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# SweGRIDS

Short project:  
01/07/2021 – 31/12/2021

**FPS26: Smart charging strategies and optimal PV-EV sizing to increase the combined PV-EV hosting capacity in the distribution grid**

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**References:** Nicholas Etherden (Vattenfall), Johanna Barr (Power Circle), Magnus Åberg (UU)

**Project funded by:**



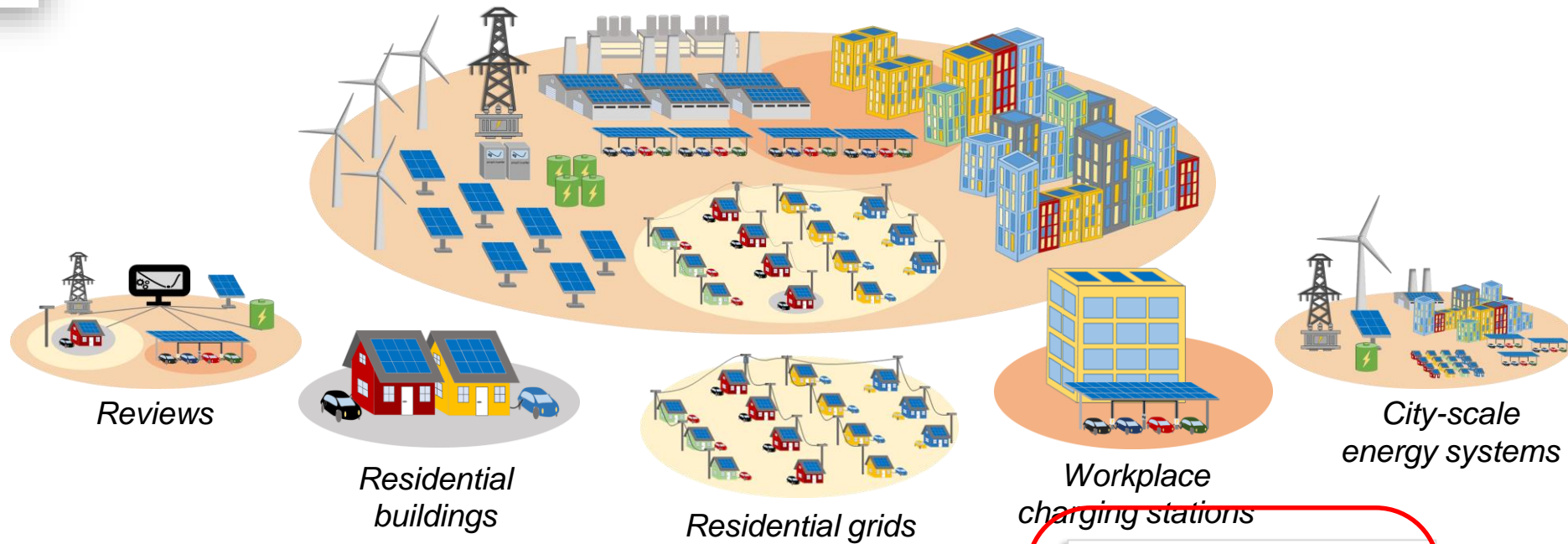


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# Synergy between photovoltaic generation and electric vehicle charging in urban energy systems

*Optimization models for smart charging and vehicle-to-grid*

*The big PhD project*



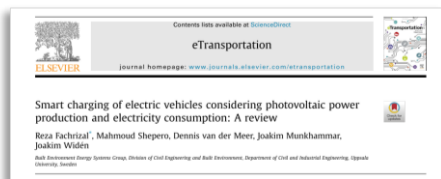
Reviews

Residential buildings

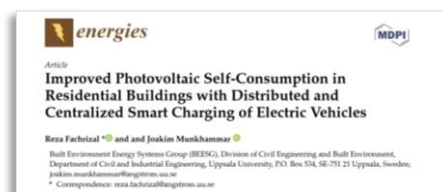
Residential grids

Workplace charging stations

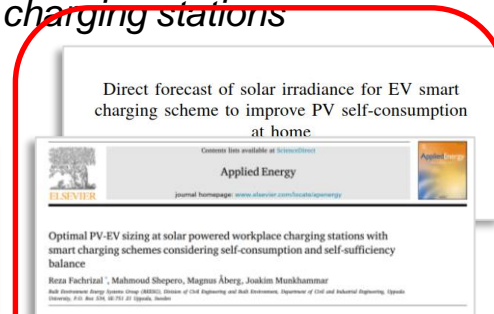
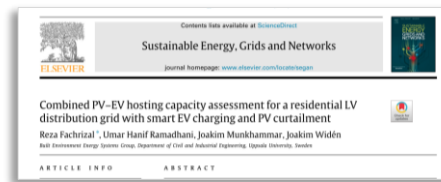
City-scale energy systems



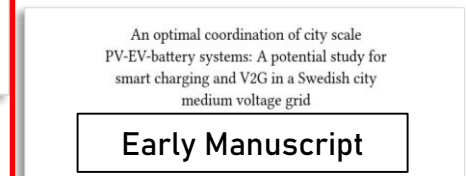
Not funded by SweGRIDS



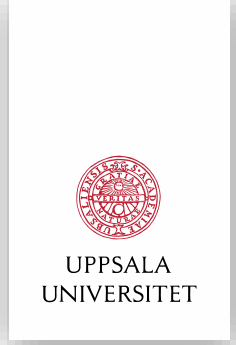
Partly funded by SweGRIDS, FPS8



Funded by SweGRIDS, FPS26 (6 months)



Funded by SweGRIDS? Hopefully!



