CLEEN
Cluster for Energy and Environment

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Efficient Energy Use

District heating business networks

Mika Luoranen
Lappeenranta University of Technology

Tomorrow's Energy Efficiency Solutions Seminar

September 14th 2015, Espoo

Introduction

- Objective (Task 3.3):
  - To identify and understand future stakeholder roles and opportunities in energy efficiency business from the regional point of view
    - Who buys energy and from whom?
    - Who produces energy?
    - What kind of energy products and services are needed?
    - Who does business in the energy market?
    - How do regions and energy markets interact?

Introduction

- Connection to program goals
- **Knowledge/resources/tools/methods to develop efficient regional energy systems and energy business => supporting tools for energy services**
  - Models, methods, solutions, business and service concepts, business roles / for design, operation, services
    - Different level of methods for different needs and phases
  - Exploitation/dissemination platform for detailed results – EFEU is offering link to energy efficiency innovation platforms (e.g. Snowball)
  - Tasks and Cases:
    - Tracking simulator based control methods (T3.1 ships, T3.2 districts)
    - Energy efficient control strategies for regional energy systems (T3.2)
    - District design methods (in WP1)
    - Future stakeholder roles in future energy efficiency business (T3.3)
    - Company pilot cases offering data for testing tools and methods
    - Simulation cases offering general data of energy system energy efficiency options

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Approach

- Different approaches for different points of views: regional energy producer / service provider, community, …
- Methods for different approaches: system level methods, process level methods, process component level methods.
- Methods, solutions, business concepts, business roles:
  - NetZED concept
  - Regional Energy Efficiency Balance Model
  - Description of business opportunities

Approach

- Which partners have contributed to the topic?
  - Research organisations (WP 3):
    - Aalto, LUT, VTT, Åbo Akademi
  - Companies (WP 3):
    - ABB, Empower IM, Fortum Oyj, Fortum P&H Oy, Gasum Oy

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EFEU Approach

Methods, tools & expertise

Energy efficiency innovation platform

Service

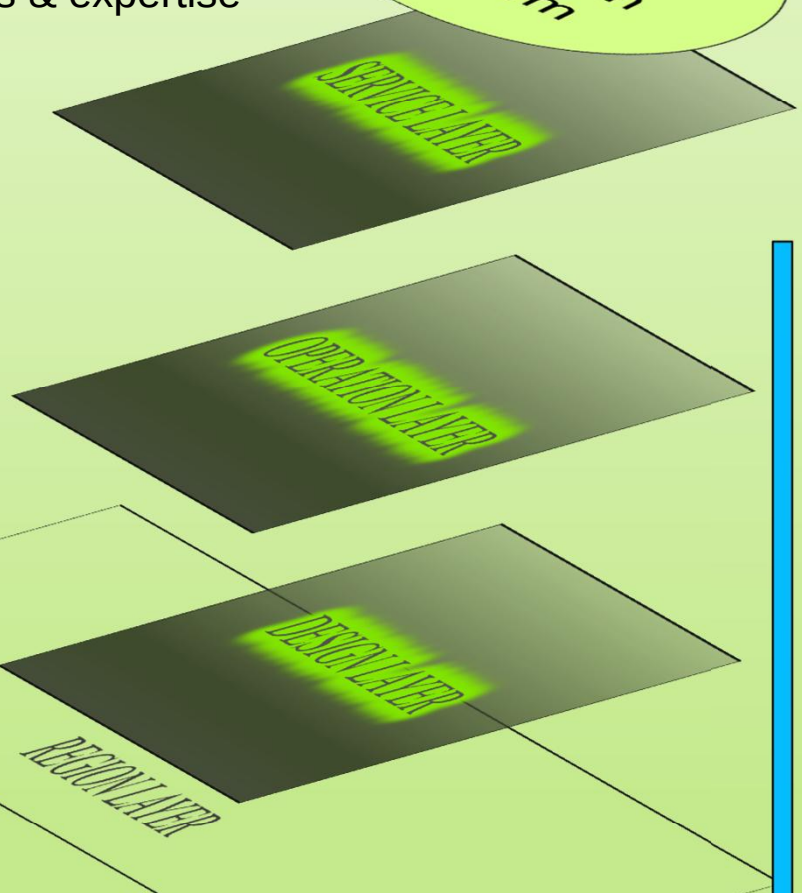
- Regional EE assessment methods
- Regional collaboration methods
- NetZED concept

Operation

- Prosumer models
- District models
- Control algorithm models

Design

- Design applications
- Design phase methods
- ...



