



EUSALP EU STRATEGY FOR THE ALPINE REGION

www.alpine-region.eu

Smart Grids in the Alpine Region

Demand Side Management and Renewable Energy

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80 million people, 7 countries, 48 regions,
mountains and plains addressing together
common challenges and opportunities



Content of the presentation

- Review of the work in 2017
- Outlook and work plan for 2018
- The power grid and smart grids
- Application fields of demand side management

Completed work packages 2017

- Survey of ongoing smart grid activities including a collection of best practise in the alpine region.
- Presentation of the results at the 4th EUSALP Action Group 9 meeting in Garmisch-Partenkirchen 24th of October 2017

Annual Plan 2018

- Implementation of an online survey
- Summarized study of the online survey and description of demand side management applications
- Publication of a factsheet “Smart Grids and demand side management in Alpine Regions”

Annual Plan 2018

The online survey will focus on the topic Demand Side Management which includes:

- **Smart Metering**
 - primary tool to establish a smart grid
- **Approaches**
 - heating systems
 - e-mobility

Online Survey

- **Used tool:**
Survey Monkey



- **Target group specific online survey**
Conducted by: EUSALP action group members,
researchers and developers, energy agencies,
network operators, industrial companies

Annual Plan 2018

Work Plan

05/2017: Completion of the structure for an online survey

07/2018-08/2018: Conducting of the online survey

11/2018: study of chances and challenges for smart grid applications in alpine regions; factsheet “Smart Grids and Demand Side Management in Alpine Regions” for a wide audience.

Requirements to the Power Grid

- Security of supply
- Efficiency and competitiveness
- Environmental compatibility
- Technical feasibility

Challenges of the Energy Transition:

- Volatile and decentralized energy production
- More and more small generation plants and private households are playing a significant role in the energy production (prosumers).
- Grid stability and supply security.



