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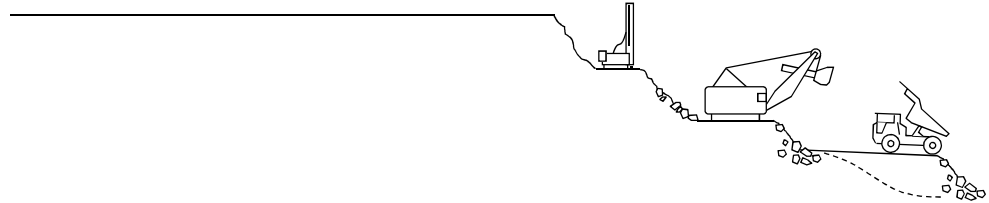
Beyond Classification – Managing Resources Sustainably

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Successful resource management requires relevant information on the resource base, adequate framework conditions and enterprising capacity in the public, private and financial sectors. We address how the United Nations Framework Classification for Resources (UNFC) is built to house resource inventories and the guidance provided for applying this to minerals in Finland, Norway and Sweden.



INTRODUCTION

The UN Framework Classification for Resources (UNFC) (UNECE, 2013) (Figure 1) is a management tool that serves several purposes. Important among them are to facilitate:

- Robust and fact-based policies.
- Government resource management.
- Industry business process management.
- Efficient capital allocation.

The Norwegian petroleum law, Section 4-1 Prudent production (Norwegian Parliament, 1996) sets out its purposes of exploration and production activities:

“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.”

This obliges licensees and Government alike.

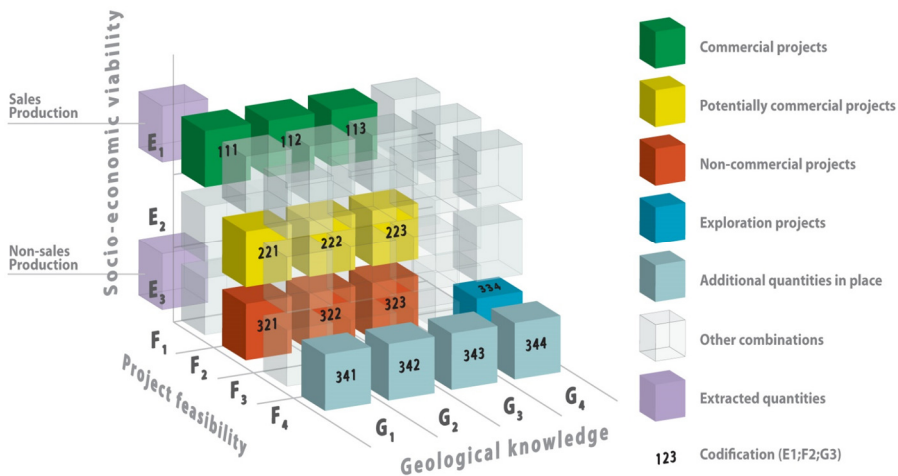


Figure 1. The United Nations Framework Classification for Resources.

UNFC has been developed as a globally applicable classification with a global mandate from the United Nations Economic and Social Council under the supervision of the member States of the United Nations Economic Commission for Europe (UNECE)¹.

It has a higher granularity than many of the classifications that are bridged to it, notably the mineral classifications developed on the CRIRSCO Template (Committee for Mineral Reserves International Reporting Standards, 2013), the Petroleum Resource Management System developed under the leadership of the Society of Petroleum Engineers (SPE PRMS) (Society of Petroleum Engineers, American Association of Petroleum Geologists, World Petroleum Council, Society of Petroleum Evaluation Engineers, 2007), the Oil and Fuel Gas Reserves and

¹ The 56 member States of the UNECE are the countries of North America, Europe, the Former Soviet Union, Turkey and Israel. There are five such regional commissions under the UN Economic and Social Council.

Resources Classification of the Russian Federation of 2013 (Russian Federation Ministry of Natural Resources and Environment, 2013, UNECE 2016), The Chinese Solid Minerals Classification (UNECE, 2018a) and the Chinese Petroleum Classification (UNECE, 2018b). This higher granularity allows an easy transfer of the UNFC inventories to inventories bridged to it. This implies that there may be several UNFC classes that combine to form one class in the bridged classification, but seldom if ever several classes in the bridged classifications that form one class in UNFC.



