



**Our change:**

From polluted to clean air  
From noise to whisper



Gerrit Griffioen  
Fleet manager of Municipality Groningen



# *Fleet of Municipality of Groningen*

- Municipality of about 230.000 inhabitants
- We are responsible for a clean and safe municipality
- We have a vehicle and machinery fleet of about 600 units
- 90 % of our fleet had a diesel engine
- We used 1,5 million liters fuel a year
- We had about 1500 handtools with fuel consumption
- And more of fuel consumption equipment

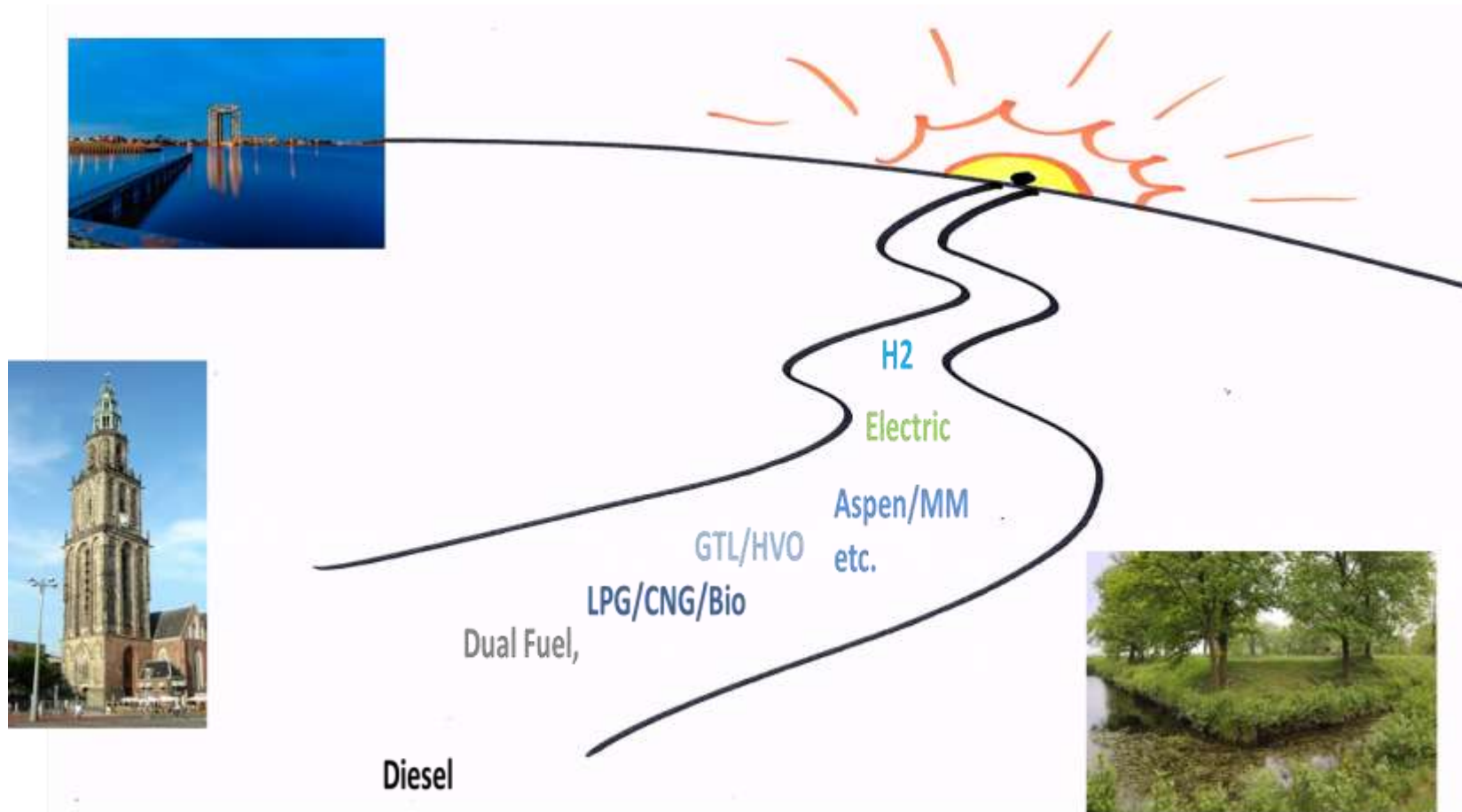


# *We have a dream*



Groningen Energy neutral / Emission free

# *The road to emission free future*



# Ambitions

## Ambitions of the municipality of Groningen

- Roadmap Groningen Carbon Neutral 2035
  - Zero Emission City Logistics in 2025
  - Zero Emission public transport in 2020
- ⇒ Hydrogen is part of these ambitions

Groningen is partner in European hydrogen programs:

- JIVE 2: 20 hydrogen busses (in 2020)
- Revive: 2 garbage collection trucks
- HyTrEc2: 6 municipal hydrogen vehicles and refuelling station
- Hector: hydrogen garbage collection truck
- Hydrogen Valley?

