A FREE ONLINE TOOL FOR THE SIMULATION OF COLLECTIVE SELF-CONSUMPTION IN BRUSSELS

CONSOLECTIV

LUCISUN ULB

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Why a need for such a tool?

- Mechanism in Belgium that rewarded the PV energy production through feed in tariffs
- Self-consumption is projected to become mainstream
- Simulate self-consumption and self-sufficiency ratio of a PV system or a group of systems in combination with one (or a group) of local consumption profile
- Combining different consumption profiles can improve particularly the SC to reduce cost of system for users.

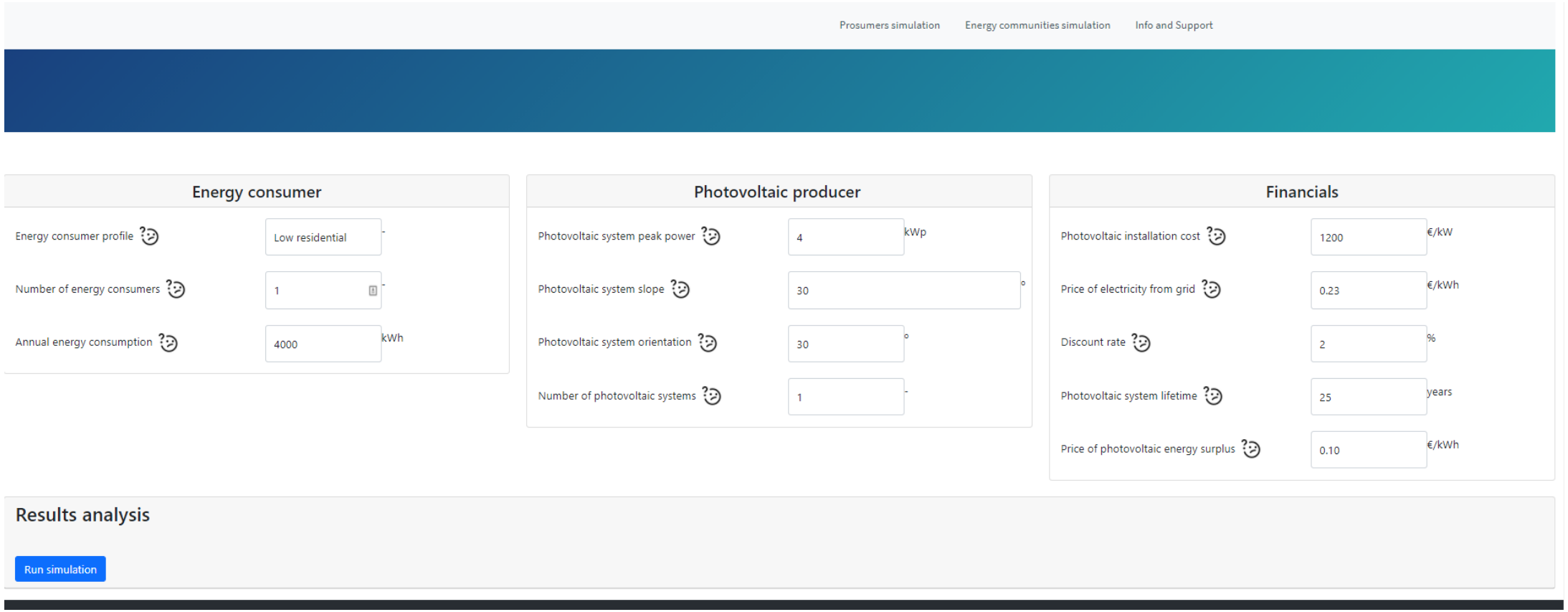
Presentation of the web app

- Free online web-based simulation in collaboration with ULB
- Tool is composed of an interface to calculate self consumption a self sufficiency ratio and as well financial parameters are taken into consideration
- Help user make better informed decision
- Two functionalities:
  - Combining different types od buildings to help people choose the best combination with the builing consumption and PV production
  - Prosumers: To decide on the optimum peak power for the PV installation and the corresponding returns on investment

