

Alkmaar

Investing in Energy Efficiency:
POCITYF Renovation Journeys in Alkmaar

RENOINVEST Round Table

Martijn de Vries
24 October 2024



The POCITYF project

- EU Smart City Project
- a **PO**sitive Energy **CITY** transformation Framework'
- Making historic cities more sustainable
- Focus on making buildings and neighbourhoods energy positive

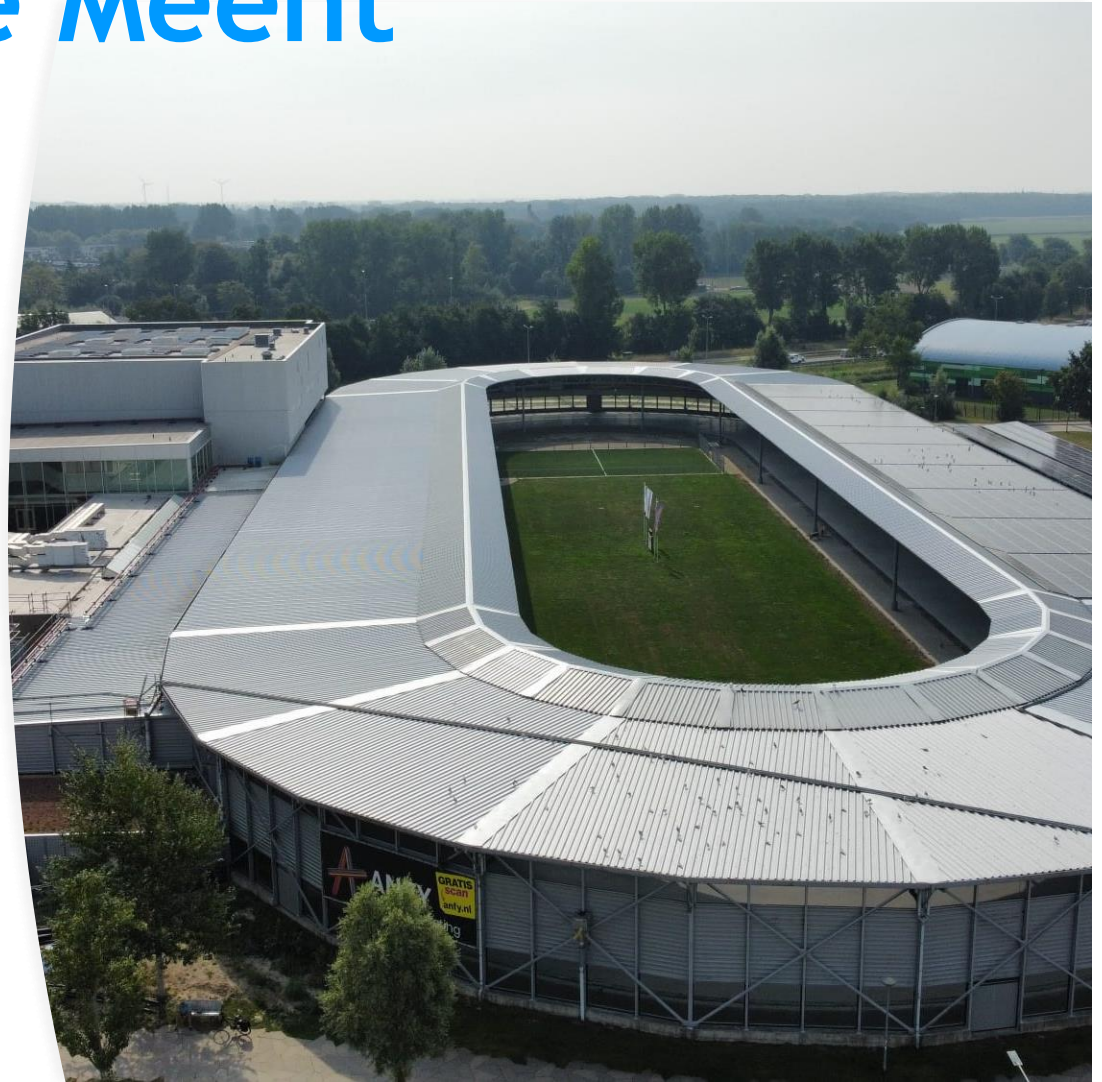


Sports Complex De Meent



Characteristics De Meent

- Multifunctional Sports Complex
- Old building: base 400m outdoor ice rink plus indoor ice hall
- New building 2016 -> extension building for more indoor sports
- Most CO2 emitting building owned by the municipality > Commitment to make the building more sustainable
- Gas-fired
- Building owner = not the operator (Alkmaar Sport)
 - Potential not fully utilised
 - No cooling
 - Input to make it more sustainable



