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*and*

Task Force on UNFC-2009 and Injection Projects

## Specifications for Application of UNFC-2009 to Injection Projects

Presentation to the EGRC 8<sup>th</sup> Session, Geneva, April 2017



UNITED NATIONS  
ECONOMIC COMMISSION  
FOR EUROPE

UNECE

# Task Force Members

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- Benjamin Court, Global CCS Institute
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# Task Force on Application of UNFC-2009 to Injection Projects Endorsed by the UNECE Committee on Sustainable Energy



## **Specifications**

**for the Application of the United Nations  
Classification for Fossil Energy and Mineral  
Reserves and Resources 2009 (UNFC-2009)**

**to Injection Projects for the Purpose of Geological  
Storage**

Done in Geneva, 30 September 2016

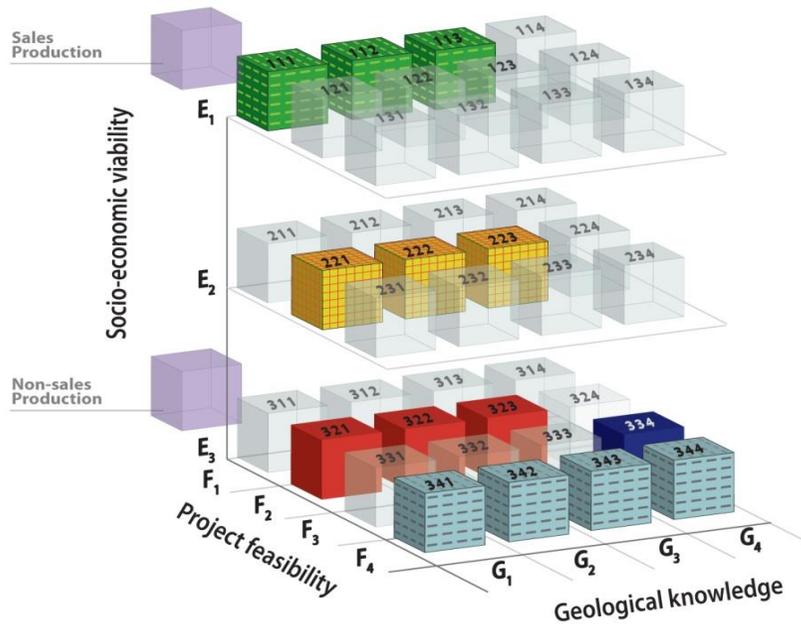
*The Specifications for the application of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009) to Injection Projects for the Purpose of Geological Storage* were endorsed by the UNECE Committee on Sustainable Energy at its twenty-fifth session, Geneva, 30 September 2016.

[LINK to document on UNFC web page](#)



# Task Force on Application of UNFC-2009 to Injection Projects

## Injection project activities - the simple picture



We need to:

- Understand the geology and dynamic behaviour of the recipient reservoir
- Design a technical concept and evaluate the project feasibility
- Calculate the costs and evaluate the economic and social viability of the project
- Make decisions

These are all activities that we know from oil and gas extraction projects and that are well defined in the UNFC2009

# Task Force on Application of UNFC-2009 to Injection Projects

## Definition of Categories – F axis

	UNFC-2009	UNFC-2009 applied to Injection Projects for the purpose of Geological Storage	
Category	Definition	Definition	Supporting Explanation
F1	<i>Feasibility of extraction by a defined development project or mining operation has been confirmed.</i>	Feasibility of an injection project for the purpose of geological storage has been confirmed.	Injection is currently taking place; or, implementation of an injection project is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of geological storage by implementing a defined injection project.
F2	<i>Feasibility of extraction by a defined development project or mining operation is subject to further evaluation.</i>	Feasibility of an injection project for the purpose of geological storage is subject to further evaluation.	Preliminary studies demonstrate the existence of a Reservoir in such form, quality and quantity that the feasibility of geological storage by a defined injection project can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of injection for the purpose of geological storage.
F3	<i>Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data.</i>	Feasibility of an injection project for the purpose of geological storage cannot be evaluated due to limited technical data.	Very preliminary studies (screening phase), which may be based on a defined injection project, indicate the need for further data acquisition and/or further geological studies in order to confirm the existence of a reservoir in such form, quality and quantity that the feasibility of injection for the purpose of geological storage can be evaluated.
F4	<i>No development project or mining operation has been identified.</i>	No injection project for the purpose of geological storage has been identified.	Reservoir which may be suitable for injection for the purpose of geological storage but which will not be utilised by any currently defined injection project.

