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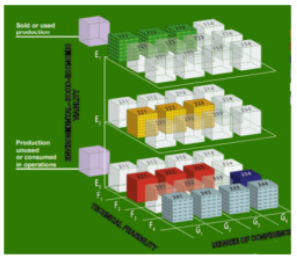
Practical Application Of the UNFC –

For Policy and Decision Makers

Matthias Hartung



VIRTUAL WORKSHOP

How the United Nations Framework Classification for Resources (UNFC) can help channel investments into energy and resource projects for sustainable development

11 March 2021 17:00 - 18:30 CET

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Bringing the UNFC 'Adoption to Life'

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- To-date, UNFC has been adopted mainly for **disclosure & reporting**
- UNFC is also to **compare & contrast across resource types**:
  - Policies
  - Portfolios
  - Projects

  } Impact on {

  - People
  - Planet
  - Prosperity
- To demonstrate this capability, a **Minimum Viable Tool** is built
  - Based on an established Resource Data Management System
  - Populated with realistic project data
  - Aimed for practitioners to use and improve
  - Supporting UNFC adoption and further gaps identification
  - For **well-informed decisions on sustainable resource management**

Roadmap to the Minimum Viable Tool

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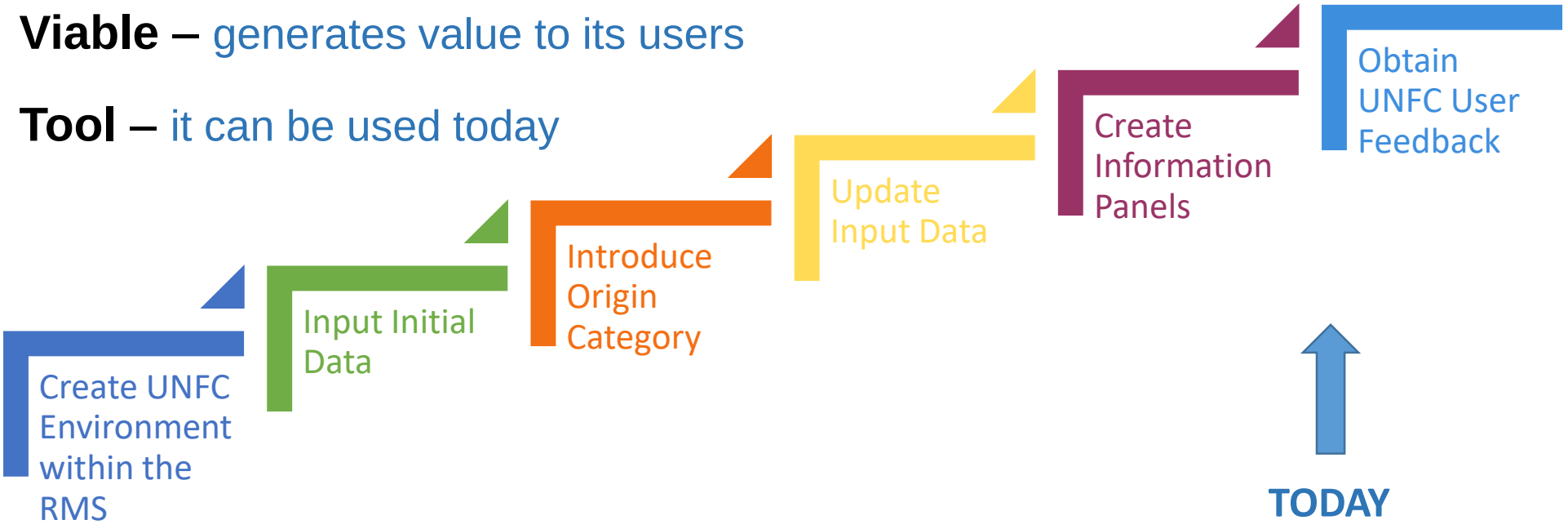
Minimum –

- Starts with resources volumes/forecasts, cash flow, employment, CO2 intensity
- Extendable - for other socio-economic and environmental quantities or criteria
- Scalable – from projects to portfolios to policies

Viable – generates value to its users

Tool – it can be used today



UNFC – Standard Reporting Template

(1)

