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Application of UNFC-2009 to Renewable Energy Resources

GERE Meeting, 12-13 October 2015



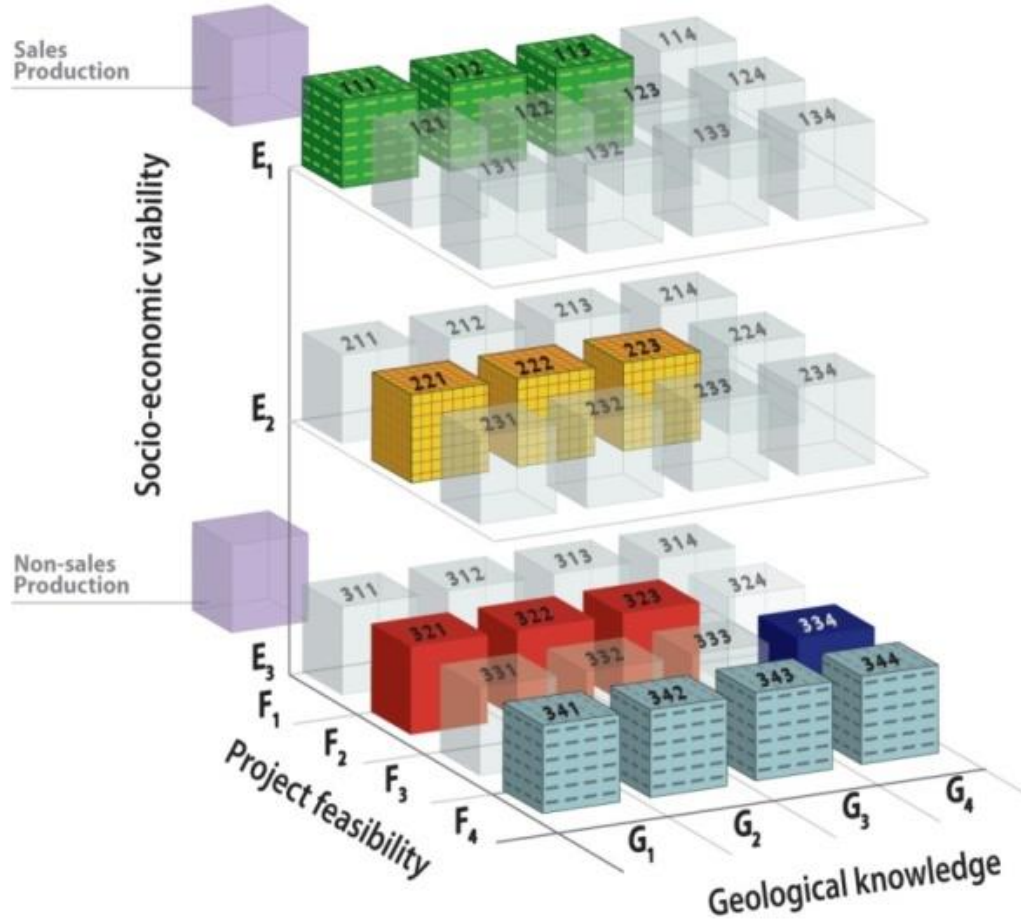
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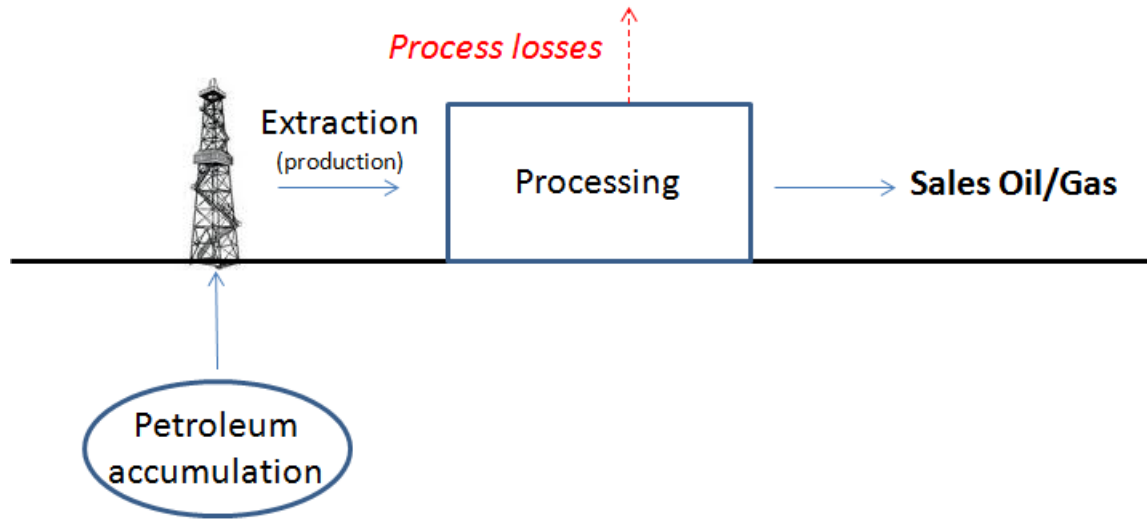
History

