

An aerial photograph of a city district, likely Brussels, showing a mix of modern and traditional architecture. A prominent feature is a tall, dark, cylindrical building with a grid-like facade. To its right is a modern building with a white facade and a staggered, stepped design. The foreground shows a public square with a geodesic dome structure and people walking. A green semi-transparent banner is overlaid across the middle of the image, containing the title text.

# Energy optimisation: smart home meets smart district

Brussels, February 2024



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Member of OR core team since 2011

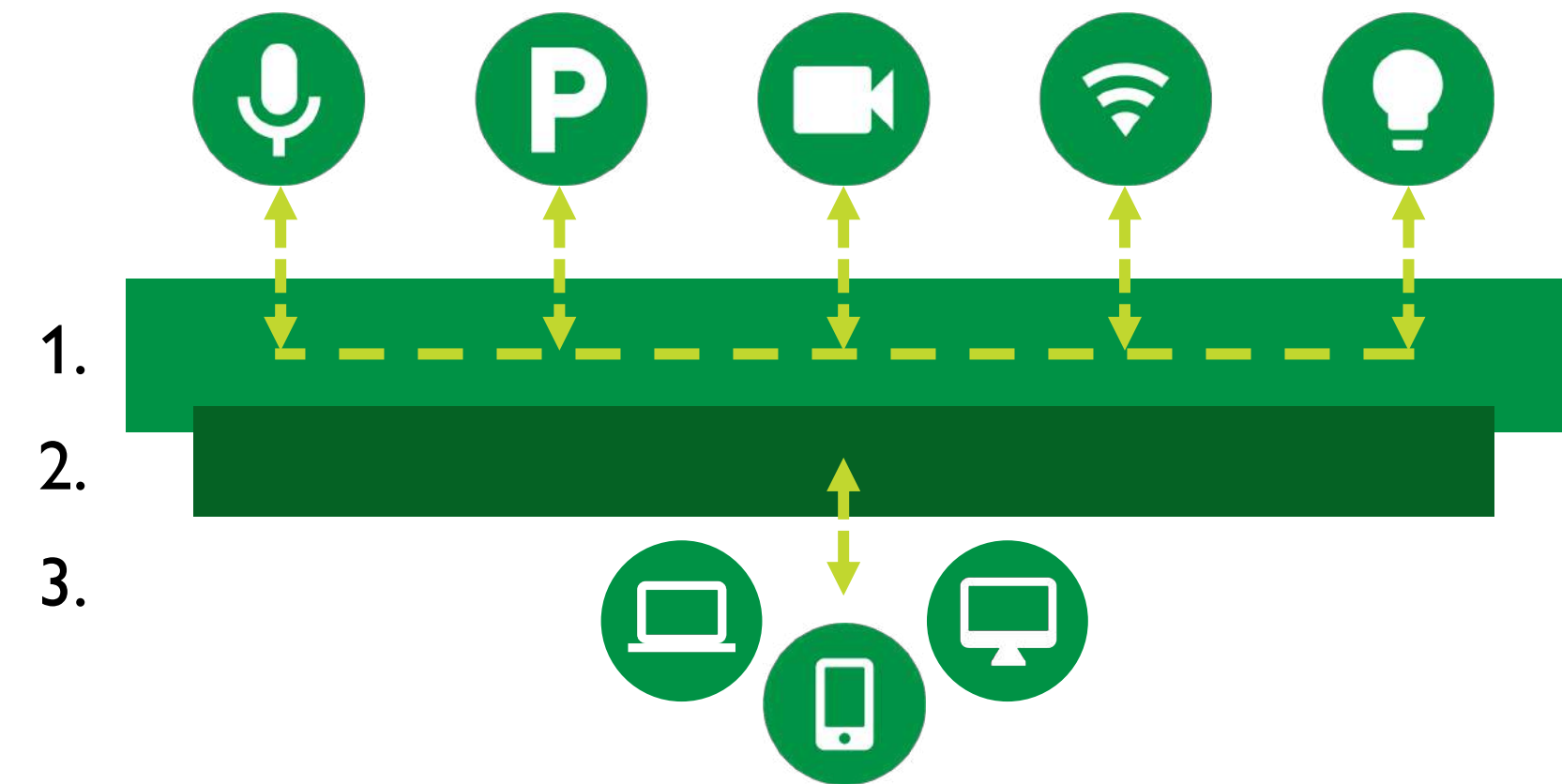
[eric@openremote.io](mailto:eric@openremote.io)





