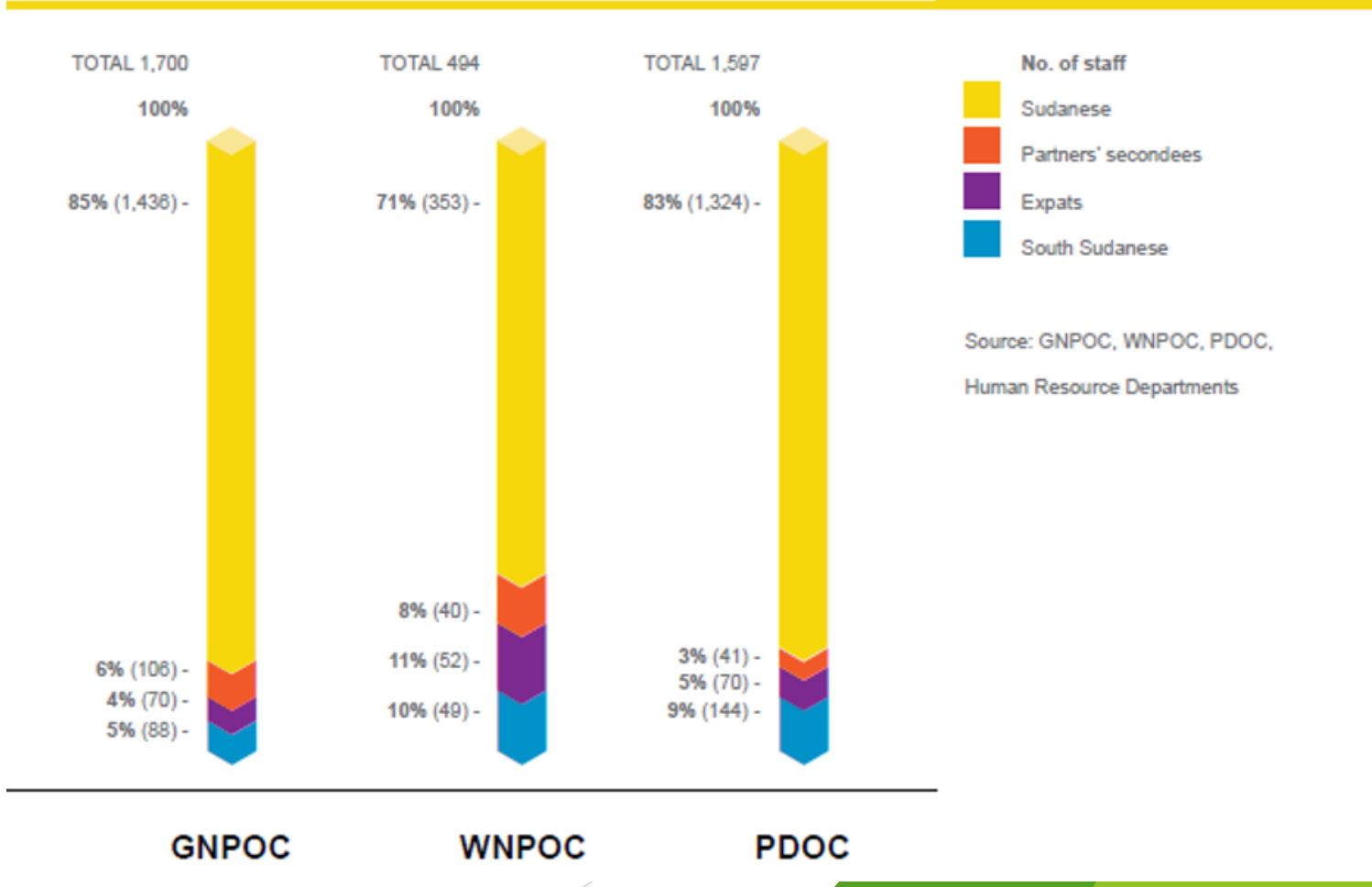
How many jobs?

2014 Uganda Industry Baseline Survey Report

- At peak, the oil industry will employ 11,000 to 15,000 people directly
- Long term jobs; 3000 during operations
- Induced jobs will range between 100,000 and 150,000 indirect jobs.
- Out of the above jobs, technicians and craftsmen will contribute more than 60 per cent,
- Engineers and managers will account for only 15 per cent and the rest shall be either semi-skilled or casual workers.

