



WINTERSOL
Renewable Energy Storage



THE
**GREEN
VILLAGE**



Een kleinschalige energy hub met seizoensopslag

Programma

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- The Green Village
- 24/7 Energy Hub
- Discussie: 'Een waterstof hub: Waar?'



The Green Village

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Van leeg veld naar fieldlab in 10 jaar tijd

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Een unieke plek om te innoveren



1 event centre
8 woningen
13 bewoners

25+ medewerkers



Regelluwe status



Publiek toegankelijk

Jaarlijks >20.000
nationale en
internationale bezoekers



Workshops &
matchmaking



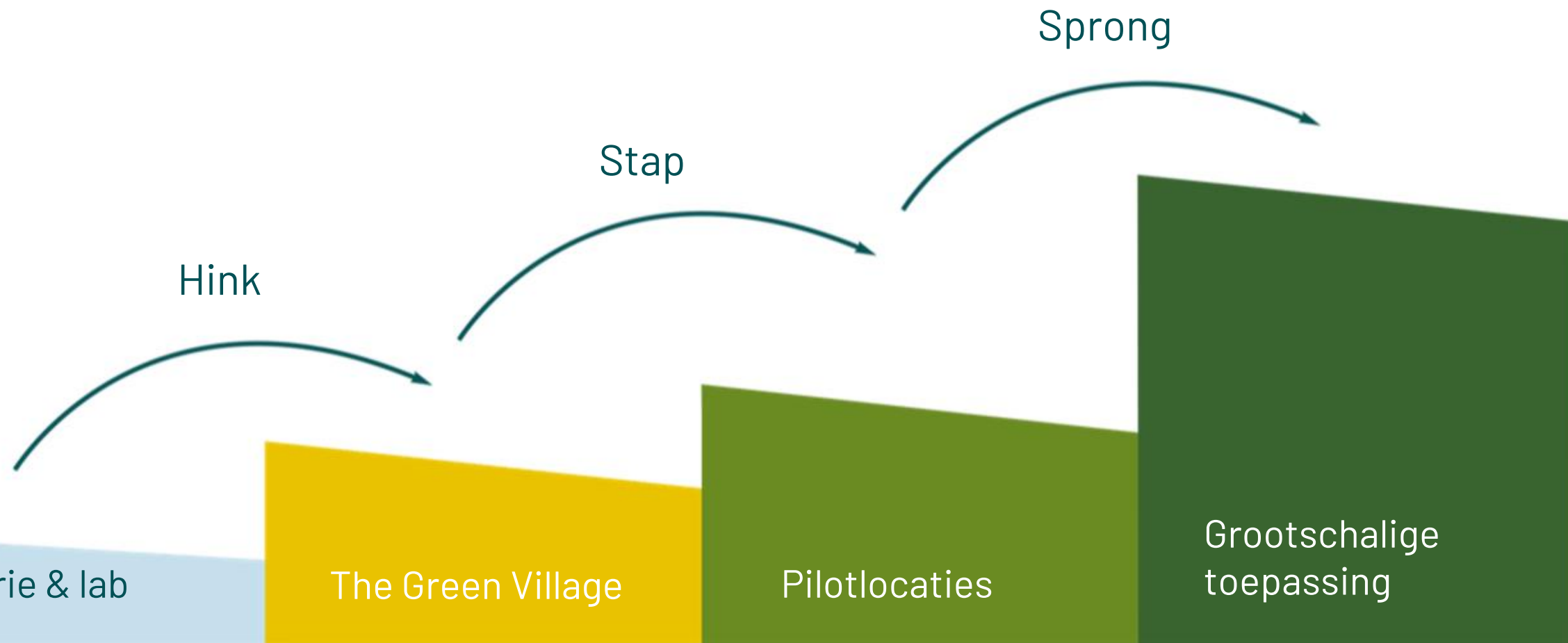
State-of-the-art
infrastructuur &
dataplatform

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De 'hink' naar grootschalige toepassing

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Tijdige betrokkenheid van stakeholders verkort 'time to market' en minder stapjes terug

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Traditioneel

Technologie

Business model

Omarming markt

Regulering



Effectieve markt introductie

Modern

Technologie

Business model

Omarming markt

Regulering



Effectieve markt introductie

The Green Village

Technologie

Business model

Omarming markt

Regulering



Effectieve markt introductie

Tijd



Proeftuin WaterstofStraat en H2@Home



- Het verwarmen van een bestaande woning met een waterstofketel, met behulp van technieken en materialen die ook bij aardgas gebruikelijk zijn
- Live in 2021

Proeftuin 24/7 Energy Hub



- Opslag van overtollige zonne-energie in de zomer, in waterstof voor de winter
- Schaal: 1 klein huishouden (2400 kWh all electric)
- Doelstelling: volledig autonoom
- Live in 2024