- UNECE called upon the EGRC to “*develop ideas on how the UNFC could apply to and integrate renewable energy by December 2013*”
- Separately, an industry-led working group developed an estimation and classification methodology for Renewable Energy (London workshop, December 2012)
- The working group reported their findings at the 4th session of the EGRC held in Geneva in April 2013
- The EGRC established a Task Force on the Application of UNFC-2009 to Renewable Energy Resources
- The Task Force presented draft generic Specifications at the 5th session of the EGRC in 2014 and final generic Specifications at the 6th session in 2015
- The Task Force has initiated Work Groups (Geothermal, Bioenergy, and soon Wind & Solar) to develop commodity-specific Specifications

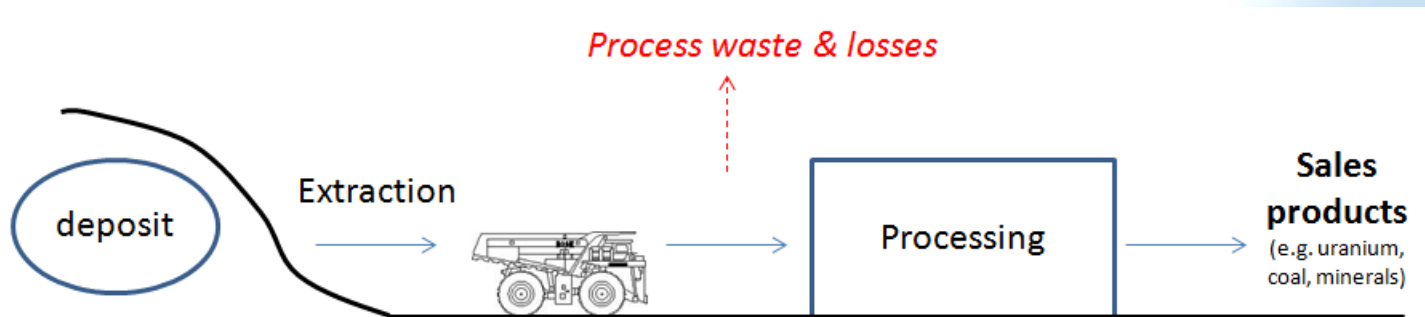
UNFC-2009



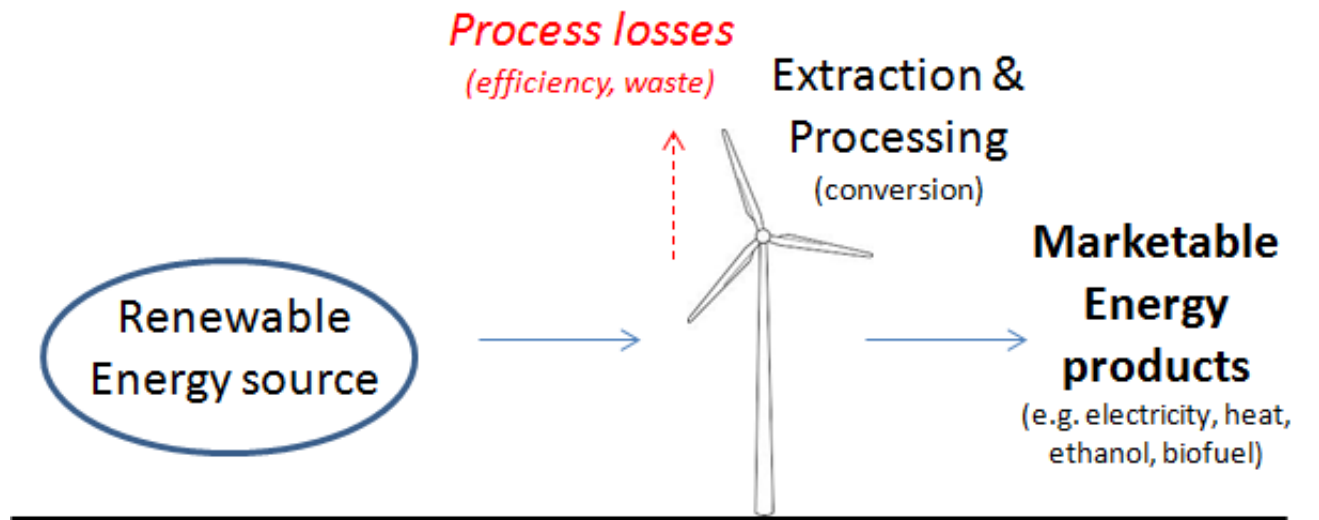
The Concept: UNFC-2009 is “Project-Based”