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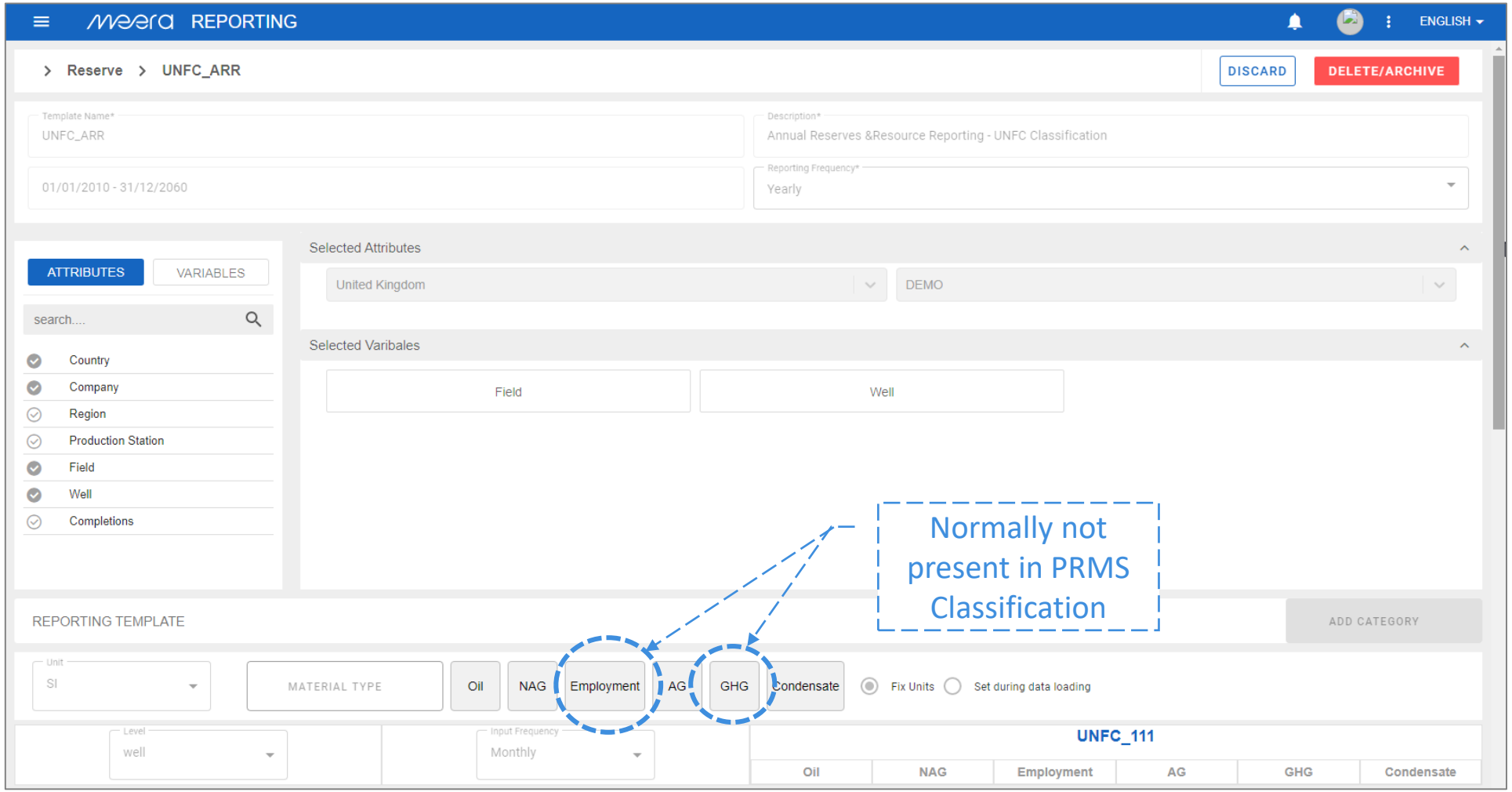

UNFC – Standard Reporting Template (2)

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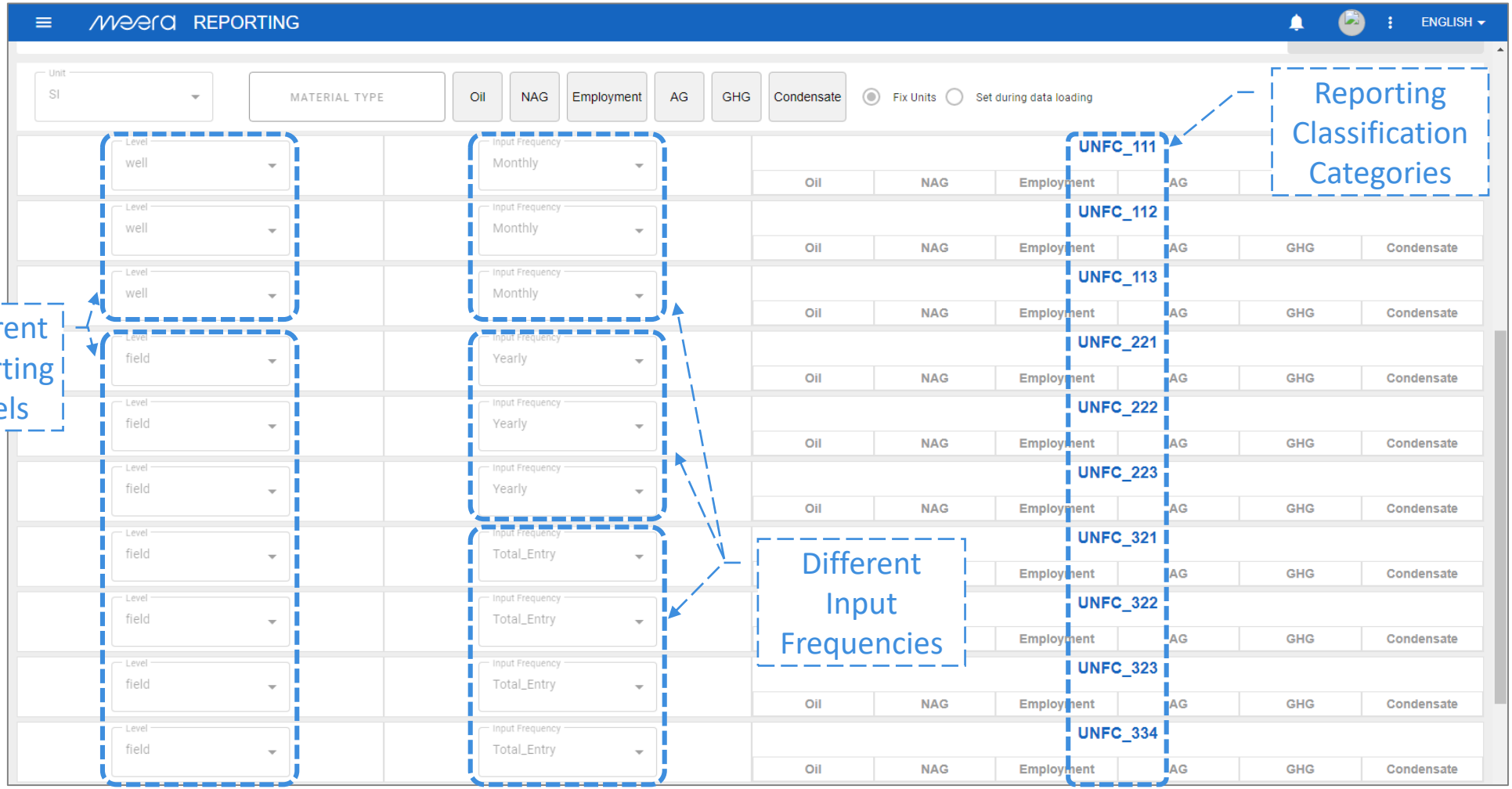