Energyhubs

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Joel Bosrup

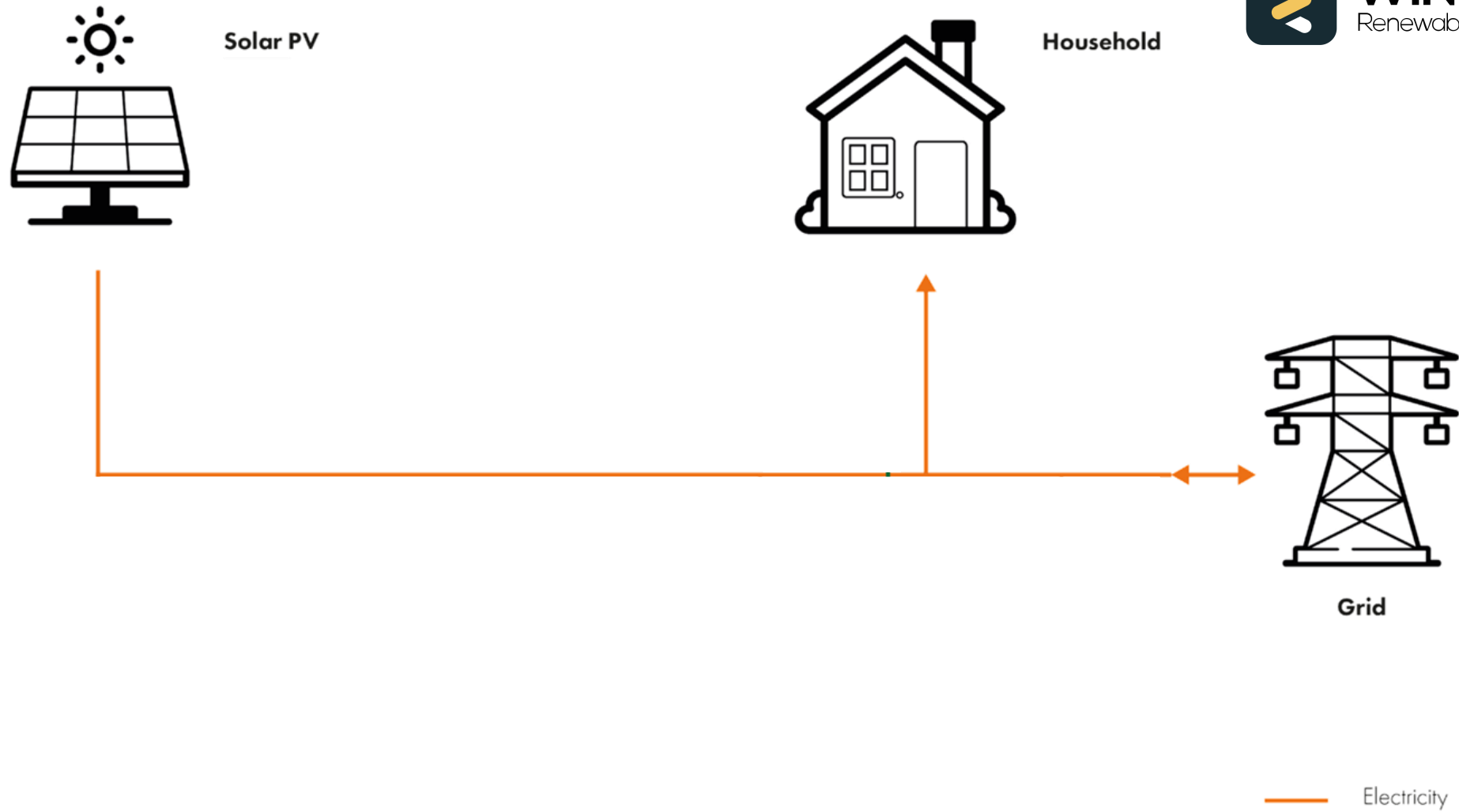
Founder and CEO

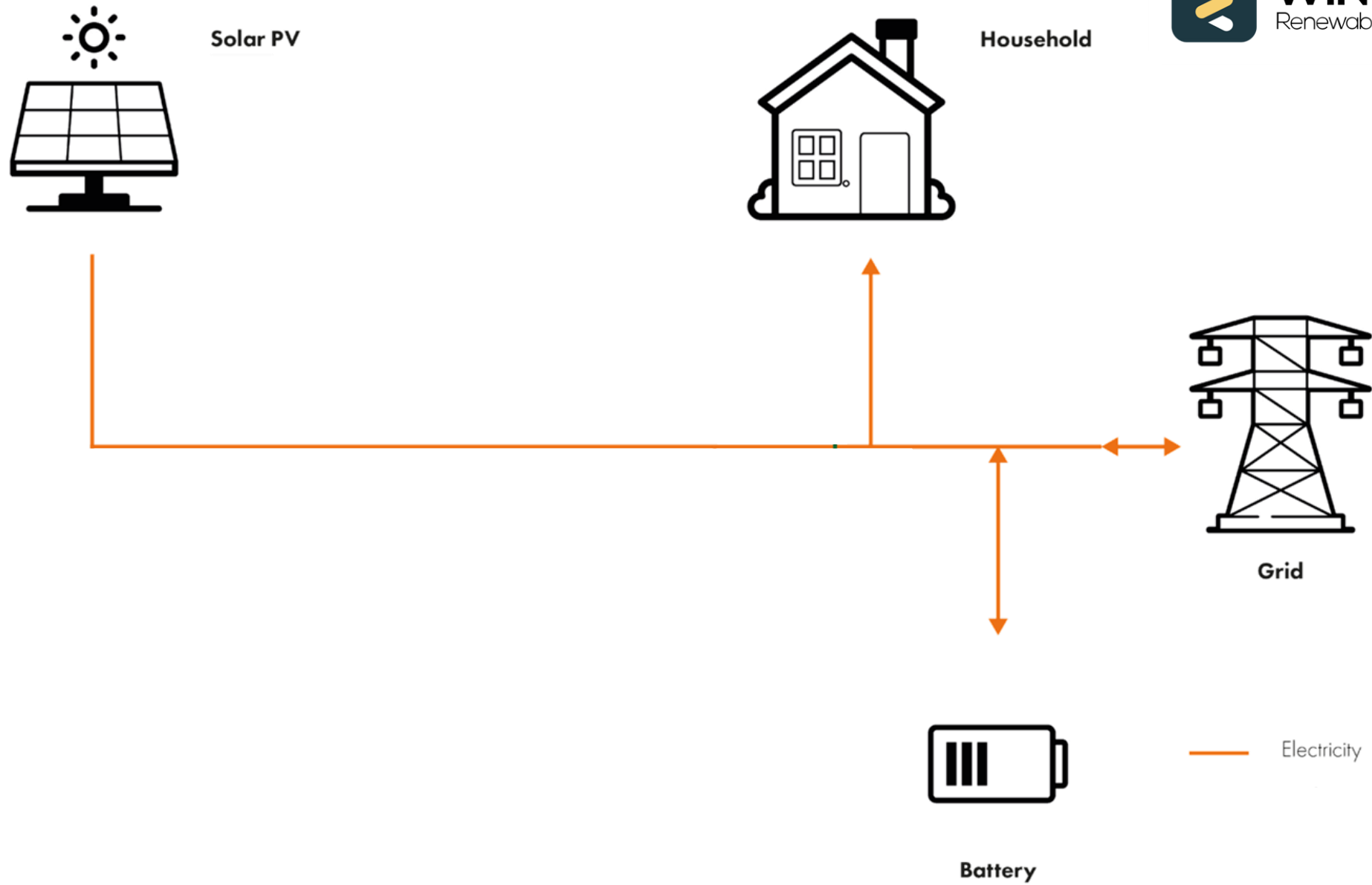
THIS PRESENTATION

