



# Application of UNFC for Resource Management

25 – 26 March 2019

Stavanger, Norway

2019

# Introduction

Classification of resource inventories is the template on which policies are formulated, Governments manage their resources, industry conducts its business and capital is allocated.

The establishment of the UN Sustainable Development Goals and the Paris Accord on Climate Change Mitigation calls for change that will affect these activities. It is clear that none of the Sustainable Development Goals can be reached without energy and raw materials, yet we know from the second law of thermodynamics and other principles that environmental consequences result from deployment of these resources regardless of how it is done. As a consequence the efficient use of resources becomes increasingly important. We therefore need to focus on the mechanisms that give the efficiencies required to create the future we want. PETRAD, together with the UN Economic Commission for Europe and the European Federation of Geologists are called to contribute to these efforts through this course on the application of the UN Framework Classification for Resource Management.

In the 1990's classifications became aligned with the value chains commonly used, particularly in the European petroleum industry. Eventually this was promoted by both the Society of Petroleum Engineers (SPE) and the World Petroleum Congress (now the World Petroleum Council) as their petroleum resource classification in 2000. This has become the Petroleum Resource Management System (PRMS) as we know it today. In minerals, the value chain was expanded by explicitly adding consideration of economic and social conditions to the industrial value chain in an effort that started in Germany and Austria in classifying coal. The United Nations promoted this as its UN Framework Classification. The first version appeared in 1997, the second, expanded to petroleum and minerals in 2004 and revised in 2009. In the same period, the mineral industry developed its reporting codes to include considerations of recoverability, economic, social and industrial readiness aimed particularly for stock exchange reporting. We know them as classifications made on the basis of the CRIRSCO template.

In this course, we focus on the application of the UNFC. It is a classification of “what we get” as opposed to a classification of “what we found” where it all started in the early 1900. The UNFC is not just a classification of geological resources, but also of the projects producing sales and non-sales products from them – and it need not be only from geological resources. It works as well for other products produced by investments. We are therefore witnessing a further development of the UNFC to renewable energy resources, underground storage projects and anthropogenic resources. Water may follow. The course will address how UNFC works for petroleum, minerals, renewable energy, geothermal resources and underground storage of CO<sub>2</sub>, gas etc.

As mentioned above, resource inventories and their classification is the template for resource management. PETRAD is therefore offering this course immediately following its 2 week course on National Petroleum Resource Management as a complement to this course for candidates interested in both.

## Objective

Application of the UNFC is still a young professional activity and the call for training has been rising quickly.

The objectives of this course are:

1. Provide an understanding of the basic structure of the UNFC
2. To familiarise participants with the four principal areas of application, namely:
  - a. Policy formulation

- b. Government resource management
  - c. Industry business process management
  - d. Capital allocation and financial reporting
3. Illustrate the above with case studies

## Target Audience

The target group for this course are geoscientist, engineers, economists, lawyers, analysts and communications/investor relation experts interested in the objectives mentioned above.

The course is endorsed by the European Federation of Geologists, providing Eurogeologist title holders with the credits required to uphold their titles.

## Pedagogical Approach

PETRAD believes that the best pedagogical learning approach is a combination of presentations, discussions, problem-based learning and team based learning. In this brief course, the sessions will consist of two lectures, each of 20 minutes followed by 20 minutes of discussion. Participants are encouraged to familiarising themselves with the UNFC before arriving at the course, and to submit topics that they are particularly interested in including in the discussion sections to the organisers on or before the **16th of February**.

UNFC references are found here:

- <http://www.unece.org/energy/se/reserves.html>
- <https://www.unece.org/index.php?id=45992>

## Program Schedule

### Day 1

---

**11:30 Registration and lunch**

**13:00 Welcome and introduction (Per Blystad)**

---

Classification background (Sigurd Heiberg)

UNFC explained (Per Blystad)

Discussion

---

**14:15 – 14:30 Coffee break**

**UNFC basics - Continued**

---

Quality assurance, aggregation, accounting and disclosure (Sigurd Heiberg)

Relationship between the UNFC and classifications bridged to it (Per Blystad)

Discussion

---

**15:30 - 15:45 Coffee Break**

**UNFC Applied**

---

Applications in Policy formulation (Sigurd Heiberg)

Applications in Government Resources management (Per Blystad)

Discussion

---

**16:45 - 17:00 Coffee Break**

---

Applications in corporate business process management (Sigurd Heiberg)

Financial reporting and capital allocation challenges (Sigurd Heiberg)

Discussion

---

**18:00: End of Day 1**

**19:00: Dinner**

## Day 2

**9:00 Plenary session continued**

---

Application to minerals (Michael Neumann)  
Application to renewable energy (Gioia Falcone)  
Application to geothermal energy (Gioia Falcone)

