Norwegian Asset Accounts Oil and Gas

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Integrated Environmental and Economic Accounting (SEEA) – 5 Areas

- Physical and hybrid accounts
- Economic accounts and other environmentally related transactions (taxes)
- Asset accounts in physical and monetary terms
- Extending National Account aggregates to account for depletion, defensive expenditure and degradation
- Sustainable development and SEEA

Environmental and Economic Accounts at Statistics Norway

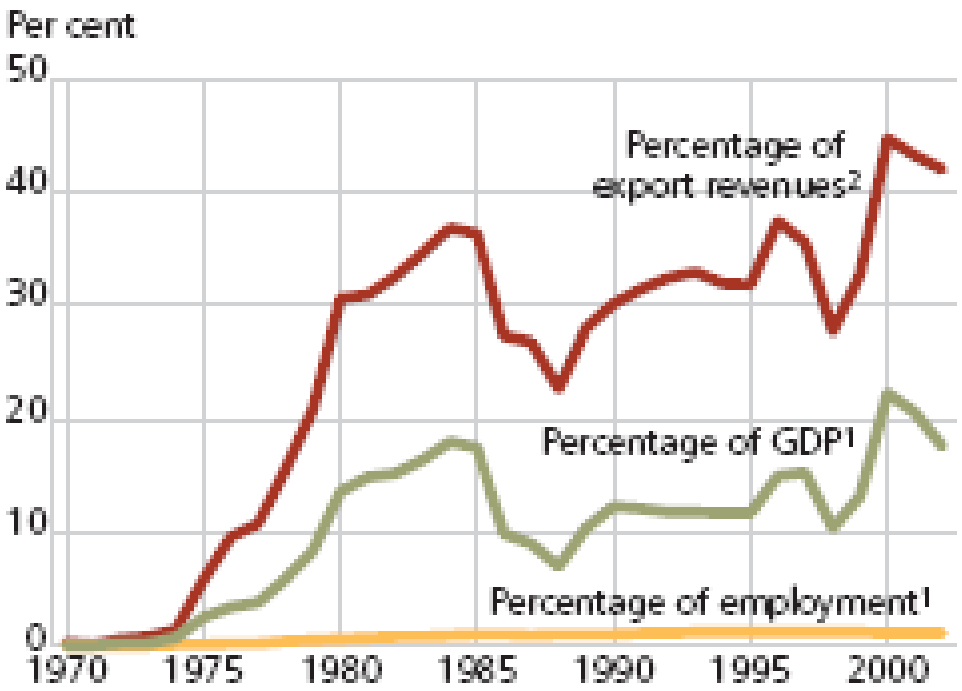
- Co-operation between the Division for Environmental Statistics and the Division for National Accounts
- 3 main areas:
  - Physical and hybrid accounts
    -- Linking data together
  - Economic accounts
    -- Expenditure accounts (env protection & resource mgmt)
  - Asset accounts
    --Environmental asset accounts (oil and natural gas)
- Sustainable development indicators

Physical and Monetary Asset Accounts for Oil and Gas

- Early 1980's: Production of **physical** asset accounts for oil and gas and a wide range of other subsoil assets (Statistics Norway & MoEnv)
  → terminated because the managers of the assets had their own calculations
- Late 1990's: Eurostat grants formed the basis for calculations of **physical and monetary** assets accounts for oil and gas, fish and forest (Statistics Norway).
- 2004: Statistics Norway is annually reporting **physical and monetary** asset accounts for oil and gas (1984-2002) to Eurostat.
  → same problem as in early 1980's

Why is this important for Norway?

Figure 2.6. Oil and gas extraction. Percentage of exports, gross domestic product (GDP) and employment. 1970-2002*



[1] Including services.
[2] Oil and gas only.
Source: National Accounts, Statistics Norway.

What do we have in physical terms?

- Norwegian Petroleum Directorate definition includes:
  - **reserves** → **proven**
  - **discovered resources** → **other discovered resources**
  - **undiscovered resources** → **undiscovered reserves**

Total: Exploitable petroleum resources

- Eurostat definition includes:
  - **discovered resources**
    - **proven**
    - **other discovered resources**
  - **undiscovered reserves**

Total: Economical recoverable resources

Changing physical units to monetary units

- Using an indirect valuation method
  → Eurostat recommends to calculate the monetary value of the oil and gas resources as the present value of the expected future net resource rent from oil and gas.