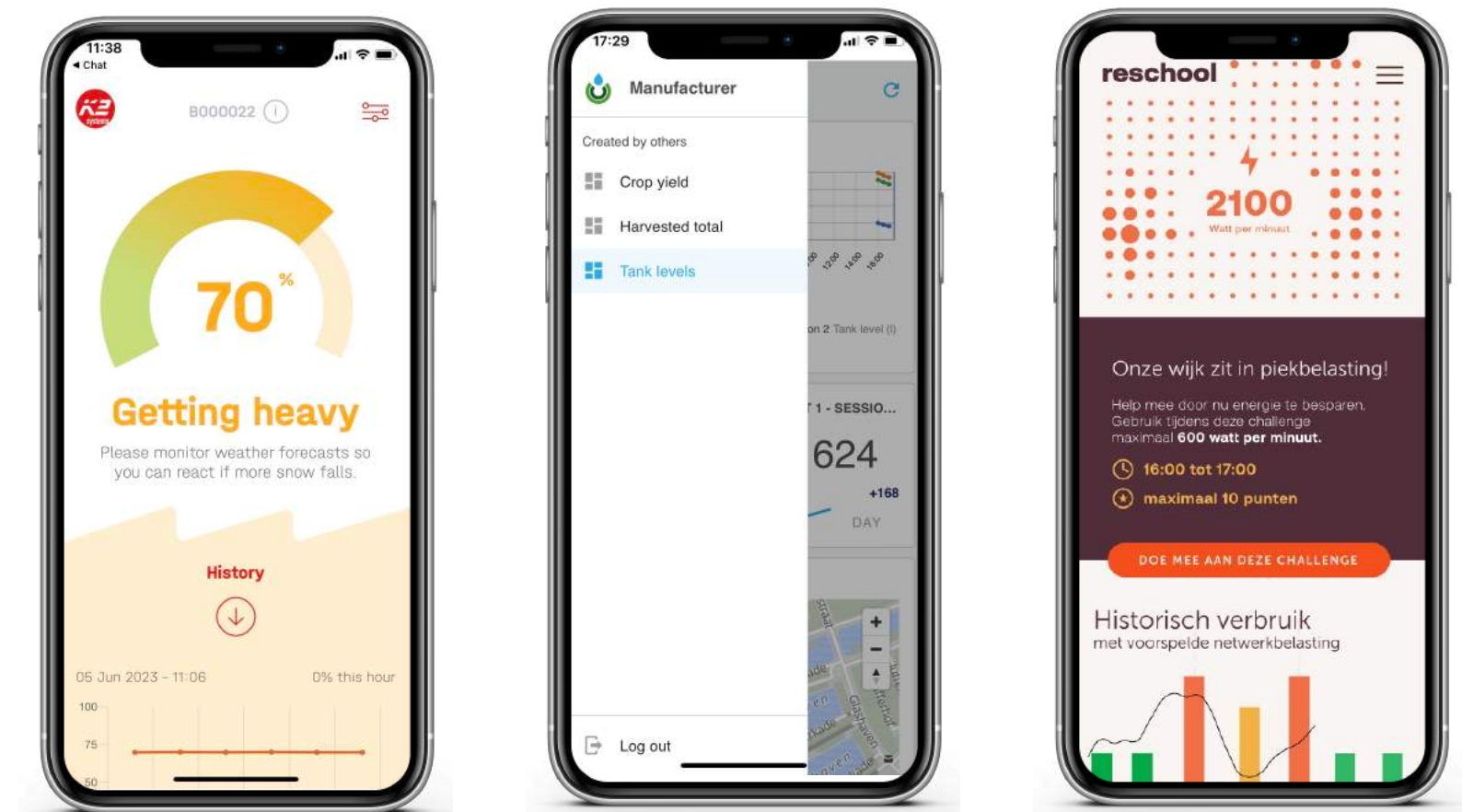
# OpenRemote, the 100% open source IoT platform

- 1. We let systems talk to each other**  
Systems which do not know each other and don't speak the same language
- 2. We add intelligence**  
By reading and writing to devices, we can automate behavior
- 3. We focus on end-users**  
Our goal is to make life easier for your end-users, with everybody having his own application