Discussion

---

**10:00 – 10:15 Coffee break**

**Two working groups: Energy session and Raw Material session**

---

## Energy session

## Raw Materials session

Lecturers			Lecturers	
10:15	Application to CCS	Karin Ask	UNECE Case 1	Michael Neumann and Janne Hokka
10:35	Case study: CCS			
10:55	Exercise			
11:15 Coffee or tea				
11:30	Case study: A petroleum field	tba	UNECE Case 2	Michael Neumann and Janne Hokka
11:50				
12:10	Exercise		Exercise	
12:30 Lunch				
13:30	Case study: The NCS	Per Blystad / Sigurd Heiberg	UNECE Case 3	Michael Neumann and Janne Hokka
13:50				
14:10	Exercise		Exercise	
14:30 Coffee or tea				
14:45	Case Study: Geothermal energy	Gioia Falcone	Nordic case	tba
15:05				
15:25	Exercise		Exercise	
15:45	Summary and evaluation		Summary and evaluation	
16:00 End of the course				

# Venue

PETRAD, Professor Hanssens vei 10, Stavanger

## Application details

Basic fee:

**NOK 7500,-** inclusive of one night in Hotel Ydalir from the 25<sup>th</sup> to the 26<sup>th</sup> of March, lunch both days and dinner on the 25<sup>th</sup> of March

Fee for Eurogeologist title holders (provided EFG endorsement is obtained as expected):

**NOK 7000,-**

Fee for participants attending the 2-week course: National Management of Petroleum resources:

**NOK 6500,-**

Participants who prefer not to stay at the Ydalir hotel, fees are reduced by NOK 950,-

Participants who wish to stay longer are encouraged to contact the hotel directly.

Participants are responsible to make their own travel arrangements to and from the venue.

Applications should be sent to PETRAD at [training@petrad.no](mailto:training@petrad.no) before the 21<sup>st</sup> of September. Admission will be announced on or before the 25<sup>th</sup> of September

## Contact details

PETRAD:

**Per Blystad**

Tel: +47 993 65 695

Email: [per.blystad@petrad.no](mailto:per.blystad@petrad.no)

**Kim Chi Tran-Gulbrandsen**

Tel: +47 473 06 828

Email: [kct@petrad.no](mailto:kct@petrad.no)

**Sigurd Heiberg**

Tel: +47 975 79 731

Email: [Sigurd.heiberg@petrad.no](mailto:Sigurd.heiberg@petrad.no)

**Berit Tvedt**

Tel: +47 908 32 826

Email: [berit.tvedt@petrad.no](mailto:berit.tvedt@petrad.no)

## Lecturers



## **Sigurd Heiberg**

*Project Director*

Sigurd holds a BSc from the University of California and a SM degree in Geotechnology from the Massachusetts Institute of Technology. He has received formal management training at IMD, Switzerland on international management and High Performance Boards. Sigurd has spent most of his working life in Government and industry working on petroleum resources management and strategy, both as Deputy director of resource management responsible for development and production at the Norwegian Petroleum Directorate, as Petroleum exploration advisor to the Minister of Water, Energy and Minerals of Tanzania and as a member of Statoil's Corporate strategy team. He chaired the Oil and gas reserves committee of the Society of Petroleum Engineers when the SPE Resource classification that later became the SPE-PRMS was developed and the UNECE Expert group on resource classification when the UNFC-2009 classification was developed. He has also chaired the Bureau of the UNECE Intergovernmental Committee on Sustainable Energy. Sigurd has engaged in education by helping to form and build PETRAD. He has been a lecturer at the MIT Sloan Executive Education and at the University of Stavanger. He has been guest editor with MIT Professor Donald Roy Lessard of "Innovation in oil and gas through partnering", Elsevier's Volume 3 of Energy Strategy Reviews. He joined PETRAD as a Project Director in 2017.



## **Per Blystad**

Per holds a Cand. Real (PhD) in geology from University of Bergen. After a few years working in a cross-disciplinary project connected to a huge hydro-electric development project in the south-western mountain area in Norway, the Ulla-Førre Investigations, he joined the Norwegian Petroleum Directorate (NPD) for more than 30 years working on petroleum resource management and project management. His working experience includes exploration and licensing, annual reporting to government from companies in relation to the revised annual national budget, resource assessments and methodology development of yet-to-find potential of petroleum on the Norwegian continental shelf. For six years Per coordinated the international project in NPD aiming at assisting countries in Asia and Africa to develop national petroleum resource management systems and capacities. After this Per was seconded as project coordinator in CCOP for two years in a project on Resource Evaluation and Planning. Per has been engaged in developing NPD's petroleum resource classification system. In 2001 he joined the UNECE Expert group on resource classification (EGRC). He was member of the Bureau and chaired the Petroleum group until 2004. He later chaired the EGRC Mapping Task Force prior to and necessary for developing the UNFC-2009 classification. He is member of the EGRC.



