

REScoopVPP

Creating an open smart building ecosystem enabling
community flexibility

Vincent Dierickx, co-founder EnergielD



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 893240

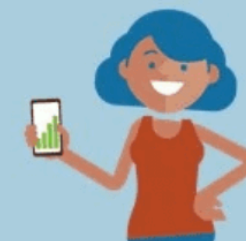




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We're an EU project developing energy flexibility tools by co-ops for co-ops!



REScoopVPP

The main aim of REScoopVPP is to set-up a community-driven virtual power plant that can actually provide flexibility services to the grid and contributes to a 100% share of renewable energy sources into the grid.



Start - June 2020



12 project partners



5 pilot sites



Tools for a community-driven flexibility system



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The GOAL

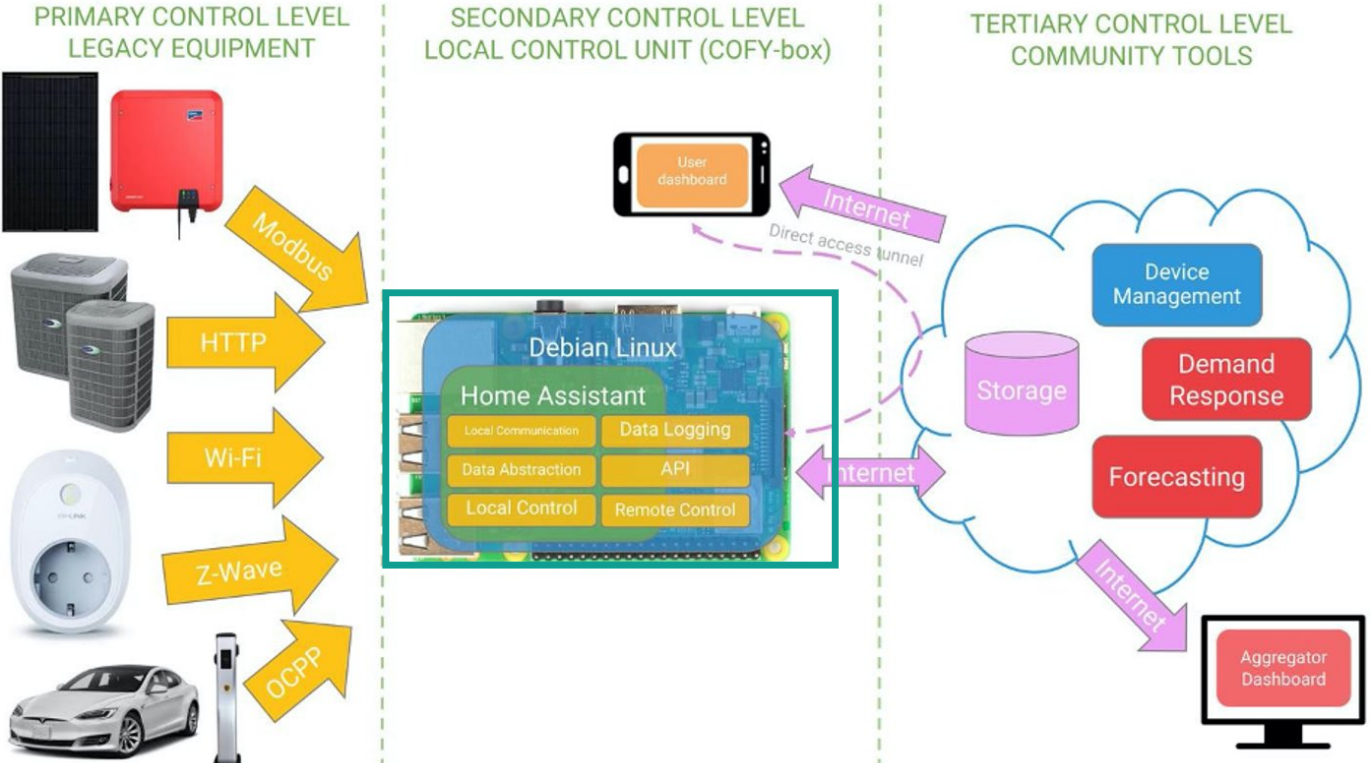
The REScoopVPP project combines front-runner energy communities to create the **most advanced community-driven smart building ecosystem for energy communities.**