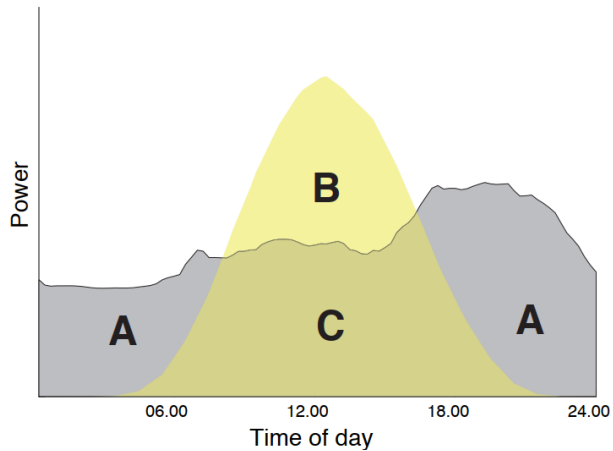
# Aims, some results and findings

## FPS26

Aims: Estimating the **optimal** combined PV-EV hosting capacity in the distribution grid with smart energy management system.

Findings:

- Increased *self-consumption (SC)* improves grid hosting capacity for new distributed generation, such as *PV generation*.
- Increased *self-sufficiency (SS)* improves grid hosting capacity for new high consuming loads, such as *EV charging load*.



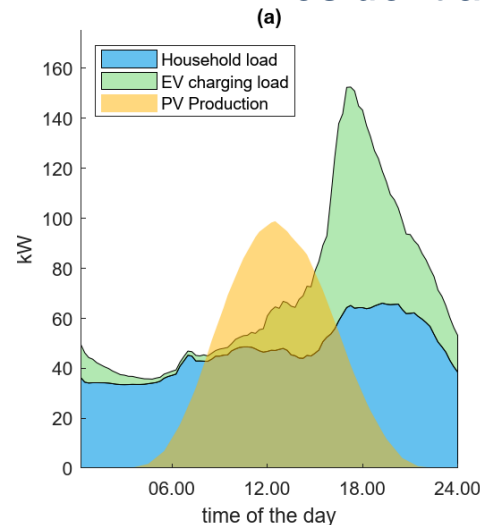
$$SC = \frac{C}{B+C} \quad SS = \frac{C}{A+C}$$

Load = (A + C)

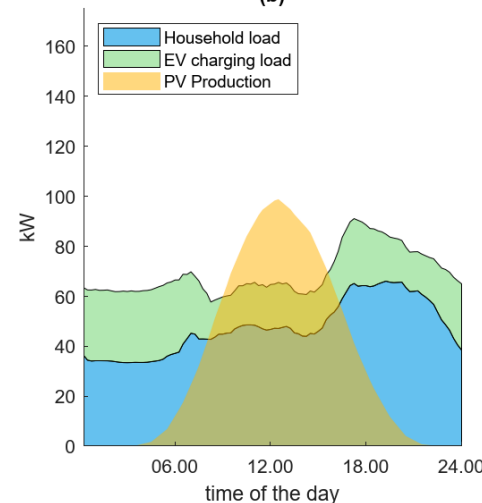
DG electricity = (B + C)

Self-consumed electricity = C

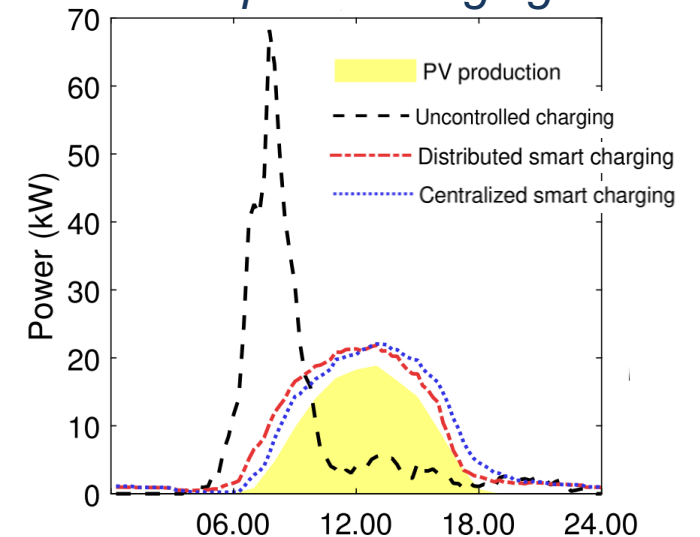
*Residential charging*



(b)



*Workplace charging*





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