Train the trainers Workshop – 20.11.2020 (online)

Store4HUC - Autarky Rate Tool

Store4HUC | Robert Pratter | 4ward Energy Research GmbH

Procedure

- Power point presentation of the tool and the backgrounds
- Demonstration of the Autarky Rate Tool
- Time for self testing
- Q&A-Session

Motivation

- Showing the potential of electrical storages
- Initiate the closer engagement with the topic
- Providing knowledge about the storage implementation in HUCs
- Autarky Rate

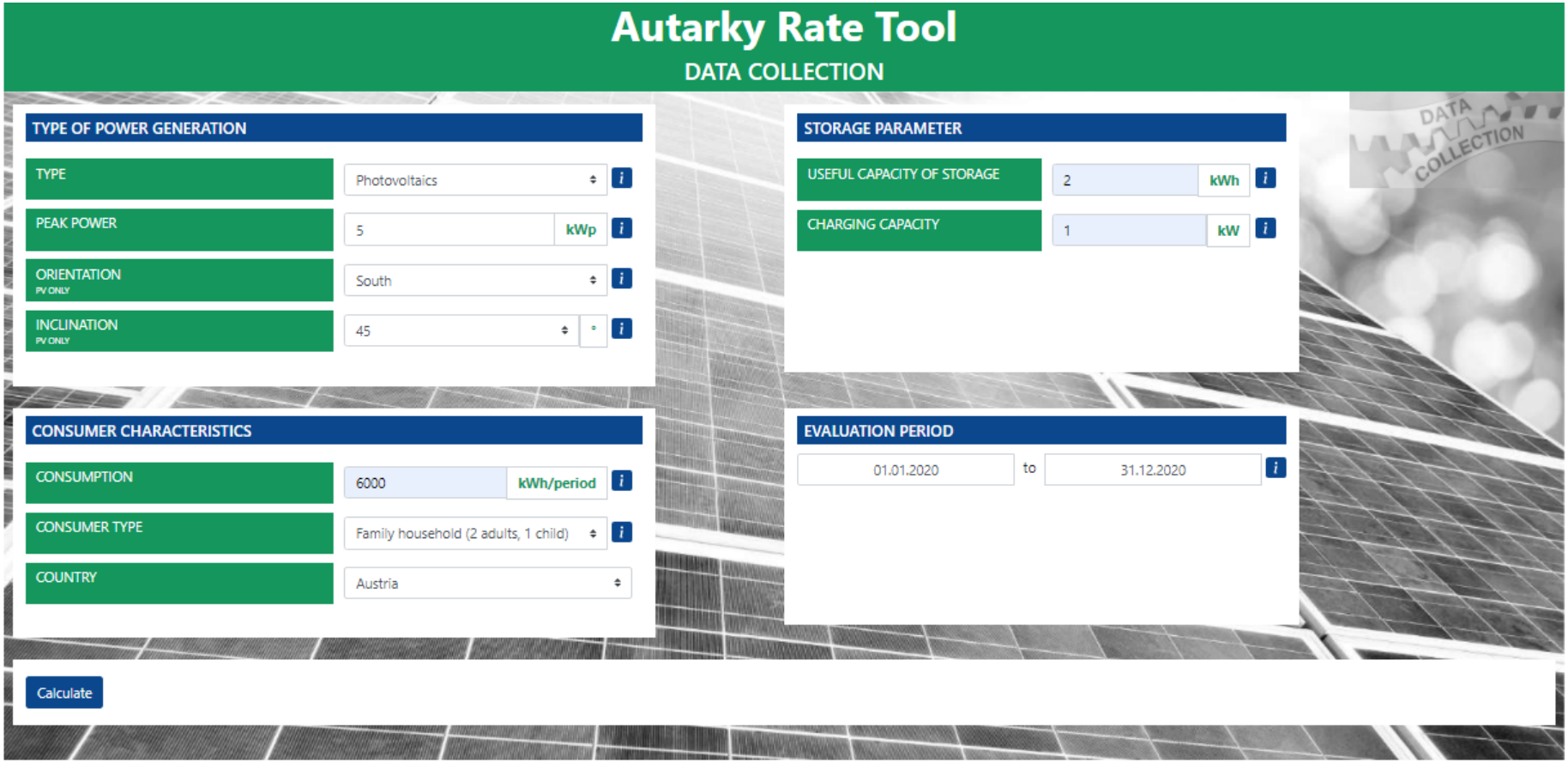
Goals

- technical
- economic
- ecological

Evaluation of different producer and storage constellations

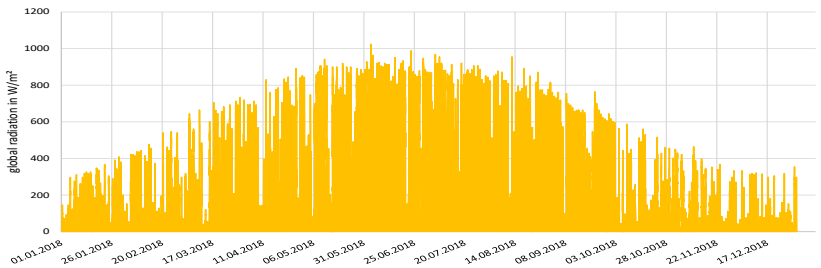
- Easy usability -> Target Group: general public