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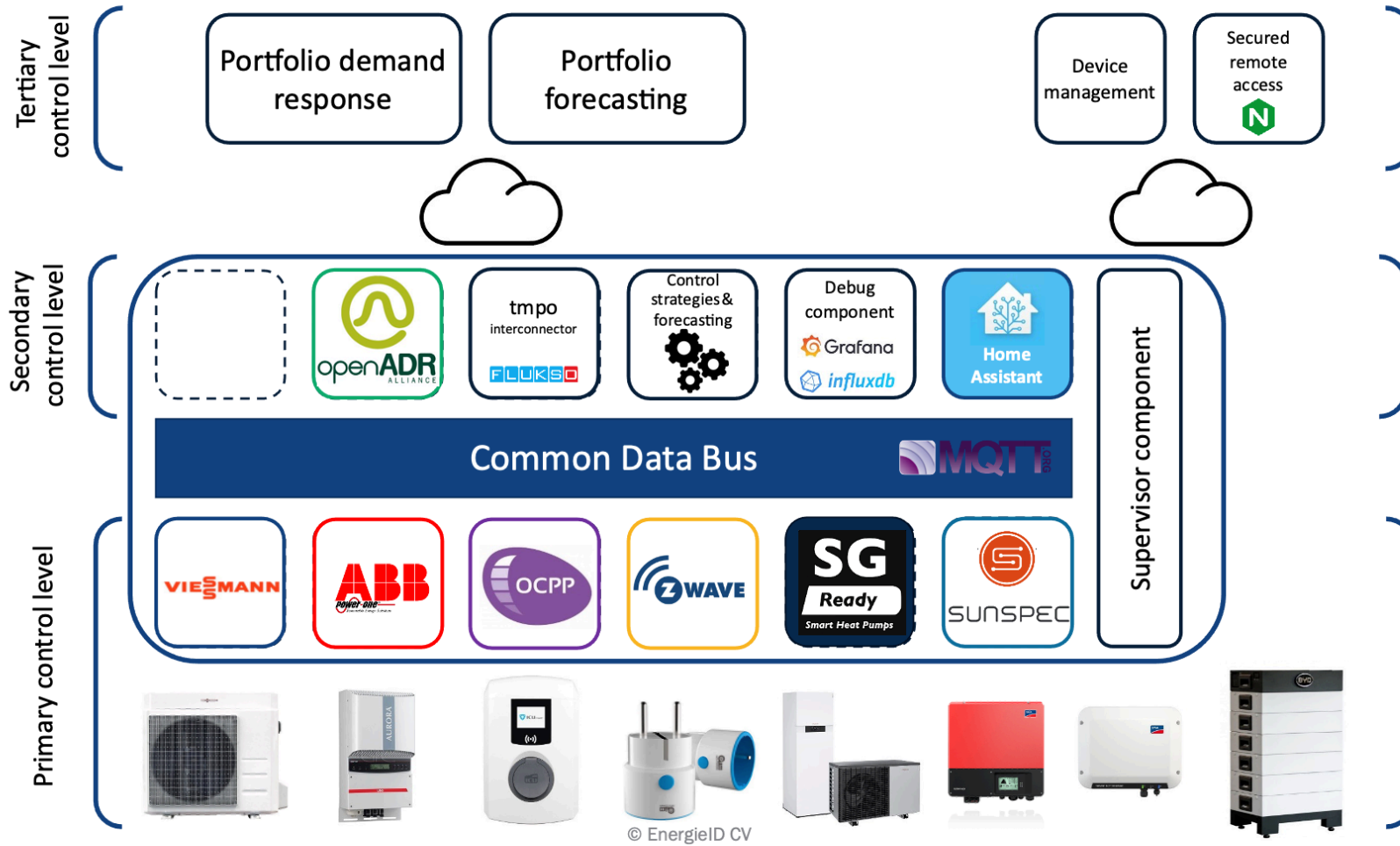


General overview



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PV/Battery

- Sunspec compatible devices
 - Most 'EU&US brands': SMA, Solaredge,
- Modbus compatible devices



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Focus on legacy assets

- Mostly heating/HP units
 - Currently supported
 - EMS+ (Buderus, Nefit, ...)
 - Viessmann RS-485
 - Working on
 - Ebus (Vaillant, Bulex,)