The **project** generally represents the level at which a decision is made whether or not to proceed (i.e., spend more money)



Renewable Energy Projects are Very Similar to Fossil Energy or Mineral Projects



The Project is the link between the Renewable Energy Source and sales quantities of Energy Products and provides the basis for economic evaluation and decision-making

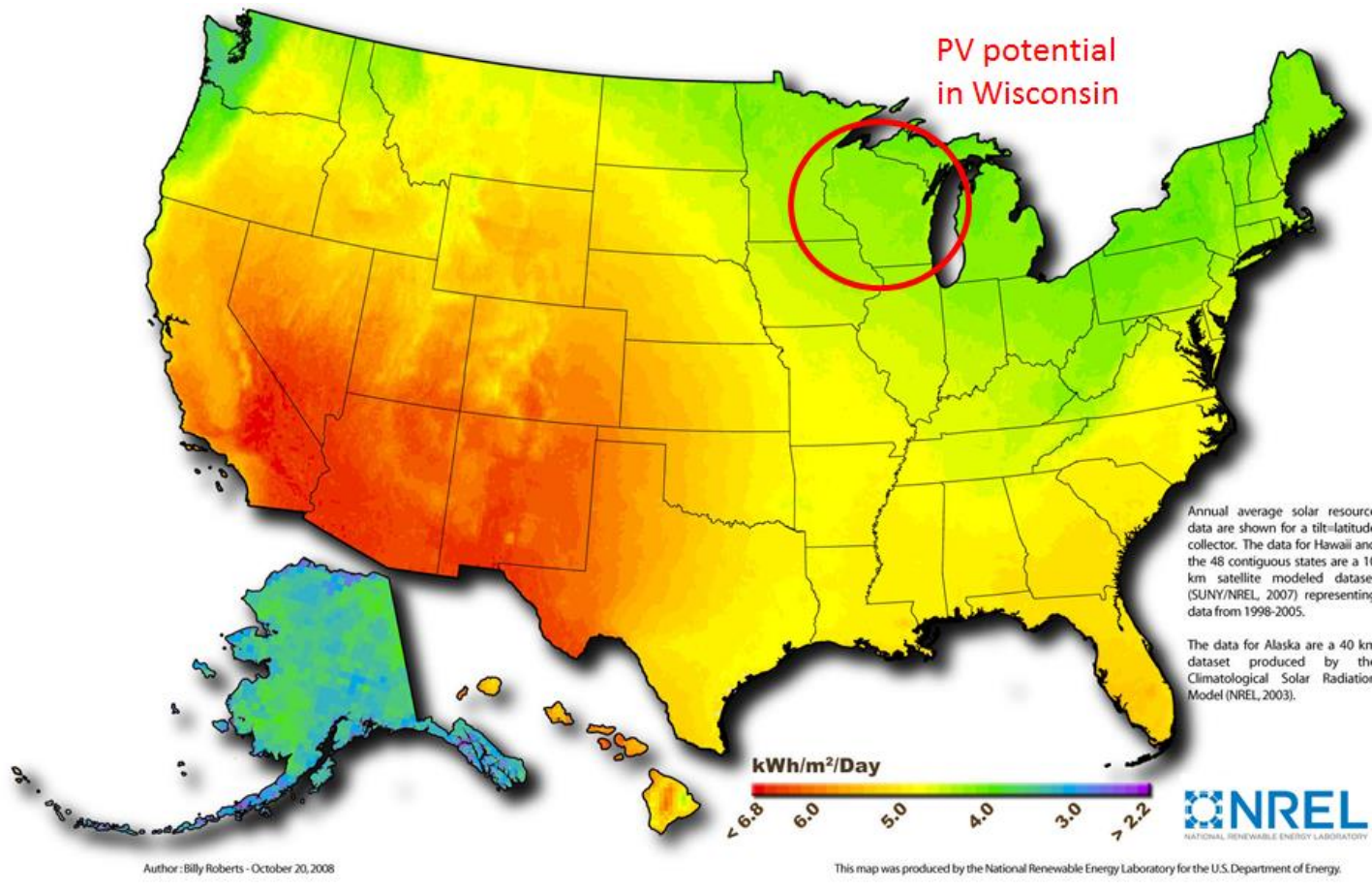
Progress to Date

- The draft **Generic Specifications on the application of the UNFC-2009 to Renewable Energy** has been published on the UNECE website after incorporation of comments received from the Public and the EGRC TAG. It will be issued after the accompanying commodity-specific Specifications are developed and approved.
- Two working groups have been established to develop the **Commodity-specific Specifications for Geothermal** and **Bioenergy**. Geothermal (in MoU with IGA) is making good progress, likewise for Bioenergy. Solar/Wind/Hydro will be developed once key stakeholder support and active involvement is secured.

Main Challenges

- Many stakeholders, different and fragmented, limited global consolidation:
 - How to get input and support from the full spectrum of stakeholders?