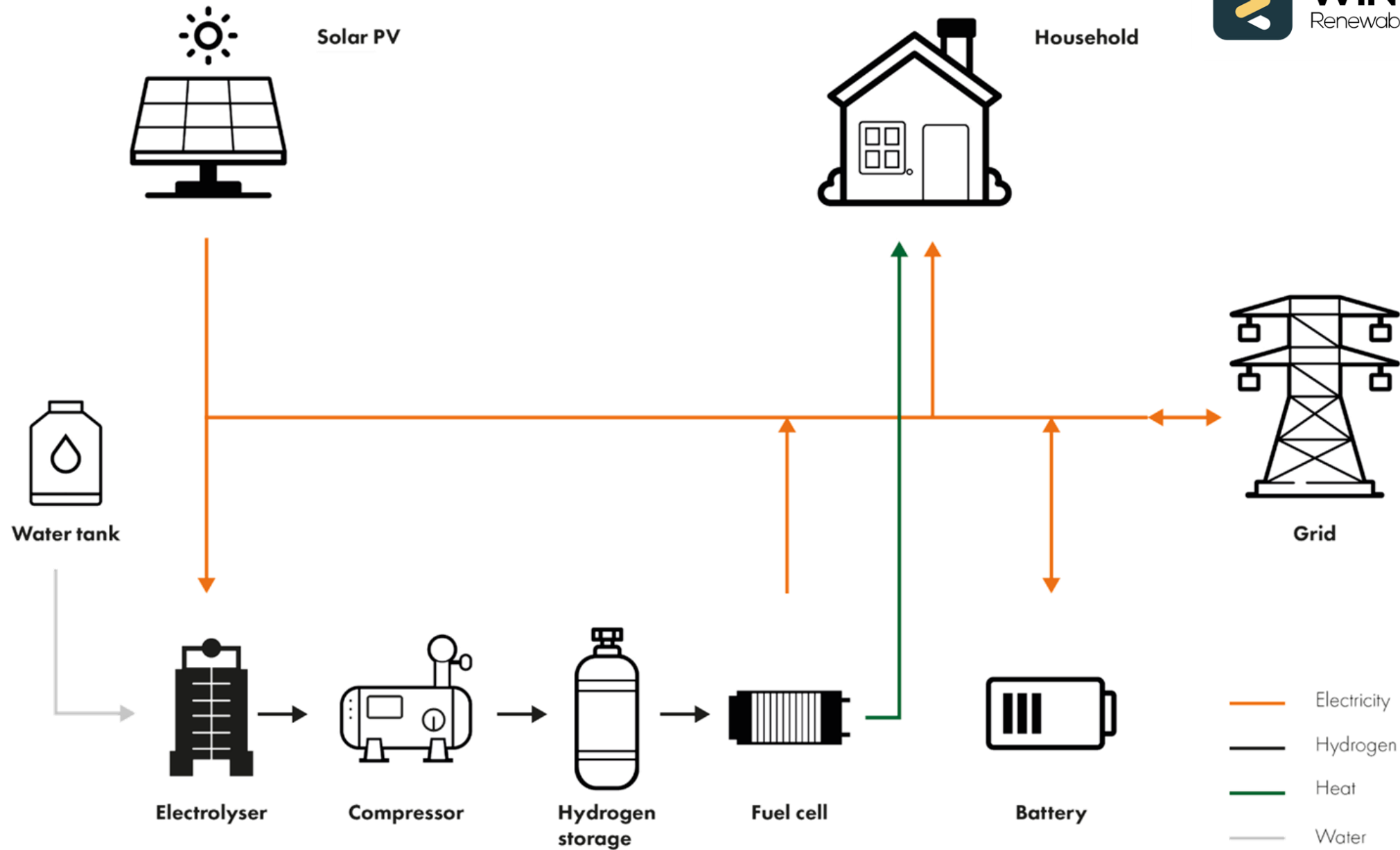
- Background
 - Why we built what we did
- Technical design
- Lessons learned
 - Design
 - Performance
 - HSE
- Who heard about the project? What do you wish to learn?