South Sudan; Jobs in the petroleum sector

- Core staff totals 3790
- In addition, contractor staff of 3000
- Total direct and contractor staff 6790
- In addition an unidentified number of casual workers



Uganda needs expatriates

Uganda needs to find the right balance in promoting own and international expertise.

- New rules restrict international oil companies (IOCs) from bringing into the country expatriates.
- Hefty expatriates salaries often becomes an issue

Women have an important role

Women are far better situated in Uganda at all levels with the oil industry, compared with African oil producers

(and possibly Norway with 15% female managers in the sector; 12% executive directors, 15-17% medium level leaders)

Success criteria

Ultimately, the realisation of the Uganda's oil potential for the benefit of all comes down to the government's ability to strike a balance between protecting Ugandans and creating a business environment in which IOCs are keen to invest

The African experience

Uganda in the African context

Recoverable reserves
bill. barrels

- South Sudan 3,5
- Gabon 2,0
- Uganda 1,7
- Republic of Congo 1,6
- Chad 1,5
- Equitorial Guinea 1,3

Production 1000
barrels/day

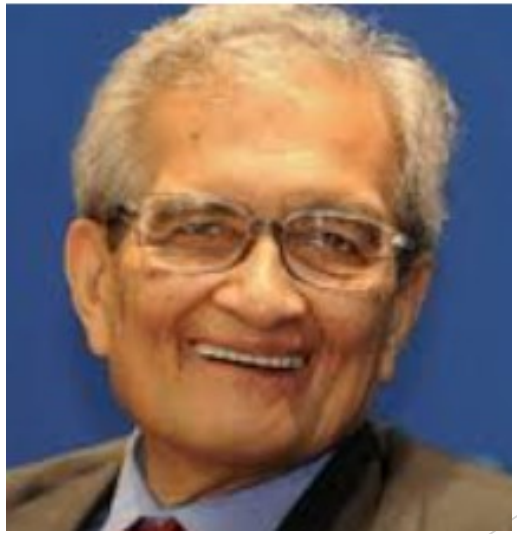
- Republic of Congo 259
- Equitorial Guinea 250
- Gabon 240
- South Sudan 160
- (~ Uganda)

Wellbeing; GDP or HDI?

The top 10 nations on the «Well being Index» are not typically oil producers, with exception of Norway

(Australia, Switzerland, Germany, Denmark, Sinagpore, Netherlands, Iceland, Ireland, Canada)

Many things of value in life cannot be fully captured by GDP, but they can be measured by metrics of health, education, political freedom, and the like. Amartya Sen:



What about Africa?

- RICH or POOR?
- Two of the richest countries in Africa are Equitorial Guinea and Gabon
- 17 of the 18 poorest countries are African; most of them rich in oil and minerals

- DEVELOPED & HAPPY (Human Development Index)
- Best in Africa (HDI) are Seychelles (no. 63) and Mauritius (64)
- Best south of Sahara is Botswana (108)
- Equitorial Guinea ranks no 145 on the HDI

Environmental issues

Wastewater

Drillcutting

Make use of it!

Some own experiences

BENIN

- **Seme field** discovered in 1968 by Union oil of California. However, not commercial then.
- Following oil price rise in 1973, Benin government negotiated with Saga Petroleum to develop the field. Agreement signed in 1979.
- Production started in 1982 at high oil prices.
- The first field development by a Norwegian oil company (Saga)
- Taken over by a Swiss registered company in 1984
- Production reduced to half
- Hit hard by the oil price shock of 1985.

Soviet Union

- Vast oil and gas reserves on the Arctic tundra and Arctic Sea
- Huge environmental challenges
- The Ardalin field first to be developed by an IOC (Conoco) 1994
- Numerous field developments delayed

Soviet Union

- Blow out lasted for 5 years
- Stopped by a nuclear detonation

IRELAND

- **CORRIB Field** discovered by Enterprise Oil 1996
- Saga Petroleum had 36,5%
- Shell took over Enterprise Oil in 2002. Saga's share to Statoil.
- Serious issues on land pipeline and onshore terminal. Longer than planned pipeline route to avoid housing areas. «Rossport 5» imprisioned in 2005.
- Production seriously delayed with major cost overruns.
- Approval given Shell 10th October 2015 to operate the gas terminal. Ready to start.
- Will deliver 60% of Irelands gas

Indonesia

- Finding a place to drill
- Pulau Gading Well no. 1

The infrastructure

Indonesia

- Access road to well site

Indonesia

104 years after Kessler's reported the Shell discovery from the deep jungle of Sumatra as a «*roar of a mighty storm*», Saga Petroleum's headquarter in Oslo receives a similar report. Pulau Gading Well no. 1 strikes gas and condensate.