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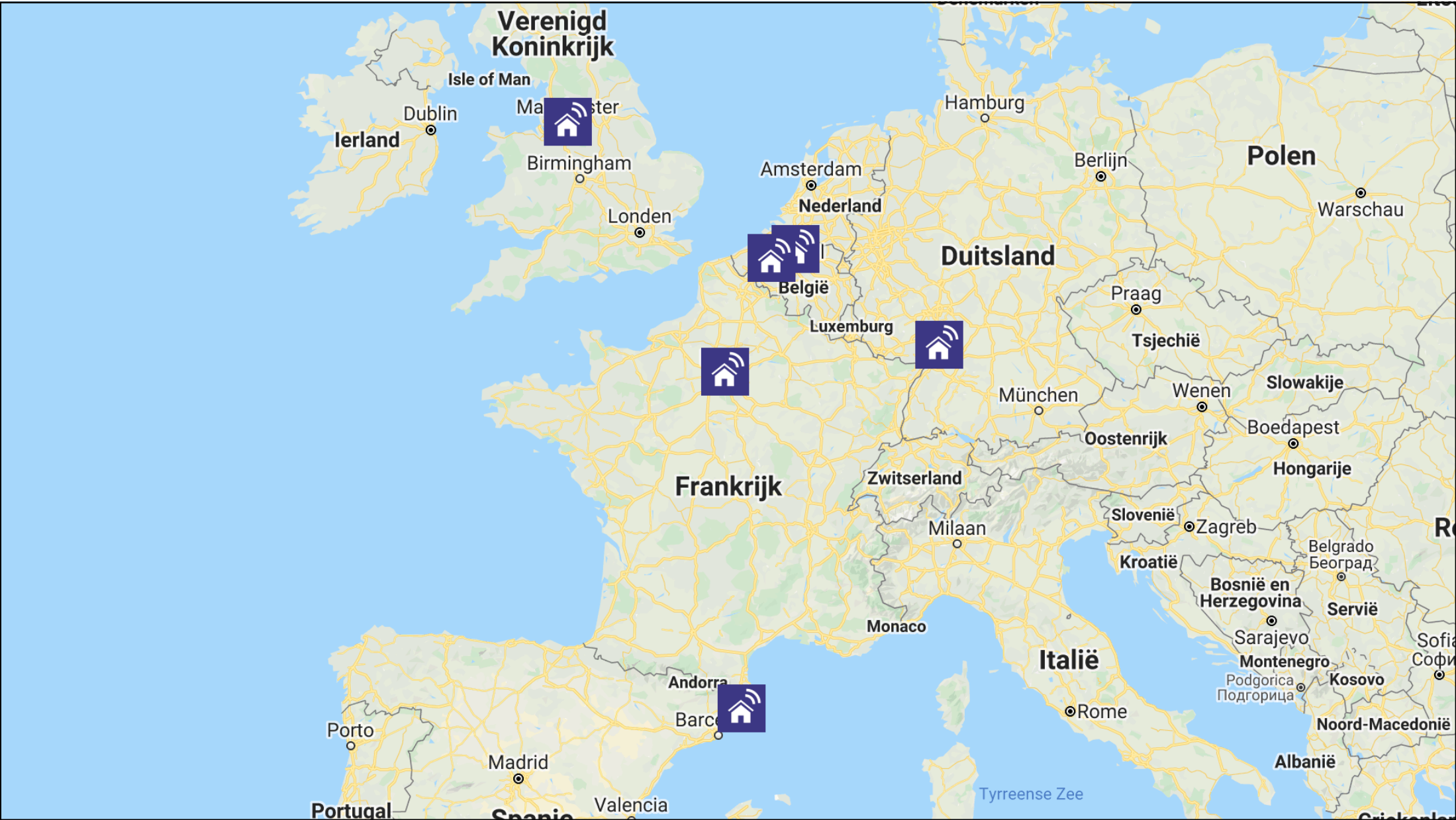
Residential assets

- Smart plugs
 - Z-wave
 - Wifi
- 'White goods'
 - SAREF compliant protocols
 - Less focus, limited flexibility



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Belgian partners



Citizen Energy
Community



Technology Solutions
Provider



Cooperative Green Energy
Supplier & Producer



GHENT
UNIVERSITY

Academic Partner



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Belgian Pilot

From former projects:

- 16 prosumers with digital meter and home battery
- 2 prosumers with hybrid HP and thermal storage
- Communication with Cofy box 1.0 is up and running