- a) Calculation of the resource rent
- b) Forecast of future resource rent
- c) Choose a discount rate (4% Eurostat)

a) Resource rent (RR) calculations

- Most variables standard NA data for **NACE 11.1** Extraction of crude petroleum and natural gas

  except

  division of taxes and subsidies into specific and non-specific,

- Normal rate of return to fixed capital = 8 %
  → Follows Eurostat recommendation

- Distribution of RR between oil and gas
  → Divided in proportion to the output value

b) Forecast of the future RR

First factor: Future prices

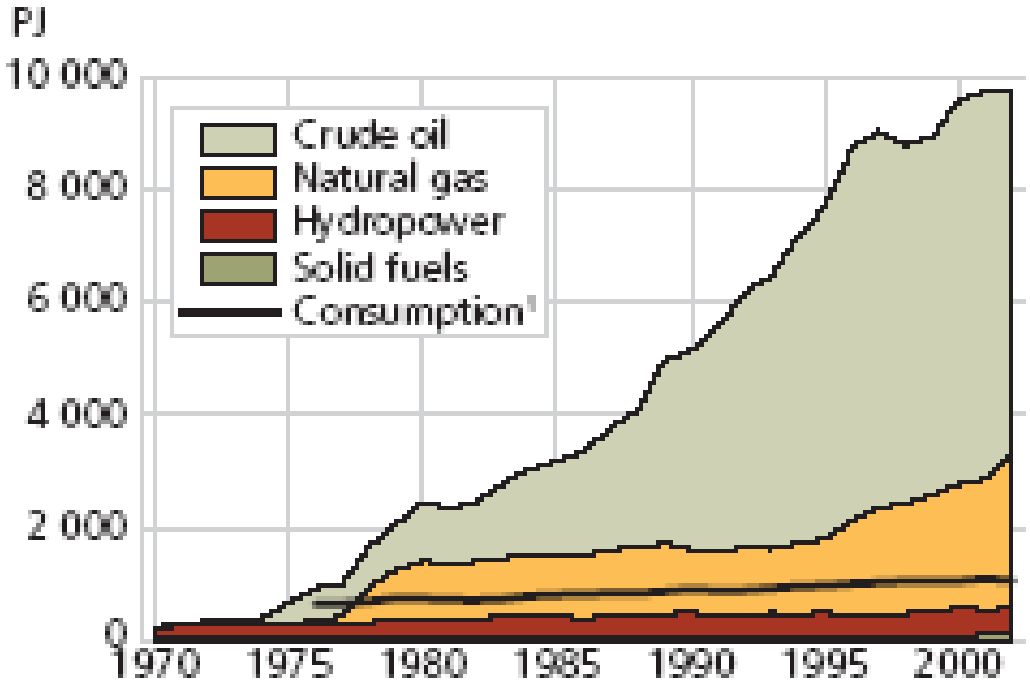
Eurostat recommends to use a constant unit rent per unit extracted equal to a three-year average of the unit rents. This will smooth out the price fluctuations.

Second factor: Extraction profile

Eurostat: Use explicit forecasts!

- but difficult to get
- estimate is based on a constant level of extraction (same as current year's extraction)