Energy balance in a summer period

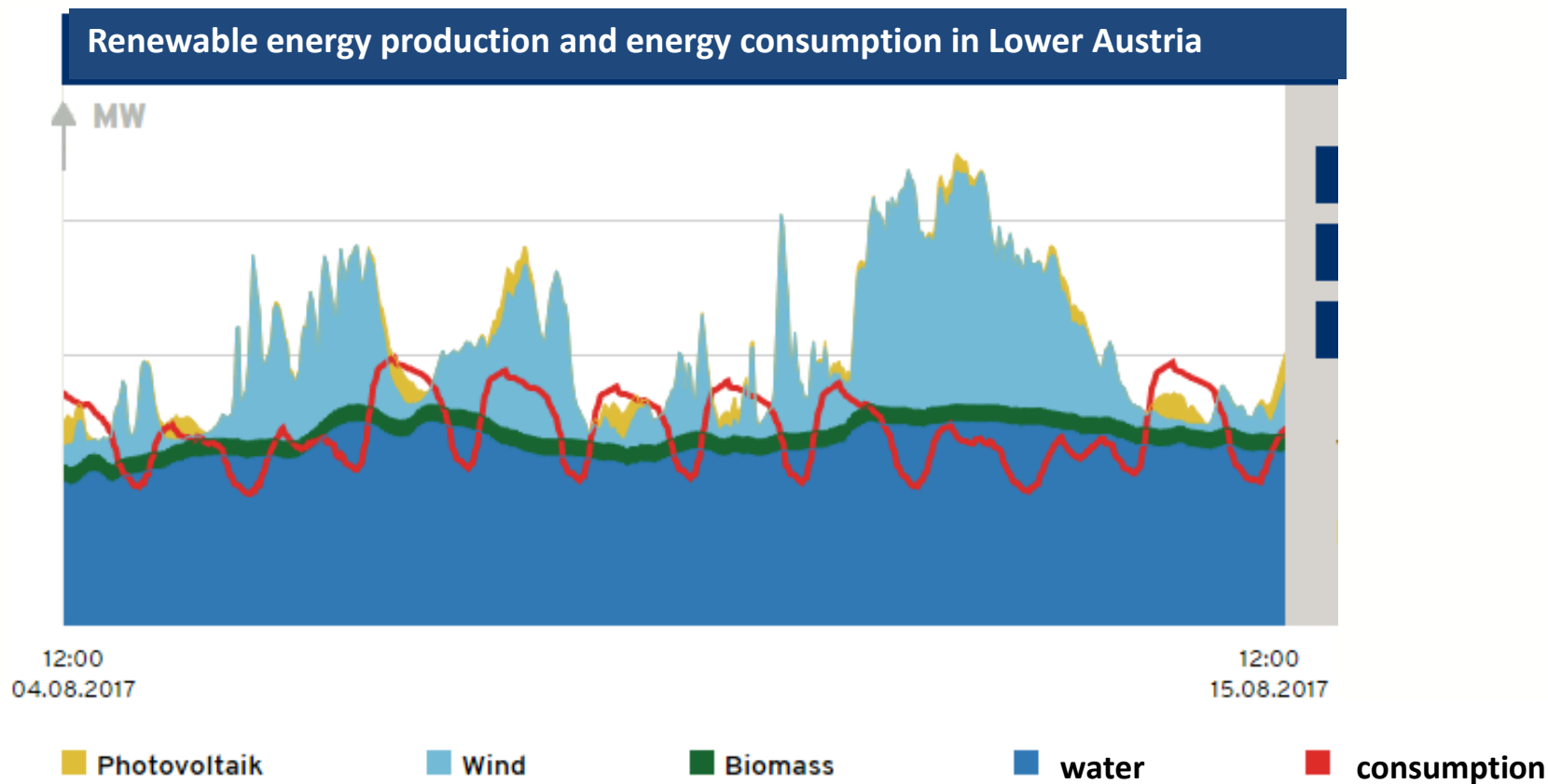


Figure 1: Renewable energy production and energy consumption in Lower Austria. www.energiebewegung.at