24/7 ENERGY HUB

- Generation, storage and supply of 100% solar energy
- Battery - Hydrogen hybrid
- Design criteria
 - Fully self-sufficient
 - Solar power only source of energy
 - Domestic user profile
 - One household at The Green Village
 - Grid connection for energy transport
- Small-scale but real-world



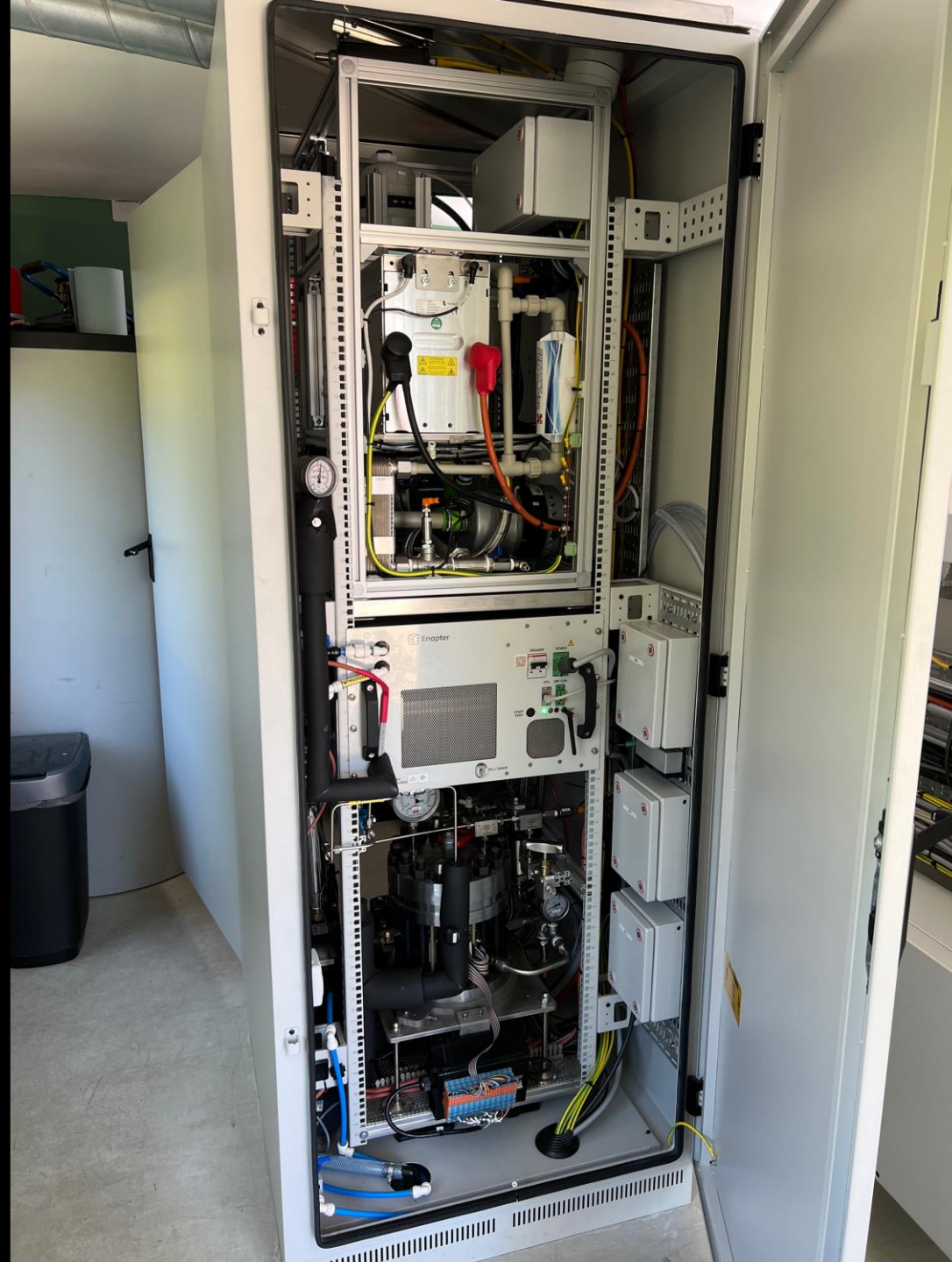


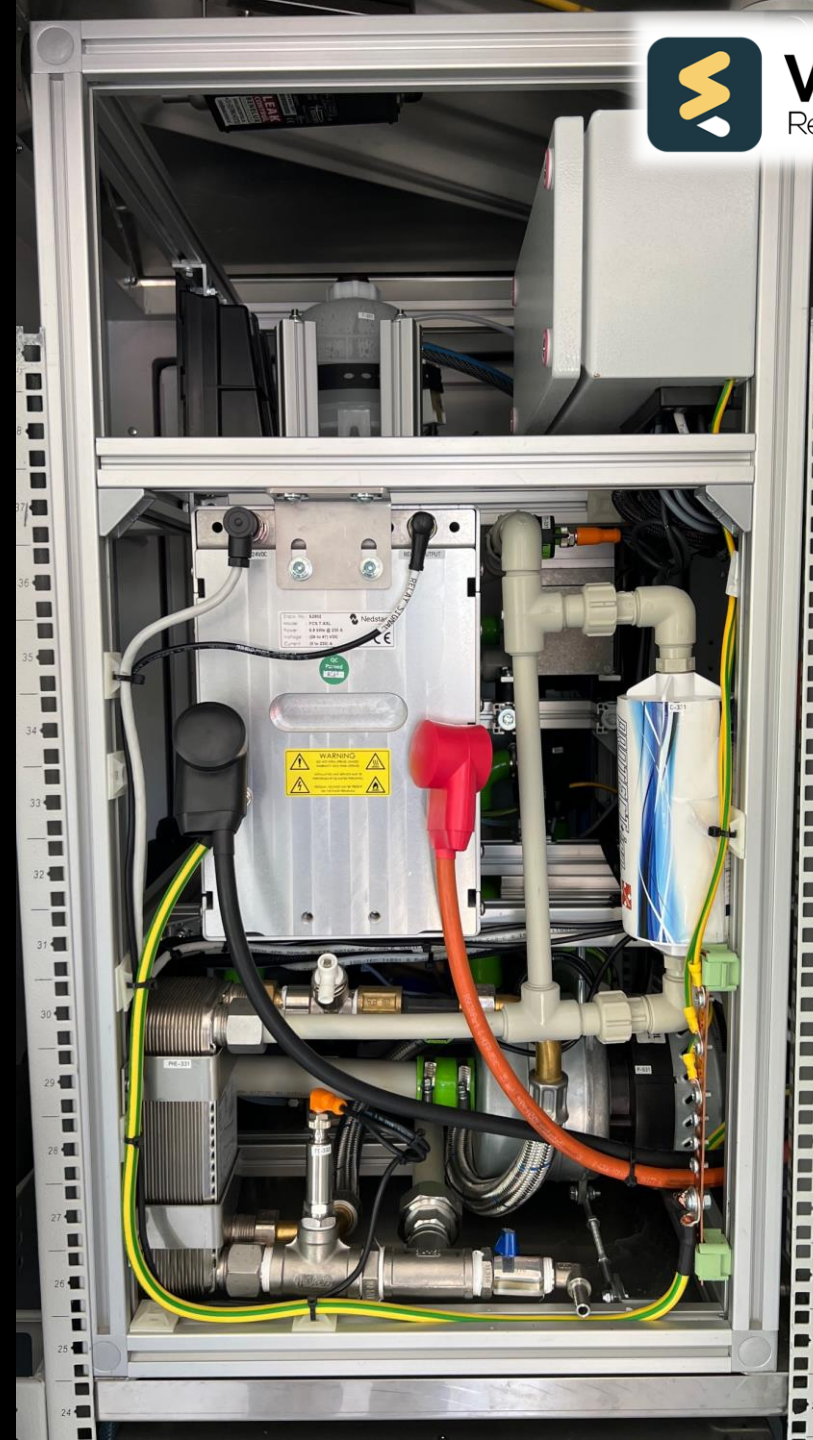






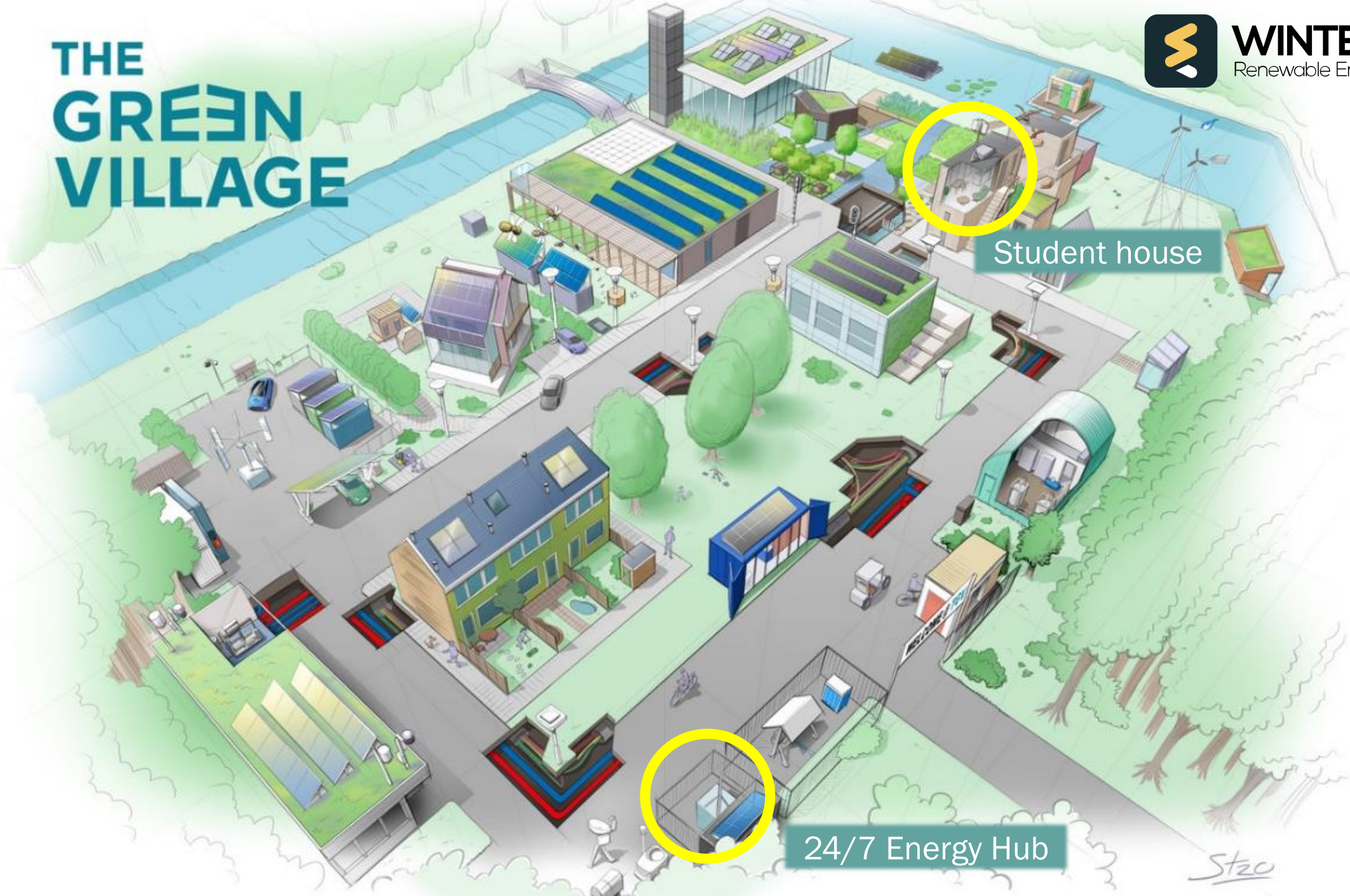






