Annex 73:
'Towards Net Zero Energy and Resilient Public Communities'

Subtask D: Local Energy Planning Guide Workflow
Alignment with other Annex 73 Subtasks
Presentation Objectives:

1) Overview over Annex 73 Topics and Subtasks

2) Understanding the Annex Scope(s)

3) Subtask D – Approach: LEP Workflow suggestion and Contributions from other Subtasks
1) Overview over Annex 73 Topics and Subtasks
Actual Subtask Topics:

Subtask A:
'Storage of Input Data for EMP'
**ST Leaders:** S. Bucking, R. Jeffers, T. Sharp

Subtask B:
'Review of Case Studies and implemented Pilot Projects'
**ST Leaders:** I. Leusbrock, M. Case

Subtask C:
'Selected Tools for Energy Conversion Systems and (el.& th.) Distribution Systems'
**ST Leaders:** A. Dyrelund, D. Hering

Subtask D:
'LEP Guidebook'
**ST Leaders:** A. Zhivov, R. Jank

Subtask E:
'Analysis of existing LEP Tools and development of a stand-alone Planning Tool'
**ST Leaders:** P. Ellis, U. Eicker

Subtask F:
'Business Aspects of NZE Master Planning'
**ST Leader:** R. Lohse
Annex 73 Deliverables:

- Guidebook on NZE planning of Public (and military) Communities
- NZP Tool: *Enhanced Net Zero Energy Planner*
- *Book about Case Studies and Implemented NZE Projects*
- Training for NZE Planners (national in participating countries)

**Time frame:**
(plus reporting period)
2) Understanding the Annex Scope(s)
... common understanding of

(1) 'Net Zero Energy’?

Definition: Amount of fossil fuel use is equal to 'exported' renewable energy

Question: do we adopt this?

Alternatives: 'Near Zero' (EPBD) or 'Low-Carbon'?

(2) 'Public Communities’?

... university campuses, hospital centers, military installations ...

Question: includes mixed zones (incl. residential)? industrial areas?
excluded: cities, urban districts

Consequence:

'Energy Master Plan' usually addressing Cities! ➔ Annex 51!
➔ Annex 73: 'Local Energy Plan' or
'Neighbourhood / Community Energy Action Plan’ ??
Difference between

**Urban energy planning** (cities, large districts)

**Operational**
- assessment of existing facilities
- economic scenario analysis
- actionable investment plan
- business model(s)
- implementation responsibilities

**Local energy planning** (neighbourhoods, campuses, revitalization zones, new developments/greenfields)

**Strategic**
- energy policy targets
- urban activity sectors
- adjustment with urban development dynamics

→ **overarching long-term climate strategy**

→ **Neighbourhood action plan**

→ different approaches, methods, tools, actors ...
Assignment of Planning Tasks:

**Top-down:**
- vision
- targets
- master plan(s)
- organisation

**Urban development**

**Dynamic changes**

**Infrastructure**

**Urban form**

**Neighborhood development:**
- integration of supply/demand
- stakeholders/decision makers
- financial risks
- residents participation
- subsidies
- new technologies

**Bottom-up**

**Urban Energy Master Plan**

- local economy
- population
- transport
- institutions
- public spaces
- infill development
- new developments
- sub-urbanisation?
- climate change precaution

**Local Energy Planning**
(3) Computer-based tools: scope?

(a) Evaluation of existing tools?
(b) Development of new tools?

Objectives?
- intended for which planning phase?
  pre-planning, feasibility study, lay-out planning ...
- comprehensive energy system models? (like NZP: Net Zero Planner')
- simulation of (campus-scale) communities? (based on 8760 h?)
- buildings included in simulation?
- including GIS? 3D modeling of neighbourhoods?
- distribution network tools?
- multi-criteria analysis tool?
  ... including resilience, security, etc.
(4) 'Case Studies & Pilot Projects'?

- What shall be demonstrated?
  Types of projects? Technologies? (e.g. control/monitoring devices?)
- experiences with planning tools/verification?
- Criteria for case selection? Residential neighbourhood case studies?
- Planned outcomes of the Subtask?

(5) 'Guidebook'

- Objectives?
- Recipients? → energy planners, decision makers, spatial planners, modelers?
  → focus on techno-economic issues!
- 'Case Study Book' as attachment?
- Publication planned? → print??
Community Energy Planning Work Flow Suggestion:

Sources:
- energy statistics
- municipal GIS
- IR/laser scanning
- utilities, ...

baseline energy/GHG inventory

Step 1

base case (‘BAU’) scenario

- energy efficiency potentials
- renewables local or regional
- energy conservation pot.

Step 2

cost structures

scenario models

Step 3

targets

additional requirements (security, resilience ...)

scenario selection

feedback

Step 4

planning tools

neighbourhood energy planning

local energy action plan

Step 5

monitoring

implementation strategy

- responsibility
- communication
- management
- priorities
- measures

Subtask contributions??

Subtask A: → step1, step 2
Subtask B: → step 1, step 2, step 5
Subtask C: → step 2, step 4
Subtask E: → step 2, step 3, step 4
Subtask F: → step 4, step 5
→ Time schedules?

→ Products until next ExCo Meeting? (Mai 2018)
Integrated Planning Process Overview

1. Establish Framing Goals

2. Establish Base Case
   - Building
   - Geography
   - Utilities
   - Cost Data
   - Water
   - Waste
   - Greenhouse Gas

3. Optimize Energy Efficiency Measures (EEMS)

4. Optimize Supply and Distribution System Mix

5. Produce Integrated Plan
   - Integrated Plan
   - Projects
   - Sequence
   - Schedule
   - Costs
   - Risk
   - DD1391

Execute, Track, Measure

Supports
To the Continental Gulf

Iterate over Building EEMS

Wind Farm
Photovoltaic / Solar Thermal
Geothermal
Geothermal
Geothermal
Geothermal
Sub-Station
Installation Boundary
Workflow for the Annex 73 EMP and Resiliency analysis

Building load profiles

- NZP, SimCity, NREL, other
- ALL bldgs.
- MC bldgs.

MC Facilities

- T1
- T2
- Tn

Baseline

MC Baseline Architecture

ST A Tiers of MC facilities and their energy requirements

ST A Threat analysis

Gap 1
Gap 2
Gap n

Analysis of Scenarios: ERA, LCCA
Environmental Analysis
NZE Analysis

Stress analysis

ERA Resiliency Analysis

BC1 arch
BC2 arch
BCn arch

MC Base Case Architecture

Scenarios

ST C Database
energyPRO NZP, ERA new?

Selected scenario

Multi-criteria Analysis

Baseline Base Case

Scenarios

ST C Case Studies

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<td>Subtask B:</td>
<td>Collection of Existing Case Studies and implementation of a pilot study.</td>
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<td>Subtask C:</td>
<td>Description of existing and innovative technologies, architecture and select calculation tools for performance of central energy systems (power and thermal)</td>
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<td>Subtask E:</td>
<td>Develop a functional description of the role of modeling tools in the Net Zero Energy Master Planning Process</td>
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