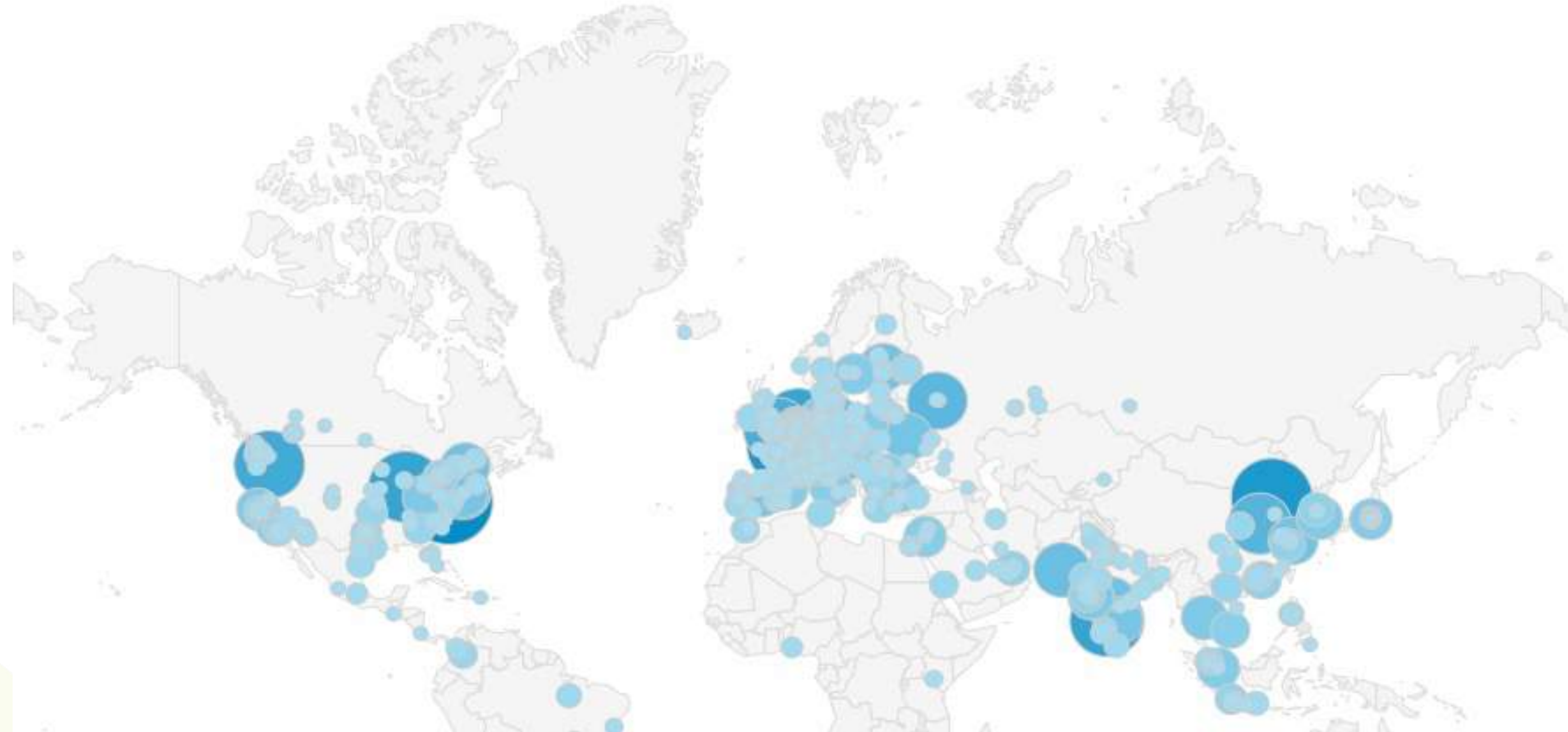


## Our uniqueness

- **We do this 100% open source**  
No vendor lock-in, safe and transparent
- **Intuitive and complete platform**  
Non-technical users can create automation, manage devices, and gain insights
- **Full service, proven with credible customers**  
Development, design, and project management. Together with the customer.