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## Classes and Categories – UNFC for Injection Projects

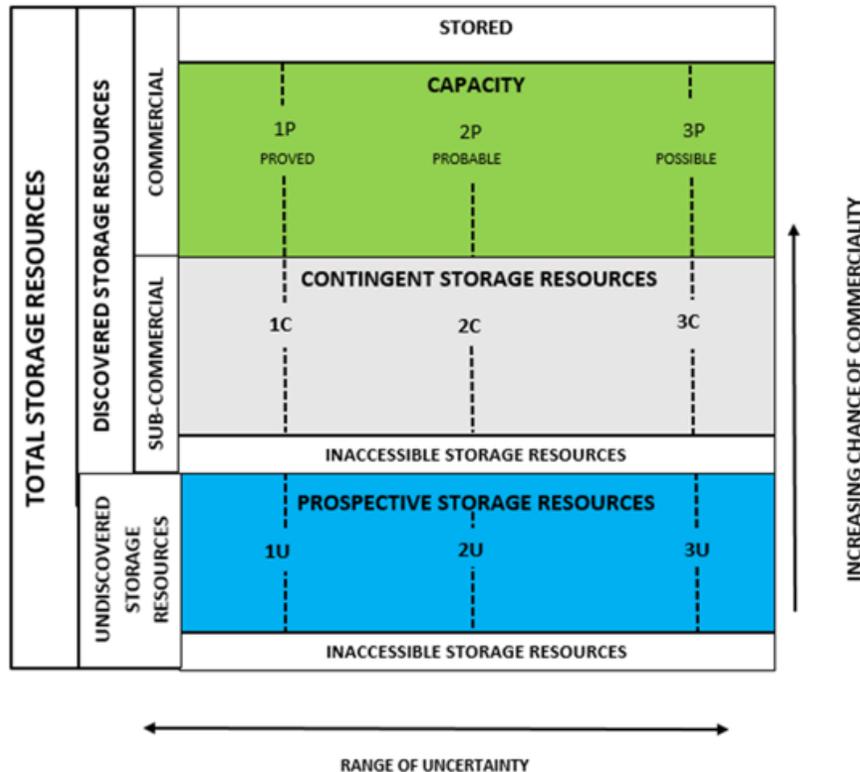
UNFC Classes Defined by Categories and Sub-Categories as Applied to Injection Projects for the Purpose of Geological Storage						
<b>Total Geological Storage</b>	<b>Injected and Stored Quantities</b>					
	<b>Lost quantities</b>					
	<b>Class</b>		<b>Sub-class</b>	<b>Categories</b>		
				<b>E</b>	<b>F</b>	<b>G</b>
	<b>Known Reservoir</b>	Commercial Injection Projects	Active Injection	1	1.1	1, 2, 3
			Approved for Development	1	1.2	1, 2, 3
			Justified for Development	1	1.3	1, 2, 3
		Potentially Commercial Injection Projects	Development Pending	2	2.1	1, 2, 3
			Development on Hold	2	2.2	1, 2, 3
		Non-Commercial Injection Projects	Development Unclassified	3.2	2.2	1, 2, 3
Development not Viable			3.3	2.3	1, 2, 3	
Storage Not Feasible			3.3	4	1, 2, 3	
<b>Undiscovered Reservoir</b>	Screening Projects	Geological Storage Identified	3.2	3.1	4	
		Geological Storage Indicated	3.2	3.2	4	
		Geological Storage Inferred	3.2	3.3	4	
	Storage Not Feasible			3.3	4	4

