



# DEVELOPMENT OF THE RURAL CVPP LOENEN





## AGENDA

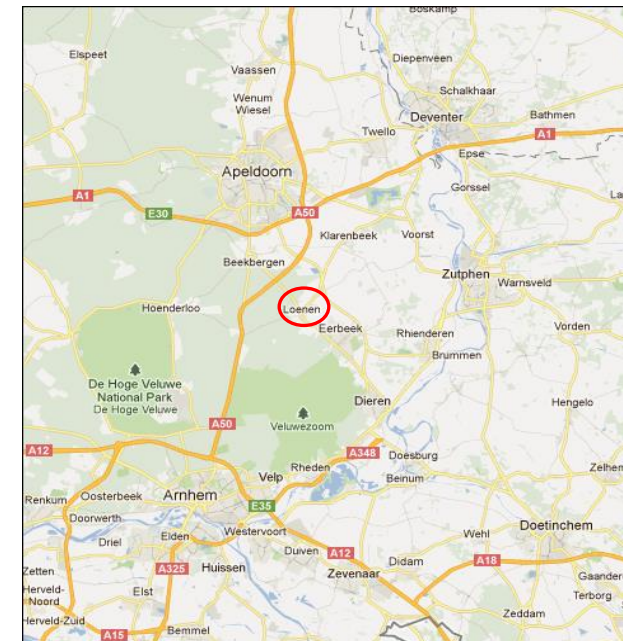
- WHO?: Intro on "Loenen op de Veluwe" (community)
- WHY?: Our journey to cVPP (context)
- HOW?: Development proces cVPP Loenen (community logic)
- WHAT?: First images cVPP Loenen (technical choices)



# LOENEN OP DE VELUWE (COMMUNITY)

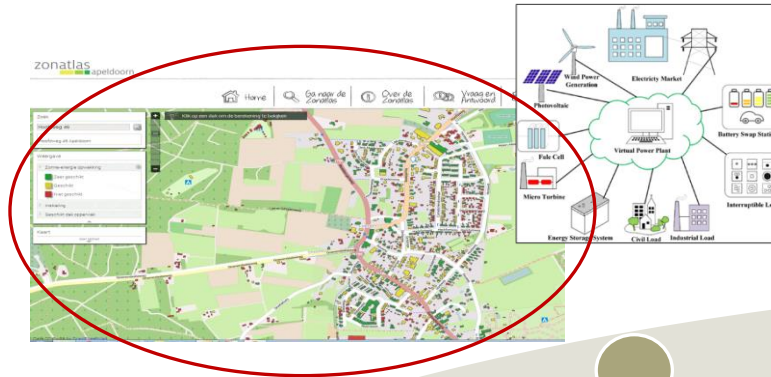
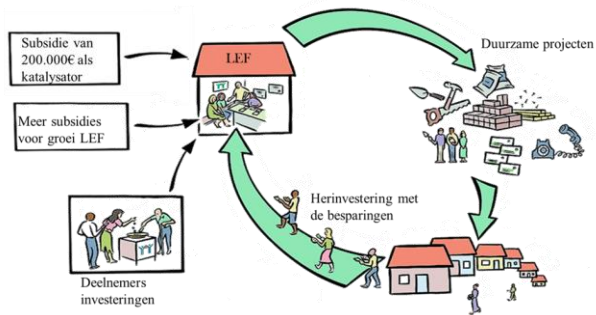


- Village at the edge of the Veluwe, Provincie Gelderland, 20 km from German border
- Rural, green character, touristic but also some paper mill industry
- Population: ca. 3.200 inhabitants (approx. 1.300 houtholds)
- Well organised village: 3 organisations with strong interconnections
  1. Loenen Energie Neutraal: bottom initiative aiming at energytransition with a revolving fund
  2. DPL/cVPP: community based Virtual Power Plant (INTERREG NWE VB)
  3. Energie Coöperative Loenen





