Austria and the province of Salzburg
Multi Utility Company Salzburg AG
Business Fields & Customers

- **Public Transport**: 54 Mio. Passengers
- **Internet**: 71,000 Customers
- **Cable-TV**: 131,000 Customers
- **Electricity**: 428,000 Customer installations
- **Gas**: 36,100 Customers
- **District Heating**: 15,500 Customers
- **Water Supply**: 150,000 Inhabitants
- **Telephony (VoIP)**: 23,000 Customers

**Business Volume 2014**: 1,285 Mio €
**Employees 31.12.2014**: 2,000

3 W. Schaffer, 05/2015
Objectives of the Model Region program

- Gather a **critical mass** of **Smart Grid applications**: analyse synergies, dependencies and interchange
- Integrate challenges from different areas in an **integrated system solution**
- Realisation in network segments with **real-world challenges & customers**
- Implementation of **Flagship Projects**, where many applications and their synergies become visible

In December 2009 Salzburg was awarded „1st Austrian Smart Grids Model Region“ by the Austrian Climate and Energy Fund.

*source: Wolfgang Prüggler, TU Vienna*
Stepwise, logic architecture of the Smart Grids Model Region Salzburg emerging to „Smart Infrastructure“

**finished and current projects**

- Combined heat & power
- DG-DemoNet Concept
- Pilot Smart Metering
- BAVIS
- ISOLVES PASSA-M
- OPTRES
- fuel cell
- DISPOWER
- Medium Voltage Demonstration Area Lungau
- Smart Heat Networks
- Smart Heat Operator model region
- ElectroDrive
- V2G Interfaces
- V2G Strategies
- Smart Web Grid information model for access to smart grid data
- Consumer2Grid
- Building2Grid
- Smart Model Community Köstendorf
- Smart Model Synergie
- Smart Low Voltage Grid
- V2G Interfaces
- building as interactive components
- Smart Infrastructure Salzburg

**Project bundle 2010 – started 03 2011**

**Vision**

- Smart Model Community Köstendorf
- Smart Low Voltage Grid
- V2G Interfaces
- building as interactive components
- Smart Infrastructure Salzburg

### finished and current projects

- **DG-DemoNet Concept**
- **Pilot Smart Metering**
- **BAVIS**
- **ISOLVES PASSA-M**
- **OPTRES**
- **fuel cell**
- **DISPOWER**

### Project bundle 2010 – started 03 2011

- **Smart Model Community Köstendorf**
- **Smart Low Voltage Grid**
- **V2G Interfaces**

### Vision

- **Smart Infrastructure Salzburg**

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*W. Schaffer, 05/2015*
Province of Salzburg

City of Salzburg
Smart Housing Complex

Smart Grids Municipality Köstendorf

Medium Voltage Demonstration Lungau - ZUQDE

Vienna
Centralized MV Volt/Var Control

Characteristics of Region “Lungau”

- Voltage levels 110 kV, 30 kV, 10 kV
- Inhabitants 22,000
- Max. import from 110kV Min. 31 MW - 7 MW
- Decentralized generation additional planned 24 MW (18 units) 6.6 MW
- Total line length 414 km (40% cable)

LDC capabilities are limited and the **coordinated control of all volt/var-related resources across the entire grid segment** is necessary.
Centralized MV Volt/Var Control

Integration of centralized voltage control scheme into existing SCADA system

Optimization of MV network nodes (voltage limits, reactive power, losses)

Results
Heavy load and generation feeders are kept within limits
→ Increased hosting capacity without network enforcement
Province of Salzburg

City of Salzburg
Smart Housing Complex

Smart Grids Municipality Köstendorf

Medium Voltage Demonstration
Lungau - ZUQDE

Vienna
In a dedicated test area the energy future is field-tested: It shall be demonstrated that despite 50% distributed generation (PV-systems) and 50% density of E-Cars supply and demand can be balanced by an intelligent smart grid solution without affecting supply quality for customers!