 - Who will “own” and “maintain” the Specifications?
 - Who will act as “Subject Matter Experts”?
- The common practice of using “Annual Capacity” and “Potential” is not consistent with the UNFC-2009 project-based approach:
 - Is there sufficient incentive among stakeholders to define a “Project” and “Project Life Time”, key to business planning, valuation and execution?
- The UNFC-2009 is based on finite (i.e., not renewable) oil & gas or mineral deposits with associated geological uncertainties:
 - The application and use of the E, F and G categories may feel confusing for some Renewable Energy stakeholders

Example: PV Potential in State of Wisconsin



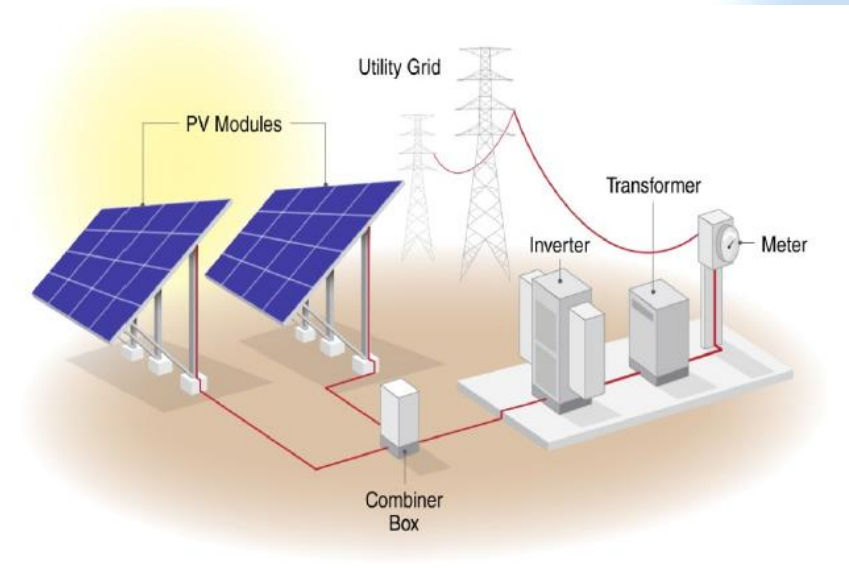
- Estimates of potentials assumed to be unconstrained by grid limitations such as lack of storage or transmission capacity.
- Utility scale PV in rural areas was restricted by excluding federal protected lands, water features and wetlands, and allowing installations only where land surface slopes are $\leq 3\%$. Resulting areas must be $\geq 1 \text{ km}^2$ to be included in the potential. Installed capacity for utility scale PV assumes an installation density of 48 MW/km^2 .