**Hydrogen HEAVENN**



JIVE 2



ZERO EMISSION

**Interreg**



North Sea Region



HECTOR

European Regional Development Fund





# Projects

## Hydrogen Vehicles for Garbage Collection

- Groningen is partner in REVIVE, HyTrEc2 and HECTOR.
- These include in total five garbage Trucks.
- Groningen has also garbage trucks outside these programs.
- The first garbage trucks started operations in 2019. All trucks will be operational in 2020.
- The HECTOR program also includes adaption of the indoor parking and maintenance.



# And more

## Hydrogen Busses

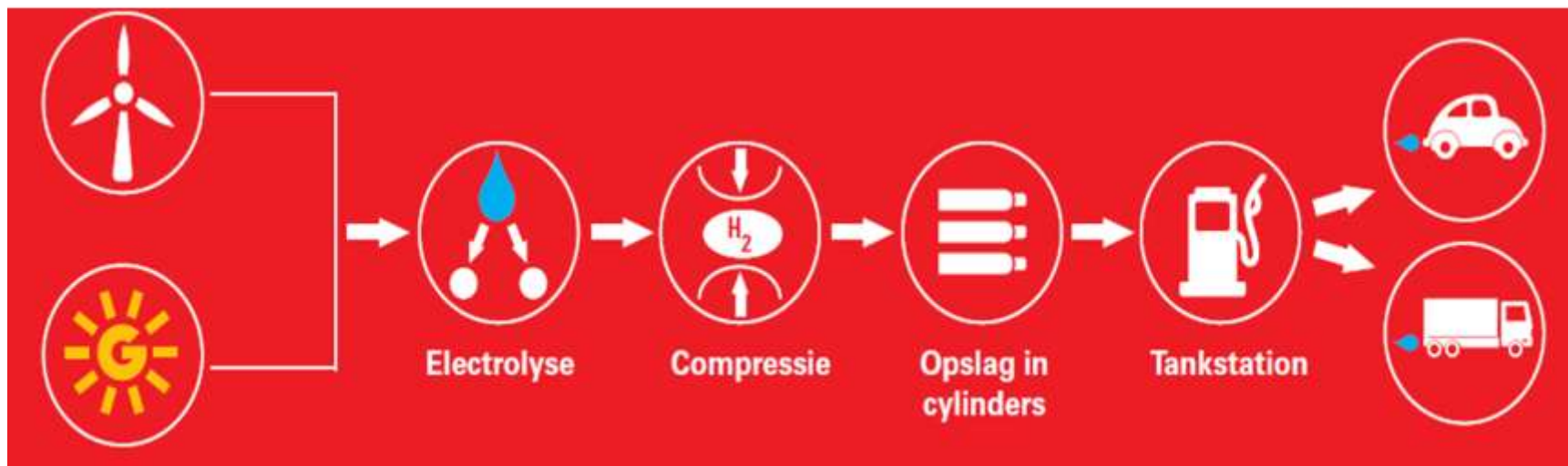
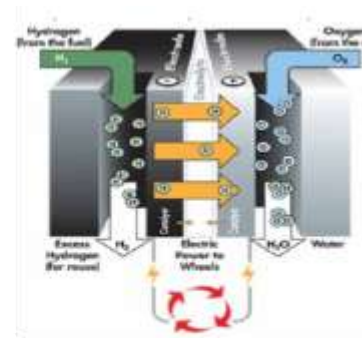
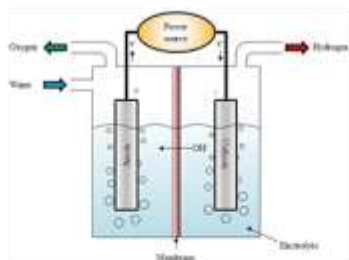


FUEL CELLS AND HYDROGEN  
JOINT UNDERTAKING

- 2 Hydrogen busses operational in Groningen since 2017 as part of High V.LO-City project. They have their own refuelling station.
- Municipality of Groningen is partner in OV-bureau Groningen-Drenthe.
- In 2018 Qbuzz won concession for zero emission public transport starting December 2019.
- Included in the offer are 20 hydrogen busses. These busses are part of JIVE 2 project.



# GREEN Hydrogen production H2





# More H2 possibilities

## Other Hydrogen Vehicles

- Four other vehicles in HyTrEc2:
  - 2 Hyundai ix35
  - Streetscooter
  - Kangoo
- Small bus for the city centre.
- Street sweeper.



**HyTrEc<sup>2</sup>**  
Hydrogen Transport Economy  
for the North Sea Region

**Interreg**  
North Sea Region  
European Regional Development Fund



# Also coming in 2020

## Coming soon: more hydrogen

### New vehicles

- More vehicles for garbage collection
- VW Transporters
- VW Crafters
- A boat for maintenance of waterways.

### Two Hydrogen Refuelling Stations

- A new refuelling station in Groningen for public use as part of the Dutch DKTI project H2GROW.
- A new refuelling station for the 20 busses of the JIVE 2 project.