Quality Assurance Reporting

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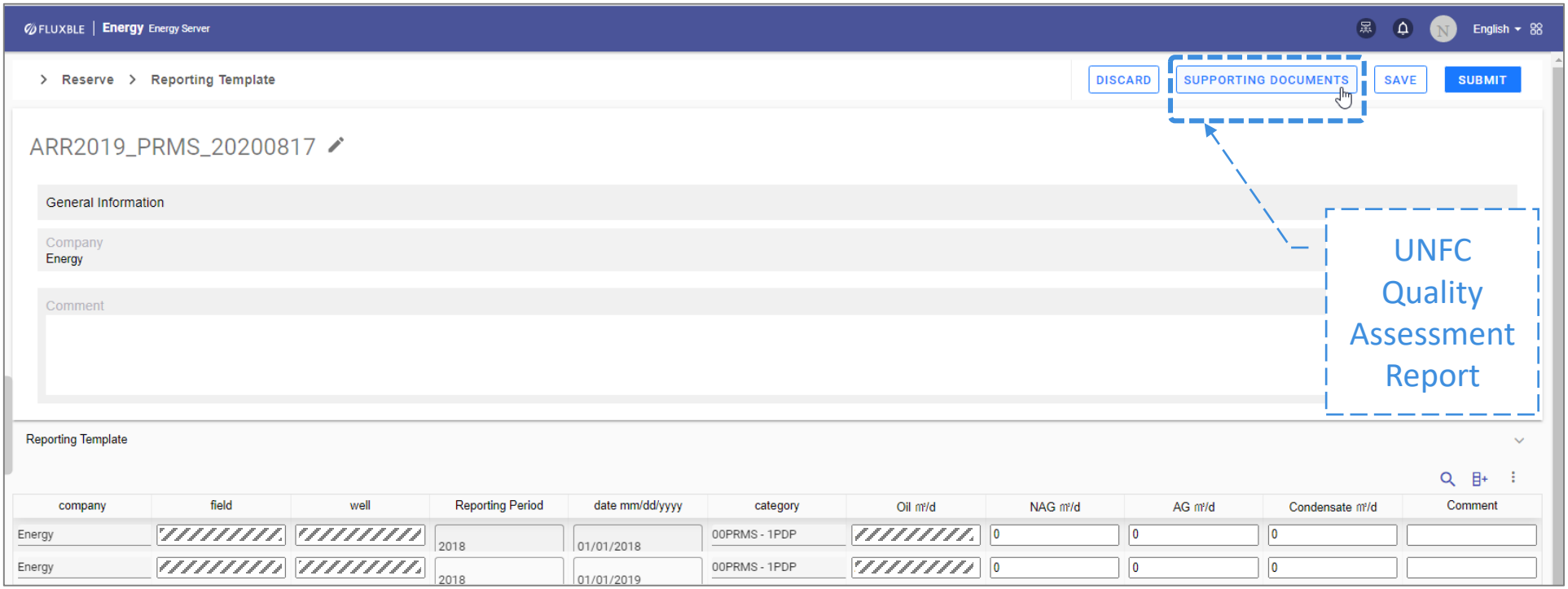

