



cloud **ENERGY** optimizer

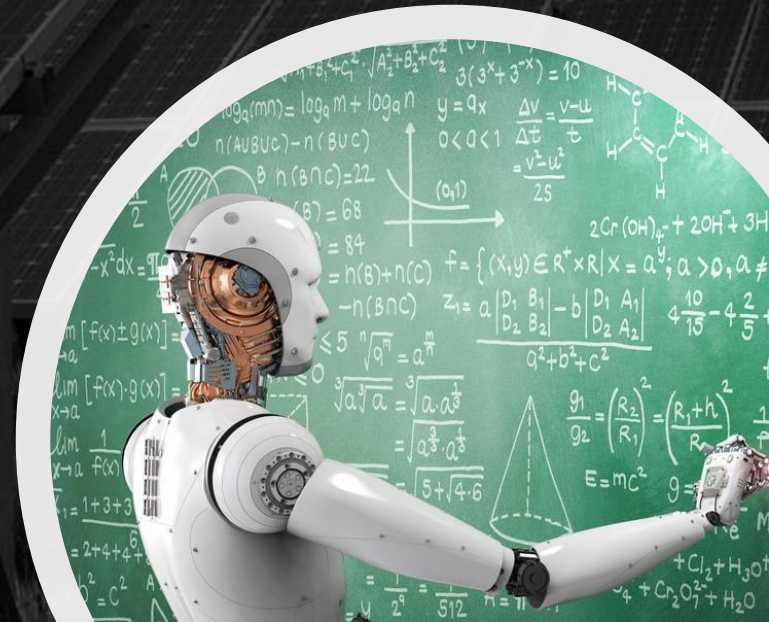


Making buildings more sustainable
Improve indoor climate
Reduce costs

We make your climate installation effective

Road trip Cloud Energy Optimizer

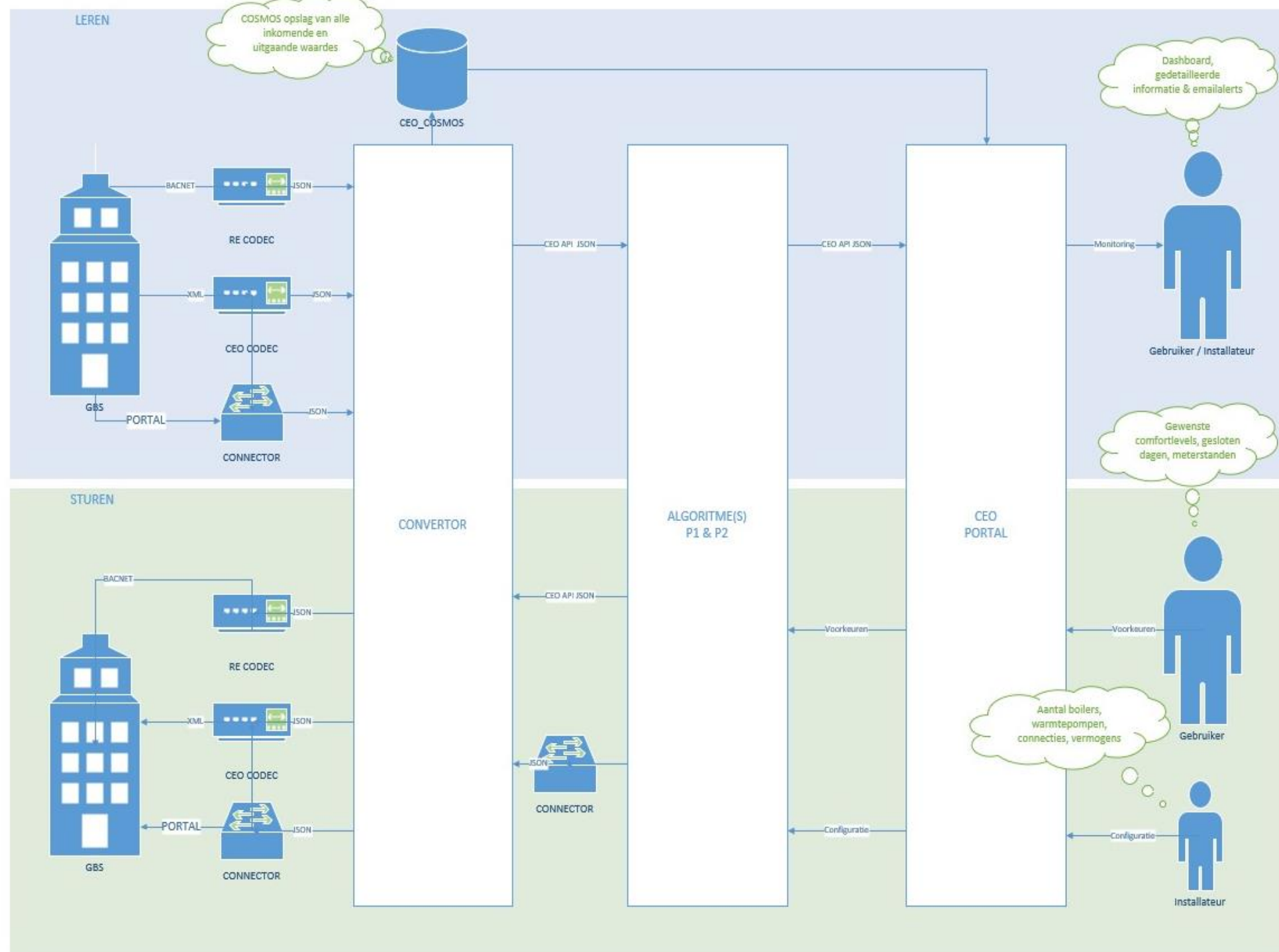
1. Data connection
2. Building parameters
3. Energy flow diagram
4. First learning period (24 hours until 168)
5. Algorithms starting
 - Supervised learning starting
 - Reinforcement learning starting
6. Unsupervised learning on background.
 - Thermal energy (every 12 hours)
 - WKO balancing once a week (Long term testing)
 - Day ahead prices every 4 hours (testing phase)