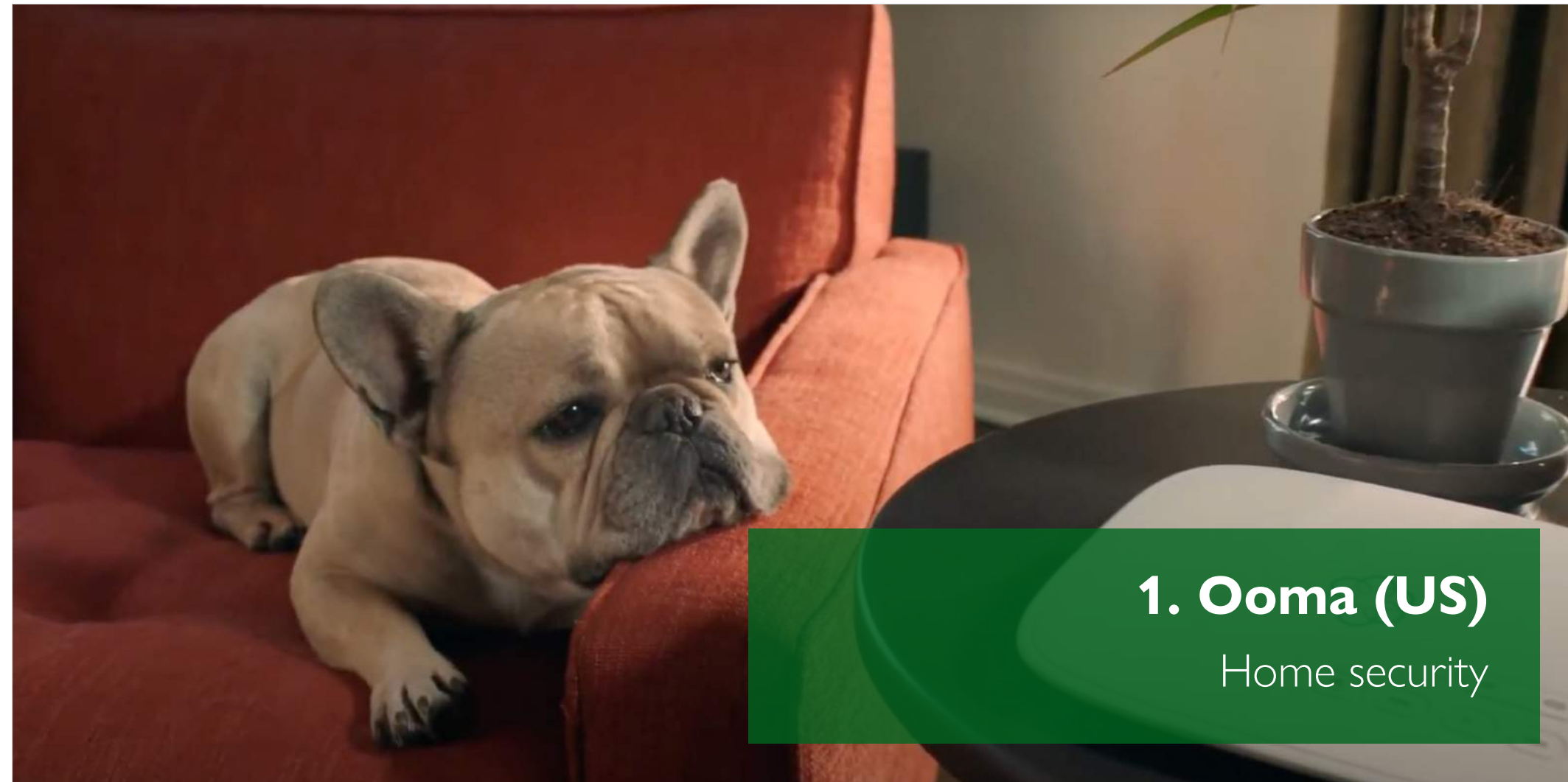
# OpenRemote open source community



Global Community in US, Europe and South East Asia  
Google Stats 30.000 Page views in September 2023