## **Janne Hokka**

Janne holds MSc in economic geology from University of Helsinki. He has over 8 years of experience in different exploration and mining projects. He has also gained field experience as an exploration geologist in Australia in copper and uranium exploration and mining projects. He is accomplished in field exploration management, logging, soil sampling, QA/QC planning and monitoring, bedrock mapping, lithogeochemistry, database construction, 3D modelling and resources estimations. Currently he is working in Geological Survey of Finland specialising in the evaluation of Mineral Resources from early-stage exploration through to production. Janne focuses on Mineral Resource estimation and preparation of technical reports in accordance with international reporting guidelines, resource auditing and training programs predominantly for mafic-ultramafic related ore systems (Ni-Cu, Fe-Ti-V), but he also has experience in precious metals and uranium. He has been part of the Nordic Group preparing the Guidance for the Application of the UNFC-2009 for Mineral Resources in Finland, Norway and Sweden and he is the UNFC contact person in Geological Survey of Finland.





## **Prof. Gioia Falcone**

Gioia Falcone is currently Rankine Chair, Professor of Energy Engineering at the University of Glasgow. Until June 2018, she was Professor and Head of the Geo-Energy Engineering Centre (formerly Oil & Gas Engineering Centre) at Cranfield University. Between 2011 and early 2016, she held the Endowed Chair and Professorship in Geothermal Energy Systems at Clausthal University of Technology, Germany, where she was also the Director of the Institute of Petroleum Engineering. Prior to joining academia, she worked with Eni-Agip, Enterprise Oil UK, Shell E&P UK and Total E&P UK, covering both offshore and onshore assignments.

Gioia has served on several expert review panels, as technical editor/reviewer for several peer-review journals, and as member of several program committees of technical conferences around the world. She is one of the 23 members of the United Nations Economic Commission for Europe (UNECE) Bureau of the Expert Group on Resource Classification, and of its Renewable Reserves Working Group. She has led the development of the Specifications for the application of the UNFC to Geothermal Energy Resource. Karin



## **Karin Ask**

Karin Ask is currently the Corporate Reserves Manager of the Norwegian Oil and gas company Equinor (previously Statoil), a position she has held since 2008. She has a bachelor degree in geology from Gothenburg University and a master of science degree in Petroleum Exploitation from Chalmers University of

Technology in Sweden. She has more than 30 years' experience from the oil and gas industry. Karin has been a member of the UNECE Expert Group on Resource Classification since 2008, as a Vice Chair of the Bureau until 2017 and as Chair of the Task Force for application of the UNFC to Injection Projects for the Purpose of Geological Storage. She is currently a member of the Technical Advisory Group (TAG).



## **Dr. Michael Neumann**

Dr. Michael Neumann is an economic geologist, based in Germany with more than 35 years of experience in exploration, mining and mine site remediation. He worked in many countries around the world for Metallgesellschaft, Sachtleben Bergbau and other companies. Recently he retired from the position of the Operations Manager.

Among others Michael was involved in the development of the Cayeli copper mine and the exploration Ovacik Au deposit in Turkey, the Nanisivik lead/zinc mine in Canada, iron-manganese deposits in Kazakhstan, copper in Armenia, gold in Siberia as well as lithium and fluorite / barite as well as environmental projects in Germany. During his career he was involved in 3D modelling of deposits, resource / reserve estimation, preparation of due diligence and feasibility studies.

Michael is member of the BDG (Professional Association of German Geoscientists) since 2003 and is since 2015 the press officer in the Board of Directors. He is Eurogeologist since 2005 and was in 2016 elected as the Vice-President of the European Federation of Geologists.

# Ydalir hotel

Telegrafdirektør Heftyes vei 99, 4021 Stavanger

Telephone: +47 481 33 100

[Hello@ydalir.no](mailto:Hello@ydalir.no)



Ydalir Hotel is a brand-new Campus Hotel in Stavanger that opened the 14th of March 2018. It is situated at Ullandhaug, adjacent to the Petrad course facilities. The unique hotel houses 59 upscaled rooms, 12 of which are apartments, including a conference area. PETRAD has managed to secure rooms at the hotel for participants that wish to stay in the nice and quiet vicinity of the course venue.

Ydalir Hotel was gifted to the University of Stavanger by the Smedvig family. Celebrating their 100th year anniversary in 2015, the Smedvig family wanted to give back to the local region. All Ydalir's surplus proceeds will be donated to the University of Stavanger yearly. This financial contribution will provide a long-term economic resolution for the cultivation of educational opportunities across all faculties.

How to get to the hotel:

The hotel is easily reached from the airport, either by taxi (12 minutes' drive) or by airport shuttle bus. By shuttle bus it takes 20 minutes including 5 minutes' walk from the bus stop to the hotel. Local travels to the city center is easy by bus stopping just outside the hotel.

Homepage with additional information: [www.ydalir.no](http://www.ydalir.no)