Regional energy systems
Case studies

Improved energy efficiency

- Tools, methods, concepts
- Research tasks & results

Approach – Regional energy efficiency assessment

- Targets:
  - To demonstrate the implementation of energy efficiency at the regional level
  - To facilitate and simplify the design of energy efficiency solutions

- Remark
  - Mathematical basis of the regional model is mainly on environmental issues

Approach – Regional energy efficiency assessment

Regional energy efficiency assessment model

- **Model input data**
  - Regional operators
  - Information about operator's energy production, energy use, fuel quality, fuel percentages, total amount of waste, total amount of energy waste
  - Energy flows between operators

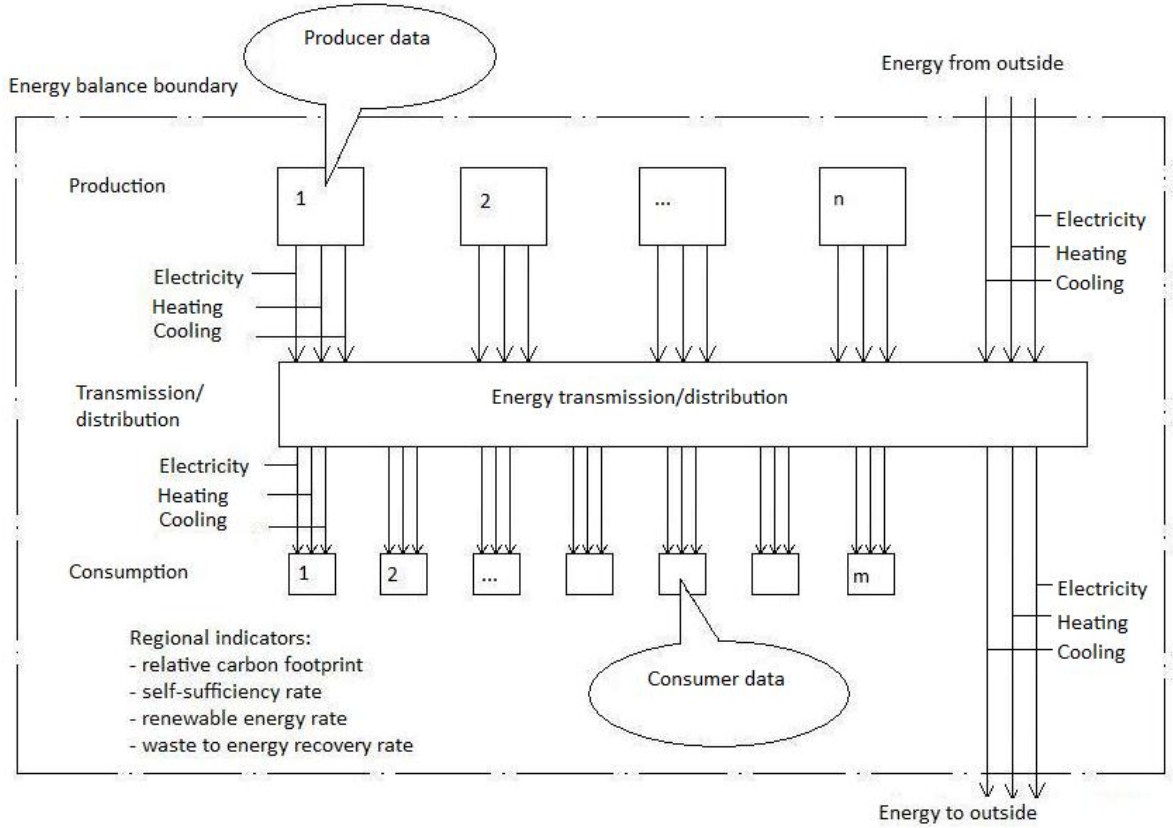
- **Measurable indicators**
  - Relative carbon footprint
  - Self-sufficiency rate
  - Renewable energy rate
  - Waste to energy recovery rate
  - Energy consumption per capita/per building square
  - Emissions per capita/per building square