Figure 2. Guidance Document for the Application of the UNFC for Resources.

The Geological Surveys of Finland, Sweden and Norway, in cooperation with the Swedish association of mines (Svemin), minerals and metals producers, recently proposed a Guidance Document with the assistance of Petronavit a.s to facilitate the use of UNFC for mineral resources (Geological Surveys of Finland, Norway and Sweden and Svemin, 2018) (Figure 2). The Guidance Document was finalized after being posted for public comments. The Expert Group on Resource Classification thereafter recommended that the Guidance for the Application of UNFC for Mineral Resources in Finland, Norway and Sweden be applied in those countries and also be used as a starting point for other countries considering applying UNFC to mineral resources. The Expert Group also recommended to assess UNFC implementation in other European countries.

While the Guidance primarily aims to meet the needs of the three countries, many of the items it addresses are necessarily of international applicability as the industries in these countries are international and are globally financed. Finland, Norway and Sweden cooperate closely with other countries inside and outside of the European Union. UNFC is now considered by the EU as a potential solution for harmonized resource management and sustainable land use across Europe as it is applicable at regional, national but also at European level. An African Mineral and Energy Resource Classification and Management System centered around UNFC (UNFC-AMREC) is currently being designed. UNFC-AMREC will incorporate the Pan-African Resource Reporting Code (PARC) for public disclosure requirements.

RESOURCE MANAGEMENT PRINCIPLES

The management principles summarised here are described in greater detail in Energy Strategy Reviews, volume 3 (Heiberg & Lessard, 2014) (See Figure 3).

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Figure 3. Table of contents of the Energy Strategy Reviews Volume 3 issue on Oil & Gas Strategy Innovation through Partnering.

Here, only four basic principles are highlighted:

Fostering and applying integrative dynamic capabilities in the public and private sectors

By capability we mean the combination of competence and capacity at the level of the organisation. To meet future demands, this capability must be dynamic in order to survive the strong reforms that are taking place locally and globally. Ongoing activities must be executed in such a manner that transferrable skills develop. This applies in both the public and the private sectors. Moreover, the dynamic capabilities must be made integrative for the two sectors to excel in concert. The private sector must adapt to the public needs wherever it operates, and the public sector must be conscious of the essential influence that its actions have on the ability of the private sector to perform at its best to deliver the results required.

While the public sector is tied geographically, the private sector can choose not to be. It can import key capabilities from abroad and it can export capabilities there, all while strengthening both the local industries, exports and its own industrial cluster.

Enhancing value at the source

In order to meet the requirements of laws such as §4-1 of the Norwegian Petroleum Law quoted above, the value at the source must be made high. It is the value at the source that determines whether a marginal quantity will be recovered or wasted (on surface or in the subsurface). The irreversible nature of recovery processes makes it particularly important to ensure that the public-private partnership is able to provide a predictable and high value at the source. Quantities lost in the subsurface or wasted during the mining stages through insufficient investments early can in general not be recovered later without a substantial loss of energy and value.

To achieve a high value at source requires a broad public-private cooperation whereby a high value is fetched in the market and transferred to the source without unnecessary losses. This means effective engineering and development of field facilities. It also means skilful development of infrastructures in time and space in the form of processing centres, transport facilities etc. Furthermore, it means skilful licensing to ensure that discoveries are sequenced to allow full use of facilities generated.

Soft infrastructures in the form of research and education, safe social and environmental benign processes, robust and effective labour relations etc. are also important.

Finally, the recoverable quantities will be higher if the economic rent is collected at the source rather than elsewhere in the exploration, development and production structures. More on this below.

Aligning interests

In order for quantities to be recovered, it is not sufficient that they are well studied and shown to be economically and industrially recoverable. It is also necessary that each stakeholder –both public and private - who has the influence to approve or block the exploration and production decisions see it this way. This becomes easier if the interests of the stakeholders are aligned, i.e. the value to all stakeholder of recovering marginal quantities is sufficient for all to agree to proceed. A number of factors will enter the considerations, including social and environmental factors, land use priorities, risks and opportunities, and most importantly the manner in which the cash flows are apportioned to each stakeholder.