We demonstrate the energy system of tomorrow!
Monitoring Smart Meter as „eyes in the grid“

36 e-cars + controllable charging stations

i-MieV: 0 – 8 – 12 – 16 Ampere

43 pv-systems (193 kWp) + 41 use a controllable solar inverter active- and reactive-power control
Smart Grids Model Community Köstendorf

Monitoring
Smart Meter
as „eyes in the grid“

36 e-cars
+ controllable
charging
stations
i-MieV:
0 – 8 – 12 – 16 Ampere

43 pv-systems
(193 kWp) +
41 use a controllable
solar inverter
active- and reactive-
powercontrol

Building Energy
Agent (BEA)
decentralised
optimisation

OLTC transformer
250 kVA, 5 taps

The Smart Low Voltage Grid Controller
keeps the overview (using smart meters) and conducts the orchestra of smart grid components (PV-inverters, e-car charging stations) ensuring a harmonic ensemble (smooth operation of the low voltage grid).
Province of Salzburg

City of Salzburg
Smart Housing Complex

Smart Grids Municipality Köstendorf

Medium Voltage Demonstration
Lungau - ZUQDE

Vienna
Flagship project HiT („Rosa Zukunft“)

- Flagship project HiT („Rosa Zukunft“)
- HiT — housing area
- energy feedback & customer interaction (130 flats)
- on-site distributed generation
- e-mobility
- demand response
- home automation

Lieber Kunde, Sie haben im Monat xy 523 kWh verbraucht
Flagship project HiT („Rosa Zukunft“)

SMART GRID ➔ SMART HOME

energy - centre
- micro-CHP
- heat pump
- district heating
- thermal storage
- Photovoltaic

user interaction
- home automation
- variable tariffs
- energy feedback
Key findings of SGMS
Key findings of SGMS

(1) The system is getting more complex due to the increase of decentralised and more volatile generation of energy. → Smart Grids are a tool to manage this challenge

- building blocks of the energy transitions:

  energy transition =
  renewable energy +
  energy efficiency +
  smart grids

- The „two way traffic“ in the grid and the increased complexity require new rules, tasks and market roles.

- Smart Grids are getting more and more daily business.
Key findings of SGMS

(2) Information- and communication technology (ICT) is the key element of the future energy system.

- **ICT-based energy systems** are able to
  - actively participate on **system stability tasks** e.g. via a subsidiary balance of increasing DER and consumption especially in the distribution grid
  - increase the **hosting capacity** of decentralised generation
  - locate the demand of grid development and potential congestions

- **Synergetic usage of ICT-infrastructure and other applications accelerate the marketability**

- **Consistent standards are necessary!**
Key findings of SGMS

(3) The guarantee of privacy & security is essential!

- The interconnectedness also carries risks.
- **Security and Privacy are a precondition for a secure grid operation and customer’s trust.**
- The standards which are already used in other sectors (finance, health, …) need to be adapted for the energy sector.
- This needs clear and consistent guidelines.
- The integrated indemnification of Security and Privacy is essential and is built upon 3 pillars:
Key findings of SGMS

(4) Smart Grids lower costs and contribute to the affordability of the energy transition!

- The DER hosting capacity of the existing grid can significantly be increased by smart grid solutions.

- First conclusions resulting from the flagship project “Köstendorf” show a duplication of the hosting capacity compared to the conventional planning approach.
Key findings of SGMS

(5) A new regulatory regime is necessary to mobilise existing flexibility potentials

- The difference between base and peak prices is not enough to mobilize customer’s flexibilities.
- The general public profits by smart grids, but the person who provided the benefit does not directly.
- The flexible customer does not get the whole cost benefit, but they are socialised over the general public.
- An adaption of the regulatory regime, e.g. implementation of flexible grid tariffs, is necessary.
Key findings of SGMS

(6) The DSO is the pivot of the energy transition!

- In the future energy system the DSO has a key role as "air traffic control centre" because of the more complex interaction between generation, grid and customers.

- The transition of the energy system requires new roles of the DSO:
  - "air traffic control centre"
  - data hub
  - market facilitator
  - flexibility operator

The future energy system
Interested in more details?

www.smartgridssalzburg.at
- Reports of finished projects

Report on results and findings
also available in English
http://www.smartgridssalzburg.at/fileadmin/user_upload/downloads/SGMS_Results_Findings_05-2013.pdf
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