Data connection

Structure is build for

- Stand alone use
- No vendor lock-in
- Possible to store data in own cloud
- Linking with data analysis is possible, like Power BI



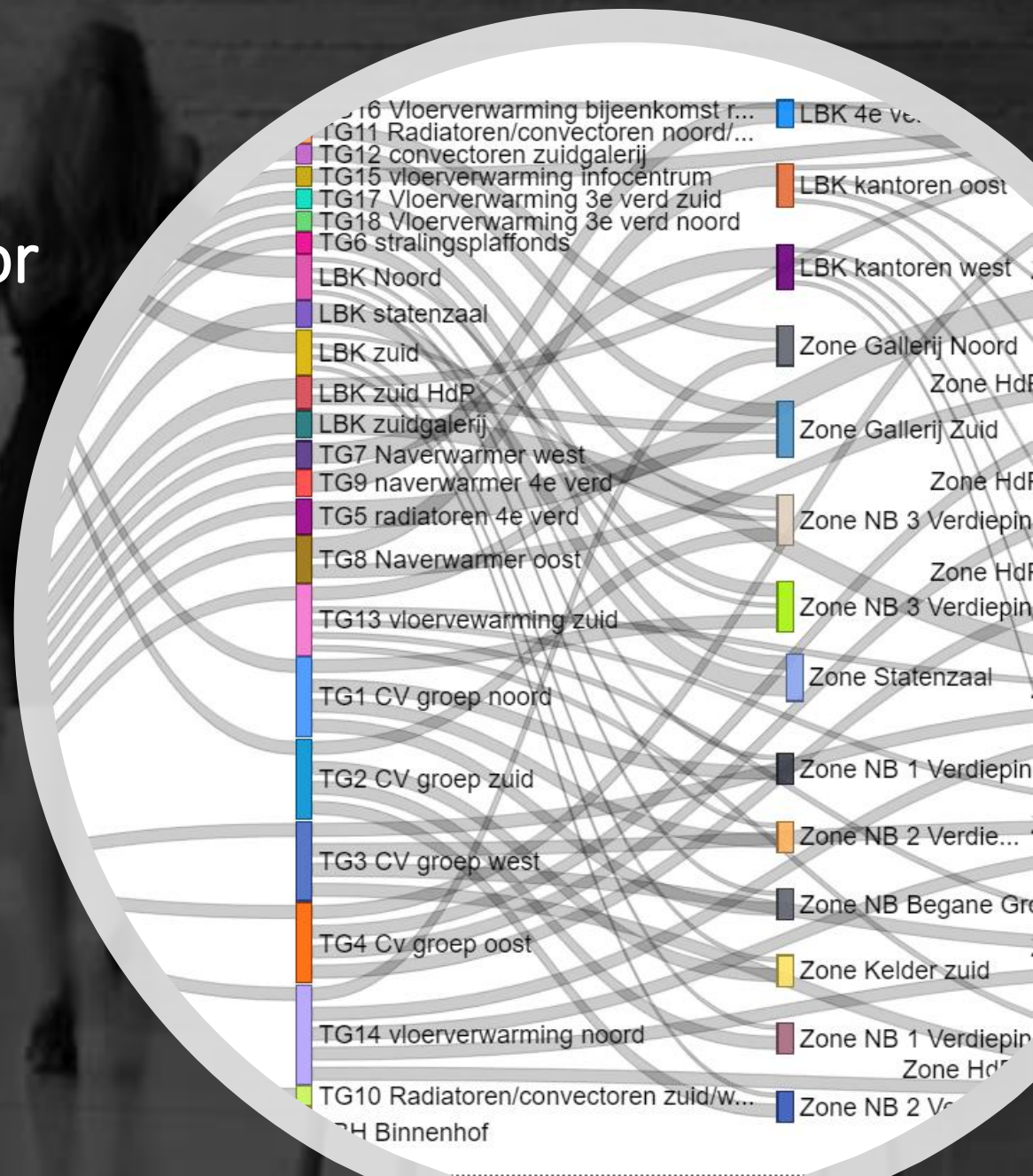
Hybrid energy balancer and operator

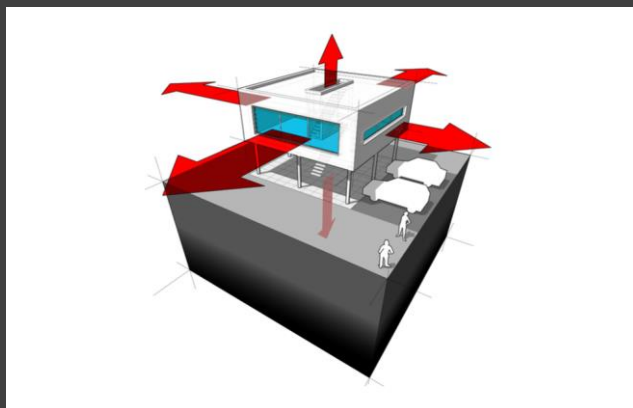
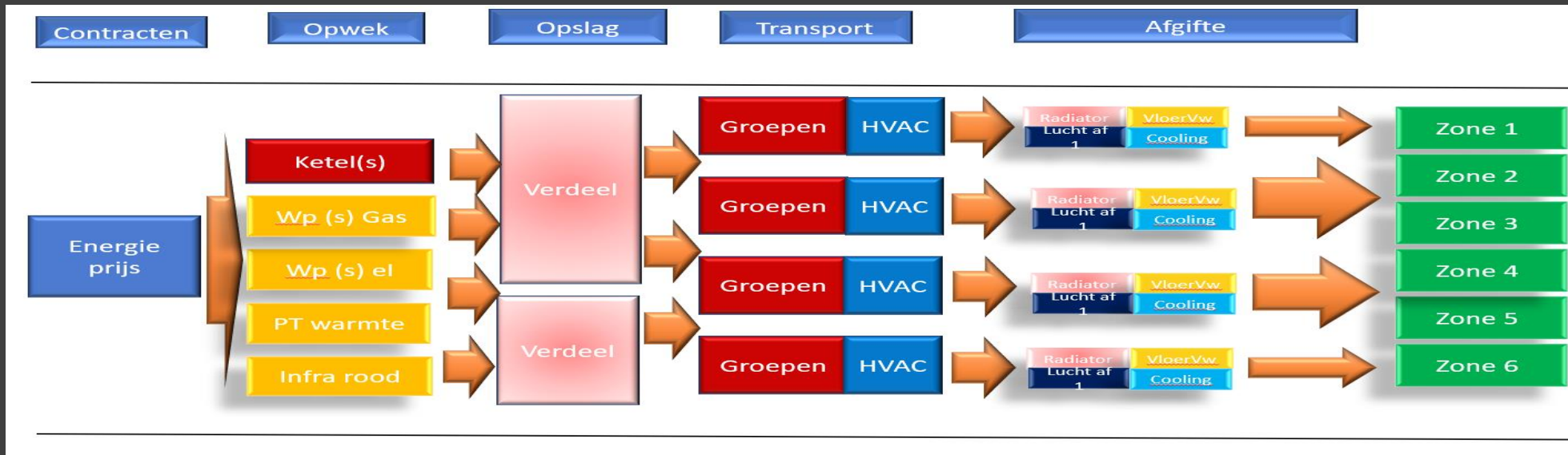
Energy flow managing system