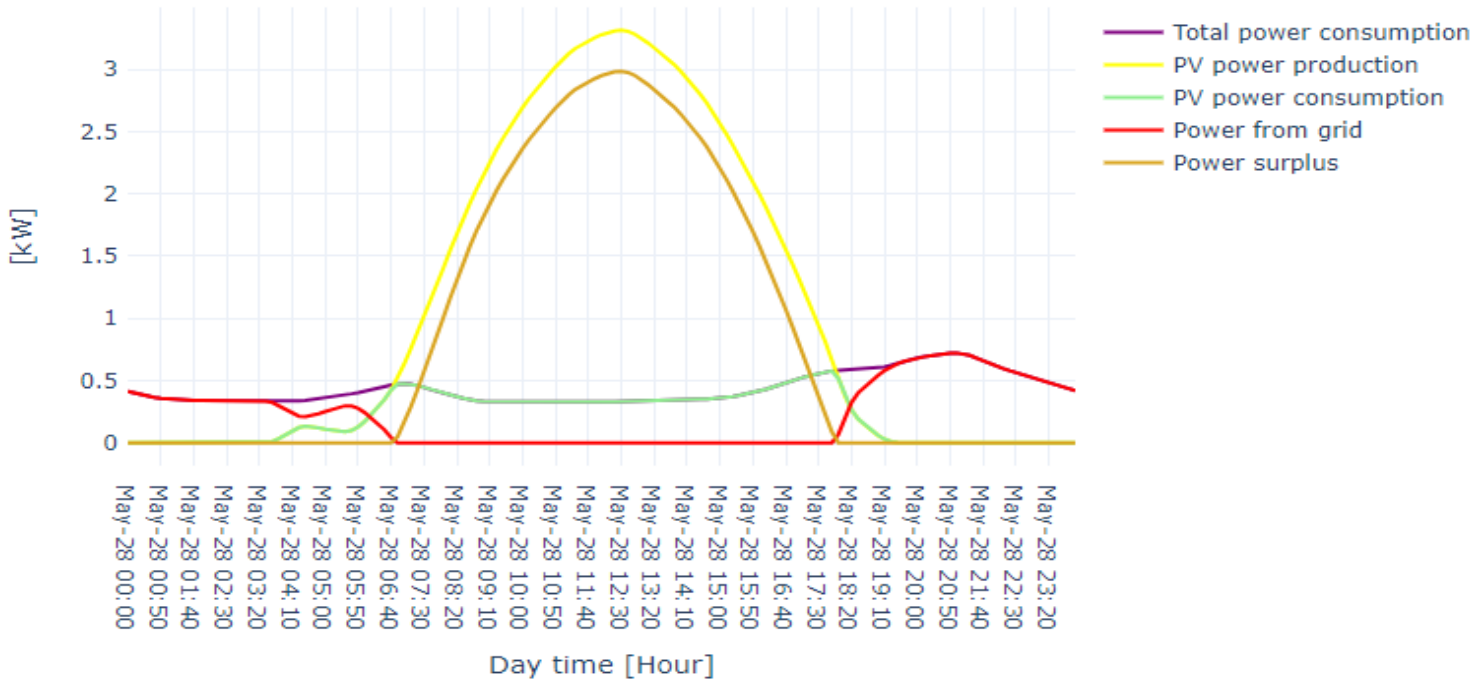
- Tool calculates self-consumption and self-sufficiency ratios on a 10 minutes basis
  - Aggregation at monthly basis
  - Aggregation at a yearly basis
- Regarding consumption profiles, synthetic profiles have been used corresponding to 17 different types of buildings
- Regarding PV generations part, LuciSun uses its internal PV simulation models
- Economic calculations are based on the self consumtion and self-sufficiency ratios calculated and specific figures that correspond to situation in Belgium.

Some concepts in Layman's terms

- PV Self-consumption ratio: Ratio of consumed PV power over Total PV produced
- Self-sufficiency: Ratio of consumed PV power over Total consumption over a period of time
- Net Present value: Amount of money one expect to make from an investment into today's money.

