Innovative PV-Solutions in Urban Energy Supply

Klemens Neubauer, Feb.2016
AGENDA

- PV in Austria and Vienna
- Key characteristics of the crowdfunding model WIEN ENERGIE
- Importance and the benefits of the business Model – Crowdfunding
- Success factors and challenges and project finance
PV in Austria and Vienna

Landscape, Population, History

- Cultural Landscape: 60 % alps
- Population structure: 64 % live in urban areas (2010)
- Hydroelectric power station (60 % of domestic power generation; app 13,2 GW in operation, production 38 TWh)

Gliederung der Kulturlandschaft Österreichs


PV in Austria and Vienna

WIEN ENERGIE – Supply Area

- Customers: 1.4 million electricity and around 669,000 gas customers
PV in Austria and Vienna

WIEN ENERGIE – company organisation

- Sales in 2014: 9,349.4 GWh electricity (20.5% of which from renewable energy sources)
- Employees: average of 2,730
- Turnover: around EUR 1,794 million in the 2014 financial year
- Strategy: 30% renewable until 2030

Wiener Stadtwerke Holding AG
Wholly owned by the City of Vienna

Wien Energie GmbH
100%

- EnergieAllianz Austria GmbH 45%
- Wien Energie Vertrieb GmbH & Co KG 100%
- Burgenland Holding AG 6.59%
- Energiecomfort Energie- & Gebäudemanagement GmbH 100%
- e&t Energie Handels GmbH 45%
- EconGas GmbH 16.51%

Wiener Netze GmbH
100%
PV in Austria and Vienna

PV-Facts in Austria

- 1% of austrian electricity demand provided by PV
- PV Potential Austria: 71 TWh/a (electricity demand 69 TWh/a)
- It needs an area of app. 710 km² (*) (< 2 x Area Vienna) to supply Austria with electricity of PV => less than 1% of total area Austria (app. 84.000 km²)

... in Vienna

- 0.4% of viennese electricity demand provided by PV
- PV Potential Vienna: 3 TWh/a (app. 33% of electricity demand 9 TWh/a)
- It needs an area of app. 80 km² (*) to supply Vienna with electricity of PV => 20% of total area Vienna (app. 414 km²)
- PV Potential Vienna on roofs: app. 29 km²

(*) bezogen auf 1000 Volllaststunden
Experiences

- Wien Energie plans, builds, finances and operates solar power plants
- More than 55 solar projects with more than 13 MWp
- For 4,800 tons of CO2 reduction per year
- Energy for around 5,200 households
- Businessmodels for various customersegments
- Wien Energie takes the technical an economical risks => „completethepackage“
PV in Austria and Vienna

1. **Solarkraft EinfachNutzen Fix oder Float**
   Customer rents PV of Wien Energie, installed on his roof and uses electricity local.

2. **Solarkraft Freiraum**
   Partner rents suitable area to Wien Energie.

3. **Solarkraft Klima (+)**
   Customer rents PV of Wien Energie, installed on his roof and uses electricity local. Control-Signal output for control of cooling system.

4. **Solarkraft Einfach Gießen (simply pour)**
   Hire-purchase for mobile PV on tractor trailer for irrigation of fields.

5. **Grüne Wärme Erdwärme (geothermal energy)**
   Combination of PV and heat pump to optimize energy usage in building.

6. **BürgerInnenbeteiligung Sale & Lease Back**
   Citizen’s can buy single PV-panels of solar power plants. Wien Energie leases back the panels and pays a rent/interest to customer.

7. **BürgerInnenbeteiligung Gutscheinmodell**
   Citizen’s can buy single vouchers so that they support the roll-out of PV. Customers get each year vouchers for the next 25 years with an additional interest on top.

8. **Solarkraft Planungstool (PV Baukasten)**
   Wien Energie offers Tools for simply planning PV plants on new buildings free of charge.

9. **Solarkraft PV Startklar (read for take off)**
   Wien Energie offers certification for existing and new buildings in view of PV-suitability.
Key characteristics of the crowdfunding model

Viennese citizens are highly interested in renewable energy sources and want to contribute actively.

Municipality of Vienna is committed to energy generation from renewable sources => part of the city government program. Photovoltaics is an important option in urban areas to follow this path. So the idea of a Citizens’ Power Plant was born.

The majority of citizens in Vienna lives in flats. There are many hurdles and burdens for tenants/flat owners to take part in renewable energy story.

Problems:
- Complex ownership structures
- Approval Procedures
- Downsizing investment options
- No technical expertise
- Conservation of ancient houses
- ...

The participation model of Wien Energie overcomes these hurdles and provides a simple, profitable and secure option for interested people to participate in solar development.
Key characteristics of the crowdfunding model

- Ecological awareness and climate protection
- Income return
- Enhancement in independence of power imports
- Local value add
- Enhancement in quality of life in own city

Vienna Citizen’s
Key characteristics of the crowdfunding model

Vienna Citizens’ Solar Power Plant: Sale & Lease Back

Citizens buy single photovoltaic panels.

Citizens buy modules.

Wien Energie leases the panels back from citizens and pays a yearly fee.

Wien Energie creates, operates and maintains the plant.

Wien Energie leases modules back.

Yearly lease.

Construction

Planning

Solar Plant

Modules

Citizens

Wien Energie
Key characteristics of the crowdfunding model

Vienna Citizens’ Solar Power Plant: Voucher-based

Partner

Wien Energie creates, operates and maintains the plant

Wien Energie lets PV for rent

Wien Energie buys annually vouchers

citizens support the roll-out of PV and get vouchers with on top interest

Citizens use vouchers
Importance and the benefits of the business Model – Crowdfunding

Benefits of the crowdfunding models

- Economical possibility to make solar energy useable in urban areas
- Completely riskless for citizens – carefree!
- Overcome legal and directive barriers of in rent living citizens
- Promotes ecological awareness of viennes viticens and climate protection (get in touch with energy production)
- Supports quality of live in the hometown
- Enhancement of energy-independence
- Citizens create the energy revolution in hometown
- Local value add based on local partners und local energy production
- Formation of opinion benefits supports general PV roll-out
Challenges

- Financial Market Authority (securities prospectus requirement, banking practice law)
- Suitable Location had to be found within a few weeks (project partner quit): structural analysis, connection with the grid, power transformer, shadowing, ownership structure, etc.
- Regulatory approvals: many municipal authorities involved (electricity department, monument conservation, fire department, environment protection, department of building regulation, labor inspector, etc.)
- Time schedule (politics, call for bids, etc.)
Success factors and challenges and project finance

Success factors

- Until now 22 Solar Power Plants realized
- Enormous response – each of them sold out in a few minutes
- All over about 25,000 Panels sold
- Supply of approx. 3,000 Vienna households

Model replicated also on voucher basis
Model replicated also for wind power plants
Further projects under preparation
Thank you and Greetings from Vienna!