UNFC Categories in 3D

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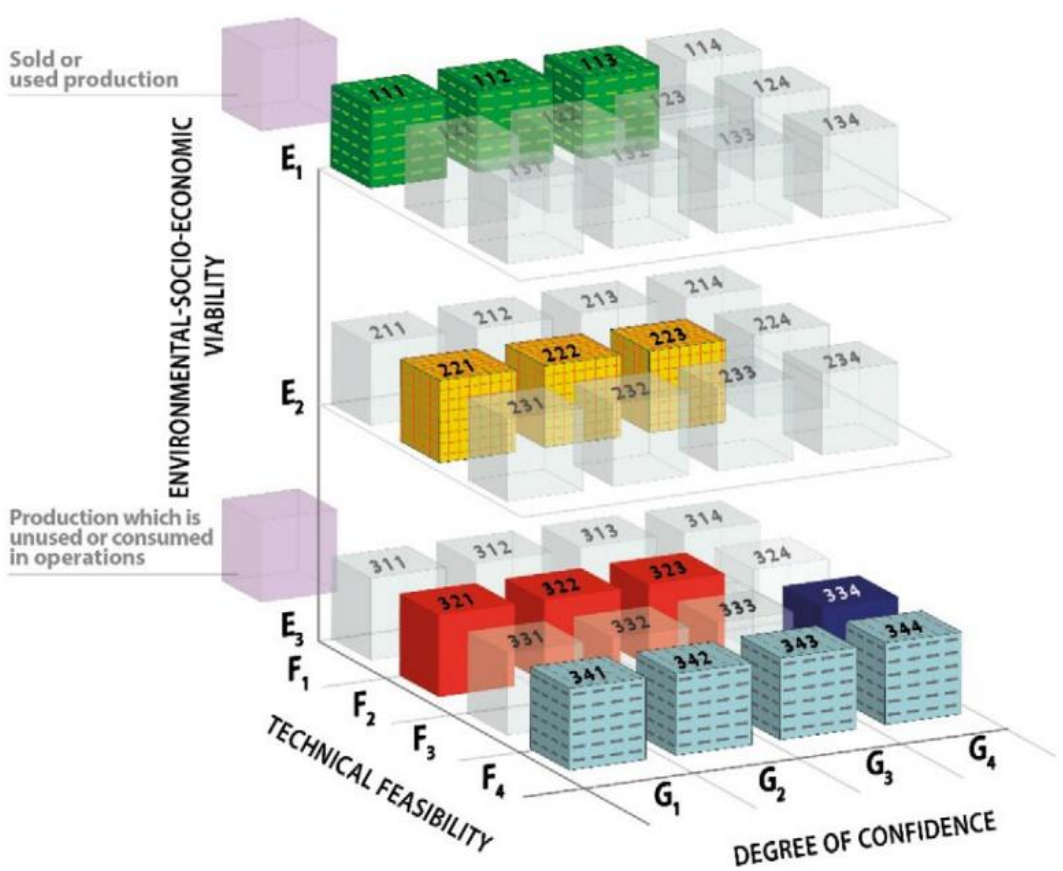
UNFC Categories and Examples of Classes



Part of the Required Element

Resource Categories – Flattened in 2D

Opening and Closing Balance of Resource Volumes

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HYDROCARBON RESOURCES [*10⁶ m³]		CLOSING BALANCE													
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
		1,665	370	96	116	188	75	89	20	4	9	91	6,847	1,239	1,627	535
OPENING BALANCE	Np	1,641	1,641													
	111	402	25	351									26			
	112	99			94									5		
	113	152				113									39	
	221	96					96									
	222	24						24								
	223	48							48							
	321	20								18			2			
	322	5									4			1		
	323	9										8			1	
	334	69										49				20
	341	6,576				48							6,528			
	342	1,200					39							1,161		
	343	1,440						12							1,428	
	344	338														338
Revisions																
Transfers			19	2	4	44	12	28	2	0	1	35	291	72	159	177
Extensions & Discoveries												7				

Annually Reported Categories

EMPLOYMENT [FTE/year]		CLOSING BALANCE													
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
			2,908	756	915	1,098	287	603	156	33	73	715				
OPENING BALANCE	Np															
	111	3,158	194	2,760												
	112	777			737											
	113	1,193				886										
	221	754					754									
	222	189						189								
	223	379							379							
	321	157								141						
	322	38									30					
	323	74										66				
	334	539										382				
	341															
	342															
	343															
	344															
Revisions																
Transfers			148	19	29	344	98	224	15	4	7	278				
Extensions & Discoveries												55				

Deteriorating

Maturing

Resource Reclassification

Learning by Doing - Origin Categories needed?

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HYDROCARBON RESOURCES [*10⁶ m³]		CLOSING BALANCE														
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
		1,665	370	96	116	188	75	89	20	4	9	91	6,847	1,239	1,627	535
OPENING BALANCE	Np 1,641	1,641														
	111 402	25	351										26			
	112 99			94										5		
	113 152				113										39	
	221 96					96										
	222 24						24									
	223 48							48								
	321 20								18				2			
	322 5									4				1		
	323 9										8				1	
	334 69											49				20
	341 6,576					48							6,528			
	342 1,200						39							1,161		
	343 1,440							12							1,428	
	344 338															338
Revisions																
Transfers			19	2	4	44	12	28	2	0	1	35	291	72	159	177
Extensions & Discoveries												7				

Other Origin Categories to be reported

EMPLOYMENT [FTE/year]		CLOSING BALANCE														
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
			2,908	756	915	1,098	287	603	156	33	73	715				
OPENING BALANCE	Np															
	111 3,158	194	2,760													
	112 777			737												
	113 1,193				886											
	221 754					754										
	222 189						189									
	223 379							379								
	321 157								141							
	322 38									30						
	323 74										66					
	334 539											382				
	341															
	342															
	343															
	344															
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nsfers			148	19	29	344	98	224	15	4	7	278				
sions & overies												55				

Classification for All Quantities

Resource Volumes, Employment, Emissions, Finance, …

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HYDROCARBON RESOURCES [*10⁶ m³]		CLOSING BALANCE														
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
		1,665	370	96	116	188	75	89	20	4	9	91	6,847	1,239	1,627	535
OPENING BALANCE	Np 1,641	1,641														
	111 402	25	351										26			
	112 99			94										5		
	113 152				113										39	
	221 96					96										
	222 24						24									
	223 48							48								
	321 20								18				2			
	322 5									4				1		
	323 9										8				1	
	334 69											49				20
	341 6,576					48							6,528			
	342 1,200						39							1,161		
	343 1,440							12							1,428	
	344 338															338
Revisions																
Transfers			19	2	4	44	12	28	2	0	1	35	291	72	159	177
Extensions & Discoveries												7				

Equivalent GHG [*10⁶ Tonne]		CLOSING BALANCE														
		Np	111	112	113	221	222	223	321	322	323	334	341	342	343	344
		632	140	37	44	53	14	29	8	2	4	35				
OPENING BALANCE	Np 623	623														
	111 153	9	133													
	112 38			36												
	113 58				43											
	221 36					36										
	222 9						9									
	223 18							18								
	321 8								7							
	322 2									1						
	323 4										3					
	334 26											18				
	341															
	342															
	343															
	344															
Revisions																
Transfers			7	1	1	17	5	11	1	0	0	13				
Extensions & Discoveries												3				