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Belgian Pilot

Planning

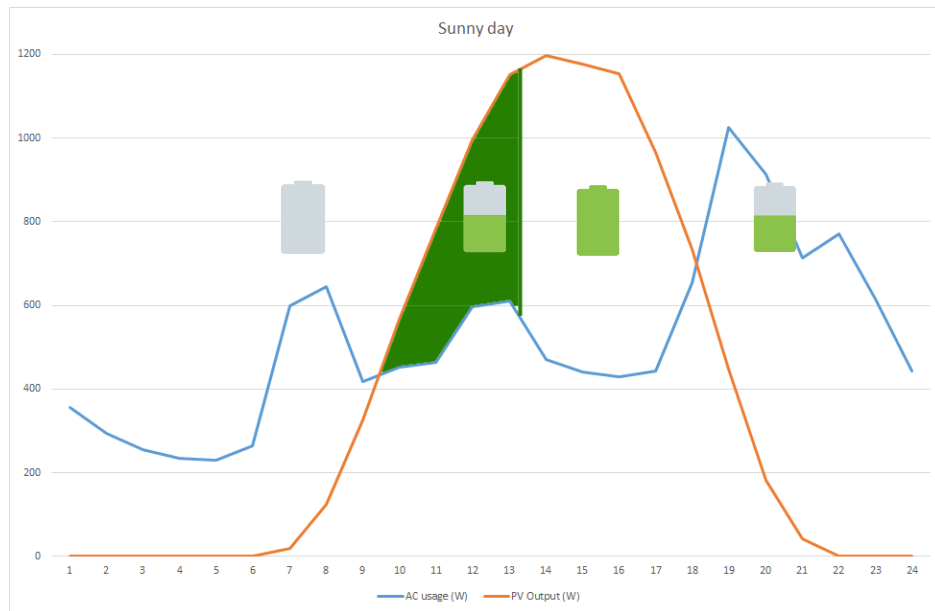
- 05-06/2021: first test phase with new iteration
- Summer 2021: test existing functionality in new iteration
- 06/2021: engagement process for another 30 participants
- 10/2021 start baseline measurements



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Control strategy: peak absorption



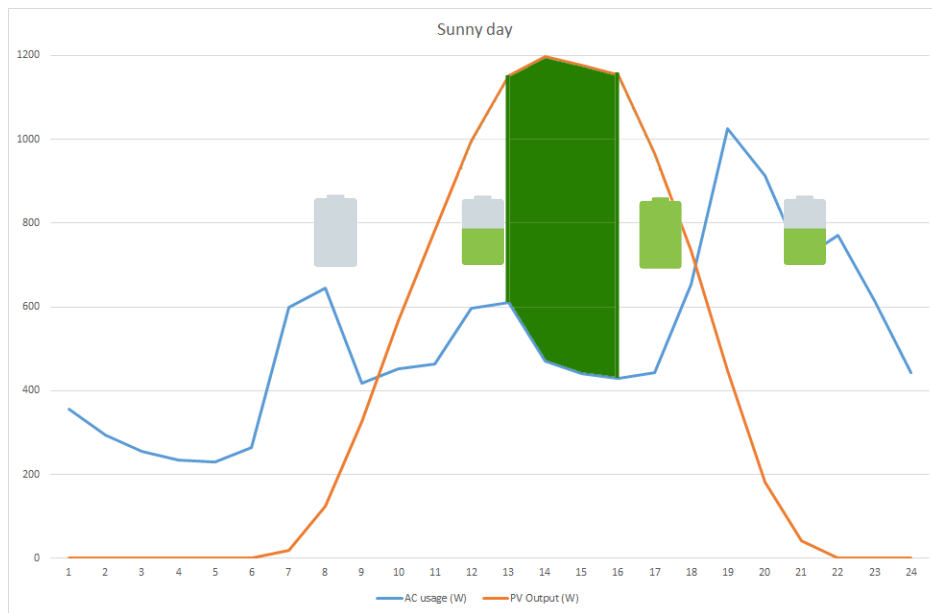
- High solar yield
- Low consumption
- Standard BMS: charge battery when solar energy is available
- Result: battery already full before noon
- Same situation across whole neighbourhood
- Grid congestion
- Inverters turn off (too high grid voltage)



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Control strategy: peak absorption



Peak absorption

- Defer battery charging to optimally absorb peak at noon
- Be sure to have full battery by end of day
- Requires forecast of solar yield and household consumption
- Check effect on grid congestion