Building digital twin based on Energy Flow

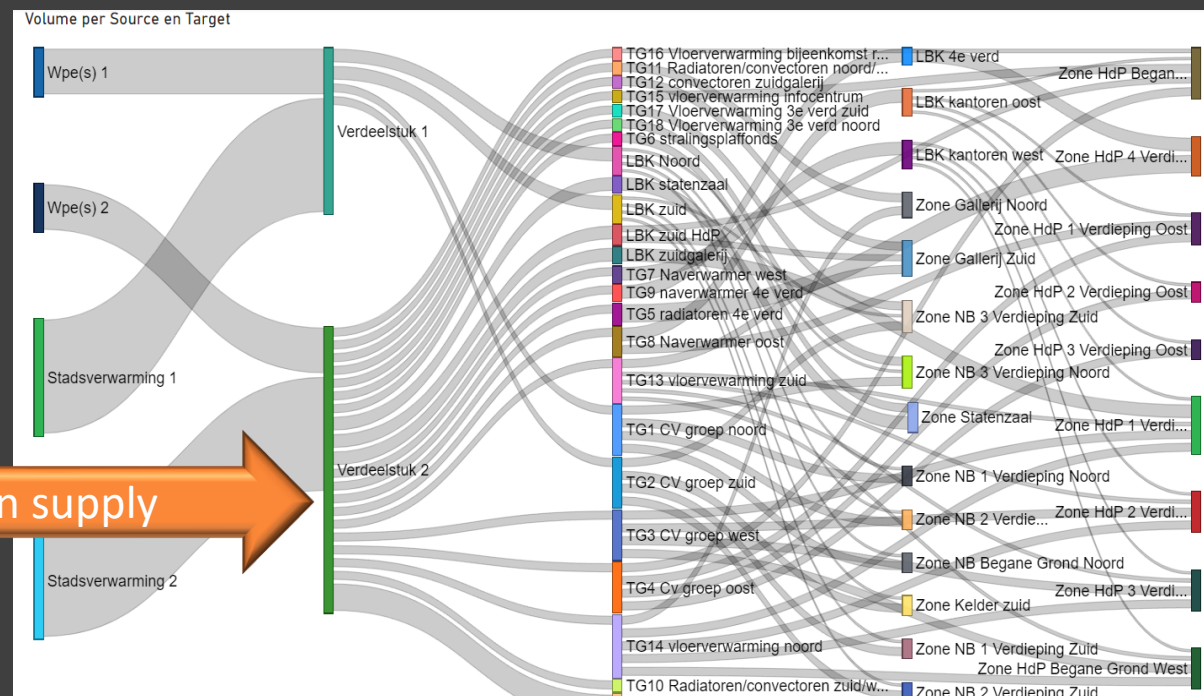
- Design parameters & reality
- Continius chain monitoring
- Climate monitoring
 - Co2 monitoring (air quality)
 - Temperature
 - Real experience (Human comfort experience)

Release for 3th party's this year.