Dashboard

Projects Overview & Details

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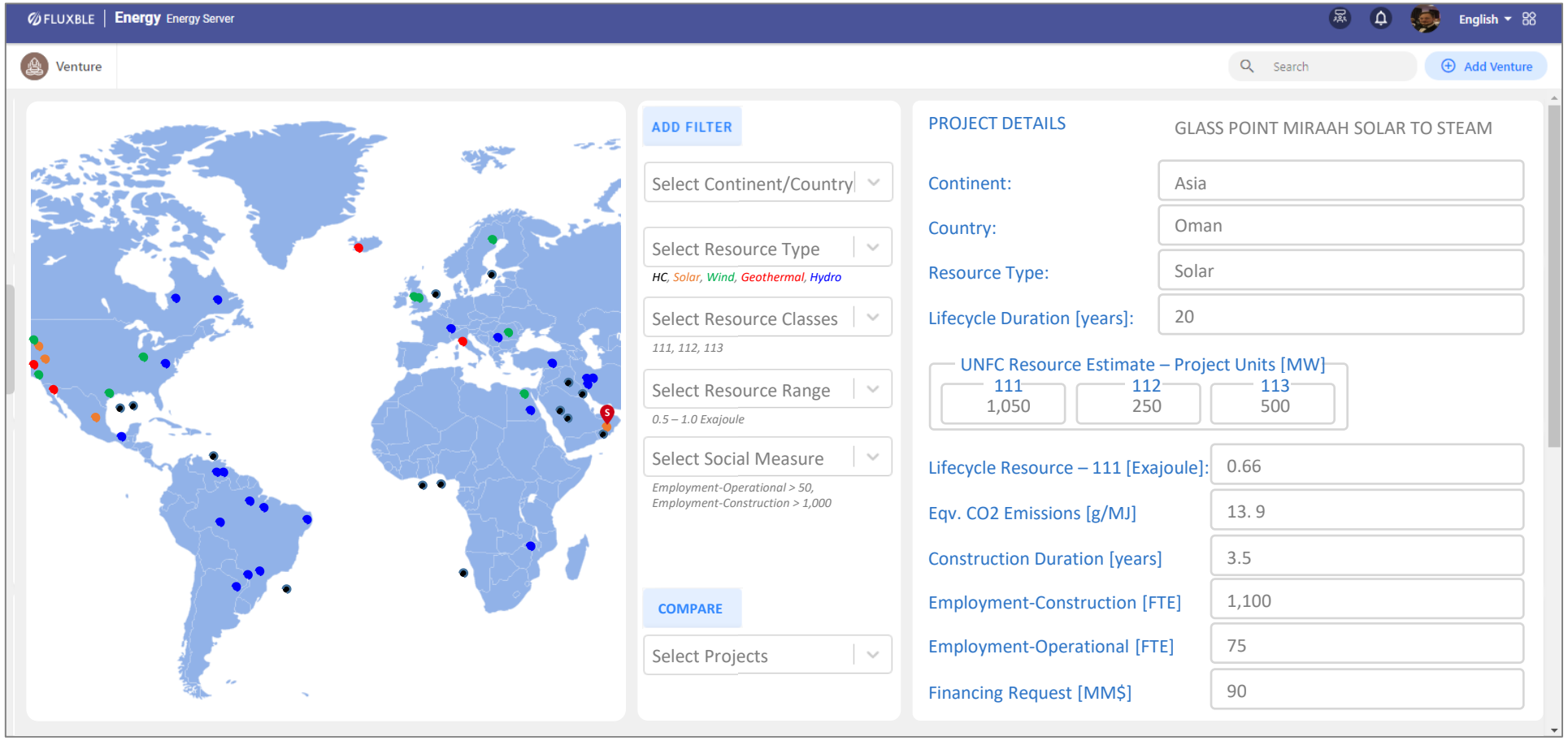