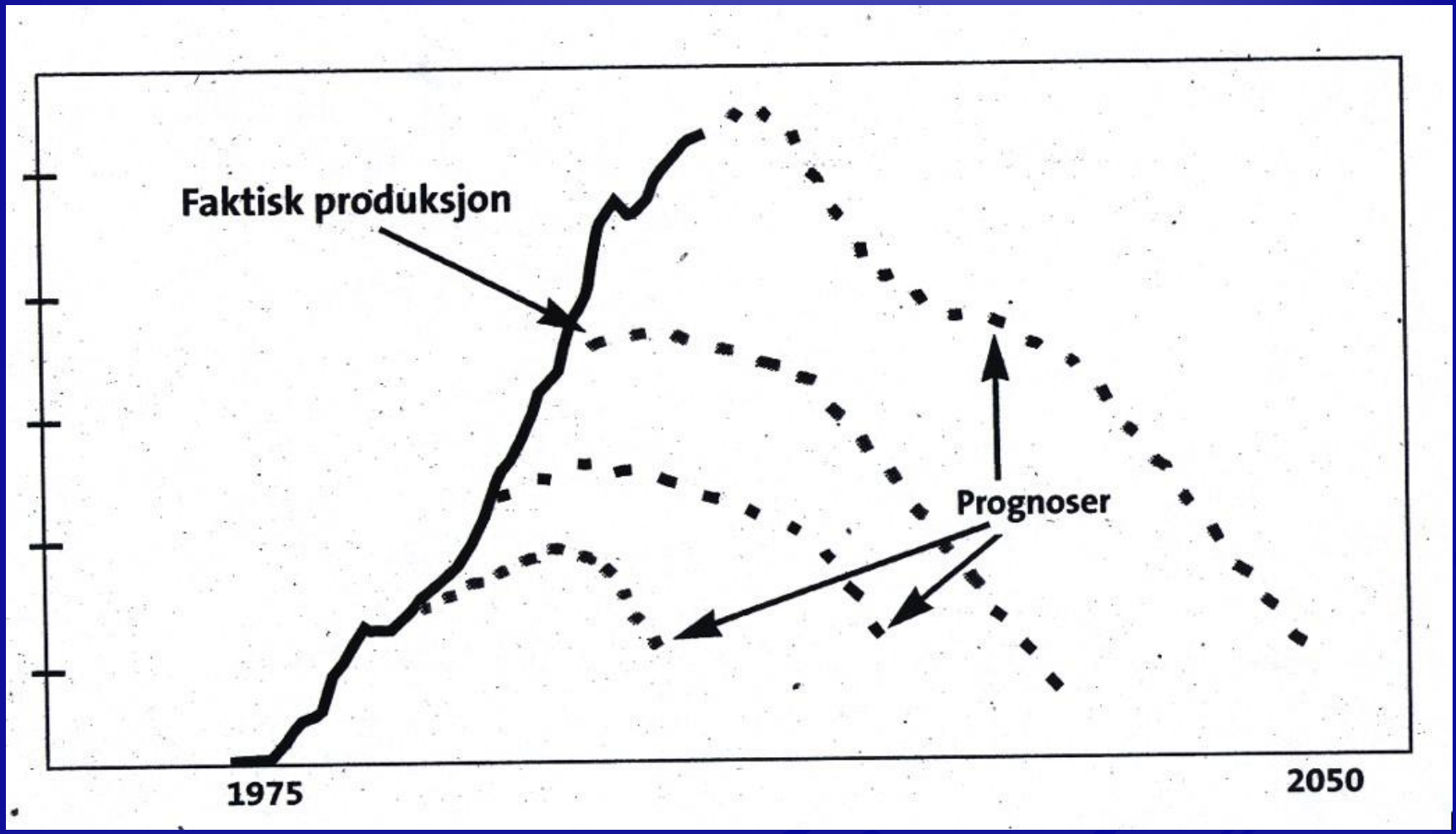
Figure 2.5. Extraction and consumption[1] of energy commodities in Norway. 1970-2002*



[1] Including the energy sectors, excluding international maritime transport.
Sources: Energy statistics, Statistics Norway, Norwegian Petroleum Directorate and Norwegian Water Resources and Energy Directorate.

The mystical oil income

Source: Dagsavisen 14.09.04



Assumptions make a BÌG difference!

- The valuation of the oil and gas resources is highly dependent on
  - forecast of **future prices** & **extraction levels**
  - the choice of the **discount rate** and
  - the assumptions made in relation to the **normal rate of return to fixed capital**

Changing the assumptions (2001)

	Oil (and NGL)				Natural Gas			
	Unit rent (mill NOK)				Unit rent (mill NOK)			
	3-year moving average			Current year	3-year moving average			Current year
	Rate of return			Rate of return	Rate of return			Rate of return
Discount rate	6 %	8 %	10 %	8 %	6 %	8 %	10 %	8 %
0 %	3 837 564	3 642 625	3 447 687	3 572 506	3 887 416	3 688 484	3 489 551	4 297 258
4 %	2 528 884	2 400 423	2 271 962	2 354 215	804 618	764 443	722 268	889 447
8%	1 788 942	1 698 068	1 607 195	1 665 381	405 984	385 208	364 433	448 786