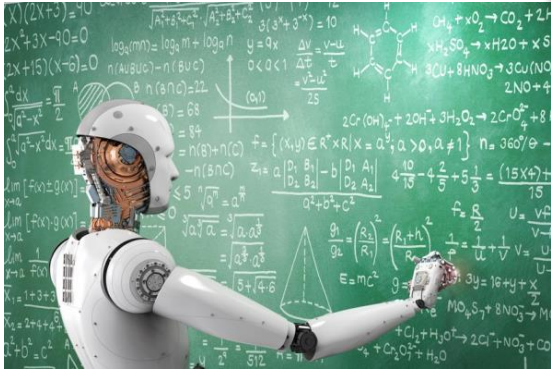
Demand bigger than supply



I wish I had had lessons in future instead of history



If you know the future. You know what to do for best results.



1. Without history no future? (Digital Twin)
2. With history a better future? (Model prediction)
3. A simulated history for a future? (Digital Twin & Model prediction)



Algorithms

- Supervised (if you know the answer)
 - Digital Twin is made
 - Used in case of no history (or bad history)
 - Model prediction will be used after learning period and will start after several (1 to 7) days
 - Score model is used as the daily Engine
- Unsupervised (if you search for something that you didn't now)
 - If history is available, it's used as learning package for supervised learning (digital twin will be updated)
 - This is also the engine for Building for Brains projects
- Reinforcement learning (trial and Error) & Digital Twin
 - Is to make learning packets



1. Without history no future?

- ✓ Energy process flow is made by engineers
- ✓ Year consumption desired
- ✓ 24/168 hours of data

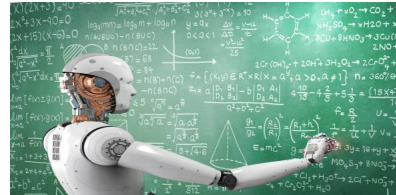


1. Without history no future?

- ✓ Easy to start
- ✓ Less optimisation
- ✓ Less luggage and less results

2. With history a better future?

- ✓ Installation data is mandatory
- ✓ Data is polluted in more than 50% of the cases
- ✓ Year consumption desired
- ✓ 24/168 hours of data
- ✓ Outside temperature below 12



2. With history a better future?

- ✓ High cost of data repairing in start
- ✓ Learning packets are good for optimisation and results
- ✓ Requires a lot of calculation power
- ✓ Many new opportunity's (B4B)

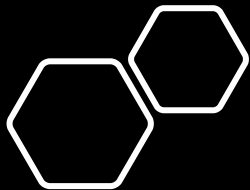
3. A simulated history for a future?

- ✓ Digital twin is made on calculation or energy flow
- ✓ Data is polluted in more than 60% of the cases
- ✓ 24/168 hours of data to start



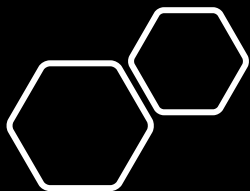
3. A simulated history for a future?

- ✓ calculations are always based on wrong assumptions.
- ✓ Self Learning is necessary
- ✓ Always need to run 24 /168 hours of data to start