Making De Meent sustainable



Overall goal

- Improve energy efficiency (thermal and electrical)
- Make De Meent energy positive

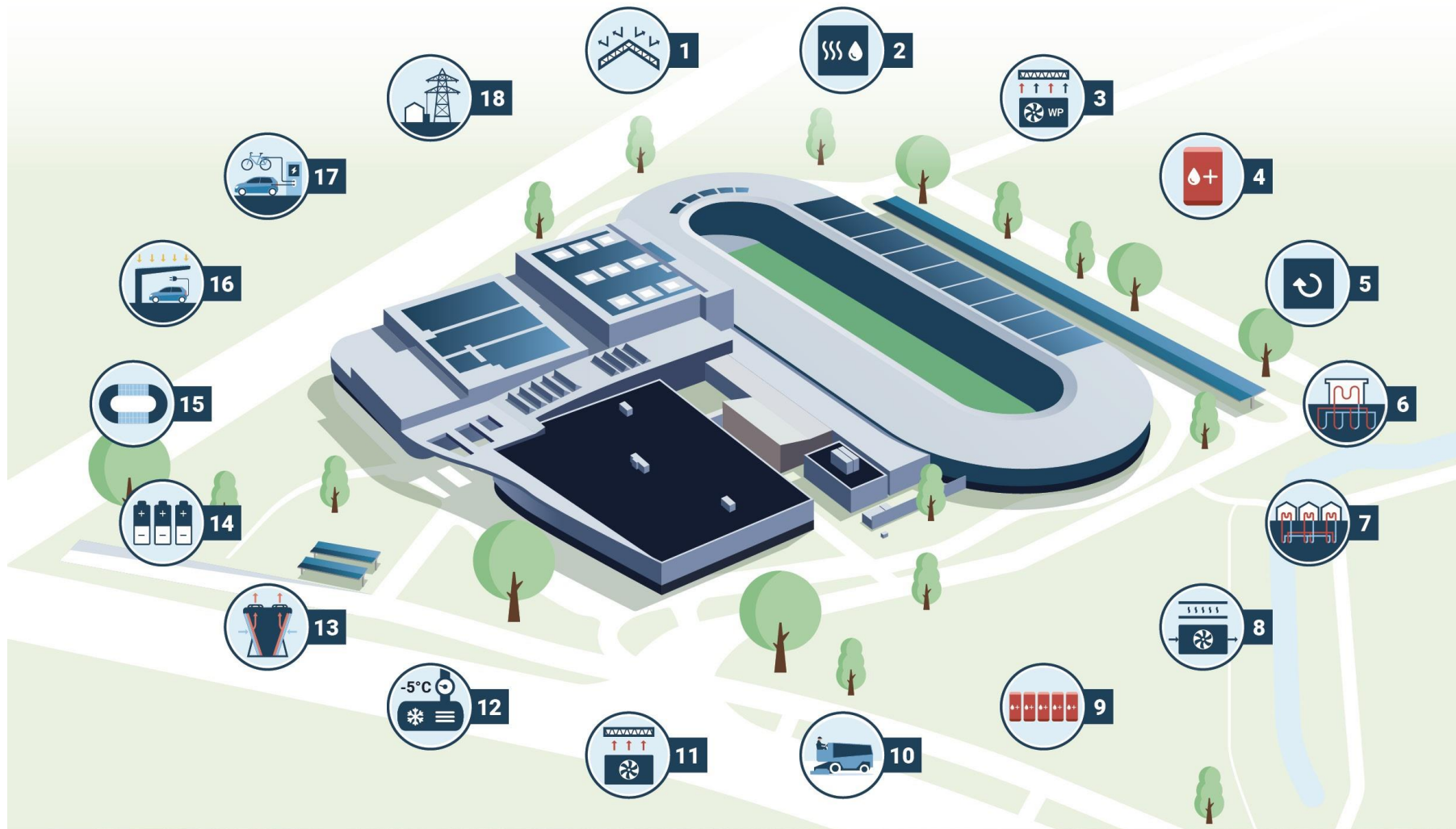
Electric solutions

- Generation of sustainable energy
- Energy storage

Thermal solutions

- Use residual heat from ice machines
- Heat cold storage (HCS) ground energy system
- Heat pumps