## Activities since last year

- Specifications are now endorsed by the Committee on Sustainable Energy and available at the UNFC web site
- No Task Force activity after this
- Some TF members involved in an ongoing SPE initiative to establish a Storage Resource Management System (SRMS) based on the PRMS
  - Intention that this system shall be sufficiently aligned with the UNFC-2009 to allow the two classifications to be mapped
  - Currently available for public comments at the SPE web site (April-May)

Other ongoing initiative on classification of geological storage

# SPE-SRMS: DRAFT CO<sub>2</sub> Storage Resources Management System



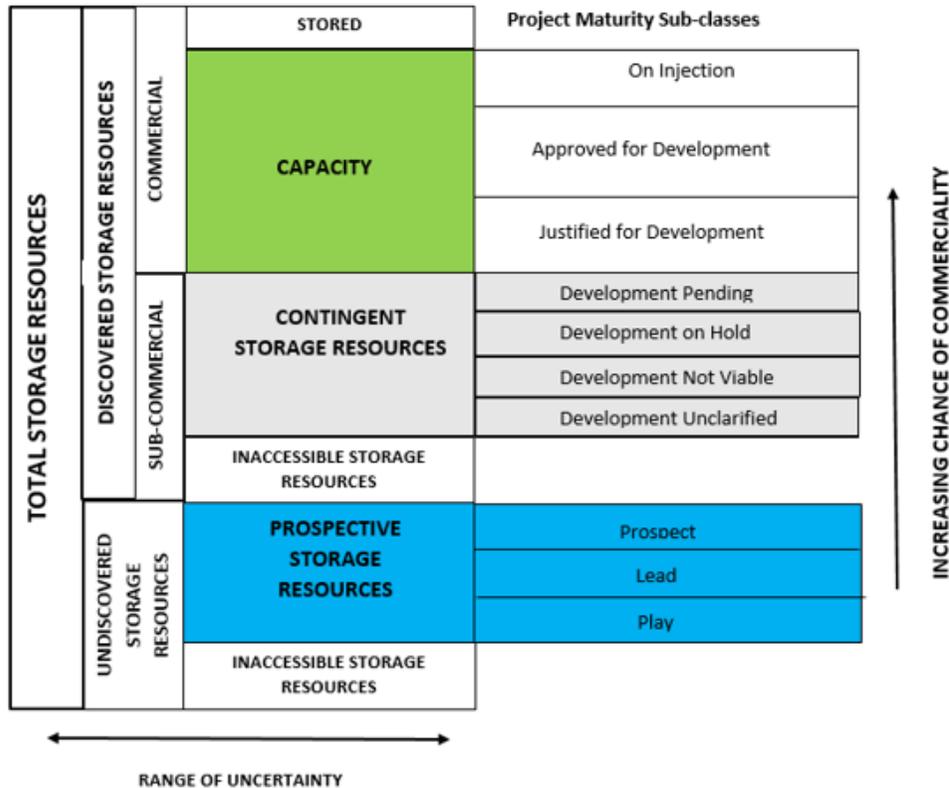
- Under development by an SPE sub-committee to the SPE CCUS Technical Section
- Seed Documents: Petroleum Resources Management System (PRMS), UNFC and various publications
- Intention that the system will be sufficiently aligned with the UNFC-2009 to allow the classifications to be mapped
- Draft currently available for public comments (April-May) on the SPE web site

Illustration from DRAFT SRMS document  
Resource classification framework

Source: SPE

Other ongoing initiative on classification of geological storage

# SPE-SRMS: DRAFT CO<sub>2</sub> Storage Resources Management System



Document content:

- Basic Principles and Definitions
- Classification and Categorization Guidelines
- Evaluation and Reporting Guidelines
- Estimating Storable Quantities
- Appendix with Glossary of Terms