If the cash flows are shared proportionally between stakeholders, i.e. they pay and receive cash in proportion to their interest in the projects, the economic interests will be aligned, and the projects will be equally economic for all and proportional to the economics of the project, regardless of the level of interest of each stakeholder. Materiality will be influenced by the level of interest and will need to be sufficient for critical stakeholder to justify the deployment of their best capabilities.

A fiscal system constructed in this way, i.e. in the form of a “Brown Tax” – a state direct financial interest creates alignment of economic interests. It can allow very high Government takes without detriment to the taxed party, except for the loss of materiality. Risk and opportunities will be shared in the same manner.

At the other extreme is a fiscal system relying entirely on gross taxes, i.e. royalty that will impose tax as a cost to the taxed party, reduce that party’s value at source and prevent its investments required to recover marginal resources. While this inefficiency normally is repaired as the production nears the end when the tax collector must choose between reduction in gross taxes or premature closure of activities, the effect of the gross taxes is nearly always much more detrimental in terms of quantities lost if it is not removed before development starts. This is due to the irreversible nature of the recovery processes mentioned above.

Gross taxes will transfer risks to the taxed party. The value of this to the tax collector depends on how the avoided risks impact the risk of the portfolio of the collector. If the portfolio is large and well diversified, the transfer may not have substantial value and may be less than the value of lost recovery. The revenue risks arising from fluctuations in the commodity prices may not be transferred between the parties as a result of gross taxes such as royalty.

Most fiscal systems lie between the extremes of gross and neutral “Brown” taxes. This is true for both the legislated and the negotiated ones, e.g. the production sharing agreements

The conditions mentioned above will be reflected in the economic and social categories of UNFC.

Recognising large developments as engineering system processes and not as discrete projects

Large oil, gas and mining exploration, development and production ventures may last for decades, many decades. Over this time the design parameters change. This includes information, the composition of the production, the production technology, the infrastructures available, the markets, the legal, regulatory and contractual framework conditions, the social, environmental and labour conditions etc. The ventures that will succeed over these time spans are the ones that have an initial architecture that provides sufficiently inexpensive and powerful flexibility to permit adaptations to be made as the changes in conditions become known. In other words, the developer is challenged to not just design facilities for the project as it appears initially, but to do so on an architecture that can accommodate future projects in an optimum manner. These alternative projects may be categorised on the industrial axis of UNFC (the F-axis).

ILLUSTRATION OF THE PRINCIPLES

The principles summarised above have been documented in Volume 3 of Energy Strategy Reviews (Heiberg & Lessard, 2014).

Examples are given there of how the shaping of an industrial ecosystem around these principles has facilitated the avoidance of gas flaring and a significant increase in the oil recovery factor in Norway.

This has taken place through the development and application of integrative dynamic capabilities. In fact, the entire offshore oil and gas development activity is witness to that. It rose largely from skills developed in other sectors and general skills facilitated by the advent of computers and numerical models in particular. The reference illustrates particular measures with respect to conscious capability development, regulation, licensing, infrastructure development, and development architectures that in concert has not only reduced waste and increased recovery, but also increased revenues to both the public and private sectors.

It shows how Government moved from royalty to neutral tax and a direct state financial interest. This facilitated a Government take above 80% while allowing industry to perform to the satisfaction of its investors. Government could do this only after a careful analysis of the changed risks that confirmed minimal effects on the risk of the Government portfolio.

The reference points out the fruitful interaction with international industries. They not only import capabilities of importance for the developments, but also provide market access for skilled national industries domestically and abroad.

Figure 4 shows the net revenue from oil and gas activities to the state. It shows how royalty is phased out and the state direct financial interest is phased in. The volatility in the curve reflects the combination of the commodity price and the sales quantity volatility. The belief has been that the only way to manage the risk associated with this volatility is not to spend the money. The money is therefore reinvested in assets whose volatilities are not strongly and positively correlated to the oil and gas price volatilities. The revues invested are shown in Figure 5. At times the interest from these investments equals or exceeds the revenue from oil and gas production and provides a stable source of cash to the government budget.