# Applications by Manufacturers



**1. Ooma (US)**  
Home security



**2. K2 Systems (DE)**  
Solar system guard



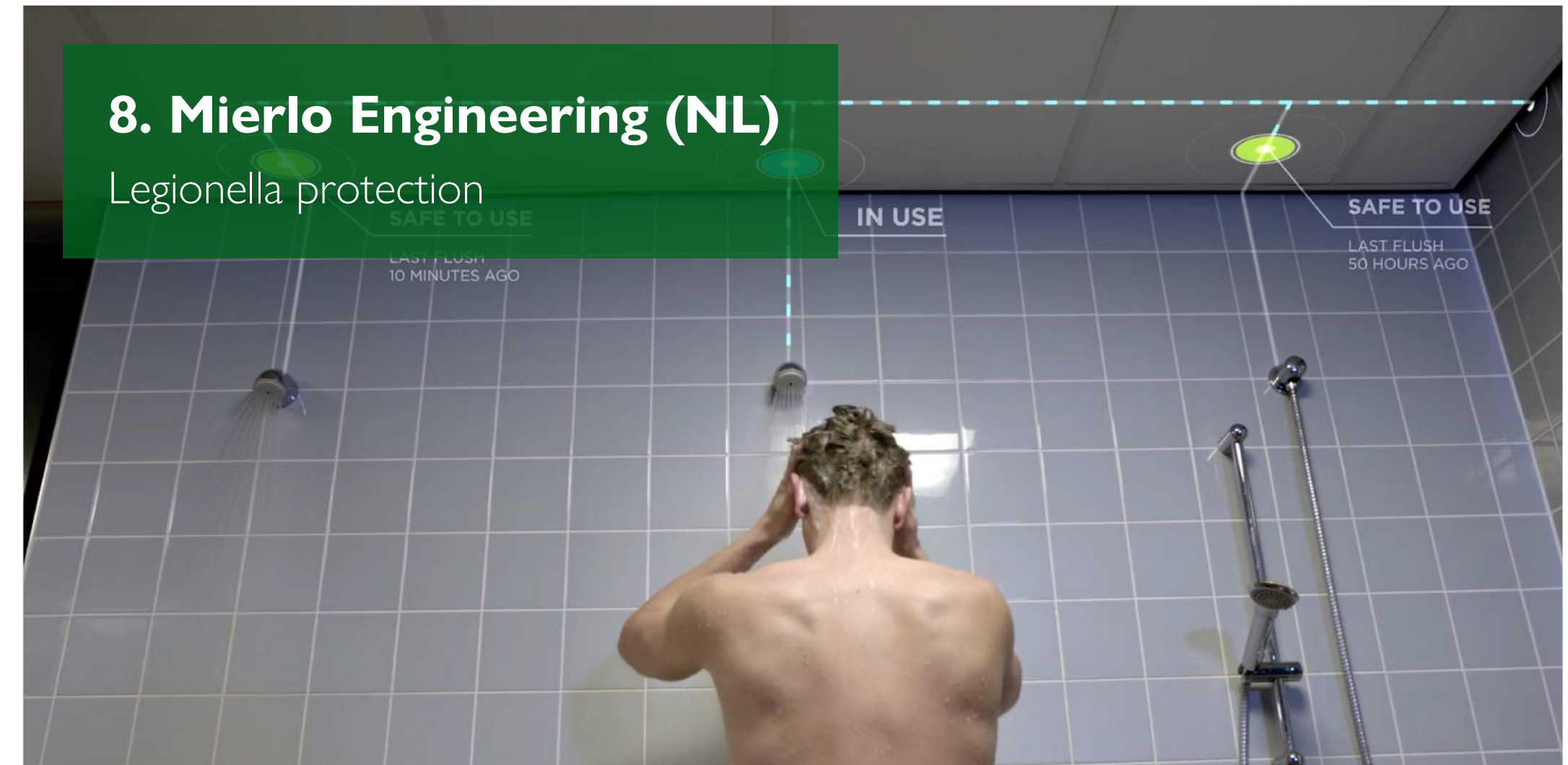
**3. Smart PSA (DE)**  
Smart clothing for firefighters



