

Global energy reserves and the need for establishing a compatible standard for measuring energy reserves and resources (UNFC)

By

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My remarks refer to our fuels of convenience, oil and gas. They also apply to other non-renewable fossil energy and mineral resources.

We do not know with great precision what the recoverable quantities of oil and gas are, nor how demand will grow. Both depend on human actions. We do know that they are in great demand, and that they are finite. We also know that we cannot recover 100% of the oil or gas that is in the ground, but the percentage will depend on the recovery processes that are applied.

The recovery processes are for the most part physically irreversible processes. The implication is that the amount we can recover and use depends on the entire history of past efforts in addition to future efforts. Said in plain words, if we fail to invest for high recoveries in the long term, those resources will be lost. The potential is destroyed. Flaring gas, early depressurisation of oil and condensate reservoirs, dilution of oil by inefficient displacement fluids are all examples of this.

Decisions to invest for high recoveries in the long term are decisions to secure supplies. The real negotiations are between governments and industry together on one side and the geology on the other.

Immediate investments to gain production in the longer term are based on the current opinion of future wellhead prices. The higher and the more predictable they are, the easier it is to undertake the required efforts to recover the substantial quantities of resources that are economically marginal.

This may sound simple. It is not. It requires a comprehensive approach addressing the economic and social conditions affecting prices at the wellhead, the efficiency and cost of recovery operations and the geological conditions. The international community of governments, industry and the financial community all influence the recoverable quantities and can increase it substantially if they act in concert.

The United Nations Framework Classification for Fossil Energy and Mineral Resources (UNFC), as serviced by the UNECE, is designed to facilitate this. It aims to serve the following four principal needs:

1. International energy and mineral studies to formulate robust and long-sighted policies.

2. The needs of governments in managing their resources accordingly, allowing market prices to be transferred to the wellhead with as little loss as possible.
3. The industries' needs for information while deploying technology, management and finance to secure energy supplies and capture value efficiently within the established frameworks. This will serve its host countries, shareholders and stakeholders.
4. The financial community's need for information to allocate capital appropriately, providing reduced costs and improved long-sightedness through the application of lower risk-compensated discount factors.

The UNFC categorises recovery projects rather than the accumulations or deposits in which they are found. The projects are categorised with respect to economic and social viability, project feasibility and maturity and uncertainty with respect to the quantities that the projects will recover. The categorisation of projects rather than of accumulations is a recent development over the last 15 years or so. It provides coherence with other information such as production, cash flows, value, demand for various input factors etc.

This key aspect of the UNFC reflects the critical relationship between the quantities that can be economically recovered and the recovery processes (projects) that must be implemented to achieve those recoveries. In so doing, it focuses on the impact of possible recovery projects, highlighting potential wastage of resources through flaring or inefficient recovery processes.

Many resource inventories are still based on a characterisation of the geologic endowment only. The UNFC is designed to also be a harmonization tool, allowing these early inventories to be mapped to a UNFC inventory without loss of information. With use, these pre-existing inventories can be expanded to contain the project detail required for an efficient resource management.

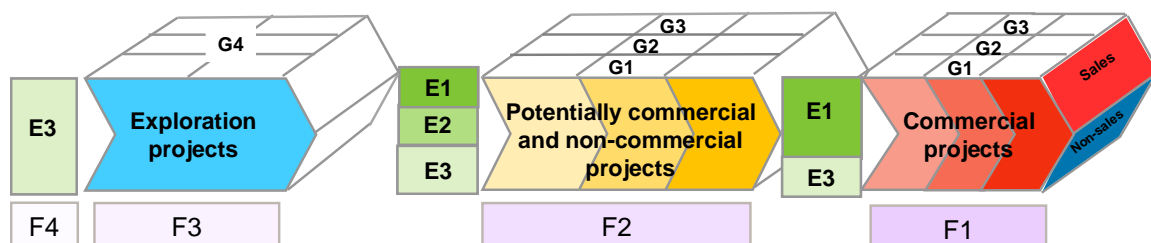


Figure 1. The UNFC and the project value chain

To illustrate, figure 1 shows a normal value chain starting with exploration, proceeding to the evaluation of discoveries, design of one or more consecutive development projects, building of the facilities and extraction. At the building and extraction phase, there will normally not be any hindrances to extraction in the economic and social domain. A distinction is made between sales production and non-sales production. For petroleum projects the non-sales production will normally be on-site fuel usage and flared gas.

