



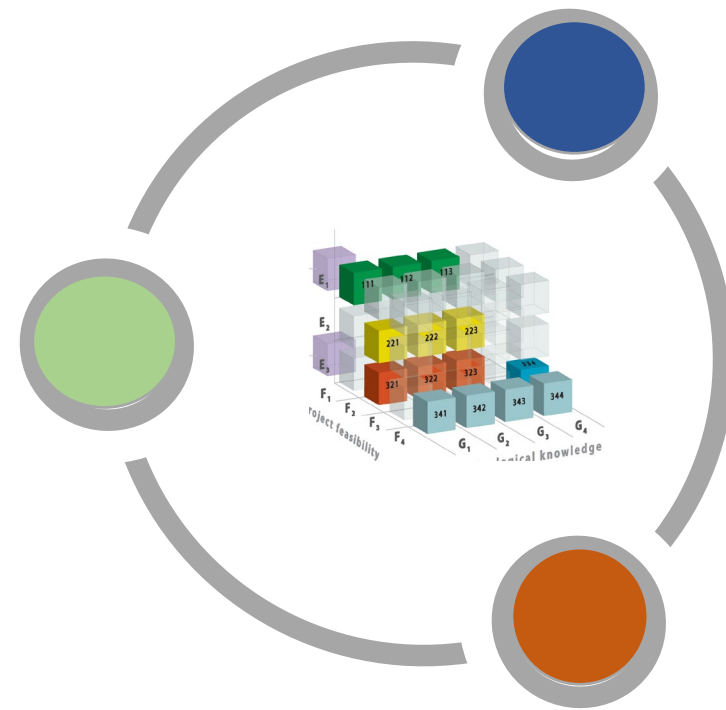
Taking UNFC from classification of resources to classification of projects for commercial resource management

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UNECE

Public-private partnership for commercial resource management

Government resource management



Lenders and Shareholder financial management

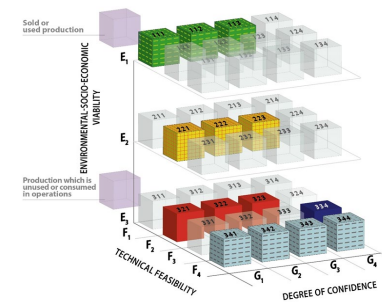
Industry project and portfolio management

The E-F matrix for project management

The G axis holds the metrics of relevance

G axis metrics for projects and for assets:

- Total sources, products and emissions
- On the time scale:
 - Products
 - Quantities of critical inputs (energy materials, good, services, people etc..)
 - Emissions
 - Cash flow details
- Etc..



		Confirmed Feasibility	Feasibility under evaluation	No evaluation due to lack of data	No project identified
		F1	F2	F3	F4
ESE Viability confirmed	E1				
ESE Viability under consideration	E2				
Production of unused material, too poorly defined or ESE considered unfavourable	E3				

For details on UNFC, see: <https://unece.org/sustainable-energy/unfc-and-sustainable-resource-management>



The Norwegian gas mega-project is made up of many sub-projects

Information on total quantities of products and sources is not enough for resource management