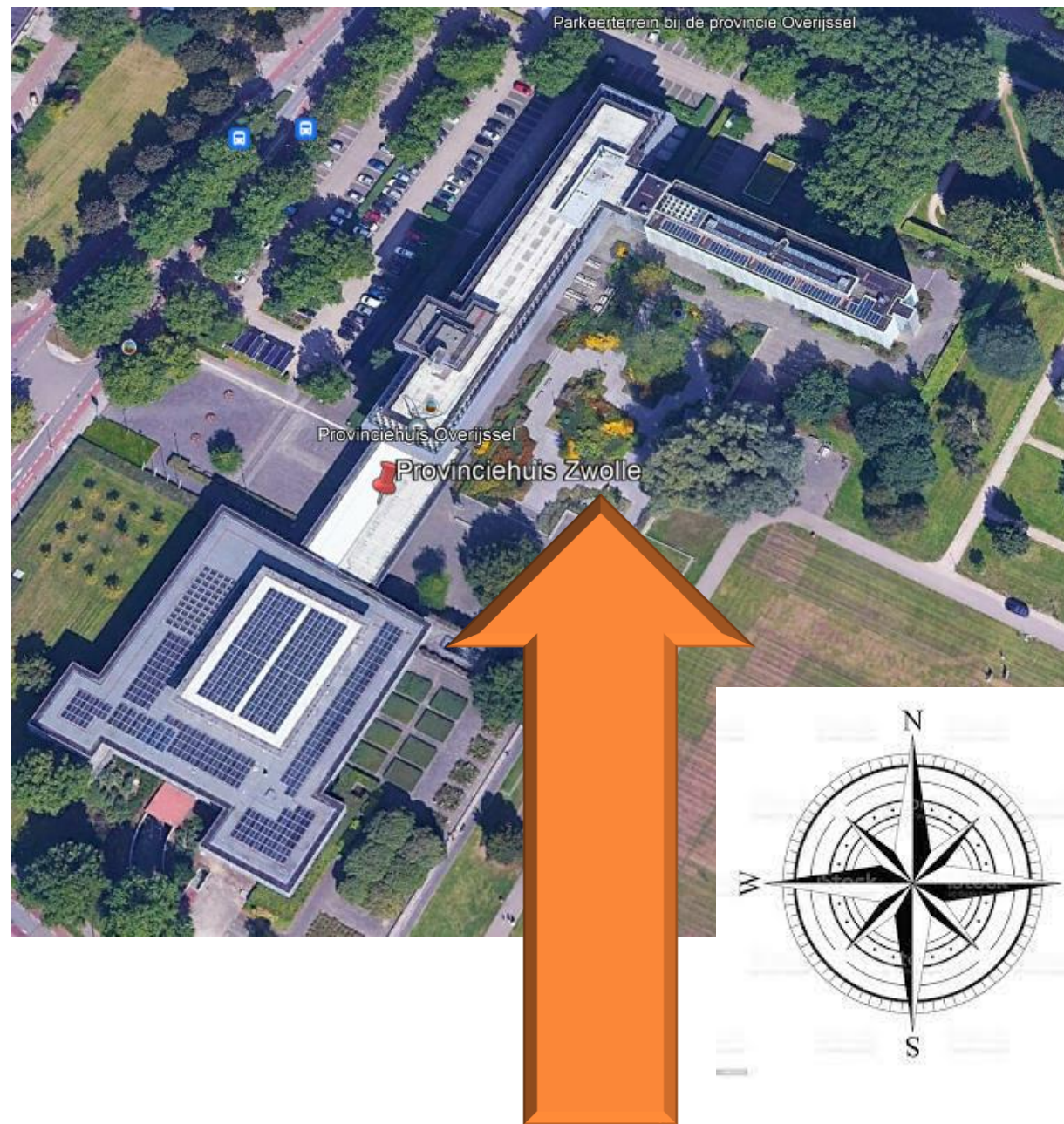
- Wind
- The direction of the wind will have
- Effect on the energy uses.
- In this case it can run up to 20% more