# OUR JOURNEY: FROM VILLAGE INITIATIVE TO cVPP-PROJECT (CONTEXT)



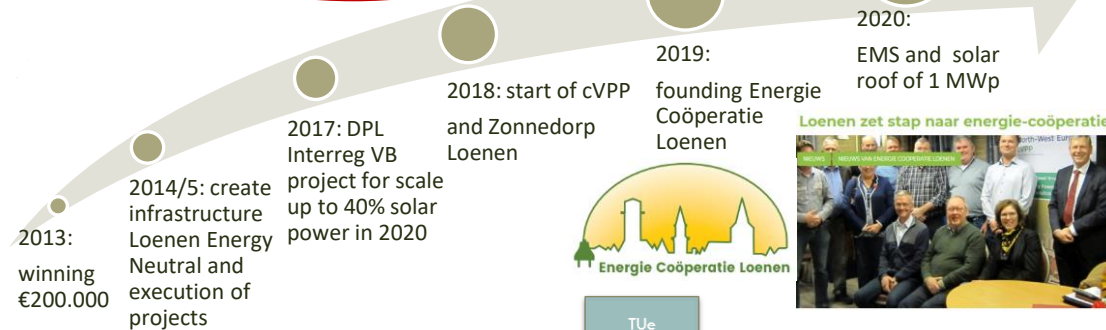
DE-centrale Loenen



Loenen Energie Neutraal



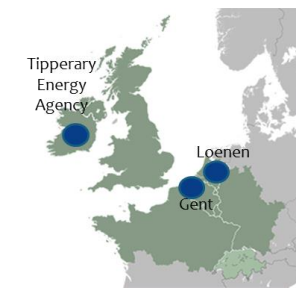
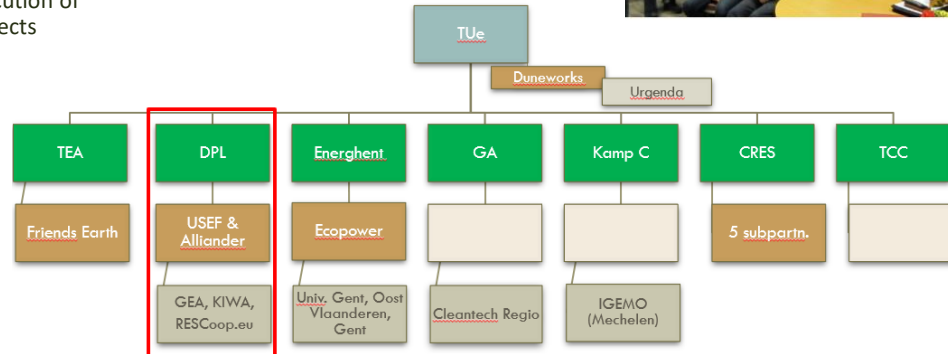
WINNAAR ENERGIEKE DORPEN APeldoorn LOENEN



Energie Coöperatie Loenen



Loenen zet stap naar energie-coöperatie





# LATEST DEVELOPMENT: 100% PARTICIPATIVE 900 KWP SOLAR ROOF



Crowdfunding for 138.000 euro (=20%)

Start on Januari 23, close on Februari 20

Result: 101% collected

Rest (80%) from bank

Obligation style participation with 4% ROI

Energy Coöperative Loenen also makes a profit

## ENERGIE COÖPERATIE LOENEN



### Het project

Bewoners en ondernemers uit Loenen hebben de mogelijkheid om te investeren in duurzame energie. Energie Coöperatie Loenen (ECL) investeert in 2784 zonnepanelen op Thomassen Distributie Centrum. De investering bedraagt €690.000.



### Lid worden?

Woont of onderneemt u in Loenen? Word dan lid van de Energie Coöperatie! Zo draagt u bij aan verduurzaming en werken we slim samen aan de energietransitie.

### Voorwaarden

Op [duurzaamloenen.nl](http://duurzaamloenen.nl) vindt u meer informatie over ECL en dit project. Een uitgebreid informatiememorandum wordt gepubliceerd zodra het project definitief is. Getoonde bedragen zijn onder voorbehoud van definitieve offertes.