Energy balance in a winter period

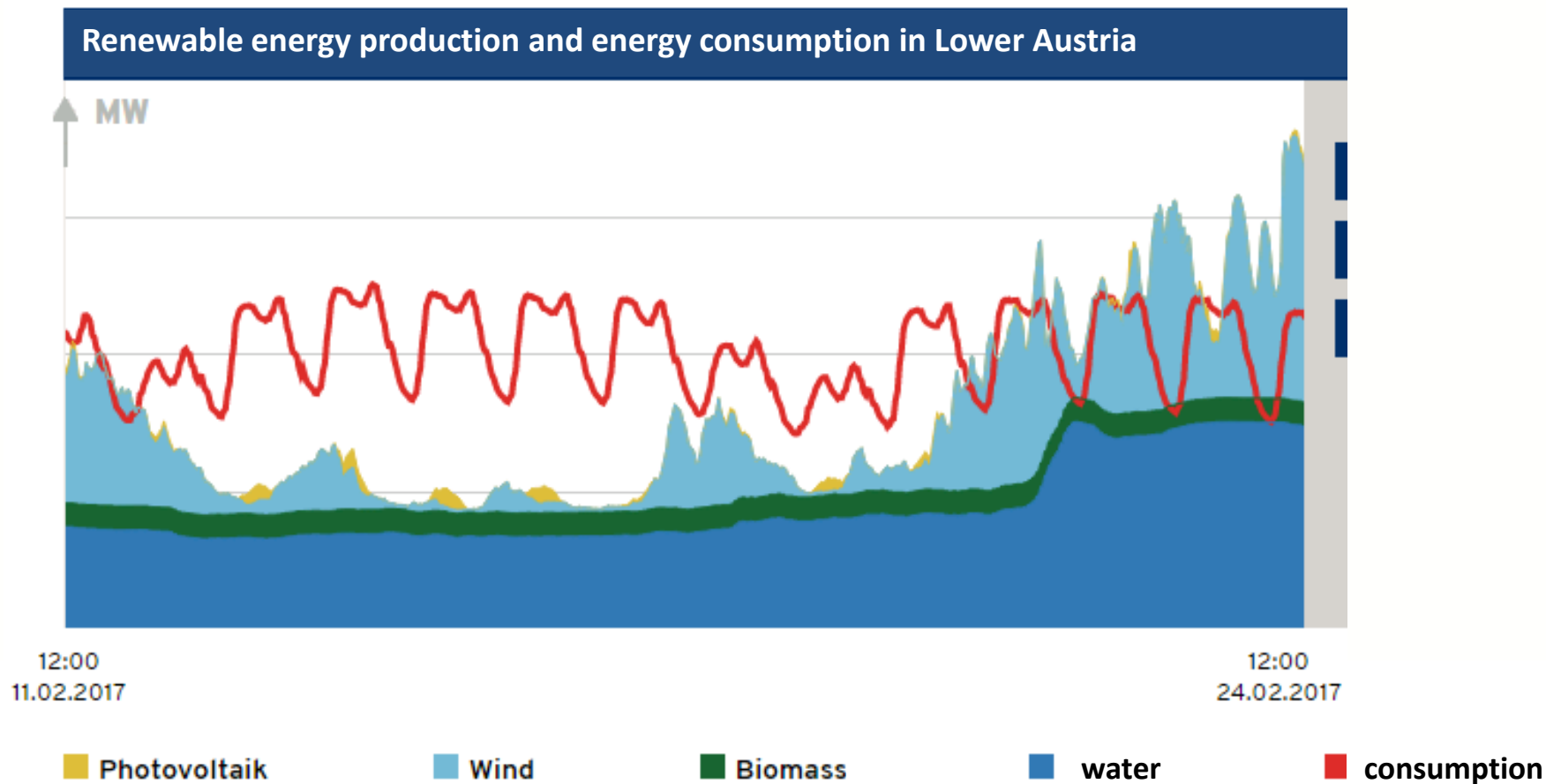


Figure 1: Renewable energy production and energy consumption in Lower Austria. www.energiebewegung.at

How can the energy supply system react to these challenges?

- Change from a consumption-orientated supply system to a generation-orientated consumption system.
- Smart grid technologies
- Demand side management

Smart Grids

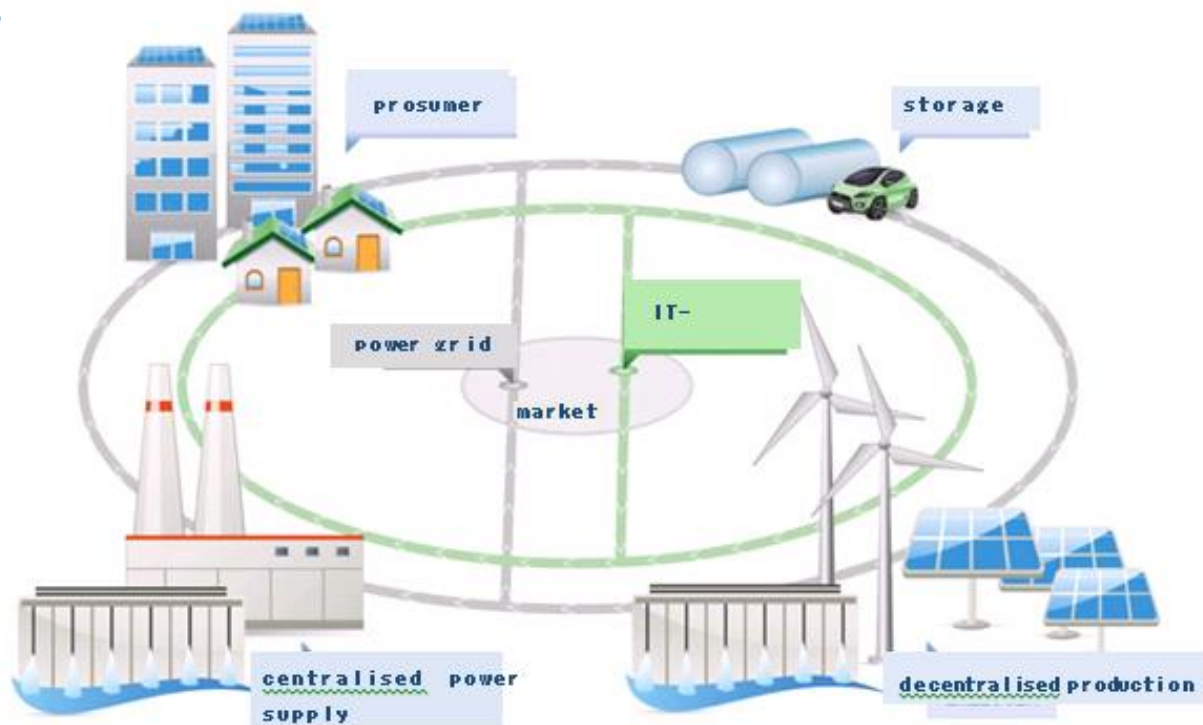


Figure 1: Smart grids model, source: www.smartgrids.at

Demand Side Management (DSM)

- Demand side management is the integration of volatile renewable energy by matching the magnitude of energy demand and production.
- The temporal shift of electricity loads increases grid security, the share of renewable energy and security of supply.

Requirement for Demand Side Management

- Smart grid
- Smart metering

Application Areas

- **Building heating systems** with component activation
- **Hot water heating**
- **E-mobility** (bidirectional and controlled charging)

Smart Metering

- EU member States are required to ensure the implementation of smart metering, there is a roll-out target of 80% market penetration for electricity by 2020.

Benefits:

- Flexible tariff models with prices on hourly basis.
- Consumption control depending on availability and price
- Consumers can see exactly how much energy they are using and when.