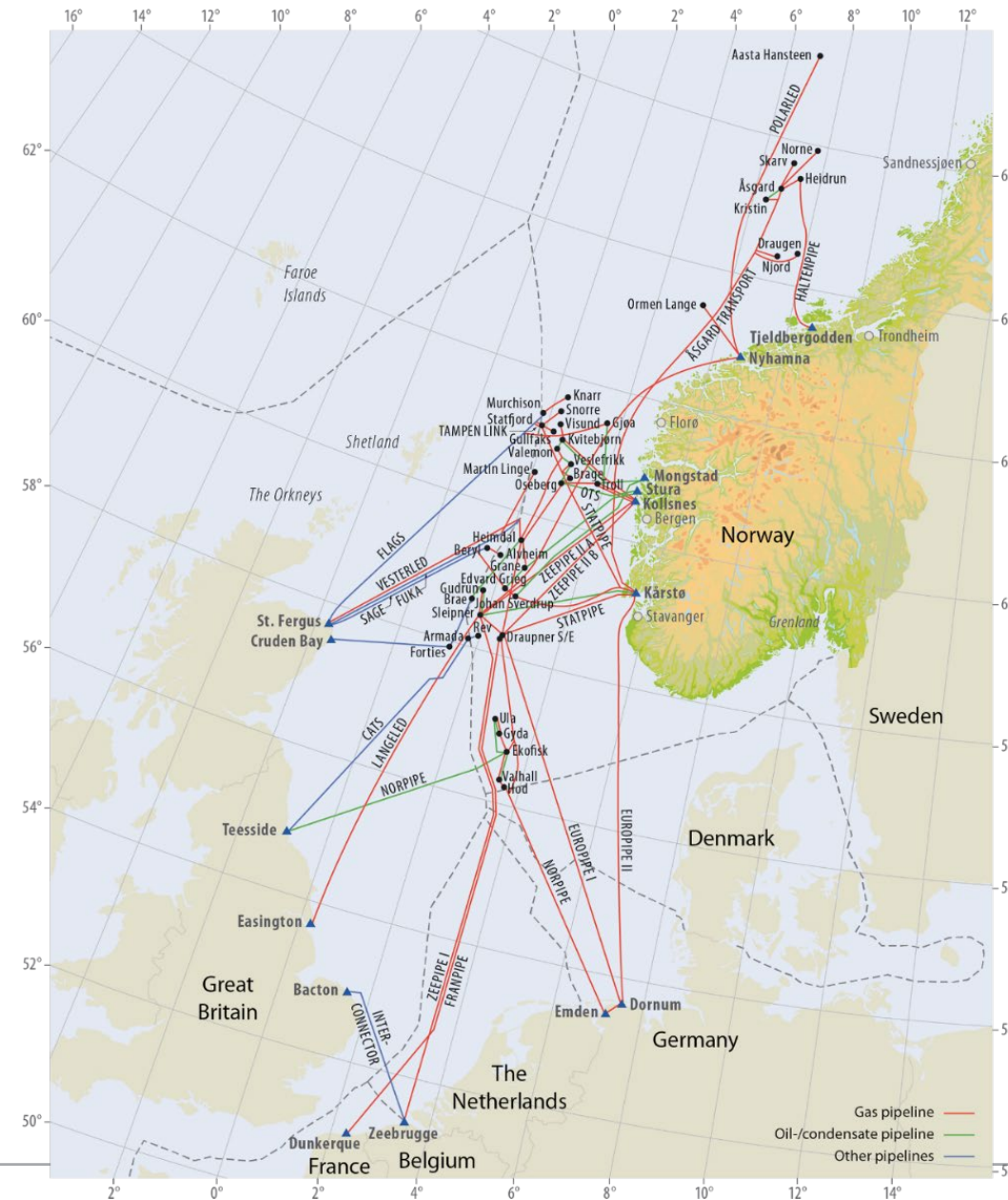
Nyhamna terminal.
Source:
<https://www.shell.com/about-us/major-projects/ormenlange/ormenlange-overview.html>



Tjeldbergodden. Equinor photo:
<https://communicationtoolbox.equinor.com/brandcenter/en/equinor/component/default/42130>



Sture terminal, Equinor photo:
<https://communicationtoolbox.equinor.com/brandcenter/en/equinor/component/default/42130>



The Mongstad refinery
Equinor photo:
<https://communicationtoolbox.equinor.com/brandcenter/en/equinor/component/default/42130>



Picture of the gas processing plant at Kollsnes
(Photo: Øyvind Sætre - Gassco)



Picture of the gas and condensate processing plant at Kårstø
(Photo: Øyvind Hagen - Gassco)