**4. VDL Energy Systems (NL)**  
Energy storage and balancing



# Applications by Manufacturers



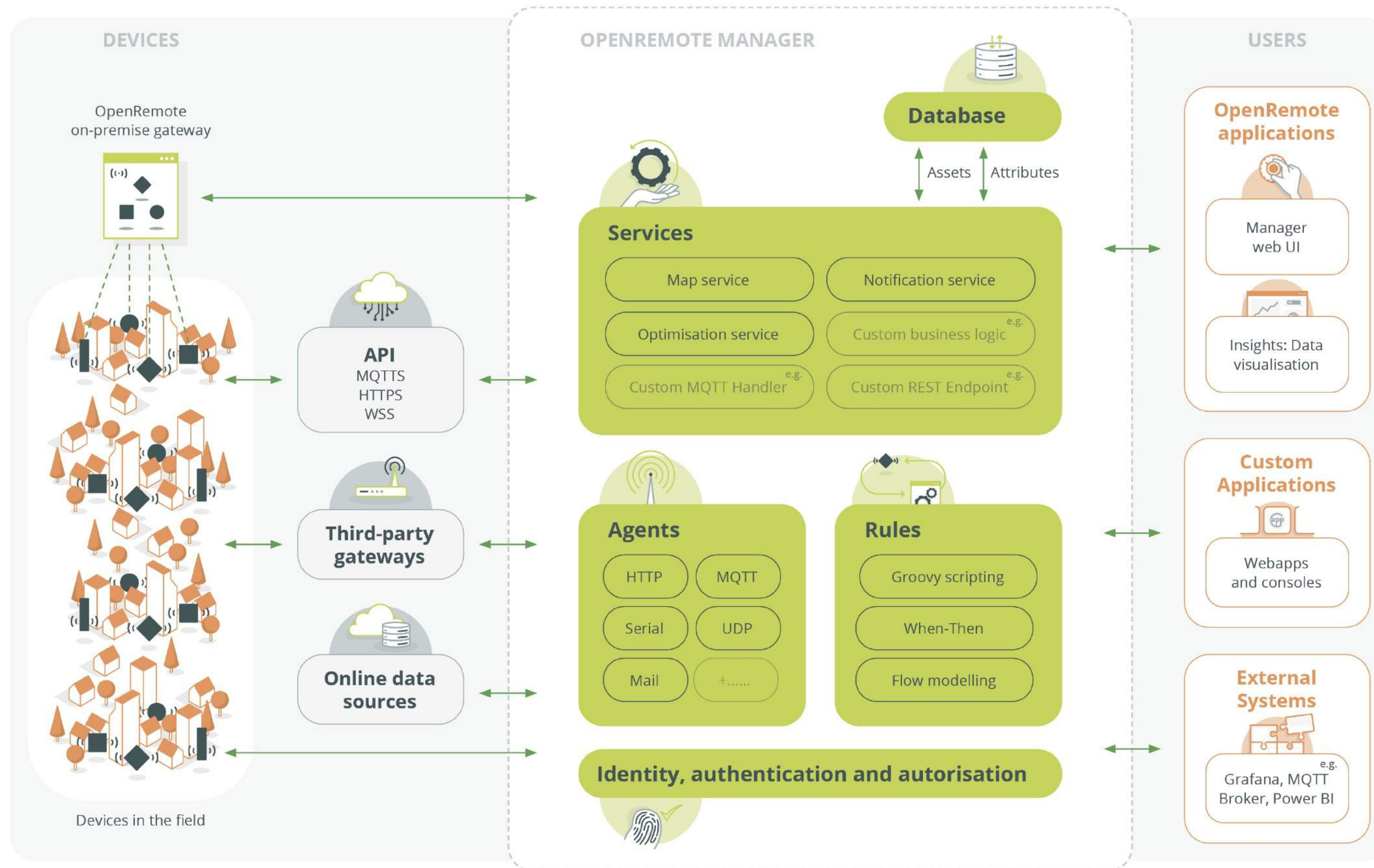


# Applications by System Integrators





# OpenRemote Architecture



## Languages

Java  
Typescript  
Polymer Lit

## Logic

EasyRules  
Groovy  
Flow  
ML Tools  
Timescale DB

## Devops

GitHub  
Docker  
AWS



A photograph of a modern, multi-story residential district built along a canal. The buildings are tall and narrow, with a mix of