- **Calculation methods for indicators**

Approach – Regional energy efficiency assessment

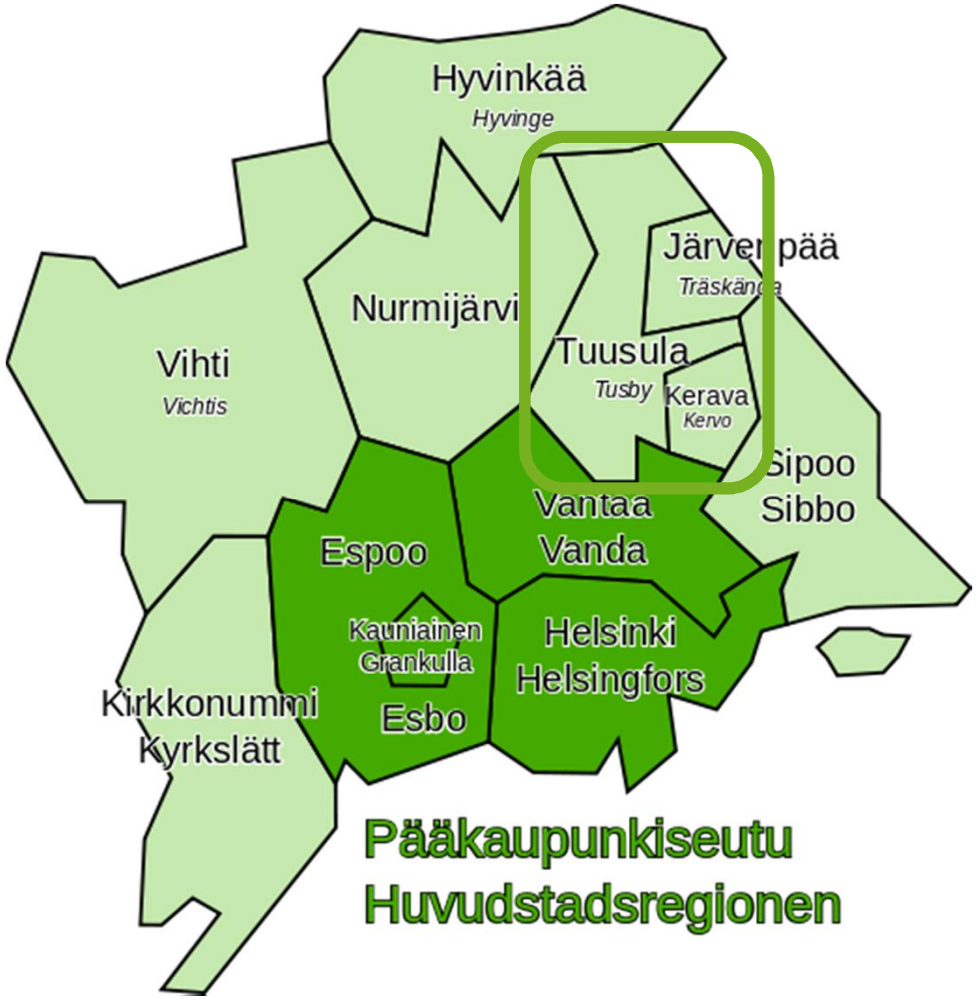
Regional energy efficiency assessment model

- Model output



Approach – production network collaboration

Case Järvenpää: location



Part of a larger Helsinki region energy and infrastructure ecosystem that has potential to advance into a one million people disctrict heating and cooling market

Approach – production network collaboration

- Basic assumptions
  - Open regional heating network
  - Aggregated district heating ecosystems (like Rykmentinpuisto)
  - Based on a real life case – how we see its potential future
  - Pricing based on an idea about a dynamic heat market that enables regional optimization
- Interviewing key stakeholders
  - Municipalities, energy companies, big energy users, potential energy (overspill) providers
    - They are being identified
      - Tuusula, Kerava, Järvenpää, Fortum, Keravan Energia, Ruukki, Finnfrost, (Vantaan Energia)
  - Profiling stakeholders, understanding needs and restrictions
- Defining required enablers, innovation network model
- Action plan – how to make things happen

Results and conclusions

- Results:
  - Methods and solutions for future energy systems
- Expected impact:
  - Novel way of thinking: how future energy systems will and should be designed, built and operated?
- Novelty:
  - More understanding: what are the bottlenecks in regional energy efficiency and how to tackle them?
- The questions to be answered?
  - How should future energy systems be designed and built?
  - What kind of business opportunities will be available in the field of energy efficiency?
- How and who could utilize these results?
  - Companies in development of energy efficiency service portfolios
  - Public decision makers in regional energy and environmental strategy planning

Future plans

- EFEU FP4:
  - Building the comprehensive ”solution portfolio” for the future energy efficiency business
  - Dissemination of solutions
- Future collaboration with program partners:
  - Combining expertise: Further development of different solutions and methods, discussion and cooperation
  - Pilot regions?
  - The world will not be complete during FP4, we need future efforts.

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THANK YOU!

Contact
Mika Luoranen
Lappeenranta University of Technology
School of Energy Systems
Mika.Luoranen@lut.fi
+358 40 515 3202

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