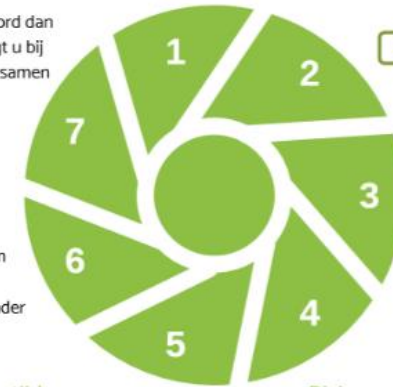
### Terugbetaling en looptijd

Uw participatie wordt in 15 jaar afgelost. U mag uw participaties aan andere leden van ECL verkopen. In bijzondere situaties en afhankelijk van de financiële ruimte kan ECL participaties inkopen.

### Risico

Hoewel een zonnedak een relatief laag risico kent, en de belangrijkste risico's verzekerd zijn, bestaat het risico dat u (maximaal) uw inleg kwijtraakt. In het informatiememorandum staat wat de risico's zijn en hoe deze beheerst worden.

Let op! U belegt buiten AFM-toezicht.  
Geen vergunning- en prospectusplicht voor deze activiteit.

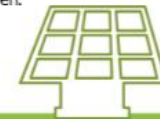


### Uw investering

ECL geeft 2784 participaties ("paneel-delen") van elk €50 uit. Als lid kunt u meedoen met minimaal 2 en maximaal 100 participaties. U koopt de participaties van ECL.

### Prognose & vergoeding

U ontvangt 4% vaste rente en de participatie wordt in 15 jaren afgelost (annuïteit). Dankzij een overheidssubsidie staan de inkomsten 15 jaar grotendeels vast. Uitgaven zijn rente, aflossing en exploitatiekosten. De winst wordt door de coöperatie ingezet voor nieuwe duurzame investeringen.





## SO WHY THE CVPP?

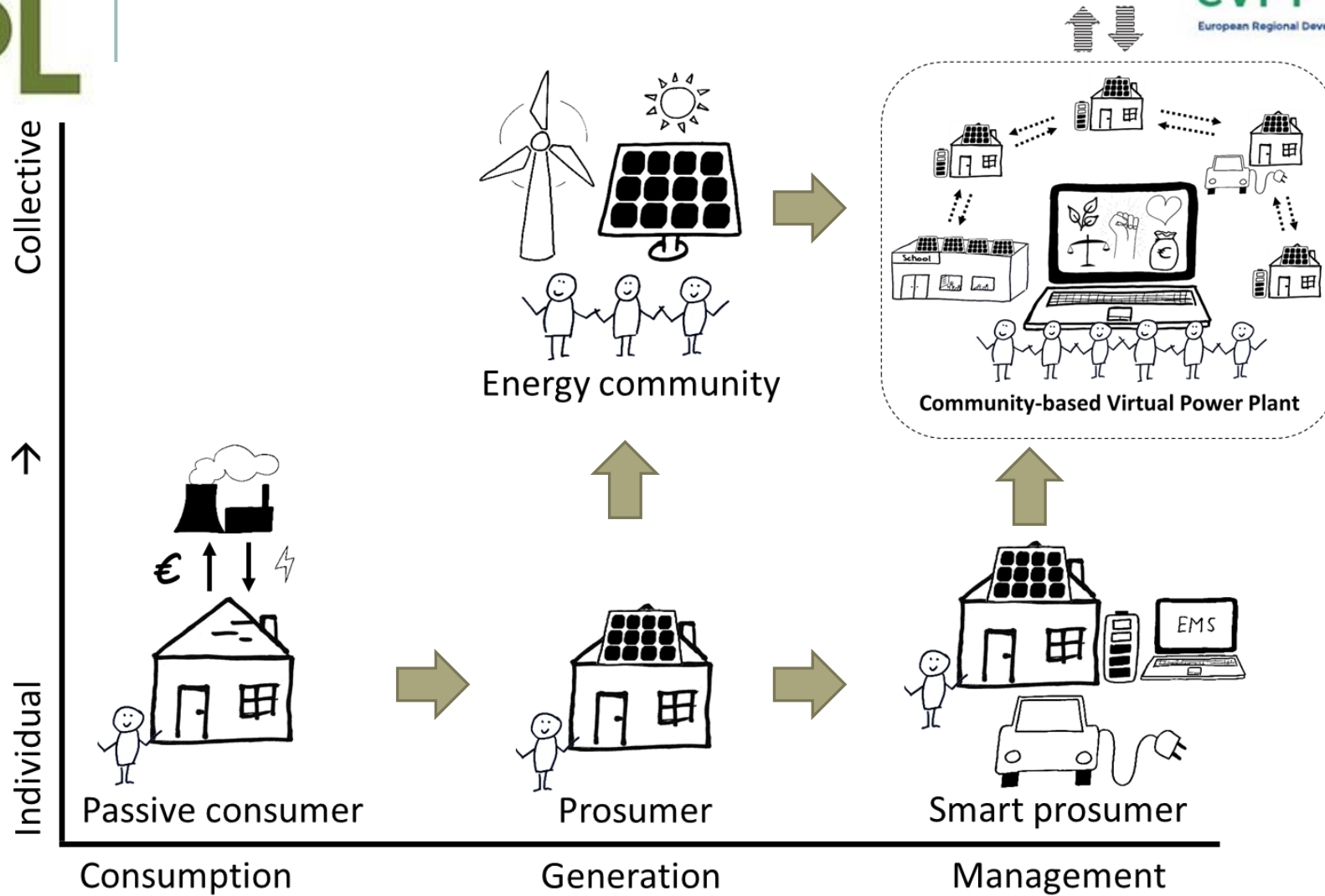
### **In recent years inhabitants and entrepreneurs have invested in sustainable projects in houses and companies**