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Building heating systems

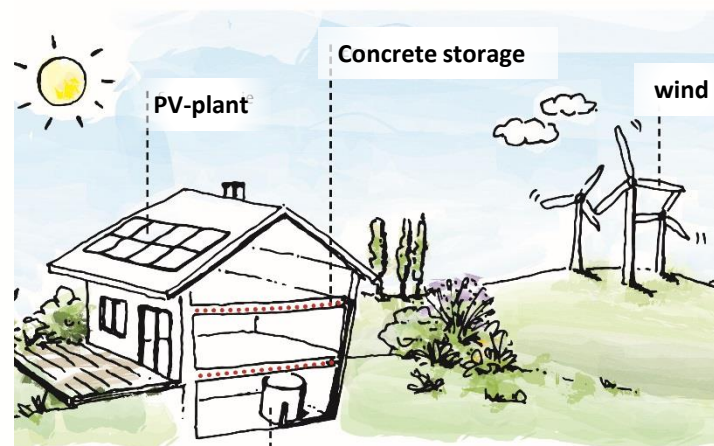
Analyses of demo sites equipped with heat pumps and thermal component activation store energy in building components to switch off the cooling/heating for hours or even days without increasing/reducing the indoor temperature and comfort of the residents.



© www.ew-ursern.ch/



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Heat pump and hot water storage

www.acr.ac.at © Z+B

E-Mobility

- Electric vehicles can provide certain services to the power grid like mechanisms that allow a flatter demand curve
- The battery of e-cars has a high potential in load shifting applications
- Requirements for the DSM:
 - Connection with the power grid when parking (charging infrastructure)
 - Flexible charging capacity
 - Smart metering

E-Mobility: V2G

- **Vehicle to grid solutions (V2G):**

The concept allows grid useful services:

- To charge when the energy demand and electricity prices are low
- To send power back to the grid when the demand and prices are high

Benefits:

Grid stability and flatter demand curves

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E-Mobility: V2H

Vehicle to home Solutions (V2H)

The combination of a PV-plant and an e-vehicle allows useful services:

- High self consumption of the home produced energy
- Quick amortization of the PV-plant

Benefits:

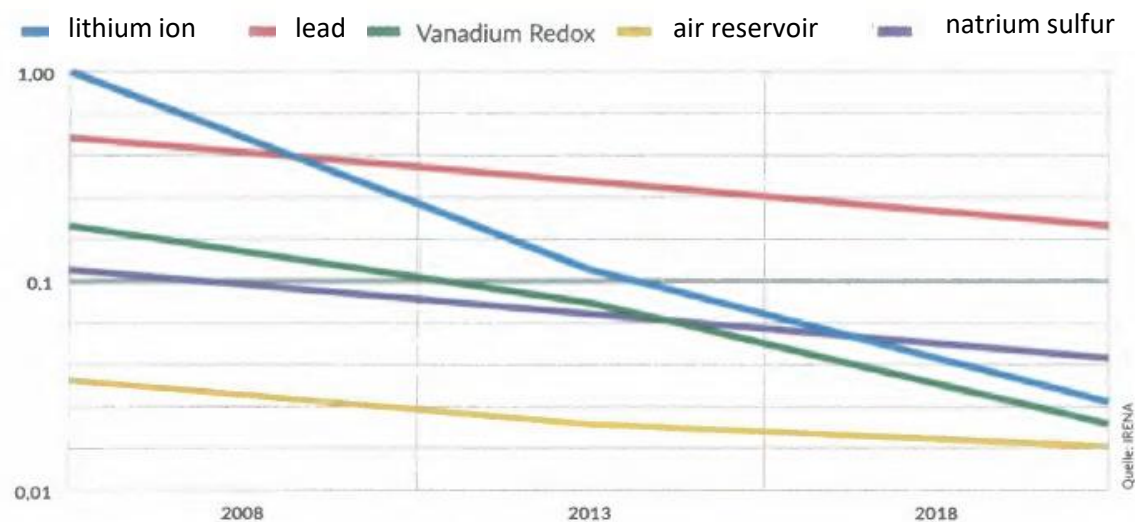
- Grid stability and flatter demand curves

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Innovation, Research and Development

- Innovation and R&D is the key to develop a carbon free future
- The cost curve of battery storage shows impressively the potential of R&D



Outlook



Finalization online survey

7th June 2018 Innsbruck:



Presentation of the results from the online survey

24th September 2018 St. Gallen



Study smart grid and demand side management; Publication of factsheet “Smart Grids in the Alpine Regions”

October EUSALP Annual Forum

Thank you for your attention