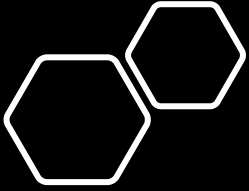




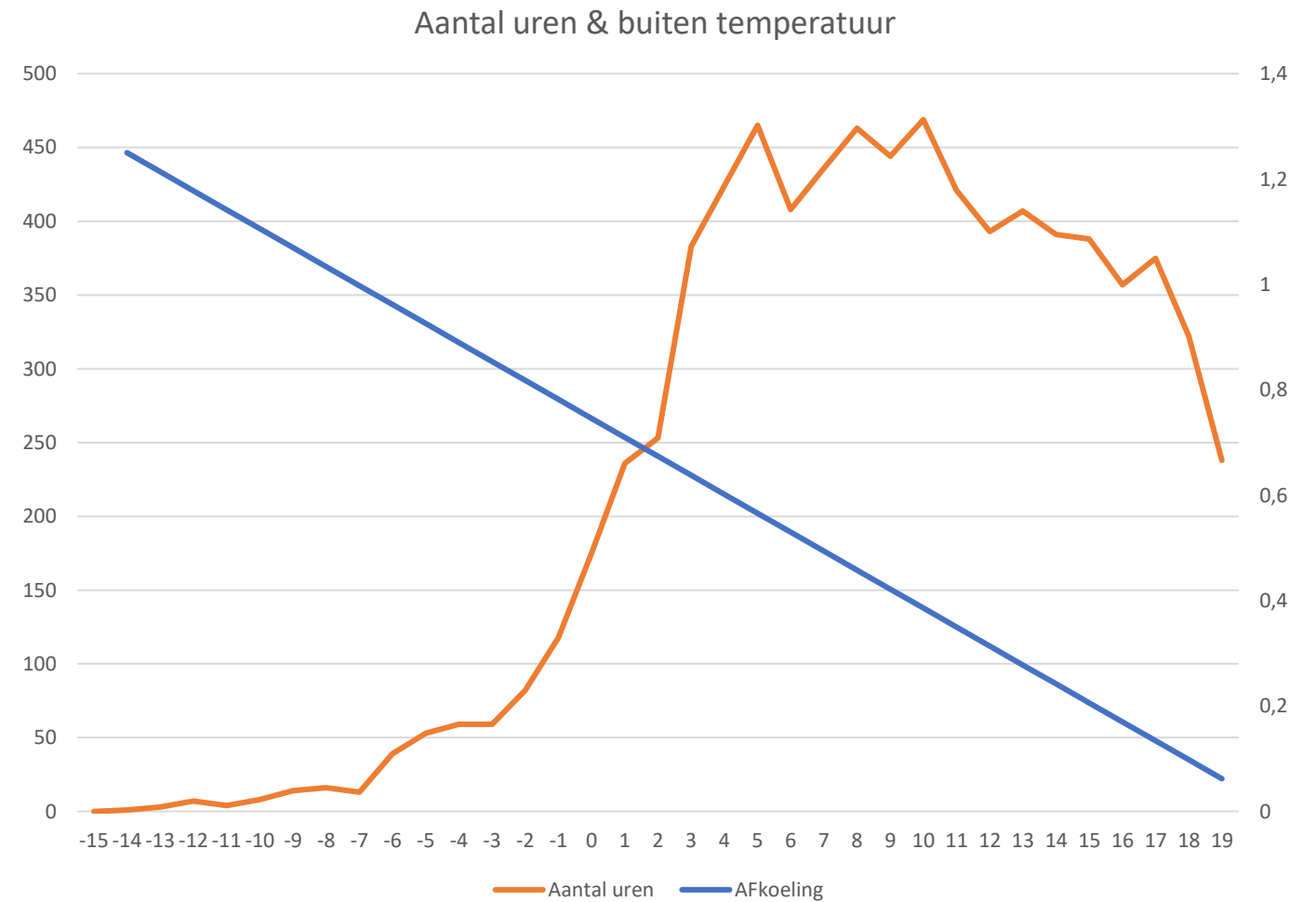
- Solar
- Effect of solar on the building
- Effect possible until 40% less

Maand	kWwarmte levering	Zon warmte kW
Januari	264.420	20.025
Februari	213.794	48.169
Maart	206.807	80.906
April	173.387	129.286
Mei	99.898	137.244
Juni	27.631	174.567
Juli	21.885	144.106
Augustus	39.489	124.553
September	62.396	91.369
Oktober	109.899	52.794
November	213.398	23.633
December	249.649	15.217





- No effects
- Is there or no effects of
 - Wind
 - Solar
 - People
 - Heating
 - Cooling



Statusoverzicht

Actief

Ja



Naam ↓	Status	Alarm	Organisaties & Installateurs
ABN Amro Breda	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Unica
Achmea Zeist - Gebouw A	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Croon Wolter en Dros
Achmea Zeist - Gebouw B	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Croon Wolter en Dros
Albeda College Rotterdam	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Technisch Buro TOM
ING Den Haag	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		ING Den Haag
McKinsey - Amsterdam	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Van Dam
Menzis Enschede	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Engie Noord
Menzis Groningen	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Engie Noord
Menzis Wageningen	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Engie
Merford	<div>CS</div> <div>OM</div> <div>CL</div> <div>IM</div> <div>MV</div>		Werkendamse Verwarmings Industrie BV