- Some 1,5 million euro are invested in PV: currently 1,2 MWp solar power in Loenen (275 households).
- In 2019 more than 1 million kWh generated in Loenen = ca 25% van household demand!
- Yearly some 200.000 euro energy cost are avoided and 500 ton CO2 emissions.
- In the near future at least an additional 1 MWp locally generated sustainable energy is anticipated, so more than 50% of local household demand will be covered!

**These changes incorporate both chances and challenges! Corona-times show one of the challenges: decreased demand leads to negative energy prices**



# CVPP: LOGIC NEXT STEP





## THE C OF CVPP! (COMMUNITY OWNERSHIP & GOVERNANCE)



- Bottom-up proces in stead of top-down
- By and for local inhabitants not by an energy company or DSO
- Individual wishes and opinions count, but endresult is a compromise of many.
- Shared values and interests are leading





## HOW: DESIGN PROCES CVPP (COMMUNITY LOGIC)

- 5 workshops in Q1, 2019
- Explaining the challenges and choices
- 100 participants
- Plus personal questionnaire to avoid peer pressure





# PROCES CVPP-DEVELOPMENT (COMMUNITY ENGAGEMENT)

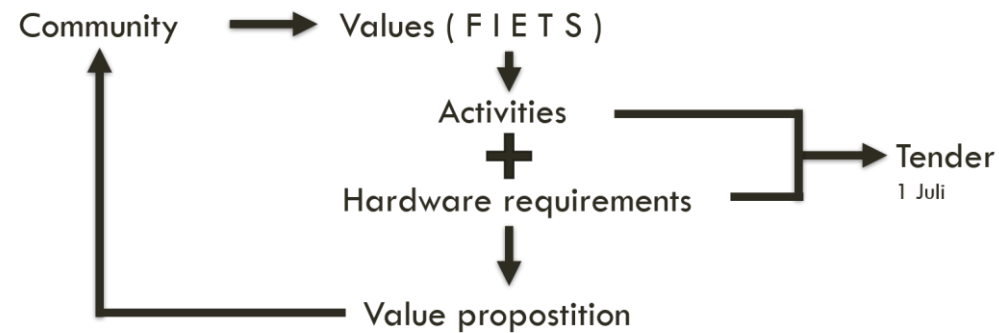


Denk en deel mee in het nieuwe Loenense EU project "de Virtuele Energiecentrale".

We willen een afstemming krijgen in de vraag en aanbod van de lokale duurzame energie in Loenen. Hierbij hebben wij uw energie hard nodig. De interactieve workshop wordt gegeven onder leiding van de Universiteit Wageningen.