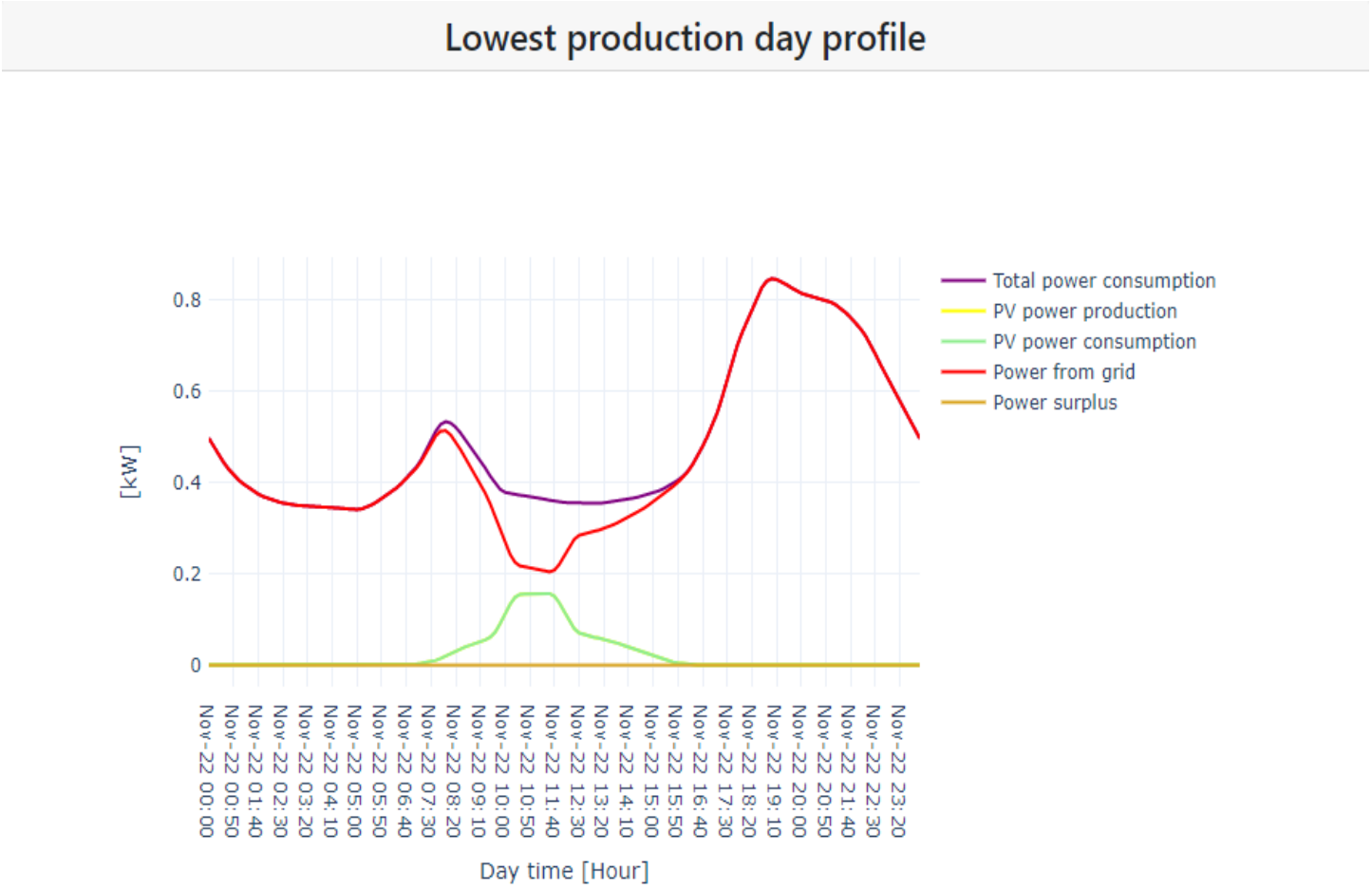

Prosumers simulation
Energy communities simulation
Info and Support
Energy consumer
Energy consumer profile
Low residential
-
Number of energy consumers
1
-
Annual energy consumption
4000
kWh
Photovoltaic producer
Photovoltaic system peak power
4
kWp
Photovoltaic system slope
30
°
Photovoltaic system orientation
30
°
Number of photovoltaic systems
1
-
Financials
Photovoltaic installation cost
1200
€/kW
Price of electricity from grid
0.23
€/kWh
Discount rate
2
%
Photovoltaic system lifetime
25
years
Price of photovoltaic energy surplus
0.10
€/kWh
Results analysis
Run simulation