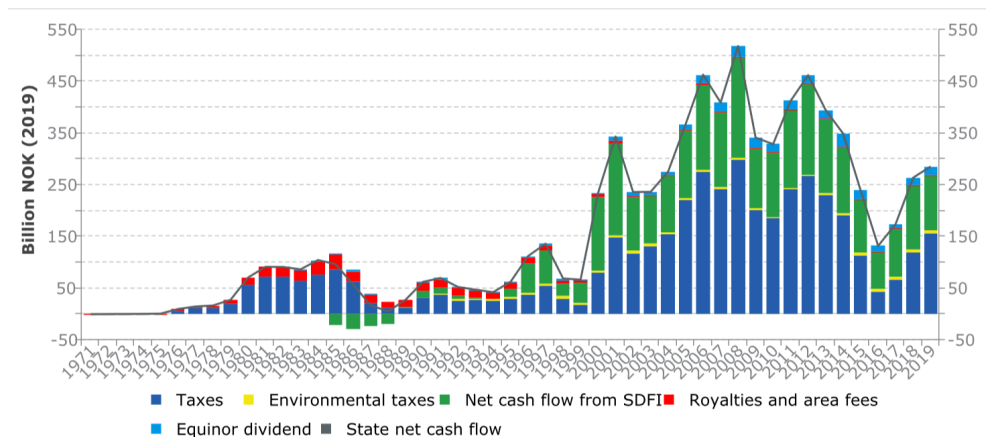


Figure 4. Net Revenues from Oil and Gas Activities to the State (Norwegian Ministry of Petroleum and Energy, (2018))

In summary, UNFC facilitates both the economic, social and industrial processes necessary to move towards a sustainable development through careful exploitation of the resources. The example from Norway shows reduced waste in the form of gas flaring and excessive use of fuel. It also shows how the recovery factors have

been substantially increased and how the state revenues have been stabilised and nearly doubled through the development of a sovereign wealth fund. This has created the transferrable integrative dynamic capabilities and the capital base required for the next generation to create the future they want.

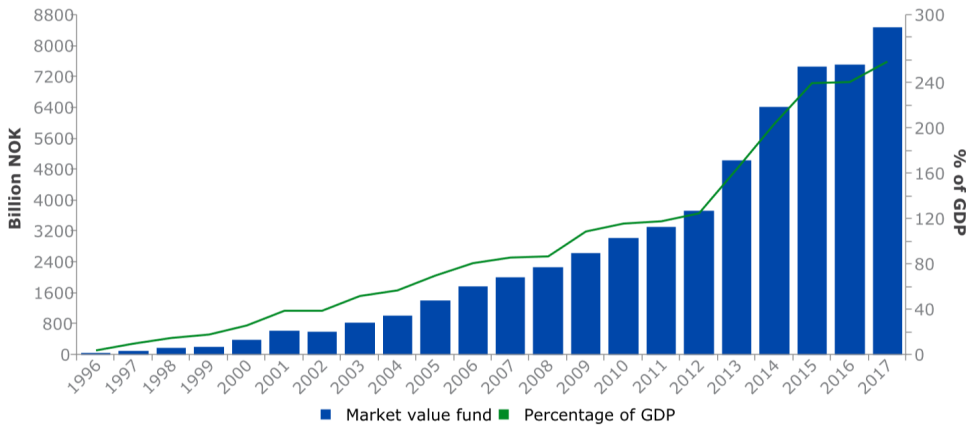


Figure 5. The Market Value to the Government Pension Fund Global (Norwegian Ministry of Petroleum and Energy (2018)).

UNFC FOR RESOURCE MANAGEMENT

The UNECE Executive Secretary Ms. Olga Algayerova, in her opening remarks at the EGRC 9th session in Geneva in April this year, pointed out that the 2030 Agenda for Sustainable Development (2030 Agenda), which calls for transforming our world, in itself reflects optimism. She noted that Sustainable Resource Management is crucial for achieving the 2030 Agenda and that transforming the United Nations Framework Classification for Resources (UNFC) into a tool for governments and industry to manage resources sustainably is more pressing than ever before.