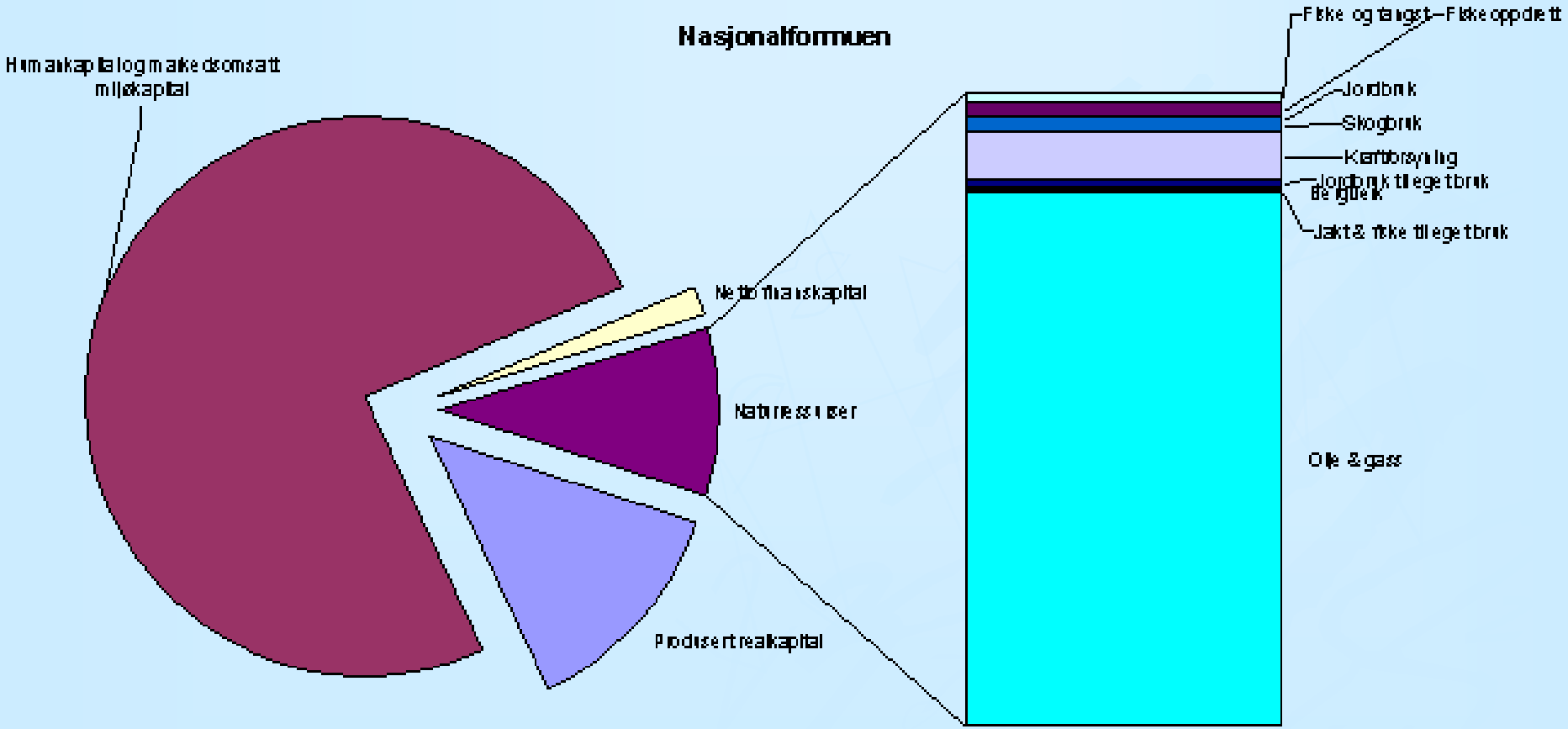
So what?

- What is the use of our calculations that we send to Eurostat?
  Answer: basically none... not included in the national accounts and not considered as ’official statistics’
- **but...**
- Ministry of Finance calculates National Wealth and presents this in their strategy plans – and here is valuation of oil and gas is included!
- Also discussed in terms of funding social security and pensions in the future

Comparison of calculation methods for valuating the oil and gas reserves:

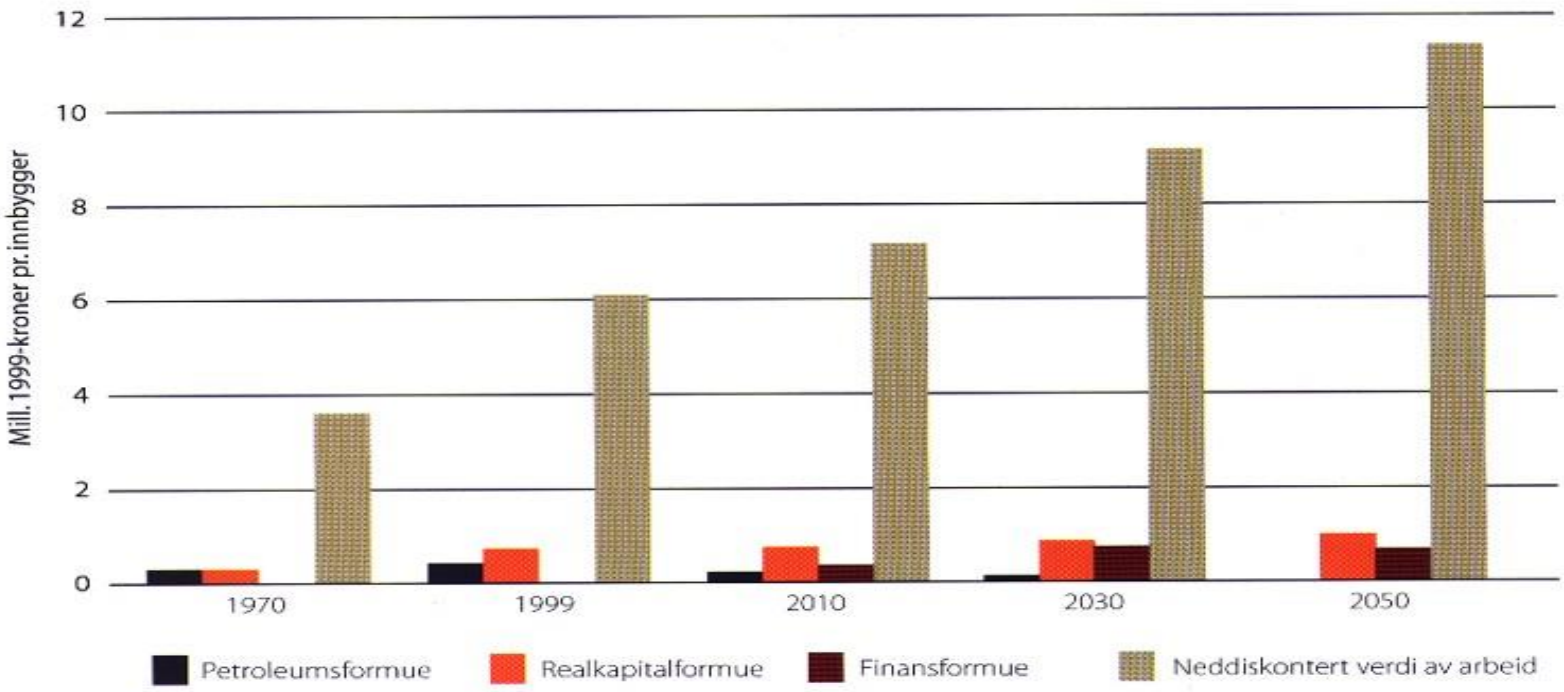
	Statistics Norway (reports to Eurostat)	Ministry of Finance (part of national wealth)
Physical estimates	**Norwegian Petroleum Directorate's estimates**	**Norwegian Petroleum Directorate's estimates**
Resource rent calculations but: **- Compensation of employees:** **- Return to fixed capital:**	**Eurostat definition** NA-data 8 %	**Eurostat definition** NA-data AND alternative salary Operating surplus/fixed capital (both mainland Norway)
Future extraction profile	**Constant**	**Forecast from Norwegian Petroleum Directorate**
Discount rate	**4 %**	**4 % AND 7 %**
Future prices	**Three-year average of the unit rents**	**Forecast from Norwegian Petroleum Directorate**

Components of National Wealth



Strategy of the Ministry of Finance

Figur 1. Utviklingen i de ulike komponentene av nasjonalformuen



Realkapitalen utgjorde vel 10 pst. av totalen, finanskapitalen utgjorde rundt 1/2 pst., mens petroleumsformuen utgjorde i størrelsesorden 6 pst. i 1999. Gjennom utvinning av olje og gass og oppbyggingen av Statens petroleumsfond vil petroleumsformuen bygges ned og finansformuen øke.

Sustainable Development Indicators

- 6 main themes connected to the Government's policy for Sustainable Development in Norway:
  - Climate, Ozone and Transboundary pollution
  - Biodiversity and cultural heritage
  - Natural resources
  - Chemicals that have health and environmental risks
  - Sustainable economy
  - Social indicators
    - National
    - International

Future for this work...

- Method for calculating the value of oil and gas reserves will need to be harmonized within Statistics Norway and between Statistics Norway and the Ministry of Finance
- Used as information for National Sustainable Development Indicators and in National Wealth calculations