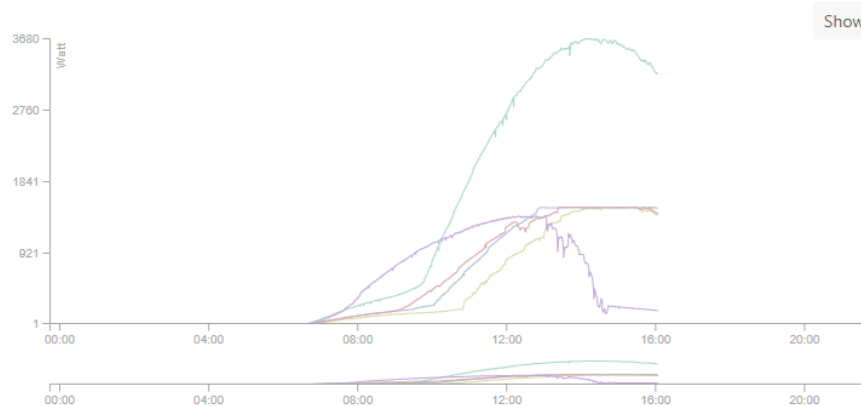
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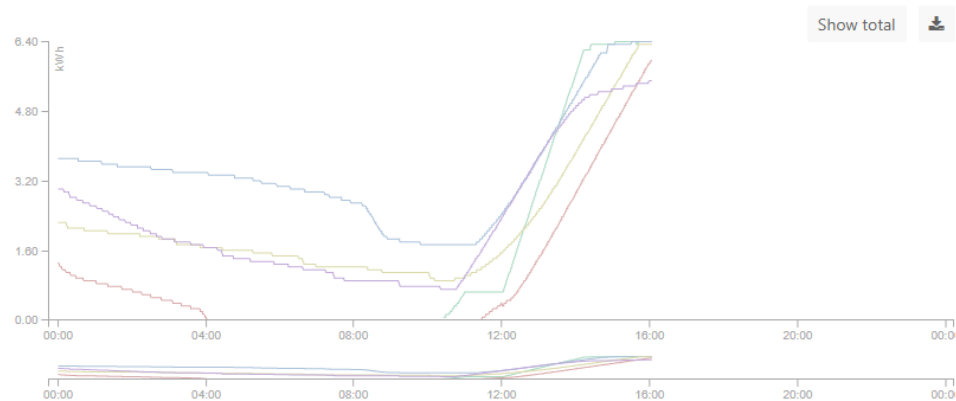
Results: peak absorption

From cVPP Community dashboard

PV production



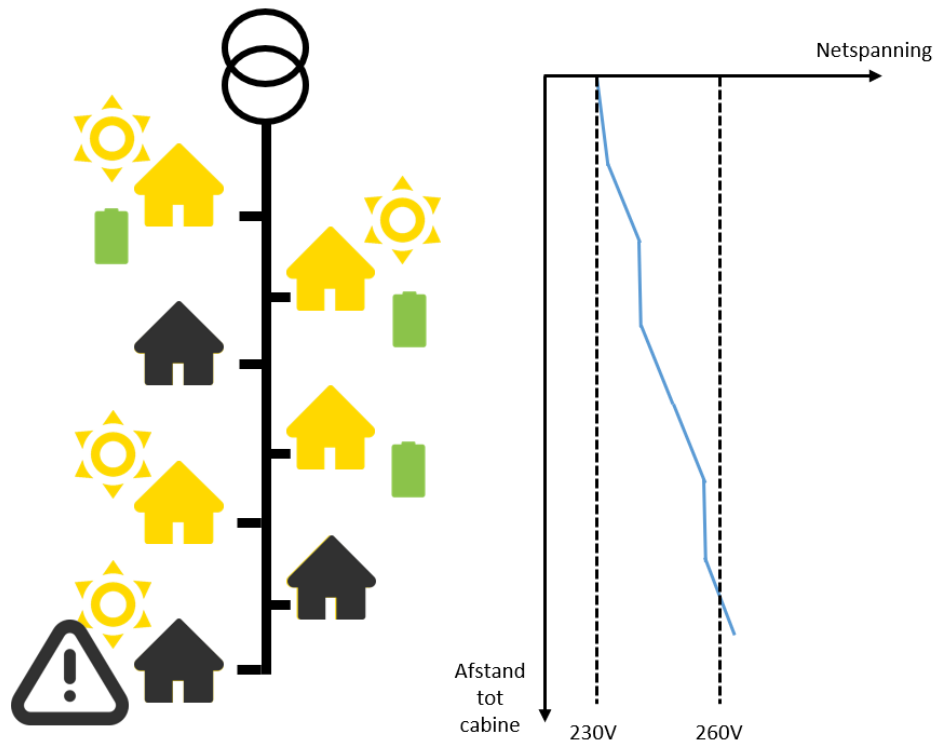
Battery level



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Control strategy: collective curtailment