Highest production day profile



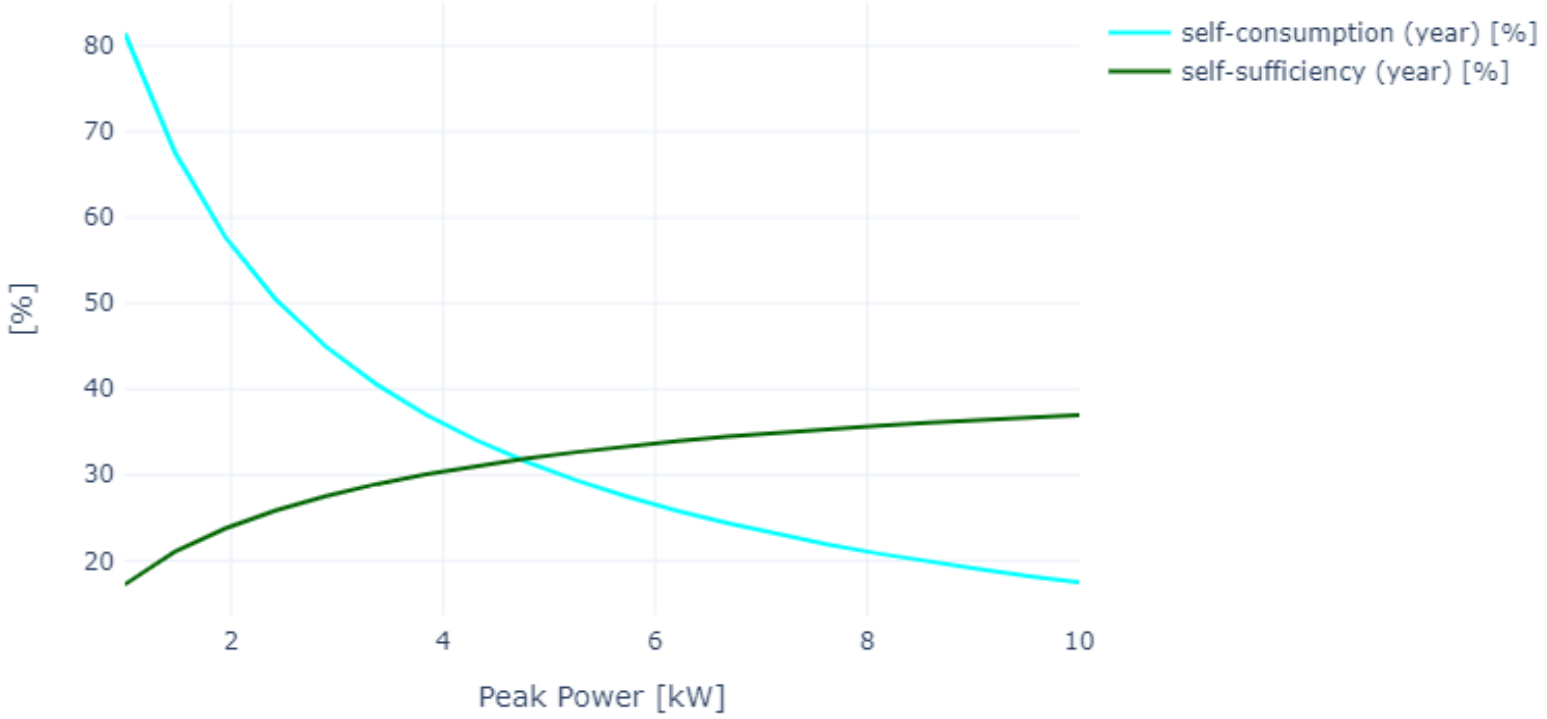
Typical duck curve* can be seen:

Timing imbalance between peak demand and renewable energy production



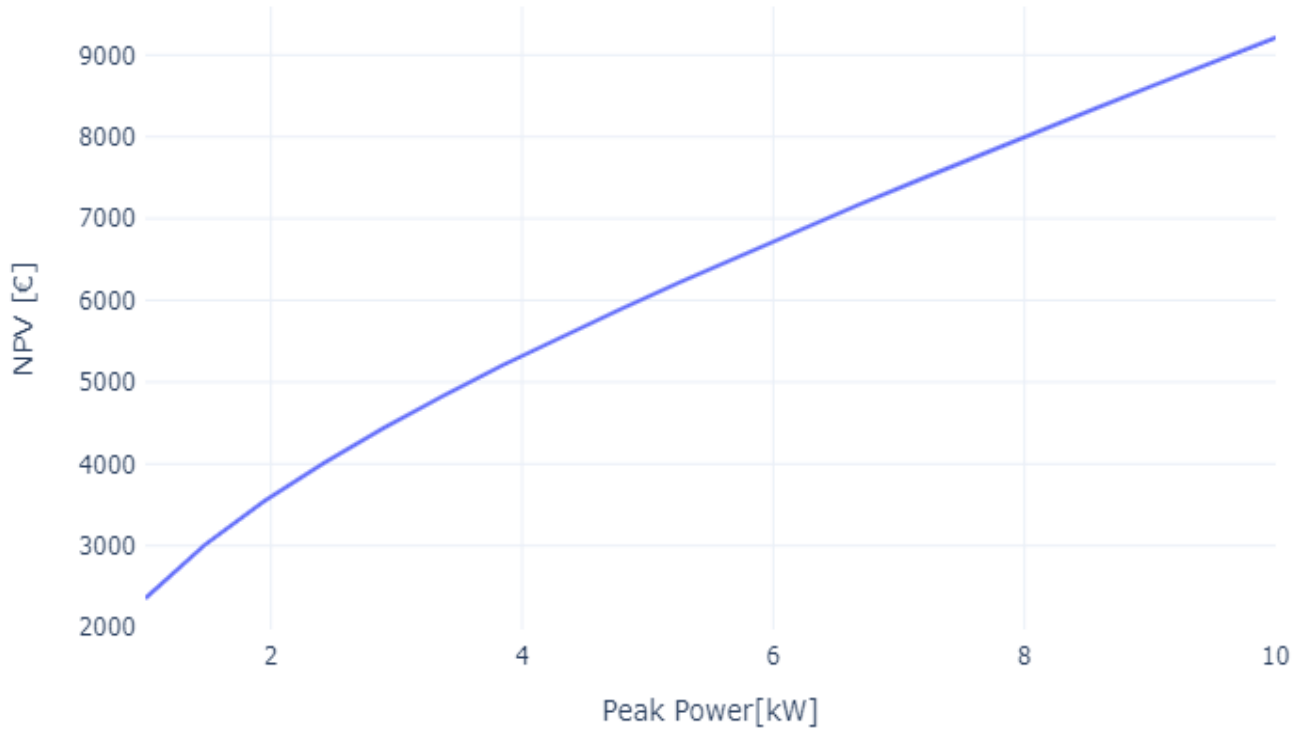

70
60
50
40
30
20
10
[%]
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month of year
Self-sufficiency
Self-consumption

Yearly integrated self sufficiency and self-consumption vs Peak power of PV installation



Cost of having a PV system
Vs
Cost of no PV system installed

Optimum peak power considered where NPV is max



Current status and next steps

- Tool is currently still in beta-testing mode.
- 07 September 2021 is the first release date and tool is free.
- Current region we consider for analysis is Brussels but analysis for other regions possible only need is consumption profiles of different type of building/systems/consumers.
- https://consolectiv.brussels/
- New version release with additional features will be done soon
  - Consiering battery systems (already implemented to be launch later this year)
  - Better UI/UX (constantly being improved)
    - More automation on automatic proposal sizing for Energy producers (work in progress)
  - Integration of EV charging with some basic example of most populars EVs in Europe

- Link to access tool

https://consolectiv.brussels/