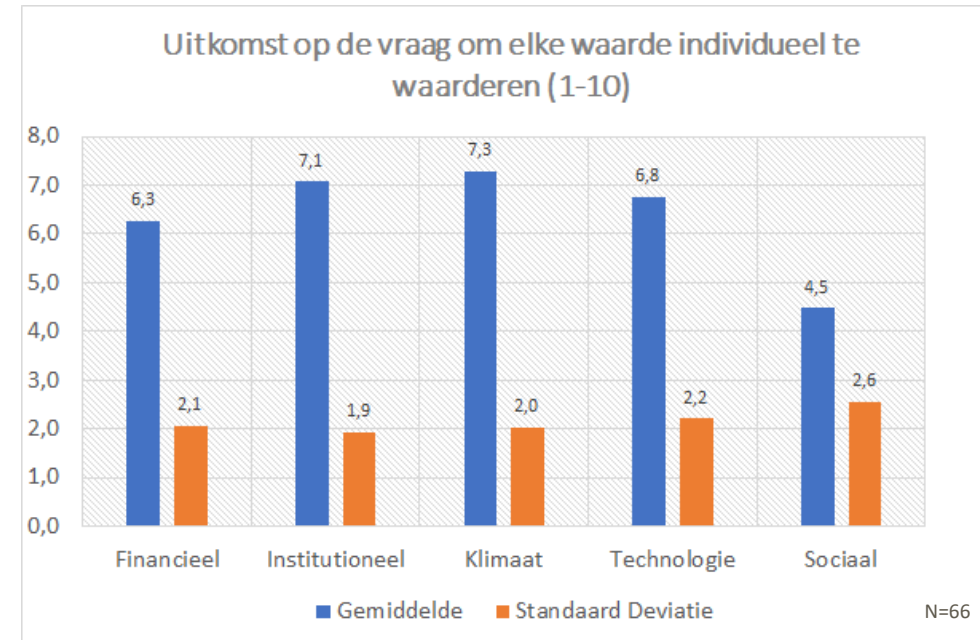
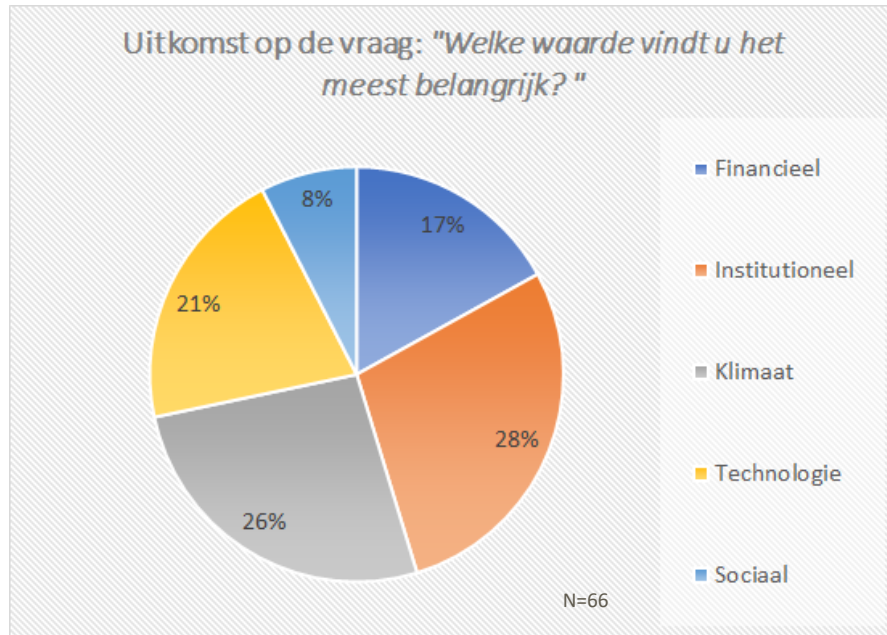
Praat mee over een duurzame energievoorziening in Loenen!