Solar Energy Project: Helios

Sunshine Ltd has taken an option for a 35 year lease of a 23-acre site in Wisconsin to build a PV Solar Park, **project "Helios"**

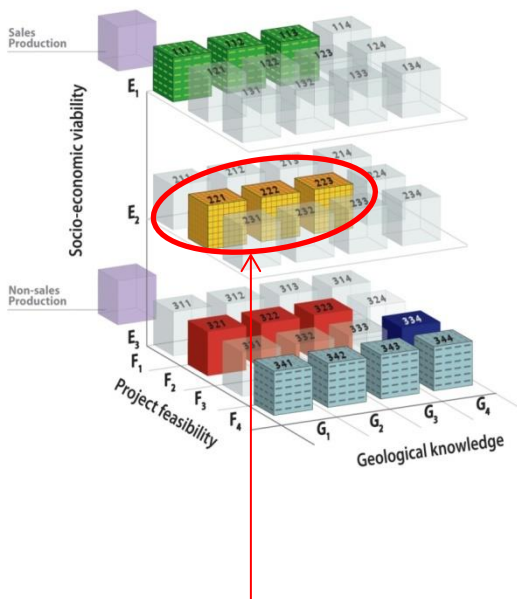
The electricity generated by Helios will be fed into the local grid and used to **offset non-renewable energy** used in a nearby city

Sunshine Ltd has not yet made an investment decision, but is in the process of completing **a feasibility study**



Classification of Project Helios Resources

- How to classify the Renewable Resources for Project Helios in terms of E- and F-axis?



| Category | Definition | Supporting Explanation (UNFC-2009 ANNEX I) |
|----------|--|--|
| E1 | Extraction and sale has been confirmed to be economically viable | Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/ contracts have been confirmed or there are reasonable expectations that all such approvals/contracts will be obtained within a reasonable timeframe. Economic viability is not affected by short-term adverse market conditions provided that longer-term forecasts remain positive. |
| E2 | Extraction and sale is expected to become economically viable in the foreseeable future. | Extraction and sale has not yet been confirmed to be economic but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for economic extraction and sale in the foreseeable future. |

| Category | Definition | Supporting Explanation (UNFC-2009 ANNEX I) |
|----------|--|---|
| F1 | Feasibility of extraction by a defined development Project or mining operation has been confirmed. | Extraction is currently taking place; or, implementation of the Renewable energy Project is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a development Project or mining operation. |
| F2 | Feasibility of Extraction by a defined development Project or mining operation is subject to further evaluation. | Preliminary studies demonstrate the existence of a Project in such form, quality and quantity that the feasibility of extraction by a defined (at least in broad terms) development Project or mining operation can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of extraction. |

Category E2F2?
With associated range of quantities (G1-G3)

Approvals and contracts not yet confirmed and some risk that lack of local community support may impact approval of permits

"...Still awaiting completion of Solar Resource Assessment (data from Satellite model and local ground measurements)"

Will this data be critical to establish the feasibility of the project...?

Work Plan 2015-2017

1. Maintain and update (when required) the draft **Generic Specifications** for the application of UNFC-2009 to Renewable Energies
2. Develop **Commodity-Specific Specifications** for the application of UNFC-2009 to Geothermal Energy, Bioenergy and Solar, Wind and Hydro Energies
3. Develop **guidelines and case studies** for the application of the UNFC-2009 to Renewable Energies

Conclusions and Recommendations

- Renewable Energies are the **energies of the future**.
- Considering environmental and societal pressures, they should be developed and implemented in the most **effective & efficient way**
- Such development will take place only if there is a **business case for investors** to finance this development
- This business case demands a **representative evaluation** of the uncertainty, maturity and value of the resources to develop
- The application of the **UNFC-2009** to Renewable Energies provides a universally recognized system to help conduct this evaluation

Call for Help

- The Renewable Energy Classification project is conducted by a group of part-time and voluntary people from all horizons
- We are passionate about Renewable Energies and wish our work will play a key role in progressing Renewable Energies in the world
- Yet, we need HELP!
- We need HELP from the Renewable Energy Industry and the Renewable Energy users to ensure their experience and needs are best reflected
- If you are interested to join our Task Force – or know anybody who would be – please contact me:

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