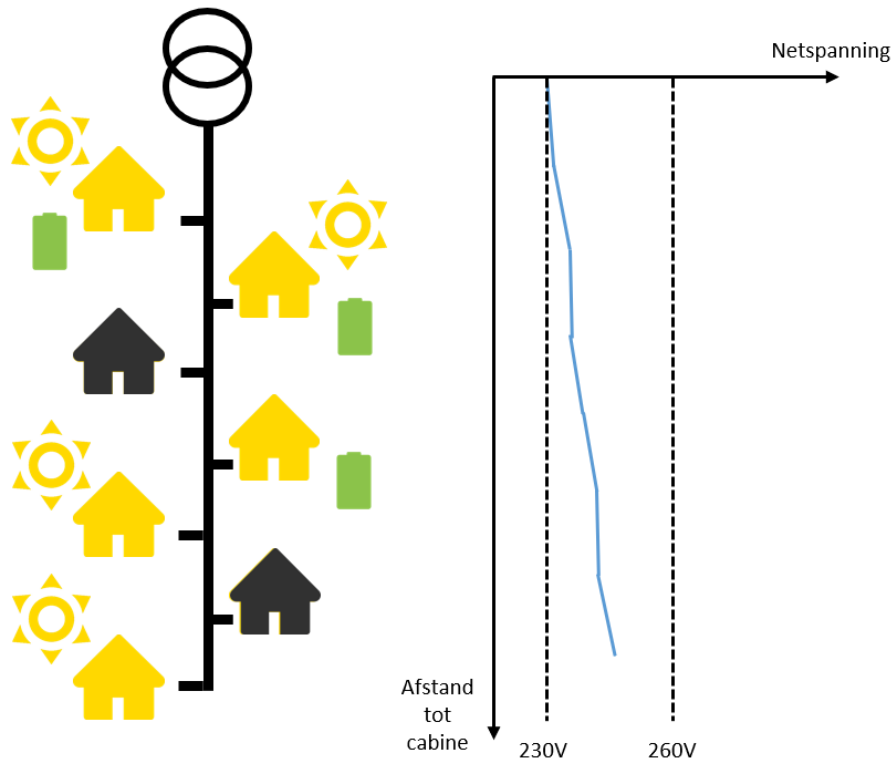
- Excess solar yield injected into grid
- Voltage rise along feeder length
- Inverters turn off
- The further away from MV cabin, the higher the chance
- No 'socialising' of yield losses



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Control strategy: collective curtailment



Collective curtailment

- Inverter signals voltage increase
- Other inverters lower their setpoint
- Less injection into feeder, voltage rise mitigated
- Individual loss of yield, higher combined yield



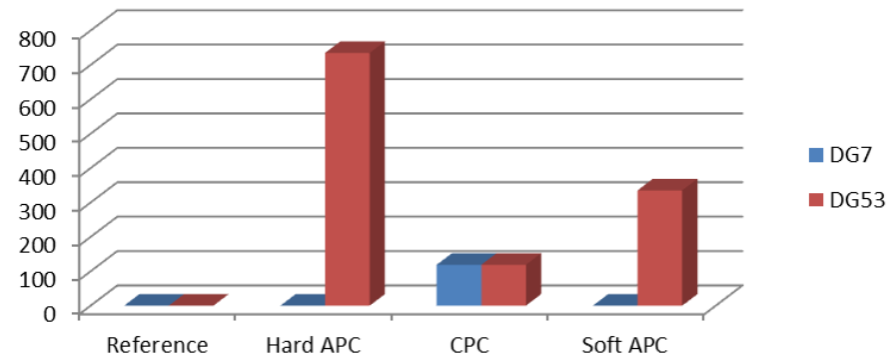
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Results: Collective Curtailment