At the same meeting, the Expert Group recommended that an SDGs Working Group is established to support the further development and effective use of UNFC to help attain the relevant SDGs and the commitments of the Paris Agreement. Further development of methodologies and case studies for the realization of the SDGs within the context of resource management is called for.

The Expert Group also requested the Working Group to develop a curriculum, policy objectives, and pilot application protocols to find potential industrial ecosystem approaches for the reaching the SDGs.

The Expert Group on Resource Classification at its ninth session (April 2018) recommended to change its name to the Expert Group on Resource Management to reflect the refocus of the Group's work to the delivery of the 2030 Agenda on Sustainable Development, in particular Sustainable Development Goals 7 Affordable and Clean Energy, 9 Industry, Innovation and Infrastructure, 11 Sustainable cities and communities, 13 Climate action, and 17 Partnerships for the goal, and emphasis on sustainable resource management.

At its twenty-seventh session (Geneva, 26–27 September 2018), the Committee on Sustainable Energy adopted the change of name of the Expert Group on Resource Classification to the Expert Group on Resource Management and its Terms of Reference, which refocus the work of the Expert Group on the delivery of the 2030 Agenda for Sustainable Development. This was endorsed by the 56 member States of the UNECE on 14 December 2018 (United Nations Economic and Social Council - Economic Commission for Europe - Executive Committee, 2018)). The terms of reference are shown in Enclosure 1.

ENCLOSURE I

Decisions on matters relating to the Committee on Sustainable Energy

Decision of the 1 (United Nations Economic and Social Council - Economic Commission for Europe - Executive Committee, 2018) (Norwegian Ministry of Petroleum and Energy, 2018) 4th of December 2018

The Executive Committee hereby approves the change of name of the Expert Group on Resource Classification to the Expert Group on Resource Management and its Terms of Reference as contained in the annex.

Mandate and Terms of Reference of the Expert Group on Resource Management

The Expert Group on Resource Management is mandated until 31 December 2019 to carry out concrete, results-oriented activities in the work areas and with the objective mentioned below.

A. Objective

Develop, promote and support the implementation of a global system which can be used as a tool for the sustainable management of natural resources to support attainment of the 2030 Agenda for Sustainable Development.

B. Areas of Work

Development and deployment of a United Nations Resource Management System (UNRMS) grounded in the United Nations Framework Classification for Resources (UNFC) comprising principles, specifications, guidelines, application protocols (procedures and checklists) and best practices to aid sustainable management of energy, raw materials and other resources.

C. Concrete activities

Develop, maintain and promote a comprehensive UNRMS that is compliant with UNFC and applicable to the resource life cycle and value chains. This work will involve improving and further developing principles, specifications, guidelines, application protocols, best practices and case studies to support sustainable management of energy and raw materials within the UNRMS framework (including, but not restricted to, renewable energy, anthropogenic resources, minerals, petroleum and nuclear fuel resources) in alignment with the Sustainable Development Goals (SDGs) and climate change mitigation (including through support for carbon capture and storage);

Provide a UNRMS toolkit to support policymaking, national resource management planning and execution, business process innovation, capital allocation, financial reporting, sustainable development monitoring and reporting, with consideration of environmental and social factors as well as local needs and priorities in sustainable resource management, for the attainment of the SDGs;

Develop principles, specifications, bridging documents, guidelines and protocols that support development of a project through all stages from conceptual studies, exploration/initial investigations, feasibility studies to production, eventual closure, site remediation and handover;

Elaborate guidelines for recognition and strengthening the capabilities of competent persons in sustainable resource management and conduct related capacity building, training courses, promotion and outreach programmes;

Support application of UNRMS in different regions and countries in cooperation with the other UN regional commissions;

Promote activities related to empowering women and addressing diversity and inclusion in the resource management sectors;

Attract and channel extra budgetary resources through a UNFC-UNRMS Trust Fund for support of the aforementioned activities and regional-, national-, and industrial level applications;

In addition, ECE member States could decide to develop other concrete and results-oriented activities within agreed mandates.

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