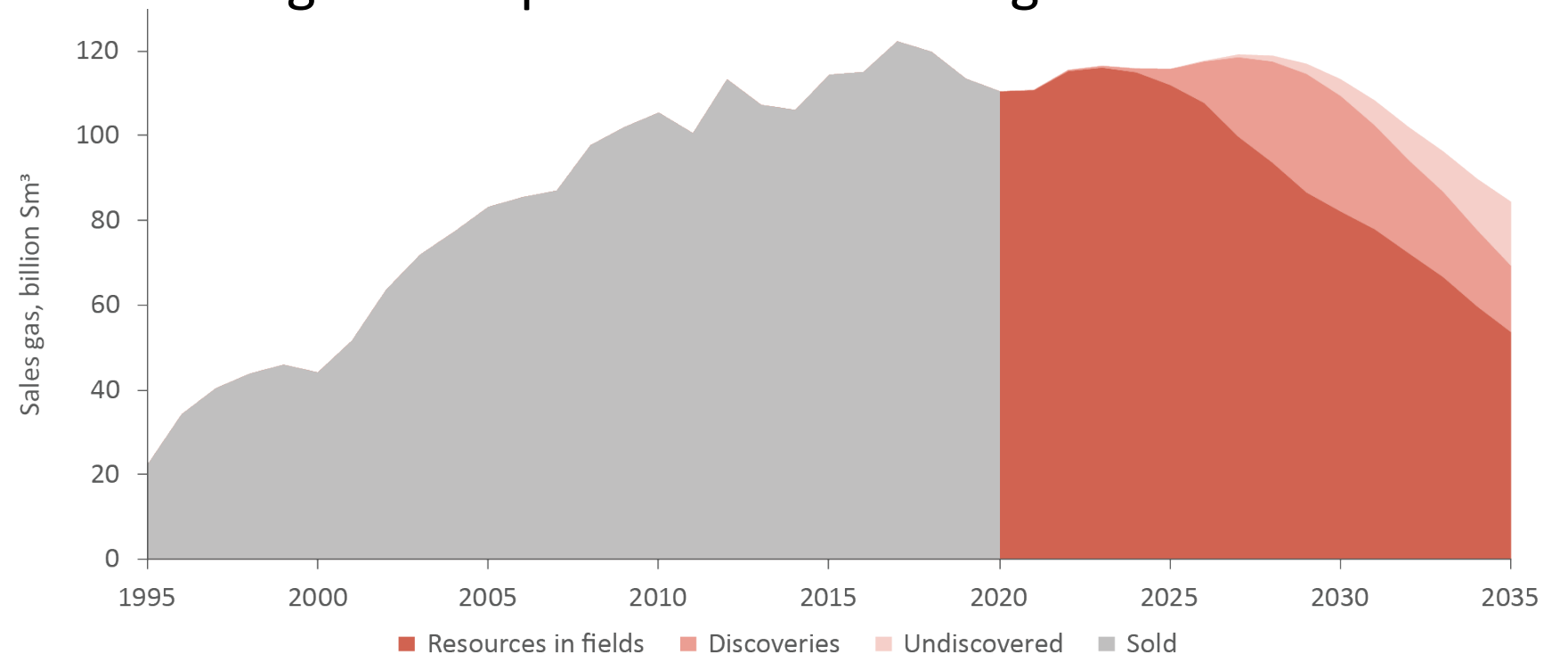
UNEP

The time scale is required together with other information that projects carry to make commercial assessments

The Norwegian gas mega-project

UNFC inventory for product quantities is not enough... ... production is managed on a time scale

UNFC Class	gas bill Sm ³ G1	gas bill Sm ³ G1+G2	gas bill Sm ³ G1+G2+G3
E1.1;F1.1	925	1,060	1,214
E1.1;F1.2	447	483	528
E1.1;F1.3	1	2	2
E1.1;F2.1	112	156	201
E2;F2.1	68	94	122
E2;F2.2	110	180	269
E3.2;F2.2	115	190	276
E3.3;F2			
	G4.1	G4.1+G4.2	G4.1+G4.2+G4.3
E3.2;F3.4	1,183	1,805	2,600

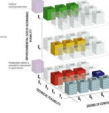



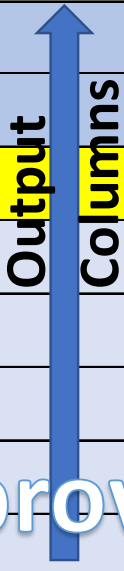
Source: <https://www.npd.no/en/facts/resource-accounts-and-analysis/resource-accounts-as-of-31-december-2019/>



The resource management matrix

Shows change from one period to the next or from one policy to the next

		Confirmed Feasibility	Feasibility under evaluation	No evaluation due to lack of data	No project identified	Closing balance										Revision			
		F1	F2	F3	F4	Sold or used	Produced and not used	E1F1	E1F2	E2F1	E2F2	E3F1	E3F2	E3F3	E3F4				
	ESE Viability confirmed	E1																	
	ESE Viability under consideration	E2																	
	Production of unused material, too poorly defined or ESE considered unfavourable	E3																	
Opening balance	Sales production							Not applicable											
	Non-sales production							Not applicable											
	E1F1																		
	E1F2																		
	E2F1																		
	E2F2																		
	E3F1																		
	E3F2																		
	E3F3																		
E3F4																			

 Input Rows
 Output Columns
 Impairment
 Improvement



Design Structure Matrix Methods facilitates management

Activities on the vertical scale delivers to activities on the horizontal scale.

Entries below the diagonal show that deliveries are made before they need to be used.

Entries above the diagonal may impact activities already carried out and represent a risk for rework and cost increases.

	Decommissioning	Operation	Design	Alignment of interests	Legal, regulatory and contractual frameworks	Strategic environmental, social and economic impact assessment	Assessing resource potentials
Decommissioning							
Operation	x						
Design	x	x				x	x
Alignment of interests			x				
Legal, regulatory and contractual frameworks	x	x	x	x			
Strategic environmental, social and economic impact assessment					x		
Assessing resource potentials						x	

See <https://dsmweb.org/> and S.D. Eppinger and T.R. Browning, [Design Structure Matrix Methods and Applications](#), MIT Press, Cambridge, 2012.

Input-Output Tables show past interactions between sectors of the economy

- Columns show the content of a supply chain.
- Rows show the application of an activity in other sectors.

	Mining	Energy	Water
Mining			
Energy			
Water			

An integrative UNFC/UNRMS facilitates commercial assessments of opportunities and risks for future investments and their effects on the environment.

Forward looking analyses requires understanding of future changes in one sector, such as net zero GHG emissions on others, such as mining.

- Future relationships between activities will differ from past activities.
- Input-output tables can be a starting point for general equilibrium models computing the effect of a change in one activity on others keeping the supply and demand balanced and allowing prices to shift.
- Other scenario models use the relations between future activities to minimize the cost of a change imposed to achieve a given goal.





Thank you!

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