brick, wood, and glass facades. Many windows are open, and some balconies have plants. A bridge crosses the canal in the middle ground, and several boats are docked along the water's edge. The scene is captured during the day with soft lighting.

Energy optimisation: smart home meets smart district



# Background: Sustainability and network congestion

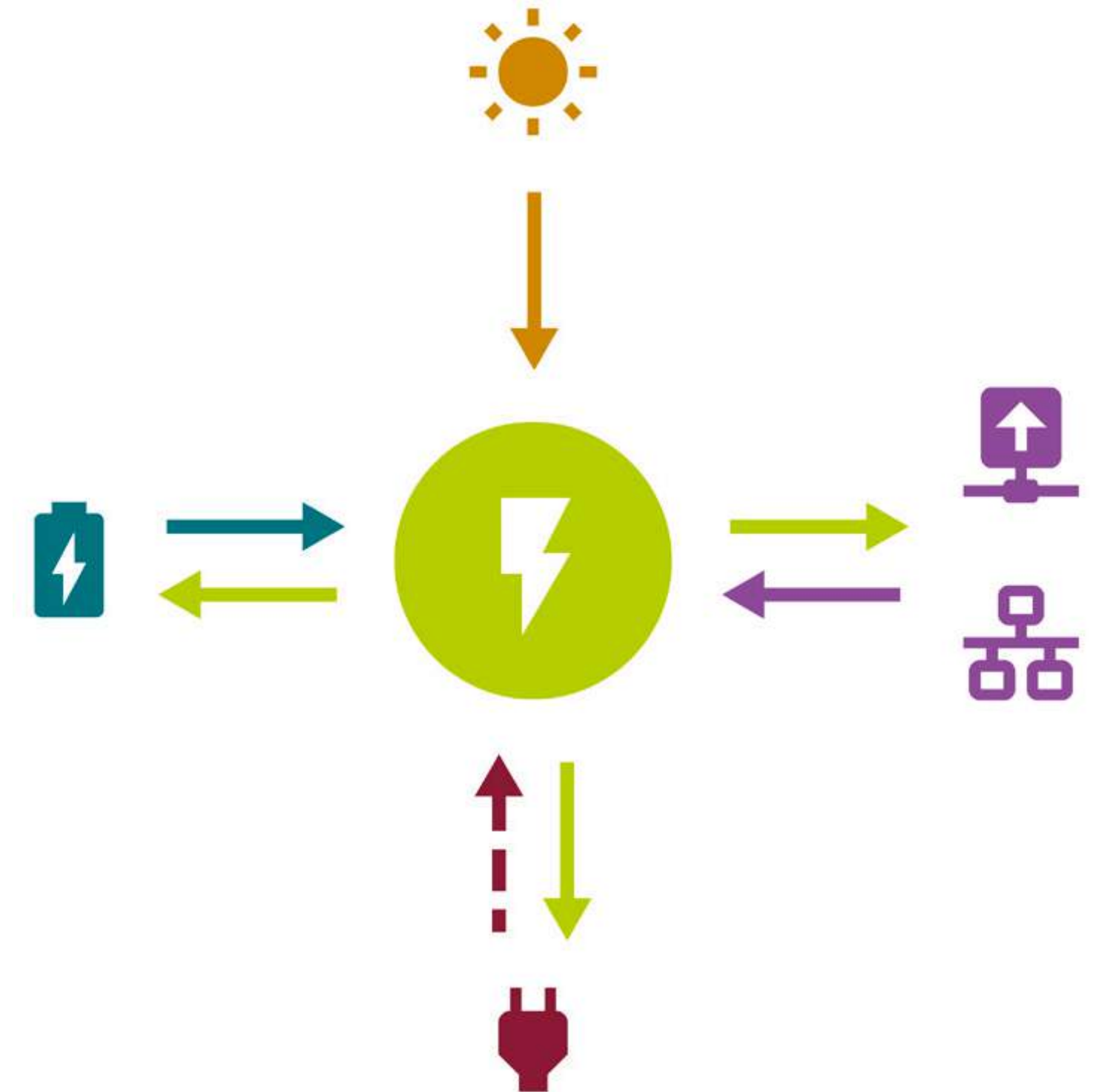
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## Smart Home: self-consumption behind the meter