Smart control via SMART grid system



LEGENDA

- | | | | |
|--------------------|----------------------------------|-----------------------------|---------------------------|
| 1. Roof insulation | 4. Hot water boiler | 9. Hot water storage | 14. Battery |
| 2. Electric boiler | 5. Regeneration exchanger | 10. Mop water supply | 15. PV panels |
| 3. Heat pump | 6. Hot-Cold Storage | 11. Residual heat heat pump | 16. Solar car park |
| | 7. Source network | 12. Ice machines | 17. Chargers cars & bikes |
| | 8. Airconditioning floor heating | 13. Drycooler | 18. Grid connection |

Electrical part

GRID CONNECTION

BATTERY →



SOLAR PANELS

SOLAR CAR PARK

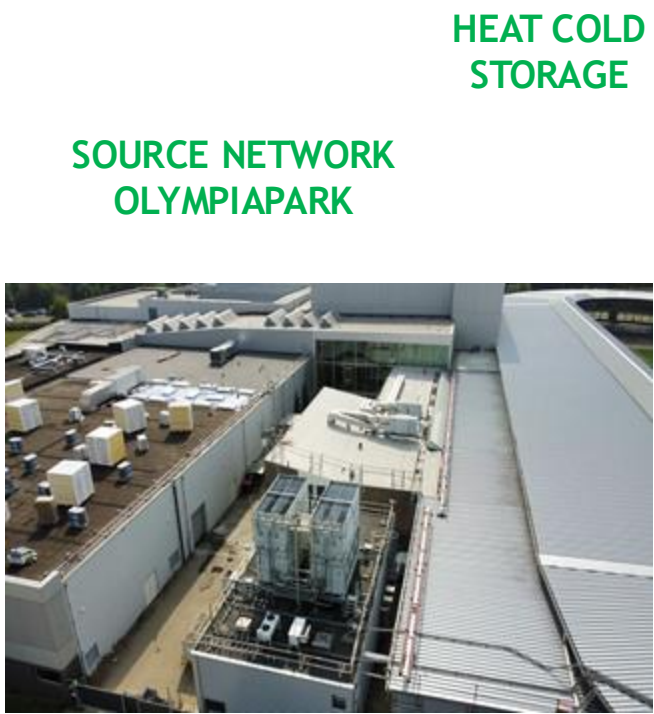


SMART GRID
ELECTRIC
+
PEAK SHAVING

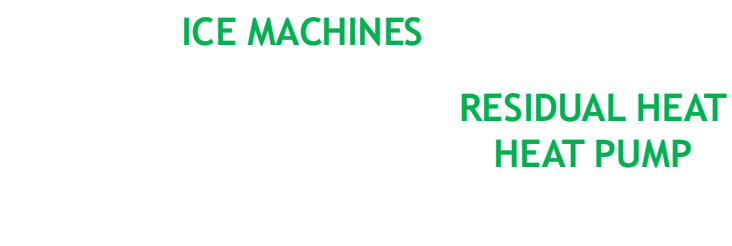
CHARGERS FOR
CARS AND BIKES



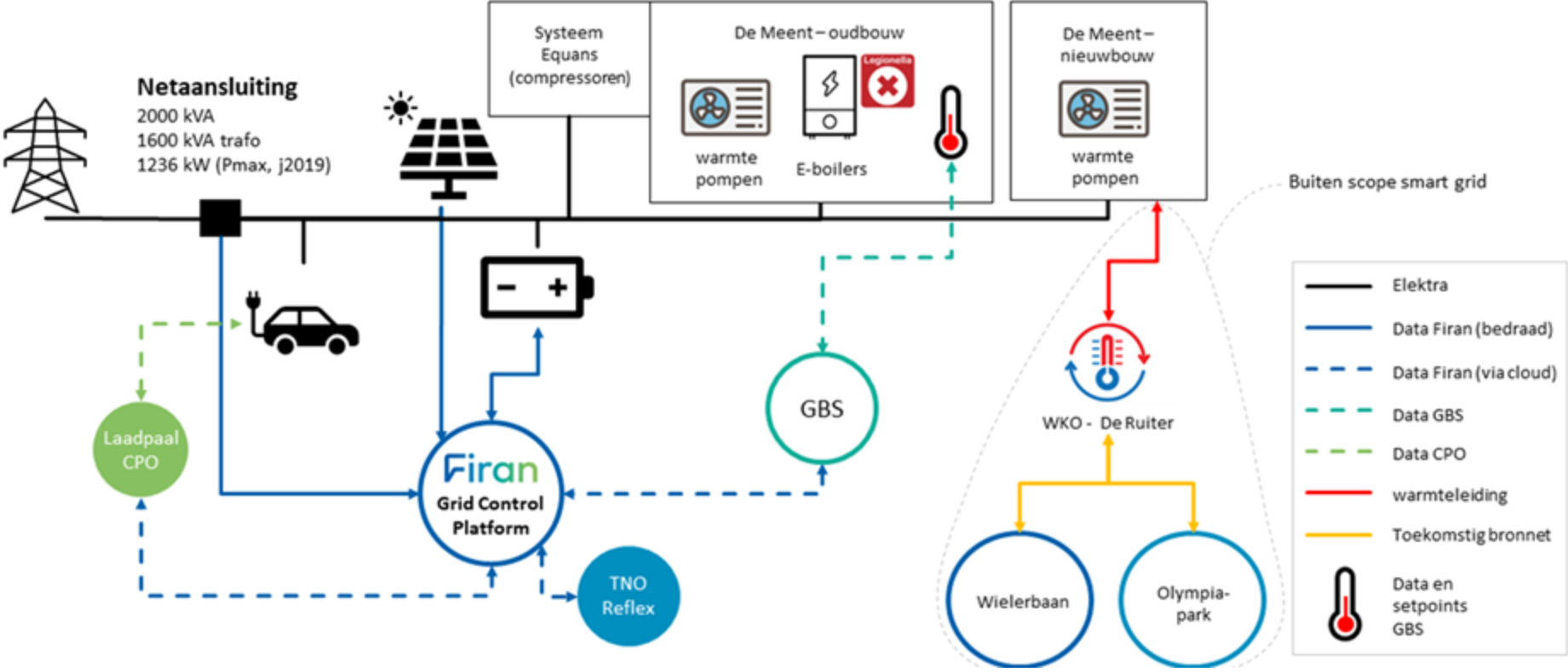
Thermal part



SMART GRID THERMAL



Smart grid De Meent



Results

Costs

- € 3,1 million
- EU subsidy > € 1,1 million

Financial results in year 1:

- Savings: € 500,000



Results

- Payback period 10 years
- From most emitting to least emitting municipal real estate
- CO₂ reduction
- Contribution to sustainability objectives
- Setting a good example
- Entrance ticket remains affordable
- Vitality & health



Woonwaard Highrise



Woonwaard Highrise

Characteristics of the highrise building:

- Constructed in the 70's
- Social housing
- 135 apartments
- Gas fired central heating

Ambition and goal of housing corporation
Woonwaard in POCITYF:

Making the Woonwaard Highrise building self-sufficient and, if possible, energy positive in terms of electricity (without increasing the problem of grid congestion)