Marked challenges

- Market regulation (law) to use less energy and lower emission
- Shortage of staff
 - Mechanical engineers
 - Service engineers
 - Mechanics
 - Programmers
- Buildings are not ready to be smart (smart readiness)
 - Costs to make them smart are high
 - Shortage of staff with the right knowledge
- Energy Grid not able to handle energy transport without flexibility in de grid

Shortage of staff

- Installers need to reduce time and costs
 - Outsourcing climate to algorithms
 - Simplify control
 - Easy installation
 - Predicting maintenance
 - Planning based on needs
 - No driving need (everything remote)
 - Notification before error





Regulations Netherlands

Bestaande bouw

- Erkende maatregelen
- 1 juli: Informatieplicht
- 5 december: Energy audit

- EPBD III implementatie: Keuring Eisen EV

- Bekendmaking normering Utiliteitsbouw
↓
Omgevingswet
- Transitievies Warmte gereed

- Start aardgasvrij maken
start making natural gas-free



1,5% energiebesparing / jaar

Energielabel C kantoren

Integrale evaluatie



49% CO₂ reductie
Streefdoel bestaande bouw



Energieneutraal / CO₂ arm /
95% CO₂ reductie
Eindnorm bestaande bouw



- BENG Overheidsgebouwen
- Nieuwbouw = aardgasvrij

Nieuwbouw

Evaluatie BENG





Government of
the Netherlands

Regelgeving in Nederland



2021

NTA 8800

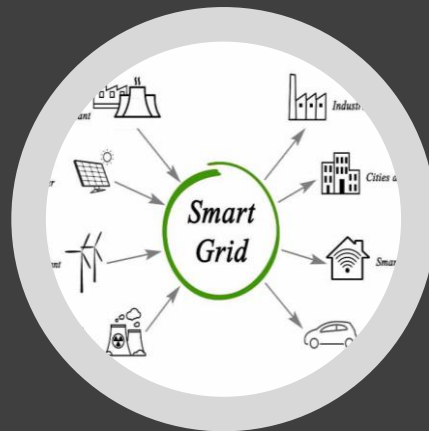
2030

49% CO2 reduction

2050

95% CO2 reduction





Smartgrid

Cloud Energy Optimizer

Possible to offer flexibility to market

No discomfort for user.

Less investment needed to upgrade the grid

Cloud
ENERGY
optimizer



Cloud Energy Optimizer

Active for 6 years in forecasting energy demand for buildings.

Active and gride demand

Information provider for Route to Paris Proof



Niels de Jong product manager at CEO since 2015

- 20 years of experience in the energy market
- 15 years of experience in data collection
- 8 years experience in the installation market
- Research, Topsector energie , RVO, TNO (Heatmatcher, DWA, Priva, TU Delft)

We bring (input)

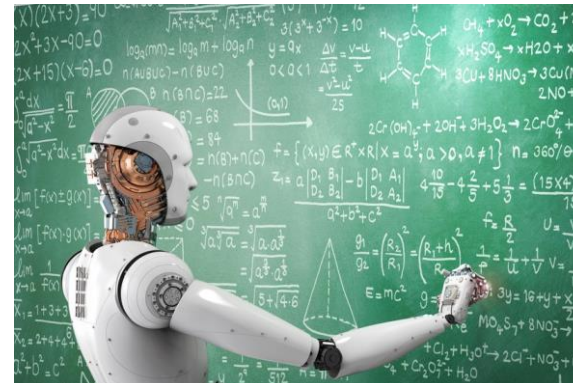
Practical knowledge:

1. Buildings
2. Installation
3. Data collection
4. Data analysis
5. Energy market
6. Installation market
7. Relationships
8. Algorithms



Targets (research)

- Next generation algorithms
- Lower cost systems
- Speed data processing
- Different types of modeling



Self-learning BMS

- Based on
 - ✓ Building data history
 - ✓ Weather forecast
 - ✓ Index (energy) Price
 - ✓ Type of installation

We make your climate installation effective

Customers

Niels.dejong@cloudenergyoptimizer.com