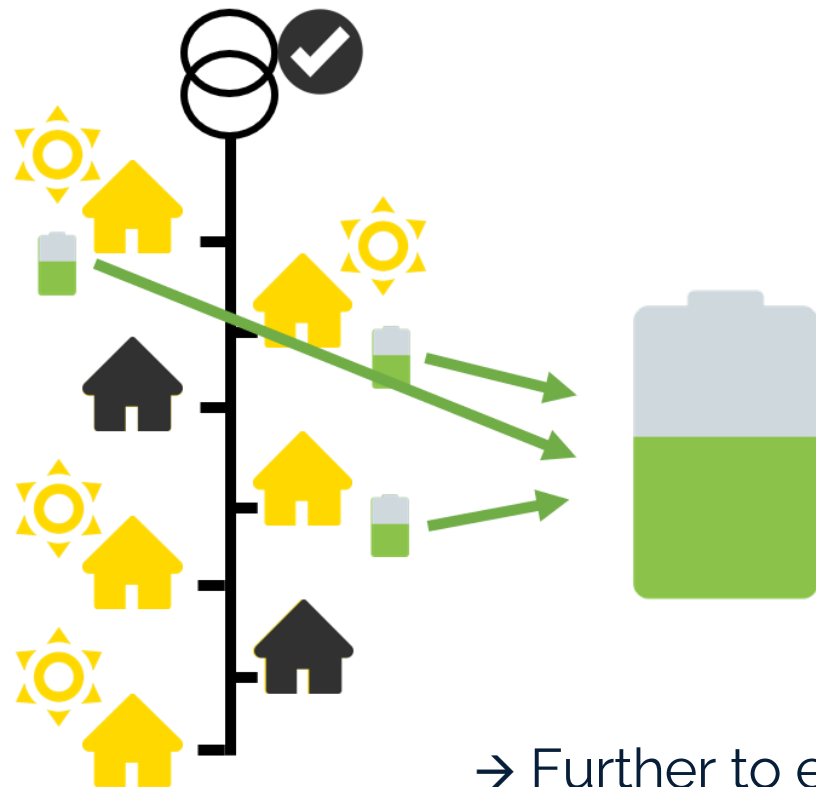
- Simulate congested LV feeder
- Compare three control strategies
 - Hard Active Power Curtailment: inverter switches off when reaching 253V (default)
 - Collective Power Curtailment or voltage control: all inverters lower setpoint if overvoltage is imminent
 - Soft Active Power Curtailment: individual inverters lower setpoint if local overvoltage is imminent

Curtailment difference between start (DG7) and end (DG53) of feeder [kWh]



(1) PV Sharing in Western Europe; Maarten Laureys (UGent), Joannes Laveyne (UGent) and Lieven Vandevelde (UGent), (2020)

Control strategy: Neighbourhood optimisation



Aggregating assets

- All neighbourhood assets coordinate to optimally absorb locally produced energy
- Increase energy autonomy
- Minimise energy exchange through MV cabin

→ Further to explore best control strategy



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Hybrid heatpumps



This project has received



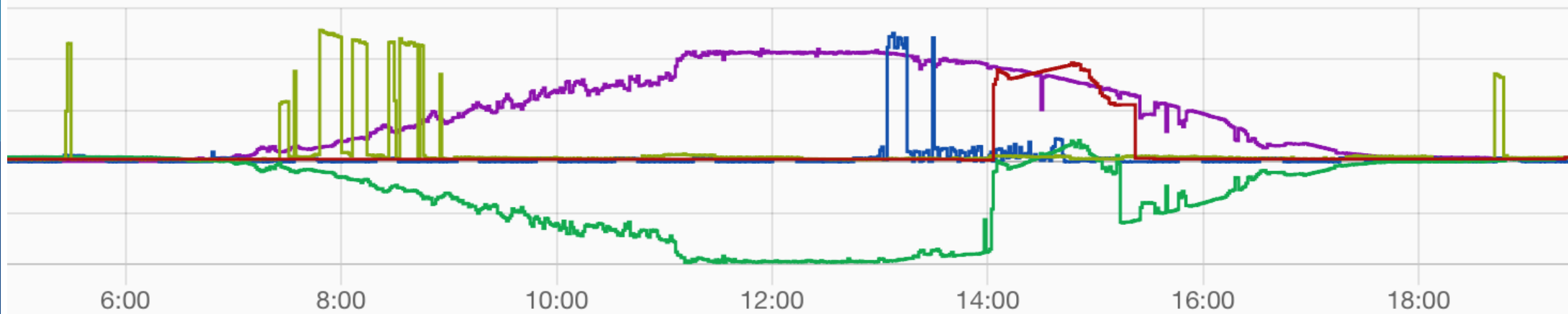
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Hybrid heatpumps