Sustainability investments

Innovative concept:

- 910 PV panels installed on roof top and facades (350,000 Wp installed, production annually 250,000 kWh)
- 2 batteries installed > energy surplus is first stored in the building and then used to power the central facilities (elevator, gallery lighting)
- Circular roofing
- Heat pump

The total concept serves the whole building, minimises the export to the grid (avoids/limits grid congestion)



Sustainability investments

Investment costs:

- PV panels on roof and facades: € 890,000
- Steel construction on roof top: € 510,000
- Circular roofing: € 240,000
- 2 x 30kW batteries: € 94,000

Total investment within POCITYF project:
approx. € 1,7 million



Sustainability investments

Starting point for Woonwaard: tenants should benefit from the investments (in terms of omfortor economical)

- Electricity: 'ROI' for tenants: Each apartment has 4/5 PV panels for which tenants pay €2.90 per month per panel. The yield per panel is on average €9 per month. On an annual basis they earn around **€350** in electricity back on their energy bill.practice
- Heat (gas): Expected 25%-30% reduction in gas consumption due to heat pump. Tenants do not invest but they benefit from the savings (€29,000 annually) leading to savings of €225 per appartment.

Adiotional aspect: how not to increase the problem of grid congestion in the Alkmaar region?





POCITYF

Thank you for your attention!



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Short movie about Alkmaar achievements in POCITYF:

<https://youtu.be/iYmAZQZZEyU?si=RDGpZ7gCroSNccb7>