- High availability-> Web application

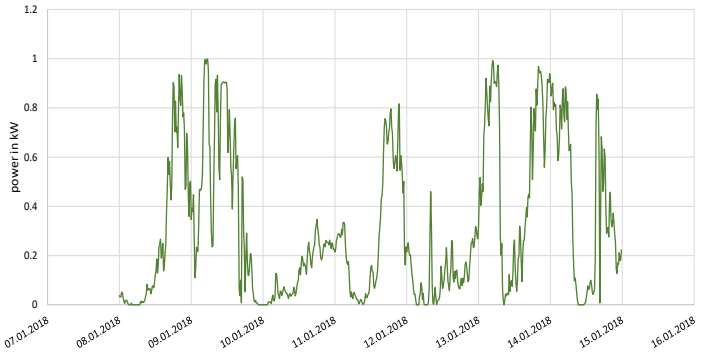
Input data

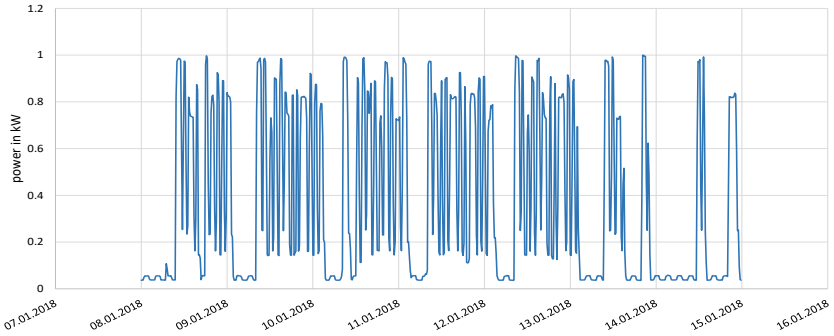

Autarky Rate Tool
DATA COLLECTION
TYPE OF POWER GENERATION
TYPE
Photovoltaics
PEAK POWER
5
kWp
ORIENTATION
PV ONLY
South
INCLINATION
PV ONLY
45
°
STORAGE PARAMETER
USEFUL CAPACITY OF STORAGE
2
kWh
CHARGING CAPACITY
1
kW
DATA COLLECTION
CONSUMER CHARACTERISTICS
CONSUMPTION
6000
kWh/period
CONSUMER TYPE
Family household (2 adults, 1 child)
COUNTRY
Austria
EVALUATION PERIOD
01.01.2020
to
31.12.2020
Calculate

Producer

- Photovoltaic
  - Orientation
  - Inclination
- Wind energy
  - Measurement data
- Small scale hydropower
  - based on measurement data







