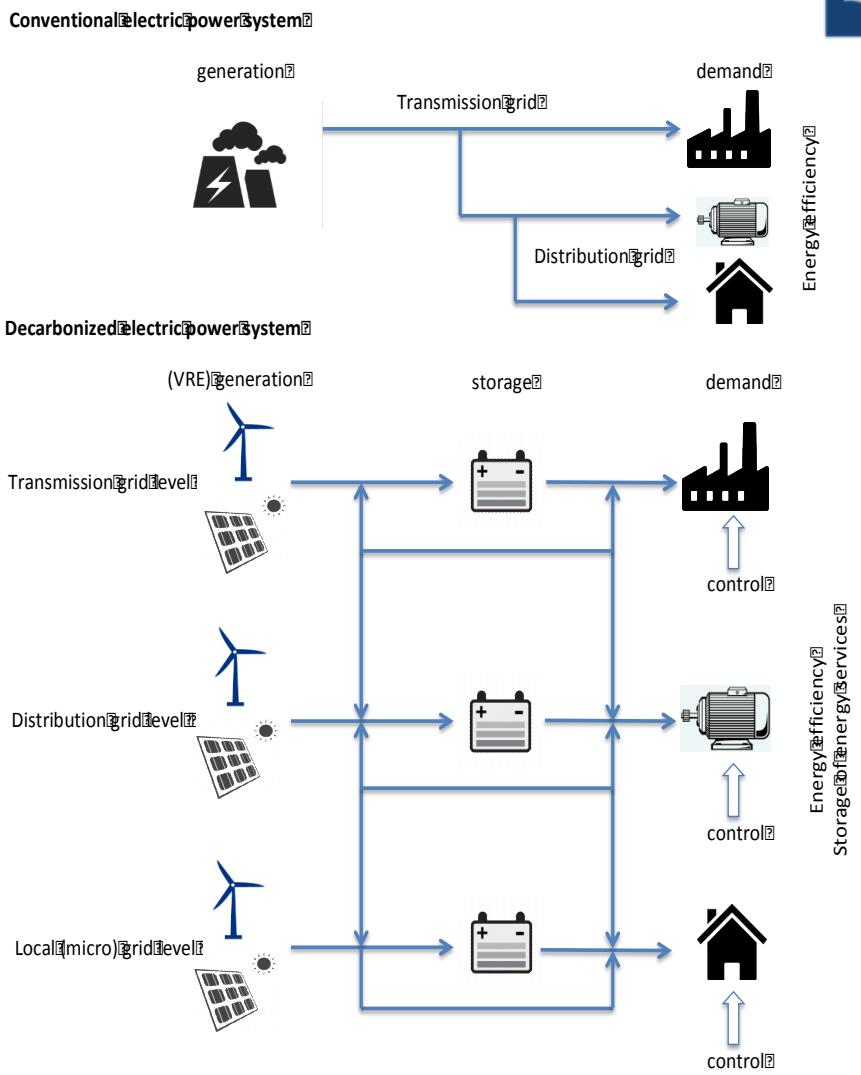


Netherlands Enterprise Agency

Energy efficiency and renewable energy in a decarbonized electric power system - asking the right questions