Dashboard

Compare & Contrast Projects

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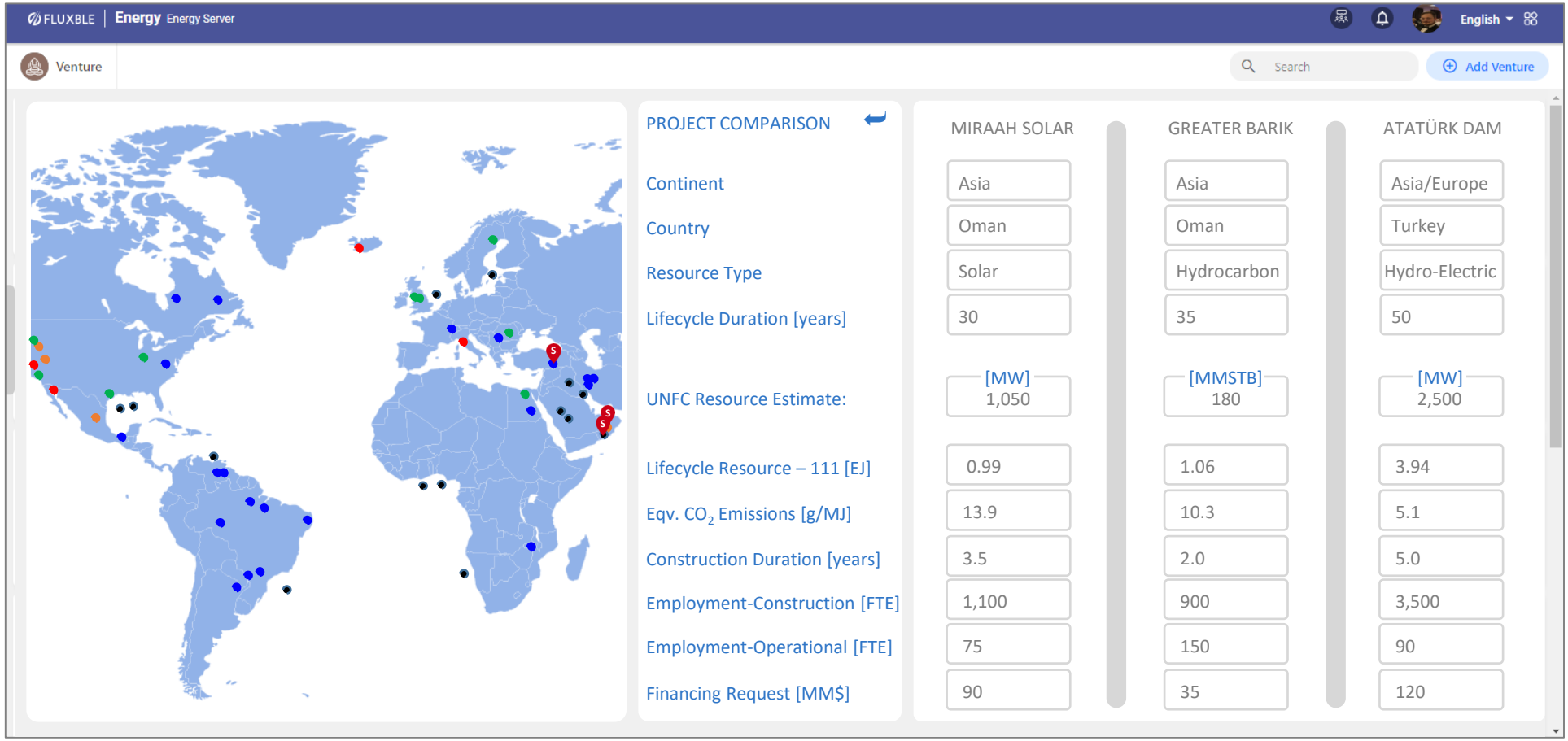

Dashboard

Solar to Hydrocarbon Comparison

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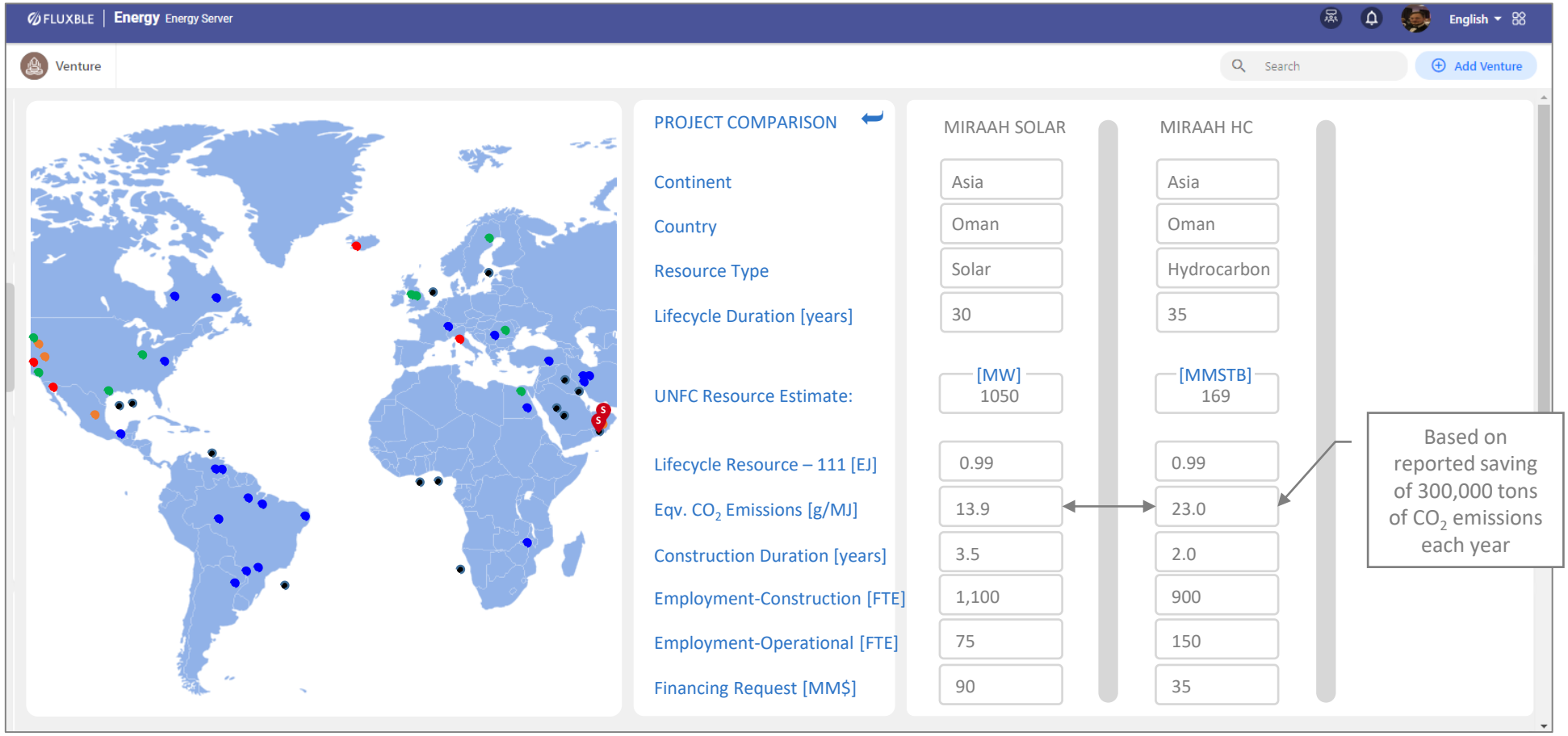