Consumer

- Household profiles
  - Single household vs. Family household
  - Retiree (at home) vs workers (not at home)
  - Generated with the so called Loadprofilgenerator[1]
- Industrial profiles
  - Standard load profiles
- Castle & Slope elevator
  - Measurement data of the pilot plant
- Scaled with the annual energy demand

[1] https://www.loadprofilegenerator.de/ (Noah Pflugradt)

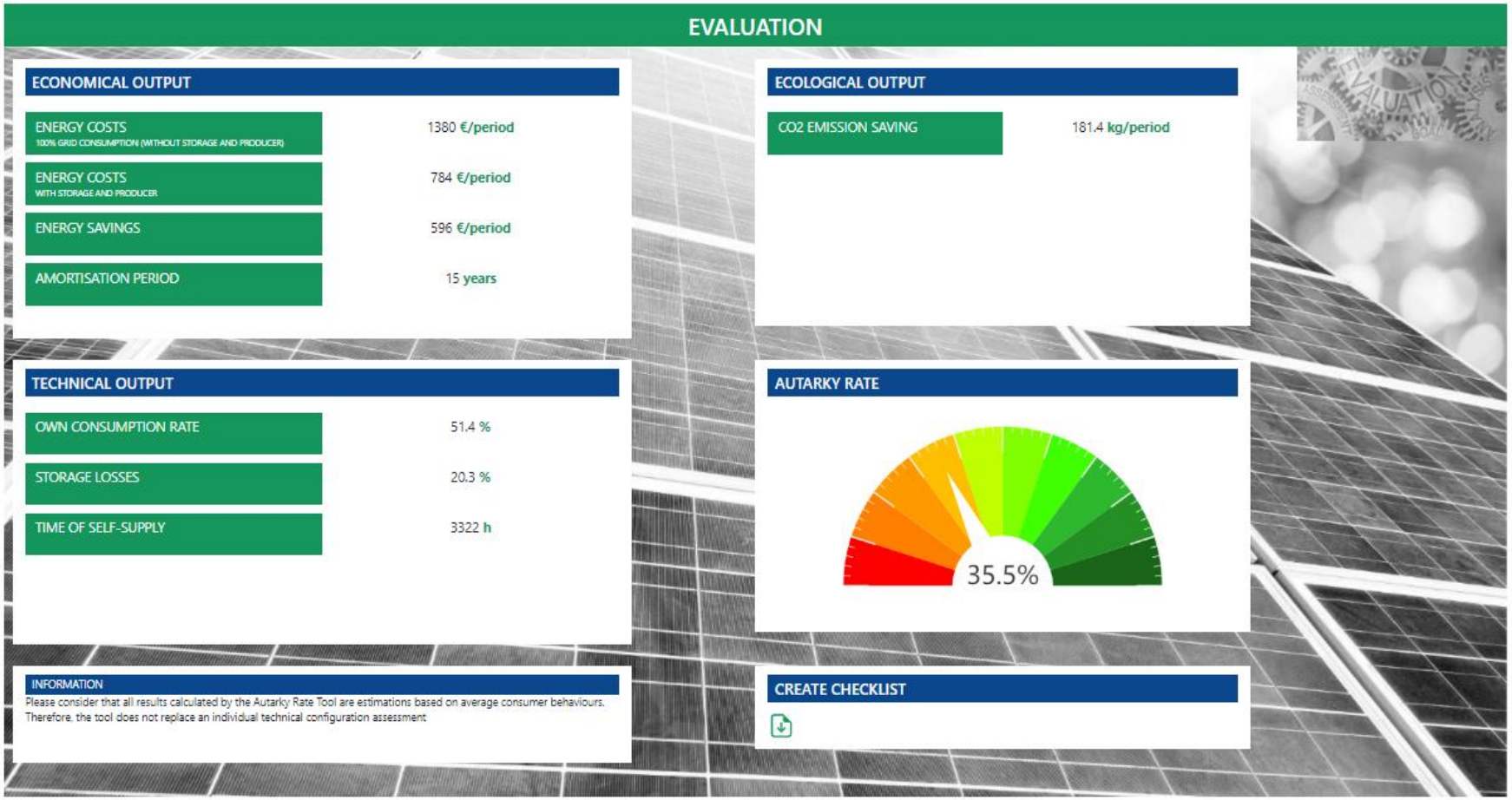
Storage

- Useful capacity [kWh]
- max. charging power [kW]
- Internal calculation of the charging losses
  - Depending on the relation between the maximum and the actual charging power
  - Best efficiency with similar proportions

