EUSUSTEL – WP 3

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- analysis of electricity generation technologies and integration into overall generation system, with emphasis on their future potential

- technical, economic, environmental characterization of each technology

- partners:1,2,3,5,7,8,9,10

Scope of WP3

- Fossil-fuel based generation & CO_2 management
- Nuclear electricity
- Renewables, new and other technologies
- System integration (centralized & decentralized)

Questions to be addressed in WP3

- clarify the future potential of different technologies, including systems issues

  through an analysis/assessment based on existing information

  resulting in 1) a uniform presentation of a technology portfolio including system constraints, 2) a state-of-the-art view of the perceived progress of production technologies

- possible approach
  - uniform characterization of each technology (quantitative)
  - identify and address key systems issues (qualitative)

Questions for characterization

1. level of details: number of parameters, depth; confidence levels of parameters
2. perspective: utility, investor, policy maker, other players
3. framework:
   - existing and evolutionary framework (=electricity system)
   - geographical scope (nations…whole EU)
   - structure of the electricity system & electricity market (open…closed ; integrated…isolated)
4. time dimension (2005…**2030**…2050?) (cf 5.1)
5. life-cycle based, or up-front only
6. interfacing with the other WPs and their needs

Characterization

- **Technical parameters**
- **Economic parameters**
- **Environmental parameters**

Technical parameters (long-list)

- **range of unit size…project size,**
- **conversion η, life-time**

- **operational time (hours of nominal power/yr)**
- **resource base (~potential/countrywise ?, fuel availability)**

- static, dynamic and transient behavior
- technical requirements on integration
- technology specific site requirements and restrictions

Economic parameters (long-list)

- **traditional life-cycle costs: investment (system=core+BOS), fuel, OEM, waste, dismantling**

- **system or electricity market costs:**
  - system integration costs (reserve, back-up, etc.; effect of system typology)
  - cost of risks ? (market, technical, immatureness,size)
  - other ?

- influence of policies & level of public support on economics & potential

Environmental parameters (long-list)

- **direct GHG emissions, production based in-direct emissions (e.g. transport of fuel)**
- ‘intrusion’ level on public (noise, appearance, disturbance, health)
- legal/societal framework, permissions, directives etc. associated with a technology

Systems issues

- Interaction of decentralized and centralized electricity systems and its influence on GHG
- Effects of the different technologies on the electric grid
- Other ?

Structure of WP 3

Task	Topic	Lead	Deliverable
WP3.1	**Fossil-based generation**	2	report
3.1.1	Coal	2,10, (9)	chapter
3.1.2	Oil&gas	1, (9)	chapter
3.1.3	CHP	1,10, (9)	chapter
3.1.4	CO_2 cap&seq	2	chapter
WP3.2	**Nuclear electricity**	8	report
3.2.1	Fission	8	chapter
3.2.2	Fusion	1	chapter

Task	Topic	Lead	Deliverable
WP3.3	**Renewables and other alt.**	3	report
	General considerations	5,8,10	chapter
3.3.1	Wind	10	chapter
3.3.2	PV	3	chapter
3.3.3	Biomass	3,7,(9)	chapter
3.3.4	Hydro	5	chapter
3.3.5	Geothermal	5	chapter
3.3.6	Fuel cells	7	chapter
3.3.7	Hydrogen	7,1	chapter
3.3.8	Storage	5	chapter
3.3.9	Other & Speculative forms	5,3	chapter
WP3.4	System integration	3? -> 1	report
3.4.1	**Integration of cent&decent**	1,5,7	chapter
3.4.2	GHG emissions from inter.	1	chapter

Characterization

- **Technical parameters**
  - unit size…project size, conversion efficiency, etc.
  - operational time (hours of nominal power/yr)
  - resource base (~potential, fuel availability)
  - technical requirements on integration
  - technology specific site requirements and restrictions
- **Economic parameters**
  - traditional life-cycle cost: investment (system=core+BOS), fuel, OEM, waste, dismantling
  - system integration costs associated (reserve, back-up, etc.)
  - cost of risks ? (market, technical, immatureness)
  - other (permissions,?
- **Environmental parameters**
  - direct GHG emissions, in-direct (e.g. transport of fuel)
  - ‘intrusion’ level on public (noice, appearance, disturbance)
  - legal/societal framework, permissions directives associated with a technology