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?
What do we have in physical terms?

- Norwegian Petroleum Directorate definition includes:
  - reserves
  - discovered resources
  - undiscovered resources

  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.  
The mystical oil income
Source: Dagsavisen 14.09.04
Assumptions make a BIG 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)

<table>
<thead>
<tr>
<th>Discount rate</th>
<th>Oil (and NGL)</th>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit rent (mill NOK)</td>
<td>Unit rent (mill NOK)</td>
</tr>
<tr>
<td></td>
<td>3-year moving average</td>
<td>Current year</td>
</tr>
<tr>
<td>Rate of return</td>
<td>Rate of return</td>
<td>Rate of return</td>
</tr>
<tr>
<td>6%</td>
<td>3 837 564</td>
<td>3 642 625</td>
</tr>
<tr>
<td>8%</td>
<td>3 698 613</td>
<td>3 493 625</td>
</tr>
<tr>
<td>10%</td>
<td>3 508 564</td>
<td>3 312 625</td>
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**Note:** The highlighted values indicate changes from the previous assumptions.
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:

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

Nasjonalfornyelsen

- Fiske og tømmer
- Jordbruk
- Skogbruk
- Kunstbruk
- Jordbruk og tømmer
- Jakt og fiske
- Brann og gass
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