Priorities

1. Priority: direct own consumption (without storage)
2. Priority: Storage (charging/discharging)
3. Priority: public grid (feed-in/purchase)

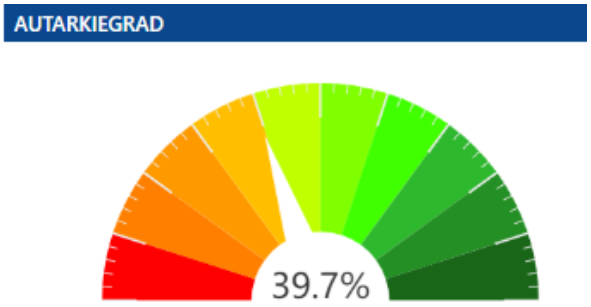
Results


EVALUATION
ECONOMICAL OUTPUT
ENERGY COSTS
100% GRID CONSUMPTION (WITHOUT STORAGE AND PRODUCER)
1380 €/period
ENERGY COSTS
WITH STORAGE AND PRODUCER
784 €/period
ENERGY SAVINGS
596 €/period
AMORTISATION PERIOD
15 years
ECOLOGICAL OUTPUT
CO2 EMISSION SAVING
181.4 kg/period
TECHNICAL OUTPUT
OWN CONSUMPTION RATE
51.4 %
STORAGE LOSSES
20.3 %
TIME OF SELF-SUPPLY
3322 h
AUTARKY RATE
35.5%
INFORMATION
Please consider that all results calculated by the Autarky Rate Tool are estimations based on average consumer behaviours. Therefore, the tool does not replace an individual technical configuration assessment.
CREATE CHECKLIST

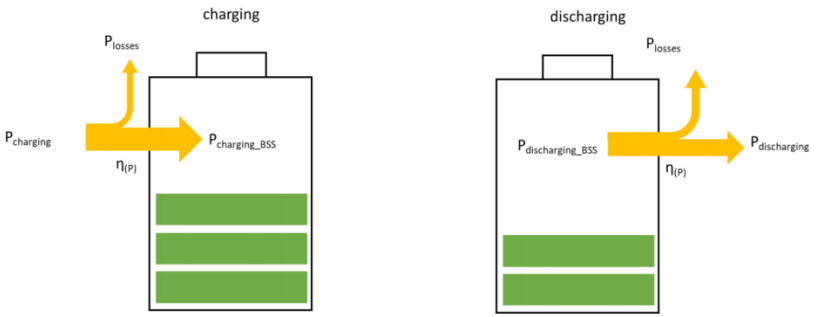
Economic & Ecological Evaluation

- Energy Cost Savings
  - Reference: 100% grid consumption (without PV and storage)
  - Calculated with country specific average electricity costs
- Amortisation period
  - Estimation!
  - Calculated with average investment costs
  - Funding possibilities are considered (simplified)
- Reduction of CO_2-Emissions