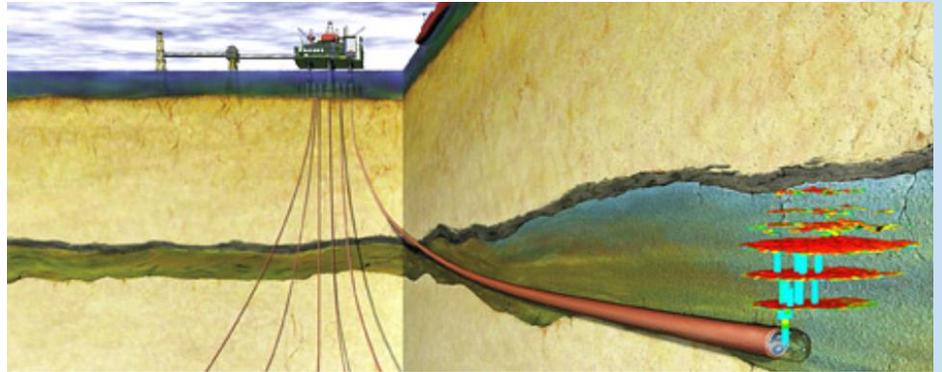
Illustration from DRAFT SRMS document

Project maturity sub-classes

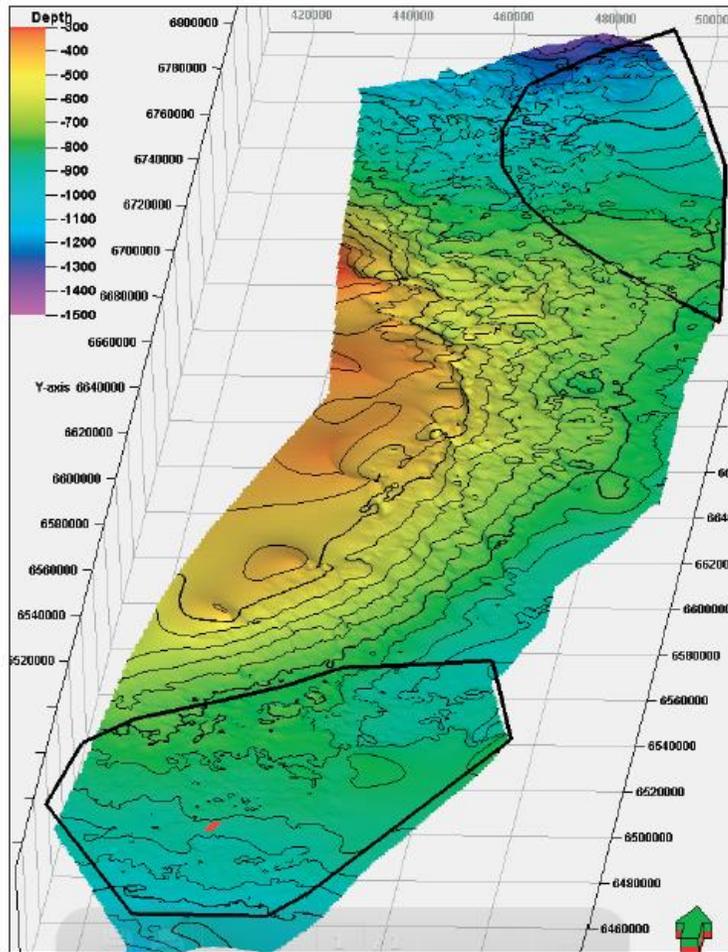
Source: SPE

## Example – Undiscovered vs Discovered Geological Storage

- CO<sub>2</sub> is currently injected and stored in the Utsira Fm at Sleipner
- The Utsira Fm is present over large parts of the Norwegian North Sea and penetrated by a large number of wells
- Is the whole Utsira aquifer thereby a *Known Reservoir*?



## Example – Undiscovered vs Discovered Geological Storage



Top Utsira formation

Source: NPD

- Mapped by the NPD and included in their CO<sub>2</sub> Storage Atlas
- Small area in the south included in a recent CO<sub>2</sub> storage feasibility study performed by Gassnova in Norway
- Active injection at Sleipner
- How would You classify these?

# Summary and way forward

- Specifications are now endorsed by the Committee on Sustainable Energy and available at the UNFC web site
- Case studies needed to test this further on real projects
- Guide lines yet to be developed
- Evaluate how well the SRMS aligns with UNFC and if a bridging document can and should be prepared

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*Thank you for your attention!*

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