+ an individual questionnaire





# RESULTS QUESTIONNAIRE (COMMUNITY NEEDS/GOALS)

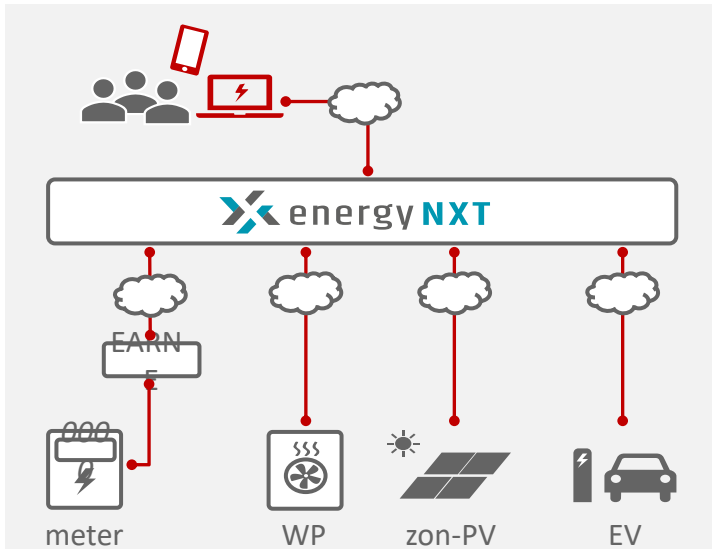




# WHAT: EMS AND GATEWAY

System with 45 participants now, 15 to add after installation of Smart meter, final goal 100 participants at end of project

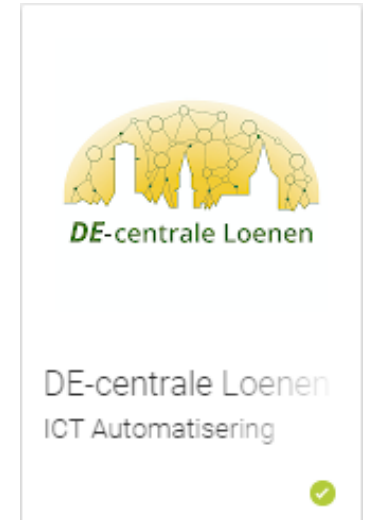
## EMS-Platform



## Gateway



## APP





## CVPP – EMS COMPONENTS

- Algorithms form the “intelligence” and are “programmable”
- Needed:
  - Consumption data
  - Production data
  - Forecast data (weather)
  - Cost data, CO<sub>2</sub> data, marketdata, ...data
  - Steeringspossibilities, load changing, time shifting, curtailment