Dashboard Forecasts

Testing Policies

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Sensitivities on Example Project with No CO2-Tax, $30/t, $50/t, $100/t CO2

FLUXBLE | Energy Energy Server

Economics | Cases | Scenarios

Cases | Parameters | Fiscal Terms

Search Project

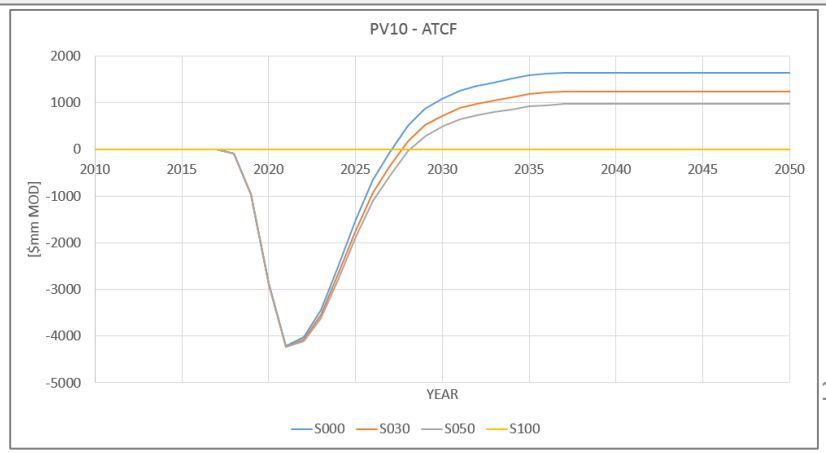
UNFC
08 Mar 2021 - 5:44 AM
- S000_UC102A
- S030_UC102A
- S050_UC102A
- S100_UC102A

UNFC_UC102A_HC
08 Dec 2020 - 10:53 AM

search...

Key Metrics Upstream	NPV [$mm, Net Share] ATCF NPV0	ATCF NPV10	DPI 10%	IRR [%]	Total Production mmboe	UTC [$/boe RT] 0%	10%	Payout Time [MOD]	Max. Exposure [MOD, Net Share]	COP
Total Project S000_UC1	8469	1646	0.315	15.971	406	29.845	15.104	7.132	2335	2037.000
Total Project S030_UC1	7548	1239	0.237	14.619	406	31.920	15.903	7.355	2335	2037.000
Total Project S050_UC1	6934	968	0.185	13.671	406	33.304	16.437	7.518	2335	2037.000
Total Project S100_UC1	0.000	0.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Example indicates project at $100/t CO2 tax is impaired



Requirements for Testing Policies

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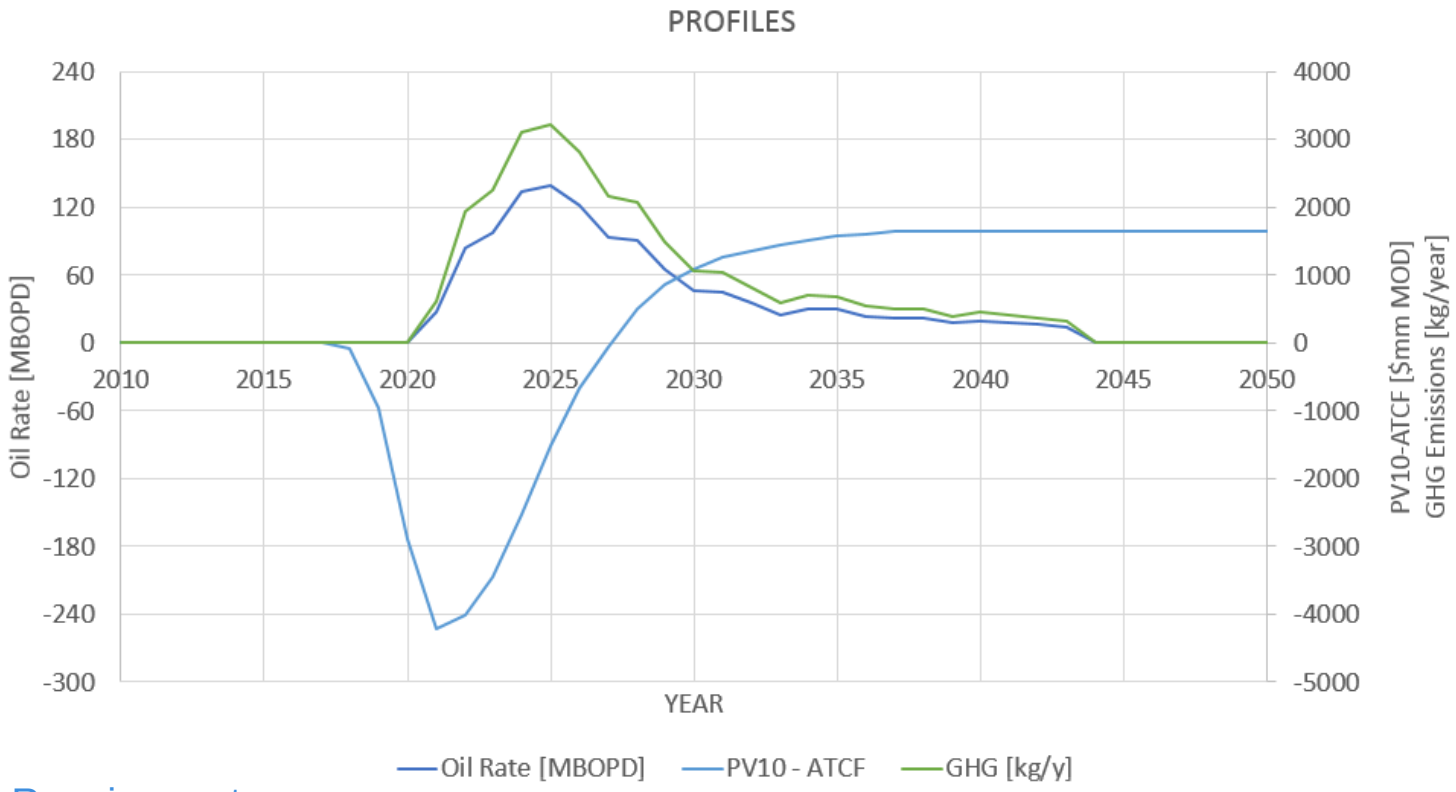