Technical Evaluation

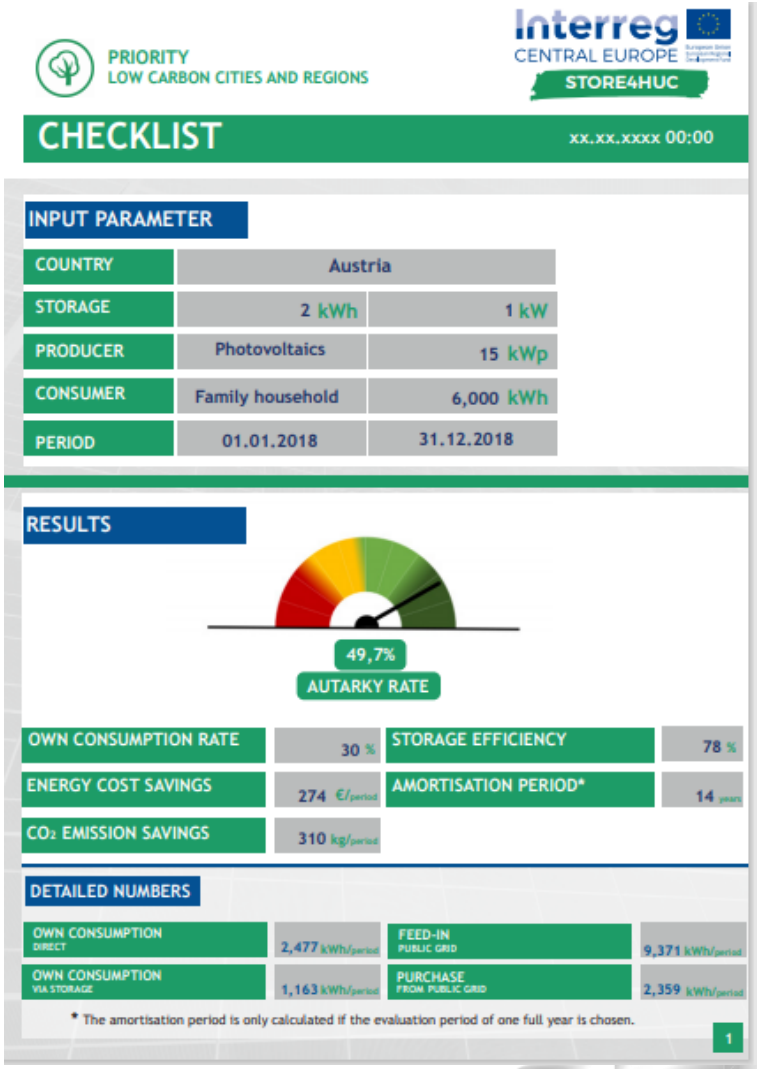


- Autarky Rate $= \left(\frac{E_{self\_RES}}{E_{tot}}\right) * 100\%$
- Own Consumption Rate $= \left(\frac{E_{self\_RES}}{E_{prod\_RES}}\right) * 100\%$
- Storage efficiency / Storage losses
- Time of self-supply
- More details are shown in the Checklist



Checklist

- Pdf-Document
- Save the calculation
- Explanation of the results
- Advices on implementing storages in HUC



PRIORITY
LOW CARBON CITIES AND REGIONS

Interreg CENTRAL EUROPE STORE4HUC

CHECKLIST xx.xx.xxxx 00:00

INPUT PARAMETER

COUNTRY	Austria	
STORAGE	2 kWh	1 kW
PRODUCER	Photovoltaics	15 kWp
CONSUMER	Family household	6,000 kWh
PERIOD	01.01.2018	31.12.2018

RESULTS

49,7%
AUTARKY RATE

OWN CONSUMPTION RATE	30 %	STORAGE EFFICIENCY	78 %
ENERGY COST SAVINGS	274 €/period	AMORTISATION PERIOD*	14 years
CO_2 EMISSION SAVINGS	310 kg/period		

DETAILED NUMBERS

OWN CONSUMPTION DIRECT	2,477 kWh/period	FEED-IN PUBLIC GRID	9,371 kWh/period
OWN CONSUMPTION VIA STORAGE	1,163 kWh/period	PURCHASE FROM PUBLIC GRID	2,359 kWh/period

* The amortisation period is only calculated if the evaluation period of one full year is chosen.

1

Outlook

- The Autarky Rate Tool will be available in January 2021
  - Direct Link: *https://store4huc-autarky.4wardenergy.at*
  - or via the project website: *www.interreg-central.eu/Store4HUC*
- Languages:
  - English
  - German
  - more to come (SI, HR, IT)

THANK YOU FOR YOUR ATTENTION

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