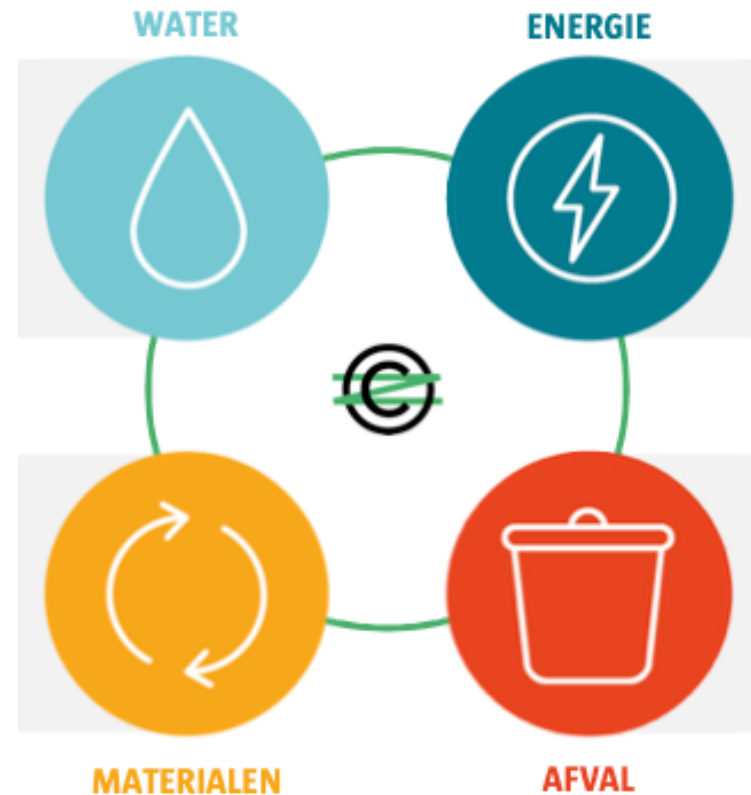
- Using as thermal storage in heating and/or DHW
- High CO₂ savings possible, but reality of cheap natural gas
- Control through (emulation of) SGReady

I2 power F ● PH3 power F ● PV power F



UIA Circular South

- Urban Innovative Action Fund
- Antwerpen Nieuw Zuid
- Online and offline nudging experiments
- Automated data streams
 - Smart meters
 - Public waste bins
 - Virtual PV & batteries
- EnergielD: mobile app



T



novation programme under grant agreement No 893240

Circulair Zuid App

15:59

HomeLab Circulair Zuid
Circulair Zuid

mei

ELEKTRICITEIT

122,59

kWh

WATER

Geen gegevens

AFVAL

7,5

kg

MATERIALEN

Geen gegevens

Zonnestroom

Rapporten Meters Circules Berichten

16:00

ELEKTRICITEIT

122,59 kWh

mei 2020

OVERZICHT

Totaal 122,59 kWh

ZELFVERBRUIK RATIO

16,8%

Dat is hoeveel van je geproduceerde zonnestroom je zelf gebruikt.

Rapporten Meters Circules Berichten

16:11

HUIDIG SALDO

€ 144

Inkomend Uitgaand

- 9 apr. 2020 09:30 Voor het invullen van onze vragenlijst krijg je 600 circles. € 600 ✓
- 6 apr. 2020 18:50 Bedankt voor het invullen van de survey! € 100 ✓
- 19 mrt. 2020 17:41 U krijgt 10 CIR € 10 ✓
- 4 feb. 2020 15:40 Bedankt om gebruik te maken van de Circulair Zuid applicatie. Samen zetten w... € 2.500 ✓
- 22 jan. 2020 23:01 You got 123 CIR! € 123 ✓
- 10 jan. 2020 14:19 Proficiat, u ontvangt 100 CIR! € 100 ✓
- 10 jan. 2020 14:19 Proficiat, u ontvangt 100 CIR! € 100 ✓
- 9 jan. 2020 12:59 Proficiat, u ontvangt 100 CIR! € 100 ✓
- 7 jan. 2020 09:09 Hoera, u ontvangt 10 CIR. € 10 ✓

Aanbiedingen

Rapporten Meters Circules Berichten

winkelen zonder verpakking ondersteunen, zoek ze

16:03

CeZaar 14 mrt.

De bakjes bij de slager of de frituur moeten bij het restafval en vergroten je afvalberg. Het is door het Federaal Voedselagentschap toegelaten om op eigen risico, zelf je verpakking mee te nemen naar de winkel.

Neem jij soms je eigen verpakkingen mee naar de winkel?

Neen, dat doe ik niet maar ga ik wel proberen

CZB Circulair Zuid Beloningsysteem 19 mrt.

U krijgt 10 CIR

CeZaar 21 mrt.

Een goed georganiseerde koelkast is goed voor je portemonnee. Aangezien warme lucht stijgt en koude lucht daalt is de temperatuur in een koelkast niet overal gelijk. Door de juiste ordening kan je voedsel langer bewaren. Plaats bovenaan dranken, in het midden bewaar je best bereide gerechten en onderaan vlees. Groeten en fruit horen in de groentebak.

Is jouw koelkast op deze manier georganiseerd?

Neen, geen interesse

CeZaar 25 mrt.

Heb je een grotere hoeveelheid vlees of vis gekocht?

Rapporten Meters Circules Berichten



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tion

10

Thanks!

energie

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