Requirements:

- Production profile for each resource category
- Cashflow profile for the project;
- GHG profile calculation in line with agreed sustainability reporting standard

Contributing Factors to Eqv. CO_2 Emissions

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Solar

- Source: https://www.nrel.gov/docs/fy13osti/56487.pdf
- **Study conducted by National Renewable Energy Laboratory (NREL)**
- Study aims to provide more precise estimates of life cycle GHG emissions from PV systems
- Contributing Factors to Eqv. CO_2 Emissions:
  - Mining and fabrication of PV Panels;
  - Mining and fabrication of power lines;
  - Mining and fabrication of panel reinforced foundation;
  - Logistics of material and construction staff;
  - Potential loss of vegetation that converts CO_2 to oxygen due to space occupation and shade creation.

Hydrocarbon

- Source: https://www.osti.gov/pages/servlets/purl/1485127
- **Study conducted by Stanford University**
- HC eqv. CO_2 emissions range between 3-20 g/MJ with a median of 10.3 g/MJ.
- Study focusses on the "well-to-wheels" life-cycle GHG emissions of transport fuels
- Contributing Factors to Eqv. CO_2 Emissions:
  - Mining and fabrication of concrete;
  - Mining and fabrication of steel;
  - Mining, fabrication & operation of heavy machinery;
  - Power generation requirement for operational usage;
  - Logistics of material and construction/operational staff;
  - Potential loss of vegetation that converts CO_2 to oxygen due to space occupation for access roads and facilities;
  - Impact on vegetation of potential spills;
  - Clean up efforts of potential spills.

Hydro-electric

- Source: https://www.hydropower.org/greenhouse-gas-emissions
- **Based on UNESCO G-res tool (life-cycle)**
- Contributing Factors to Eqv. CO_2 Emissions:
  - Mining and fabrication of concrete;
  - Mining and fabrication of reinforcement steel;
  - Mining, Fabrication & operation of heavy machinery;
  - Decay of submerged vegetation
  - Loss of vegetation that converts CO_2 to oxygen.

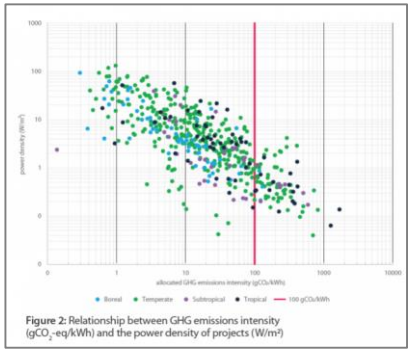

Figure 2: Relationship between GHG emissions intensity (gCO_2-eq/kWh) and the power density of projects (W/m^2)

Learnings from Early Adoption

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- 3D representation are illegible; **2D representation work** well
- **Reporting requirements** to cover production and (non-)sales volumes, revisions, transfers, discoveries and extensions
- **Single reporting standard set** needed for
  - Carbon intensity
  - Financial reporting
  - Local/in-country employment
  - Other quantities?
- **International Centers of Excellence**
  - For learning by doing
  - Sandbox for practitioners
- **Adopters with project/portfolio data** and use cases needed

Conclusion

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- UNFC works to **compare & contrast across resource types**:
  - Policies
  - Portfolios
  - Projects

  Impact on

  - People
  - Planet
  - Prosperity
- **Minimum Viable Tools** exist to build trusted data systems
- **Double-Materiality assessments can become data-driven**, dynamic, and context-driven, using a wider scope of data
- UNFC becomes **a "negotiation" tool** for
  - “Balanced and integrated resource management“
  - Resolving conflict and
  - Create the win-win-win for People, Planet & Prosperity
- **Time to adopt the UNFC**
  - **For well-informed decisions on sustainable resource management**

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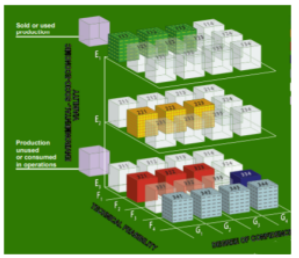
Thank you

Matthias Hartung

Executive Consultant on
Data & Digital Transformation

And the MVT provided by

TARGET ENERGY SOLUTIONS LTD



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