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Student house

24/7 Energy Hub

Stzo

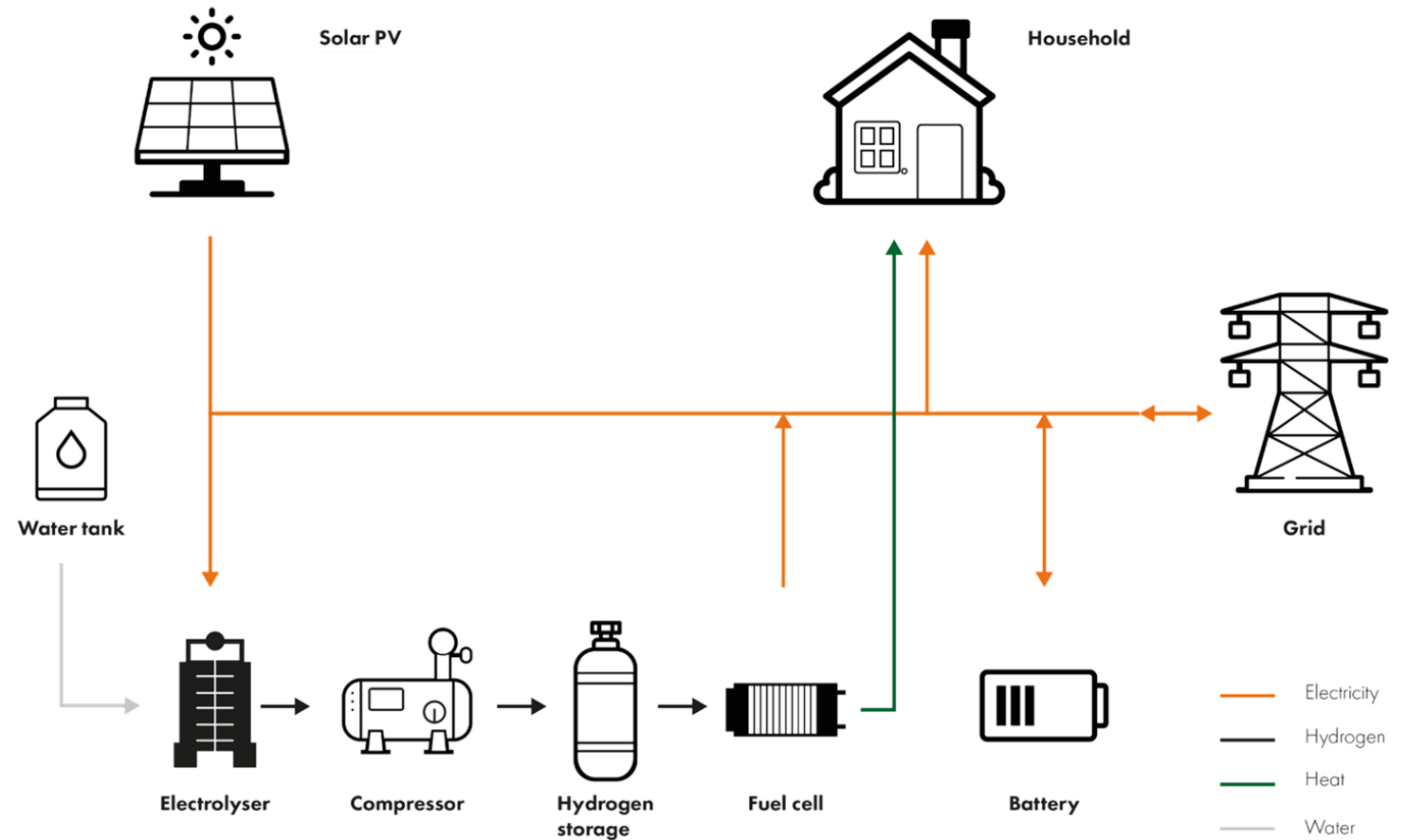
House 2 400 kWh/year

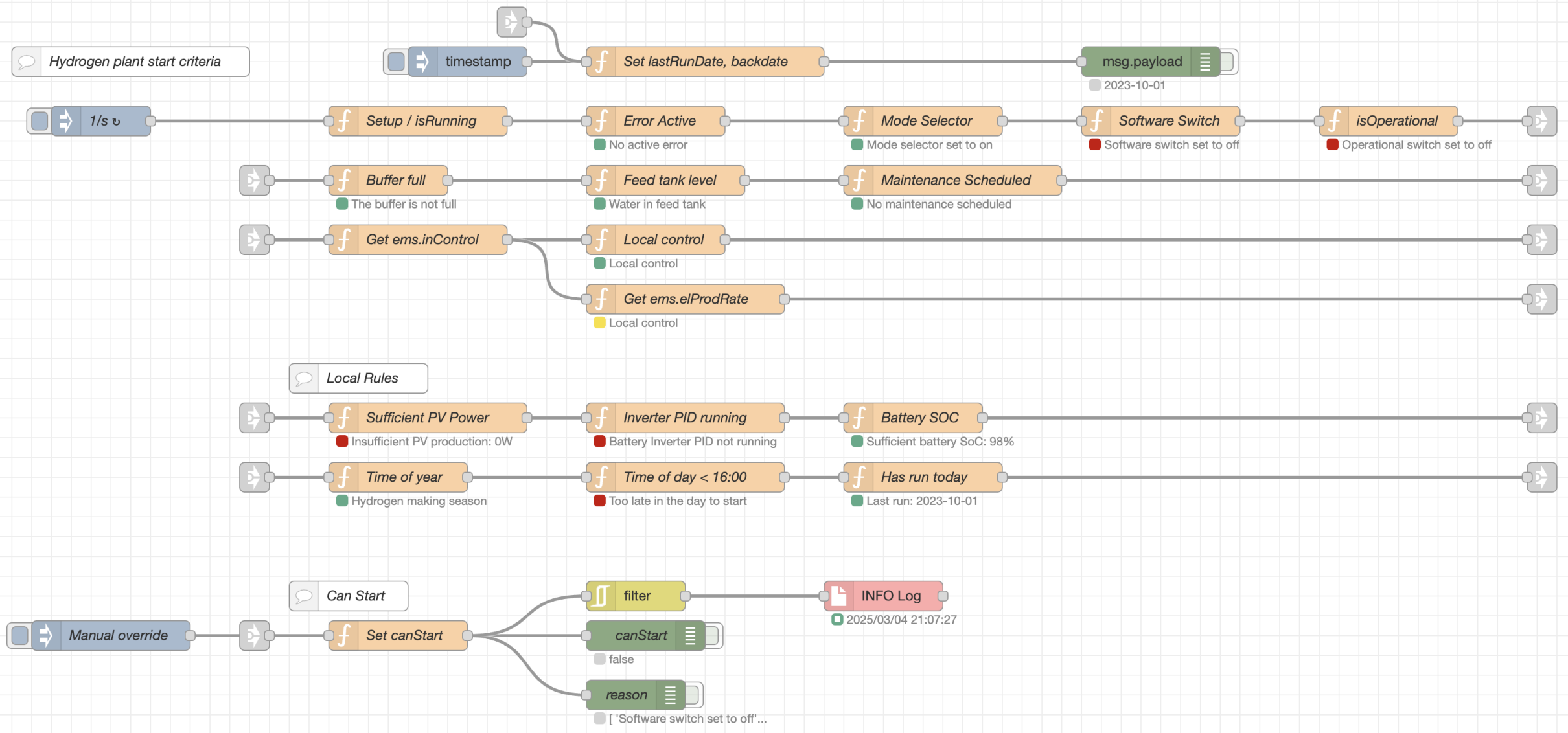
PV 6 kWp

Electrolyser 2.4 kW

Fuel cell 1.8 kW

Battery 15.4 kWh





LESSONS LEARNED - TECHNICAL

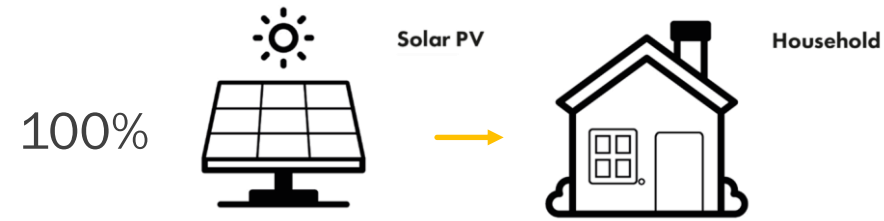
- Hardware design choices interconnected
- Control strategies, when make hydrogen
- Devil is in the detail