- Forecast
  - production based on weather
  - consumption based on historical data (WEA)
  - agile energy tariffs for import and feed-in
- Optimise
  - flexible loads, targeting minimum costs or carbon exhaust
  - include levelized costs of storage of flexible loads

## Smart District: self-consumption behind transformer

- Forecast
  - production for the district, extrapolating real-time household data
  - consumption for the district based on historical data (WEA)
  - net power district and risk of congestion
- Optimise
  - flexible loads, targeting minimum costs or carbon exhaust
  - adding ad hoc dynamic network tariff for all households
  - send personalised challenges to households to change behaviour
  - adjust power profiles for shared flexible loads

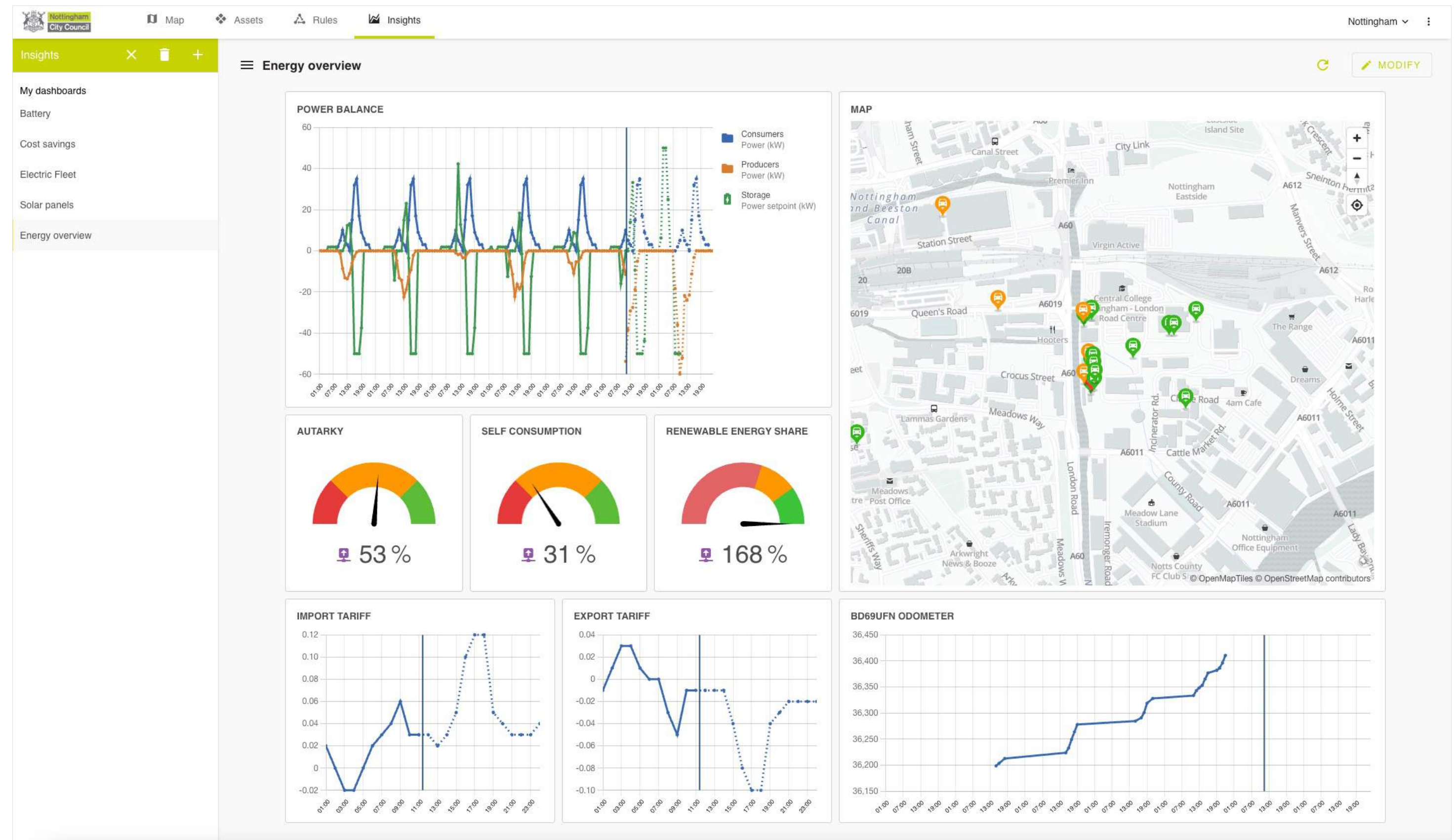




# Smart Home: Nottingham City Council

## Nottingham EMS

1. As energy manager control battery and vehicle charging (V2G), saving €.
2. As fleet manager set energy schedules for the vehicle categories.
3. The EMS prevents surpassing site limit.





# Smart District: Amsterdam

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## Community Mobile App

1. You manage individual energy consumption with real-time insights, saving €.
2. As a neighbourhood you manage peak consumption to respect the grid, earning €.
3. The EMS prevents surpassing peaks by automatic control of large consumers.





# Smart District: Amsterdam



My power consumption right now

The neighbourhood is doing well

My power consumption today

How the neighbourhood is doing today





# Smart District: Amsterdam

The neighbourhood is reaching its limit





# Smart District: Amsterdam



Receive a challenge

Participate in the challenge





# Smart District: Amsterdam



You joined and reached the target

Earning points during this hour

Tips to reduce power consumption





# Smart District: Amsterdam



Postpone your cooking or doing your laundry

Charge your car later or less

Reduce the temperature in your room for an hour





# Smart District: Amsterdam



Challenge completed!  
You earned 4 points





# Smart District: Amsterdam



An overview of your trophies

Points earned with challenges

Points earned by avoiding neighbourhood peaks





# Smart District: Amsterdam

The screenshot displays a web-based interface for managing smart district assets in Amsterdam. The interface is organized into several sections:

- Header:** Includes the logo for 'Gemeente Amsterdam' and navigation tabs for 'Kaart', 'Assets', 'Regels', and 'Inzicht'. The current location is set to 'Amsterdam'.
- Assets List (Left Panel):** A sidebar with a search filter and a list of assets under the category 'Household meters'. The selected asset ID is 'fa0739d2-8b5c-4386-84f4-c4a45ffd'.
- Asset Details (Main Panel):**
  - INFO:** A section for notes, currently empty, with a 'Bijgewerkt: 18 jul. 2023 19:22' timestamp.
  - ATTRIBUTEN:** A list of attributes for the selected asset:
    - Earn-E device ID:** fa0739d2-8b5c-4386-84f4-c4a45ffd (Updated: 18 jul. 2023 19:22)
    - Earn-E device software version:** 118 (Updated: 18 jul. 2023 19:22)
    - Smart-meter model:** ISK5\2M550E-1013 (Updated: 18 jul. 2023 19:22)
    - Timestamp:** 2024-01-17T17:20:38Z (Updated: 17 jan. 2024 18:20)
    - Gas flow rate (m³/min):** (Updated: 18 jul. 2023 19:22)
    - Power (W):** 2450 (Updated: 17 jan. 2024 18:20)
    - Power calculated (total energy / dt) (W):** (Updated: 17 jan. 2024 18:20)
- LOCATIE:** A map showing the asset's location in Amsterdam, near the 'Papaverkanaal' and 'Klaprozenweg'. The coordinates are 4.9, 52.4. The map was updated on 18 jul. 2023 19:22.
- GESCHIEDENIS:** A section for historical data. The current view is for 'Power (W)' over a 'Dag' (Day) period, ending on 17/01/2024 at 18:20. The graph shows power usage fluctuating between 0 and 8,000 W over a 24-hour period.
- GEPKOPPELDE GEBRUIKERS:** A section for associated users, currently empty.



# Smart District: Amsterdam







[openremote.io](https://openremote.io)



[github.com/openremote/openremote](https://github.com/openremote/openremote)



[forum.openremote.io](https://forum.openremote.io)



[youtube.com/c/openremotepro](https://youtube.com/c/openremotepro)



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