Indonesia

The next prospect

Sungai Kenawang in

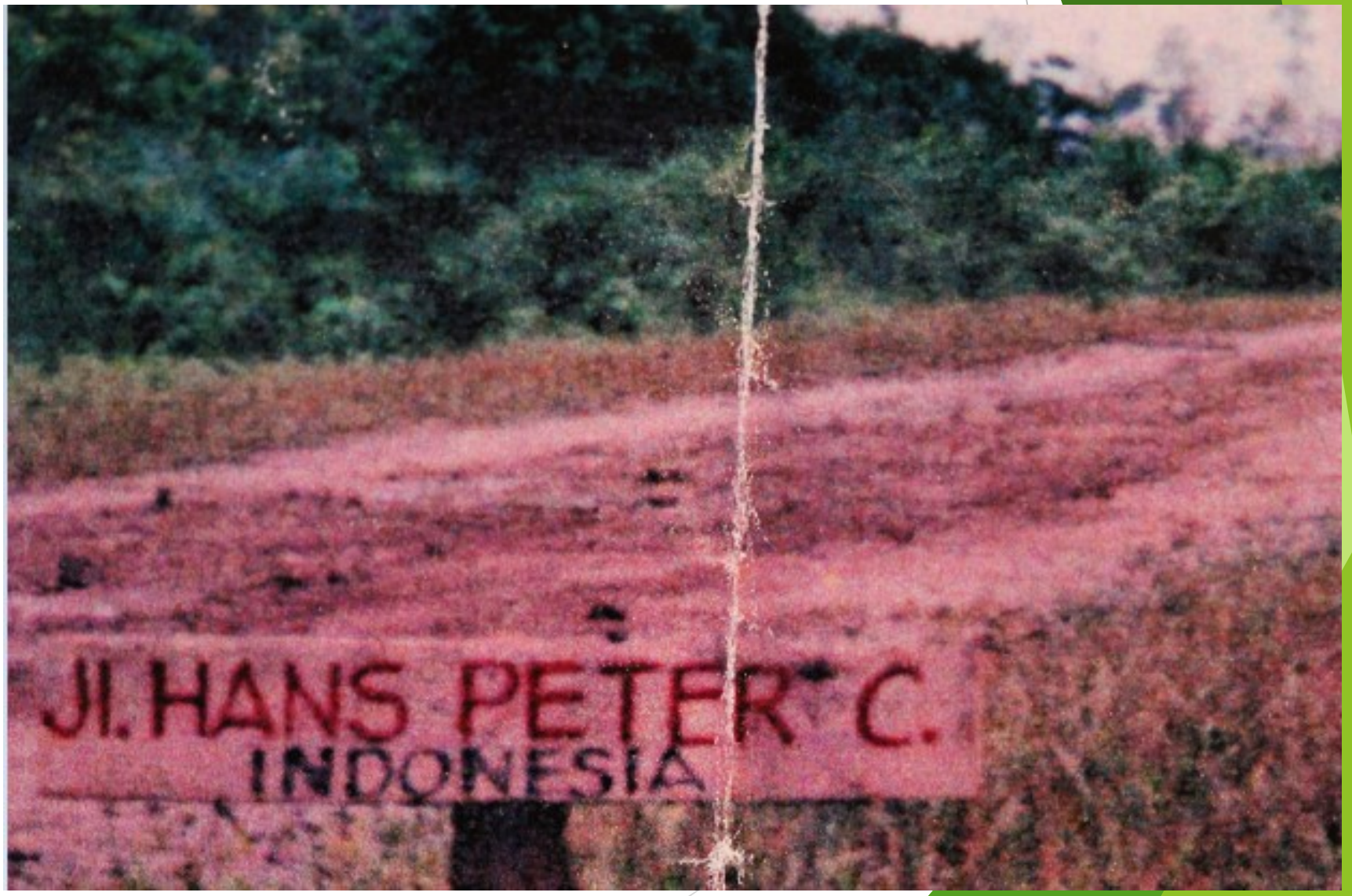
«the middle of no-where»

1,500 houses built in 10 months

Why???

The Road

20 years later



South Sudan

Central Processing Facility

Wastewater Pit

“The resources shall benefit the whole society”

Thank you