LESSONS LEARNED - PERFORMANCE

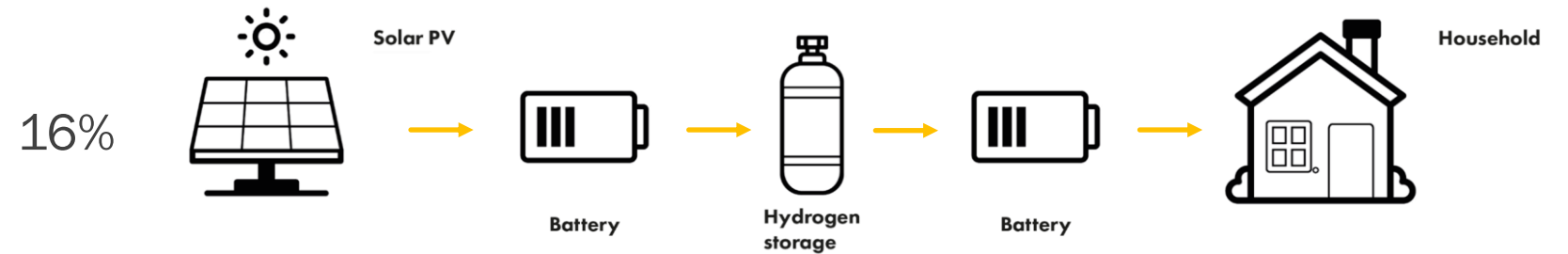
- Efficiency

- Energy routes

- Best:



- Worst:



- Black-box/average:



LESSONS LEARNED – HEALTH AND SAFETY

- HSE process parallel in all stages: definition, design, implementation, operation
- Lack of standards for small-scale
- Standards and best-practices not always in sync

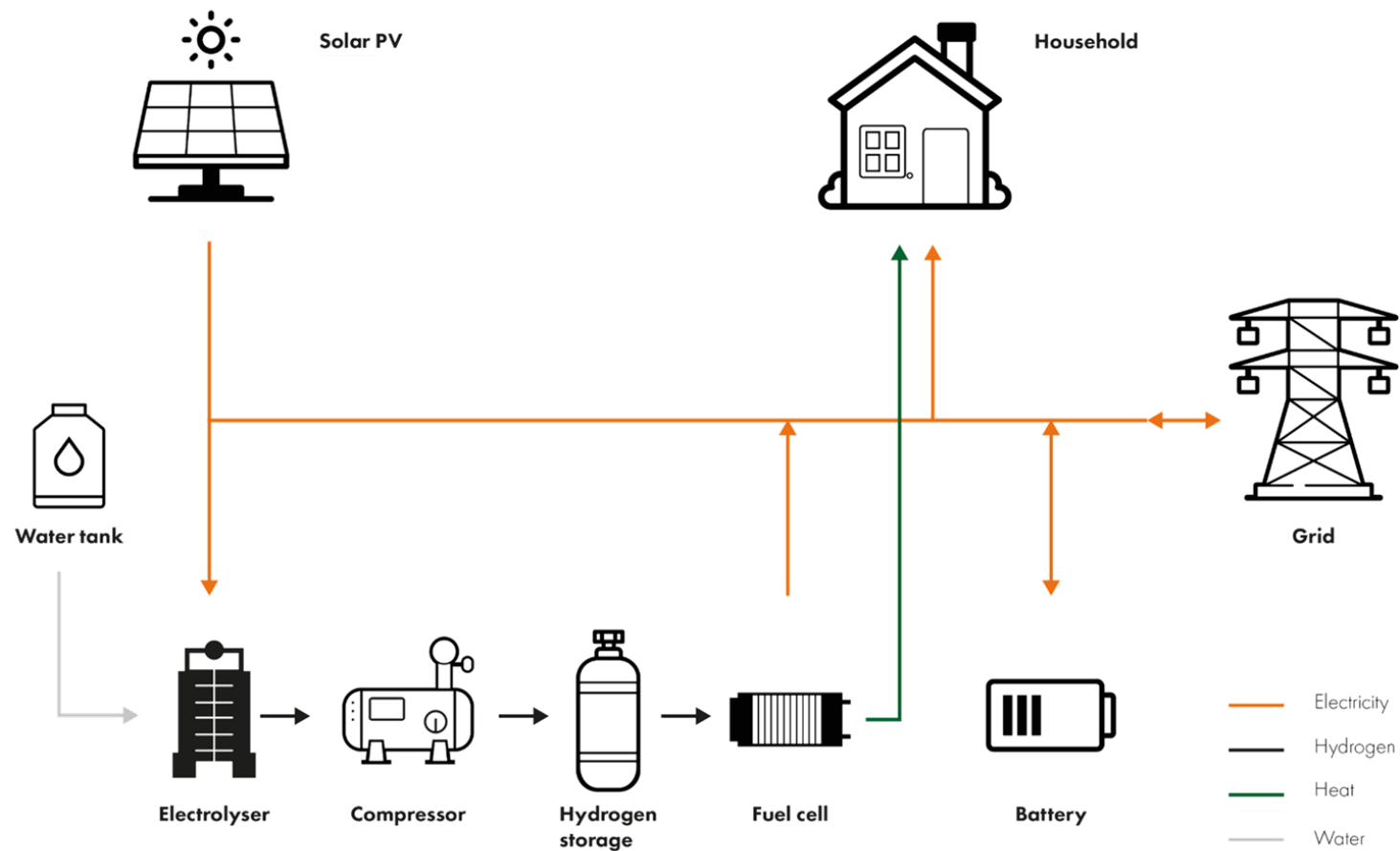
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Questions?

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Workshop

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Let's discuss...

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Where do you think a hydrogen based seasonal storage system fits in the Netherlands?

Keep in mind:

- Required space
- Public acceptance
- Efficiency
- Costs



www.thegreenvillage.org

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voor onze nieuwsbrief!



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