CA EED 1st Plenary Meeting

Parallel Session: EE and RES working together

20 October 2017 - Sofia

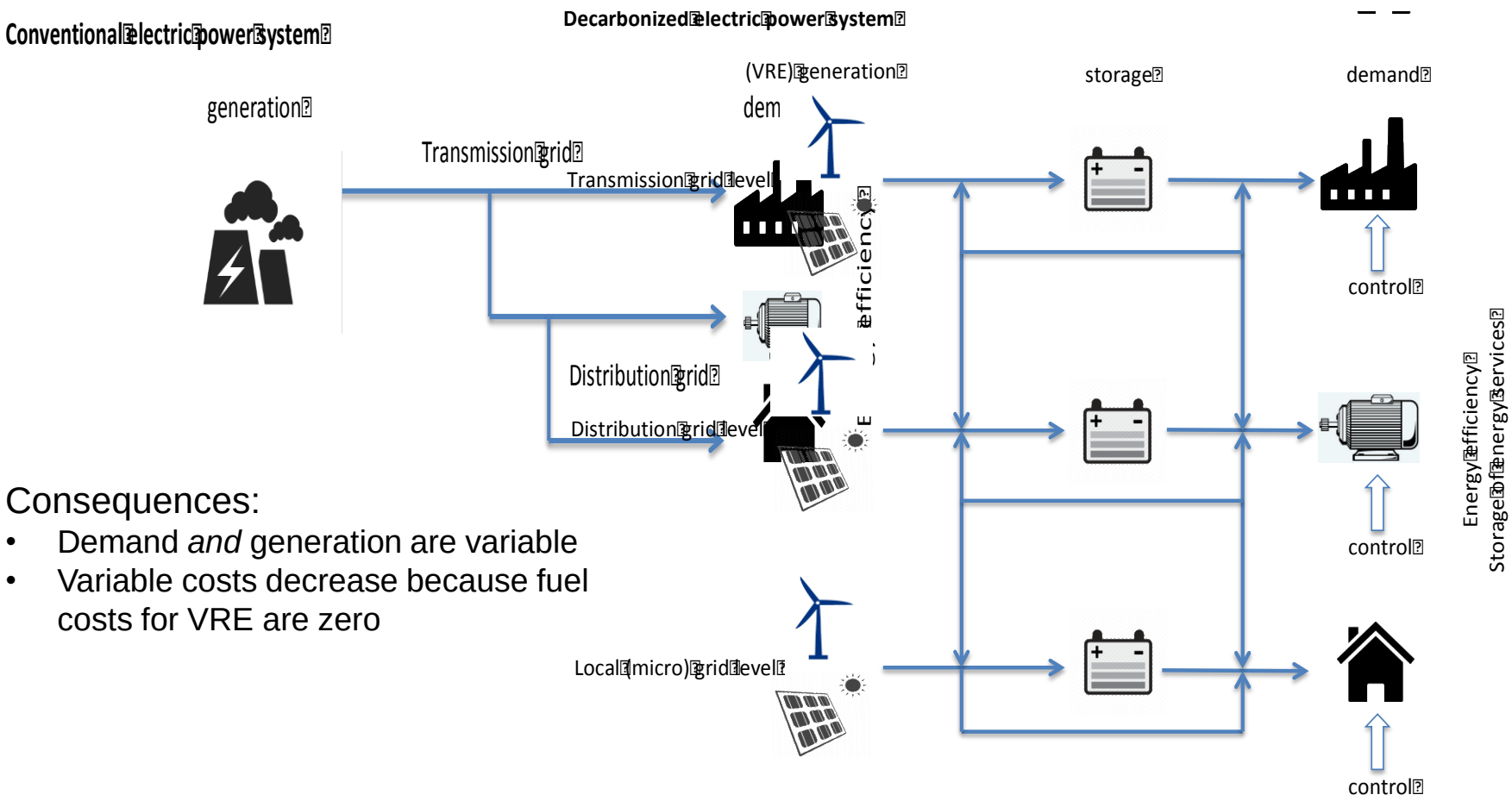
Hans-Paul Siderius

Netherlands Enterprise Agency / TU Delft

Overview

- Conventional vs decarbonized electric power system
- Challenges and impact on energy efficiency
- Asking the right questions
- Links between EED and RES (from EED perspective)

Conventional vs decarbonized



Consequences:

- Demand *and* generation are variable
- Variable costs decrease because fuel costs for VRE are zero

Challenges

- Flexibility is needed:
  - To manage variability in generation and demand
  - By means of storage, demand-side control and connections (transmission and distribution)
  - But energy efficiency is not flexible

- Increasing complexity (technical and policy)
  - Generation, demand-side control and storage at all levels
  - Overall cost minimization versus use of markets
  - Competition between flexibility tools, and between generation and efficiency:
    - Improving energy efficiency versus more VRE generation
    - Increasing interconnection versus using storage
    - Using demand-side control versus using storage

Relation between energy efficiency and renewables

Centralized model

- Flexibility is dealt with at highest level: large storage and interconnection, integration of larger power plants.
- Fixed costs (grid and storage) increase, variable costs decrease.
- Energy efficiency measures less attractive for individual end-users, but still attractive for society (public good character).

Decentralized model

- Flexibility is dealt with at lowest level: end-users are stimulated to generate the electricity they use, including using flexibility tools to minimize impact of grid.
- Energy efficiency measures attractive for individual end-users.
- Free-rider issues: end-users that do not invest still profit from measures from others.

Asking the right questions

- Where lies the balance between renewable energy and efficiency: how far can or need demand be reduced by means of energy efficiency in order to generate this demand by means of VRE sources?
- Which designs – technical, market and regulatory – can realize a decarbonized electric power system?
- How to deal with energy efficiency in a decarbonized power system?
- How to manage the transition from the current power system to a decarbonized power system?

Links between EED and RES

- Article 4: Building renovation
- Article 9,10: Metering and billing
- Article 14: Promotion of efficiency in heating and cooling
- Article 15: Energy transformation, transmission and distribution

Thank your for your attention.

Questions?

hans-paul.siderius@rvo.nl