In the evaluation phase, there may be restrictions both in the technical and industrial domain and in the social and economic domain. The UNFC allows projects to be categorised independently with respect to maturity in both of these domains. The effects on recovery of improved social and economic framework conditions or of improved technical and industrial processes can then be seen and distinguished.

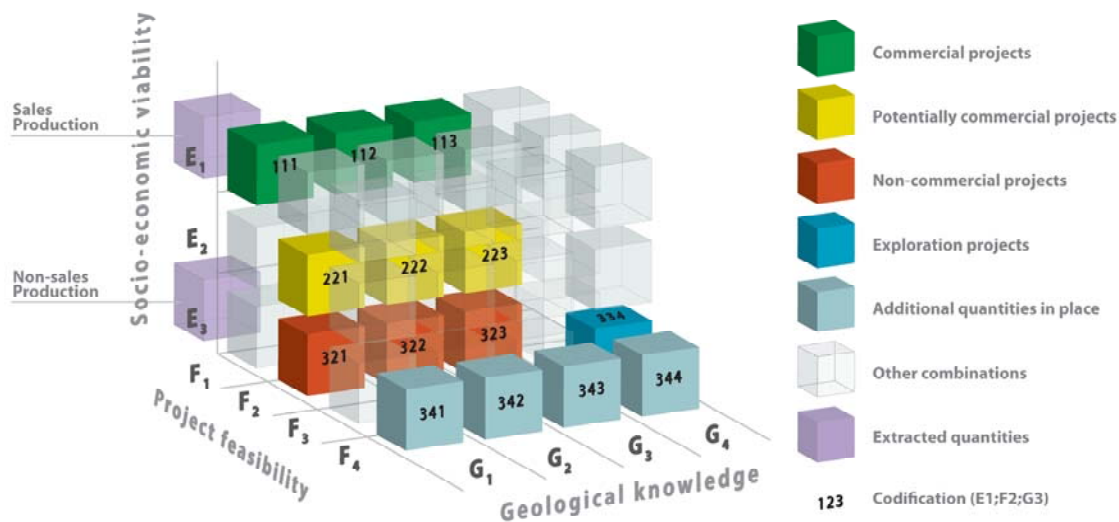


Figure 2, The draft United Nations Framework Classification for Fossil Energy and Mineral Resources 2009

Figure 2 shows the condensed and formal representation of the UNFC with the unique and language-independent numbering system for the categories. They are the E categories in the economic and social domain; the F categories in the project feasibility and industrial domain; and the G categories in the geological domain reflecting uncertainties in recoverable quantities.

The case of Norway demonstrates how the principles supported by the UNFC have secured oil and gas supplies to the UNECE region. This has been achieved by a concerted effort by governments and industries to achieve high recoveries.

Already in 1975, the importance of recovery efficiency was recognised in the Norwegian Royal Decree regulating petroleum activities. The text developed then has remained unchanged until today. The petroleum law in force states:

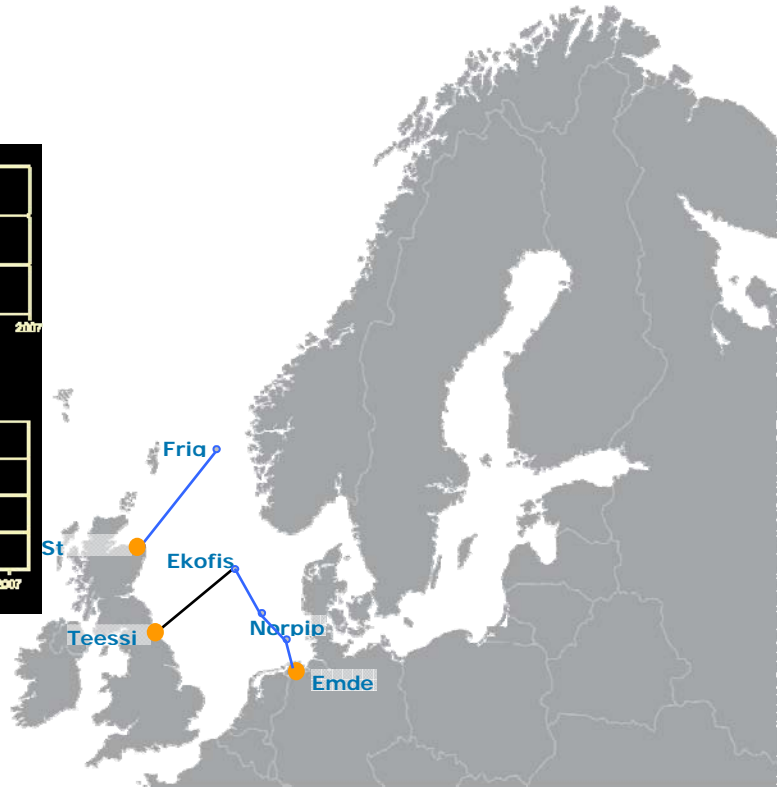
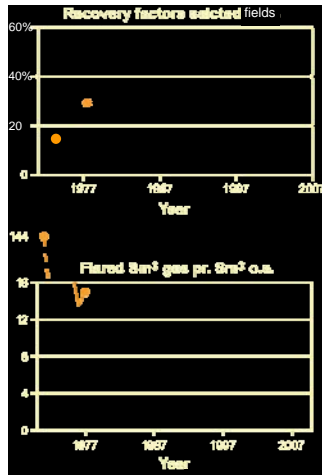
“Production of petroleum shall take place in such a manner that as much as possible of the petroleum in place in each individual petroleum deposit, or in several deposits in combination, will be produced. The production shall take place in accordance with prudent technical and sound economic principles and in such a manner that waste of petroleum or reservoir energy is avoided. The licensee shall carry out continuous evaluation of production strategy and technical solutions and shall take the necessary measures in order to achieve this.”

These are not empty words.

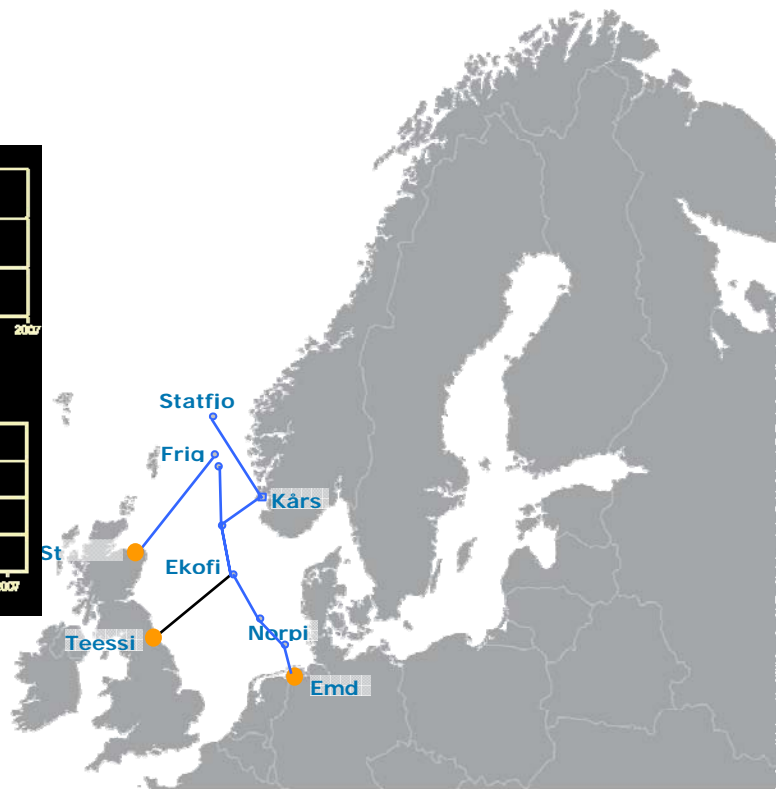
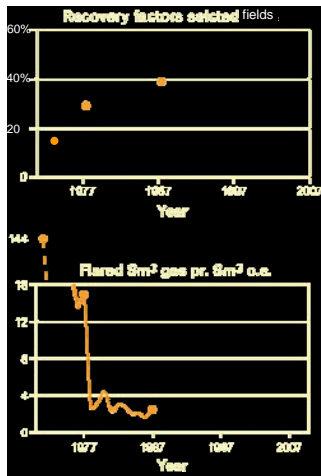
The history is shown in figure 3. Developments started in the south and progressed towards the north, allowing early investments in infrastructure to be re-used. This helped to reduce costs and consequently increase the well head values. Increased efforts to improve recovery efficiencies became economically viable. Bold technological advances with respect to recovery processes and offshore facilities were conceived, developed and implemented to recover the resources. With time, the framework conditions were also made more efficient. Elements of gross tax that act like costs in reducing well head values for the developer were removed. Neutral taxes that do not affect incentives were introduced. This took the form of