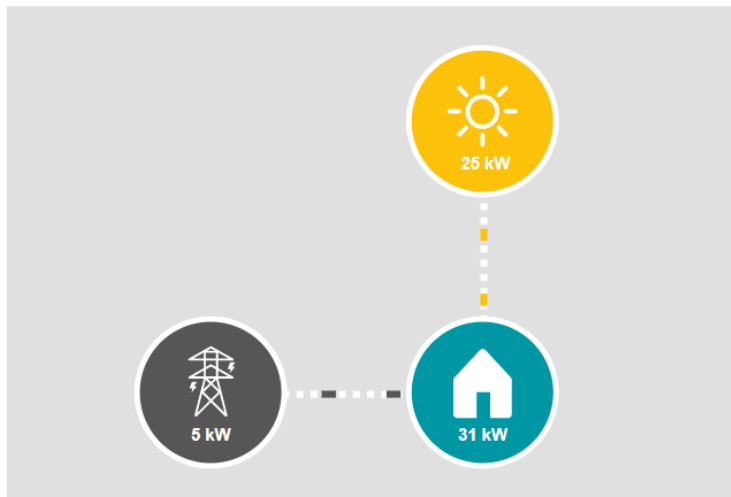


# CVPP-DASHBOARD FOR TOTAL GROUP

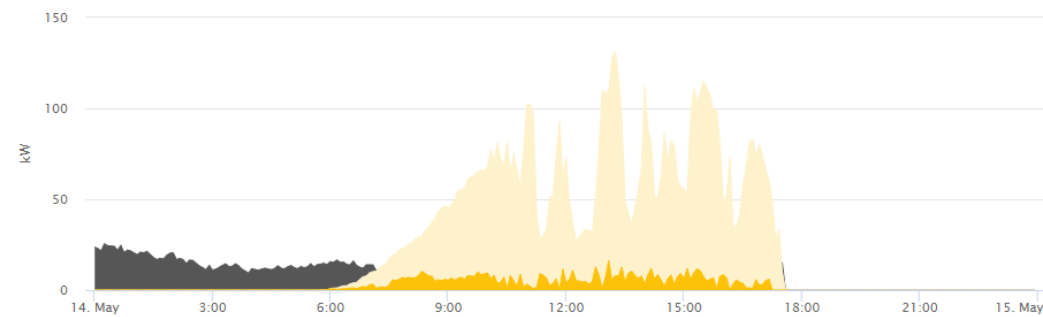
DE-centrale Loenen ▾

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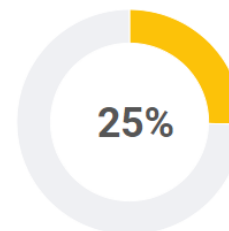
## Overzicht



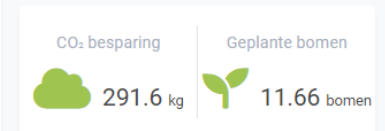
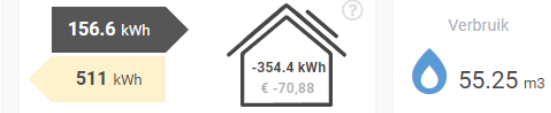
## Vandaag



## Zelfvoorzienend



● Eigen opwek ● Flex bronnen ● Net



DE-centrale Loenen



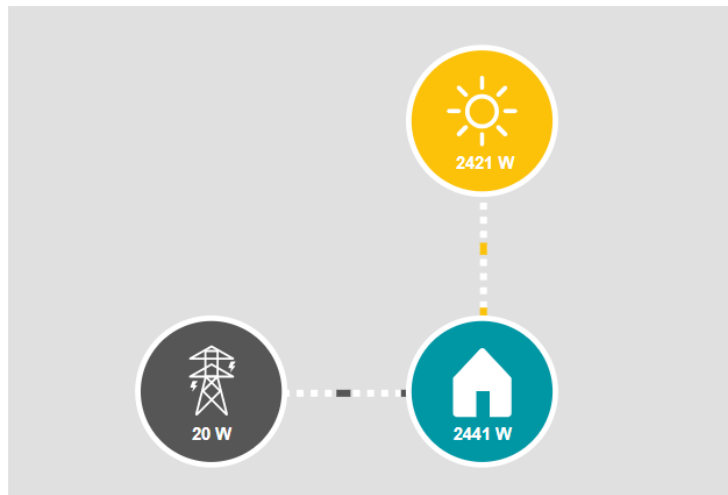
# CVPP-DASHBOARD FOR AN INDIVIDUAL

- Overzicht
- Actueel
- Historie
- Inzicht
- Sturing
- Administratie

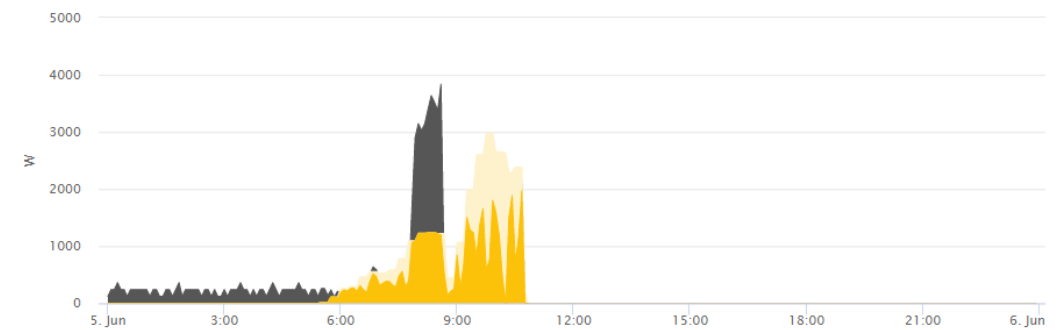
cVPPL0027

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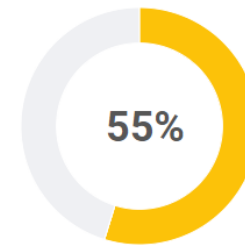
## Overzicht