abolishing royalties and of introducing a “Brown tax”, the State Direct Financial Interest (SDFI). The pipeline infrastructure was regulated to facilitate access to markets and the transfer of prices to wellheads without loss in the form of excess profits and fees paid for its use. Fees and regulations were introduced to curb emissions of carbon dioxide and other substances.

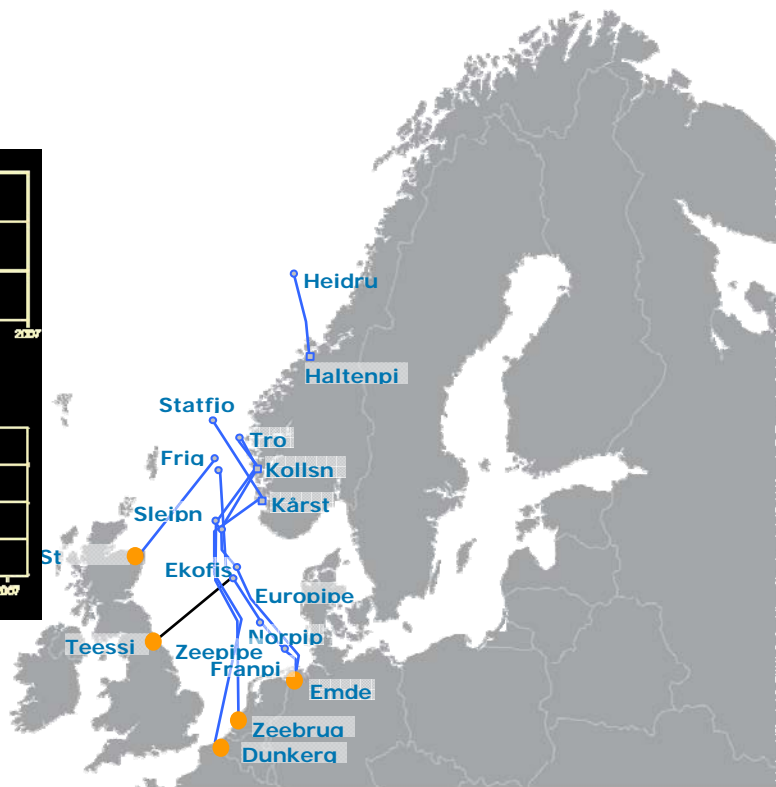
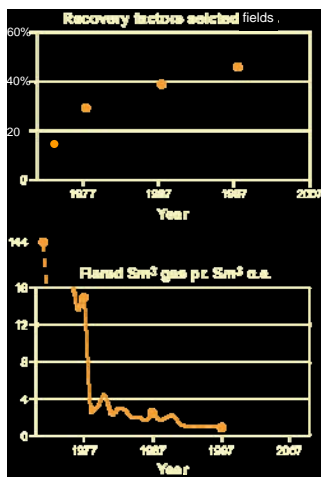
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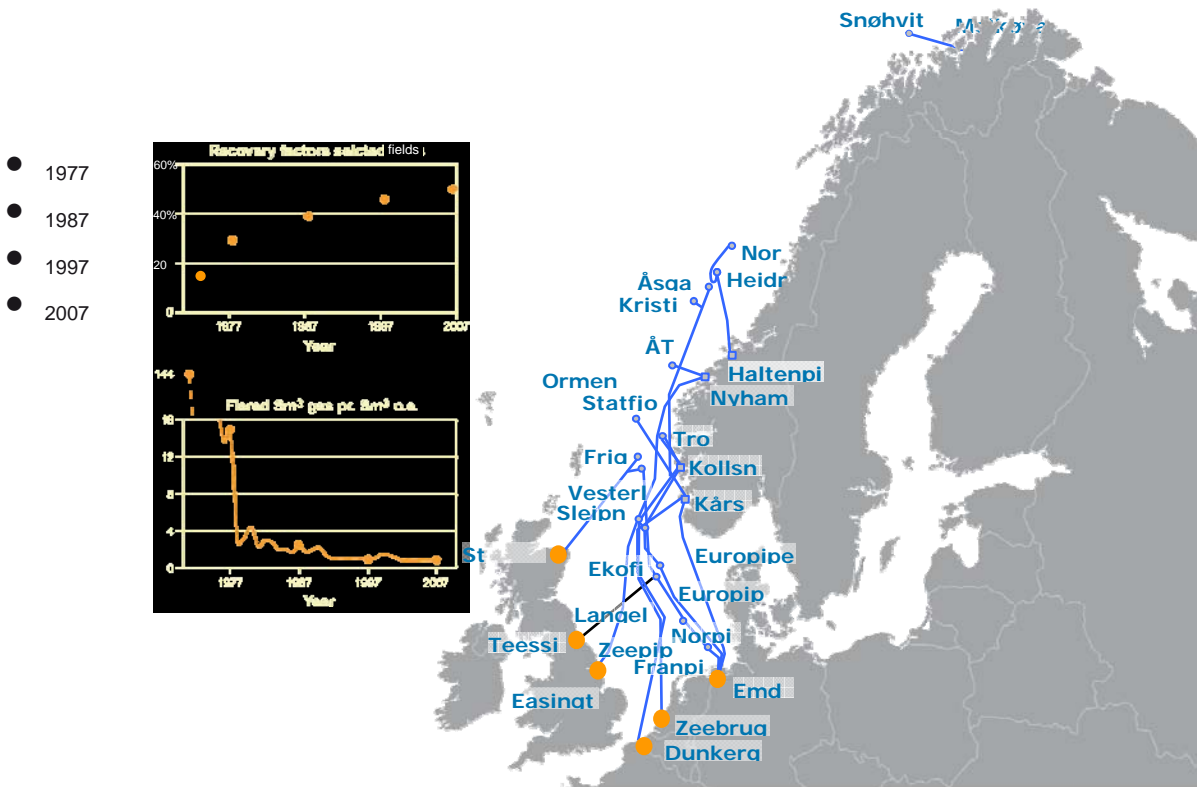