## Vandaag

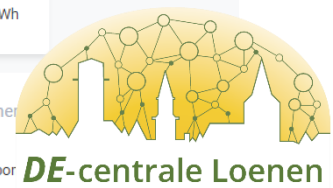


## Zelfvoorzienend



Eigen opwek Flex bronnen Net

3 kWh	0.4 kWh € 0,09	Verbruik 0 m <sup>3</sup>
Opwek 6.2 kWh	Verbruik 6.7 kWh	
CO <sub>2</sub> besparing 2.9 kg	Geplante bomen 0.12 bor	





# CVPP - PROFILES

DE-centrale Loenen ▾

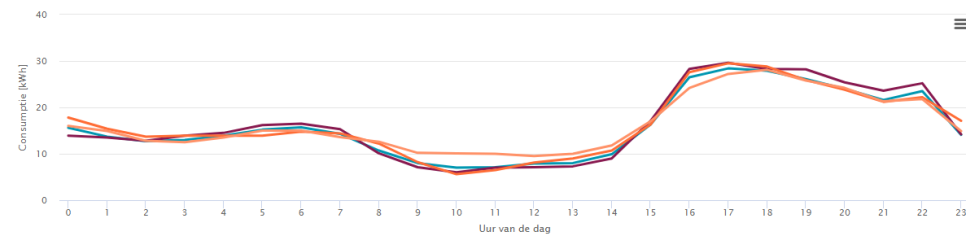
Selecteer een periode

01-01-2020 tot 31-12-2020

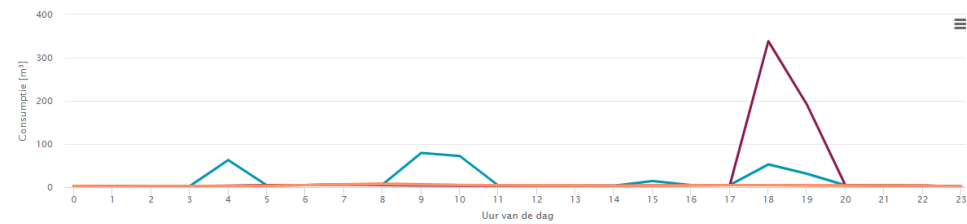
Selectie

- Gemiddelde
- Maandag
- Dinsdag
- Woensdag
- Donderdag
- Vrijdag
- Zaterdag
- Zondag

Elektriciteit



Gas



DE-centrale Loenen









# CVPP - STEERING INDIVIDUAL

cVPPL0027 ▾

### Beschikbare apparaten

- PV 
- SGR Mitsubishi WP 

### Groepen

- DE-centrale Loenen Collectief zelfverbruik 
- Individuele zelfconsumptie Zelfverbruik 

### Schema instellen

	0:00	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	
Maandag																									
Dinsdag																									
Woensdag																									
Donderdag																									
Vrijdag																									
Zaterdag																									
Zondag																									

Sturing toegestaan

**OPSLAAN** **ANNULEREN**



# CVPP – CONTROLLABLE LOADS



- Nibe can be controlled by a cloud-based solution: water booster on. Only hot water storage will be heated.
- Mitsubishi can be controlled by a gateway solution: Recommended on. Hot water storage and room temperature will be heated.



- Charge point operator Newmotion was not willing to cooperate.
- Alfen charge point can be controlled but is not yet available in Loenen (underway?)



- Solaredge and Enphase converters can be monitored
- Solaredge converters can be controlled by a cloud-based solution but for now this seems too expensive
- Omnik and Enphase did not cooperate
- 1 MW PV roof has SofarSolar converters, SofarSolar is willing to cooperate.



## LONG TERM VISION ON LOENEN EMS

Relevance EMS will depend on:

Controllable assets

Activities

- ✓ Selfconsumption
- ✓ Dynamic pricing
- kW max
- Flexibility & balancing market
- Selling overproduction

National transposition of EU legislation (Winter Package)



**THANK YOU FOR YOUR ATTENTION!  
ANY QUESTIONS?**