Figure 3. Gas transport and terminals, recovery factors and flared gas

The improvements in oil recovery from an estimated 18% of the quantities in place in 1973 to nearly 50% on average in 2007 represents nearly a tripling of the resource base. Very little gas was lost as seen in figure 4. Today, this is valuable gas, located in the region where it is used.

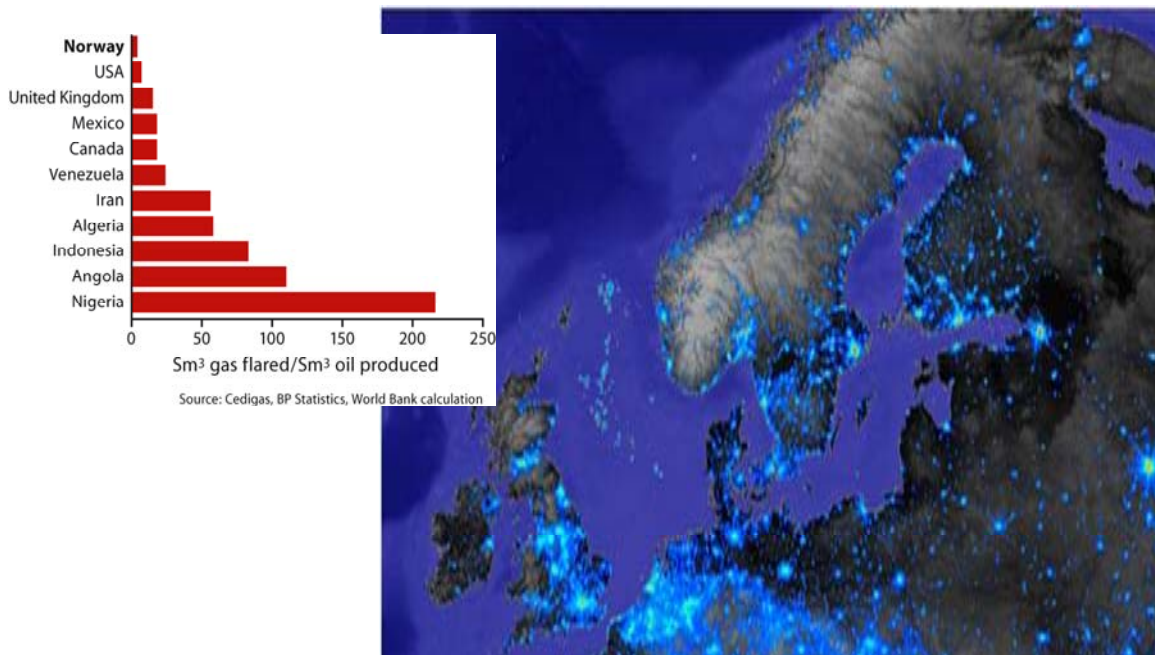


Figure 4. Energy to Europe

Finally, the Norwegian Government has managed these achievements with great benefits to its treasury. Figure 5 shows the government cash flow from petroleum. Government take is strongly influenced by the SDFI that to a much lesser extent than other taxes cause a degrading of the economic and social categorisation of the recovery projects (the E categories of the UNFC).

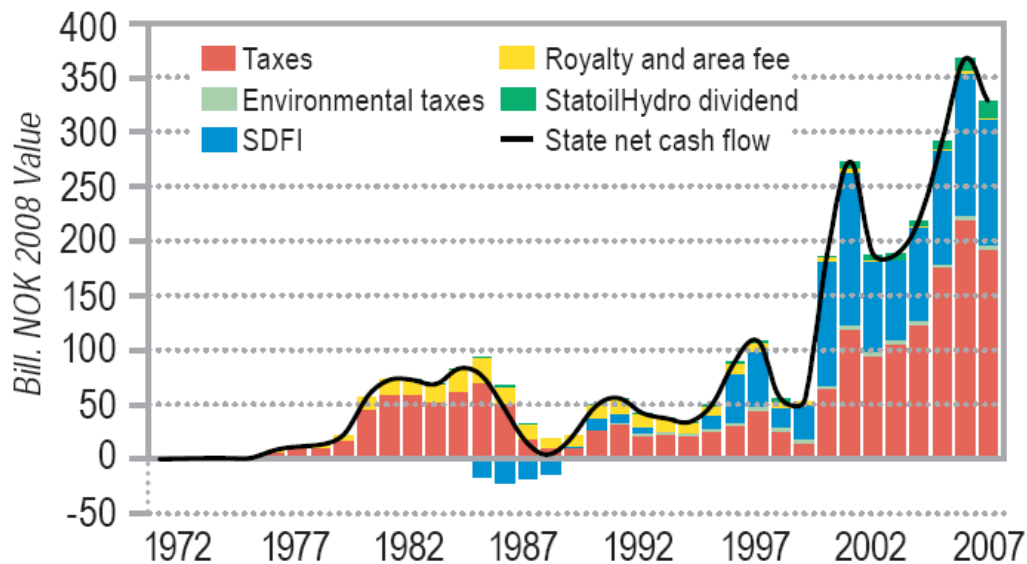


Figure 5. Government cash flow from petroleum

The UNFC is designed to facilitate such international cooperation for energy security through efficient recovery of natural resources. The UNECE Ad Hoc Group of Experts on the Harmonization of Fossil Energy and Mineral Resources is currently working intensely to enhance its details. The schedule is driven by the efforts to improve financial reporting standards globally.

In conclusion, I would simply urge the Commission to request governments and encourage industry to adopt and apply the United Nations Framework Classification for Fossil Energy and Mineral Resources in accordance with UN ECOSOC Resolution 2004/233.