# Why Revive

- Revive makes it possible
- We will get a view in different European Fuel cell suppliers and their performance
- We help other future users what is possible with H2
- With this support we can make a realistic start
- Nice to work with and go together with other subsidy programs, we can learn from each other
- Also other programs are supporting like, tank infrastructure, parking in a building and safety, workshop safety etc.
- We create a cleaner world, new rich technology, created by wealth of mother nature
- But this project is not enough, to incentive a larger application, more subsidy programs are needed.
- We learn from each other and give our result to the world producer and end users



# Experience till today

- It is difficult to finance
- Takes a long time to start
- Results are great and interesting
- We prefer only Green Hydrogen
- 8 til 10 kg H<sub>2</sub> for one day operation
- As a starter we have little start up problems, but are nicely solved by the supplier.
- Our drivers are enthousitic about it
- Our workshop engineer are very intersted with it
- Luckaly there are more suppliers than e-truck, they can (have to) learn from each other.
- Daily operation for 6 month now, about 6 small downtimes, which will be solved with next delivered trucks
- We have a lot of interest from European countries, and over the world.



# Learning goals general

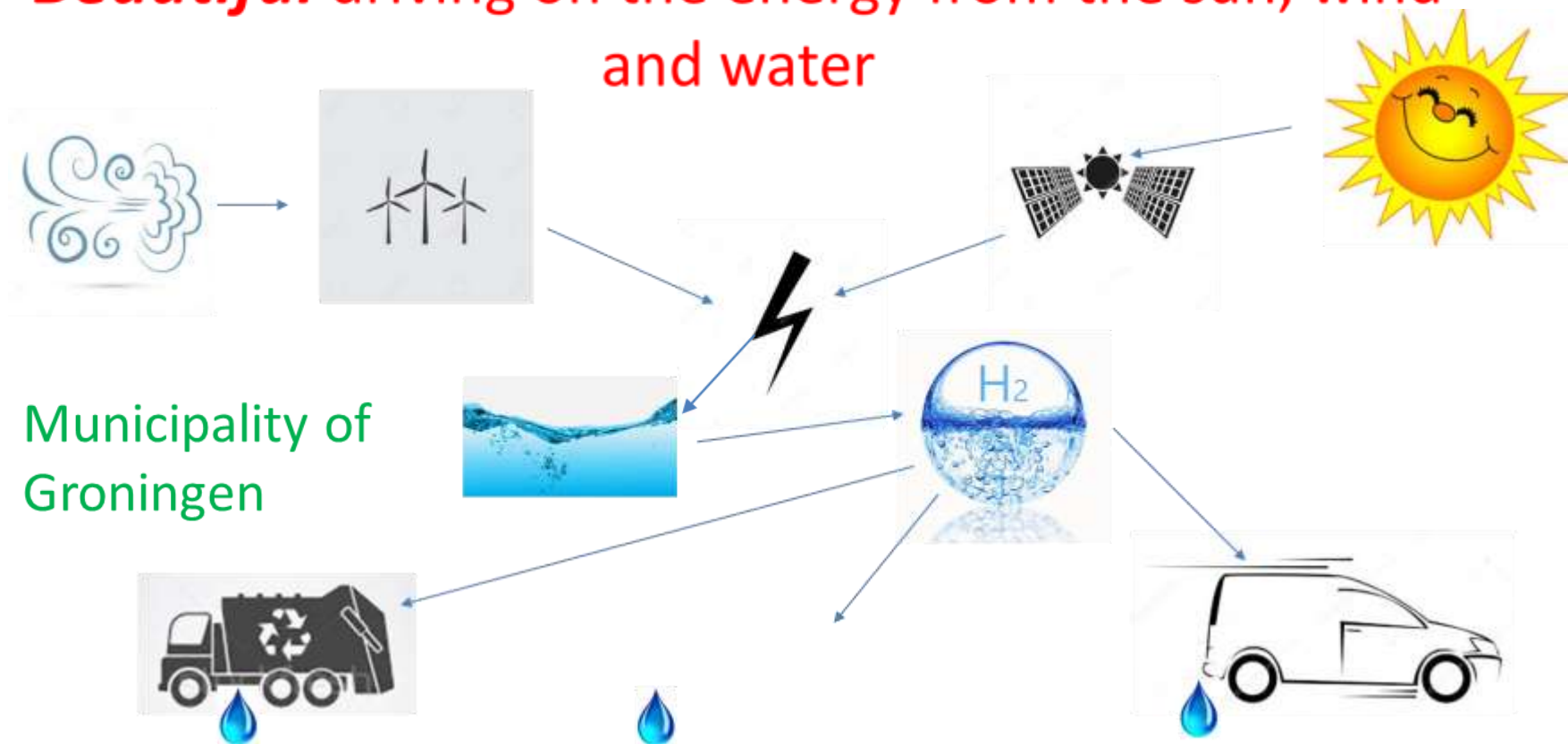
- Costs H2, by 2 or 3 with today price level
- New Technology, it could start with risks
- Involve the staff, drivers, be open
- The driver decides and has an important role
- Training workshop engineers and drivers
- Inform safety people, e.g. fire brigade
- Invest into filling station H2, or be involved with it
- Invest in workshop and parking building
- Stay focused, what do you want to achieve: it is the climate change, CO2 reduction, no emission etc.



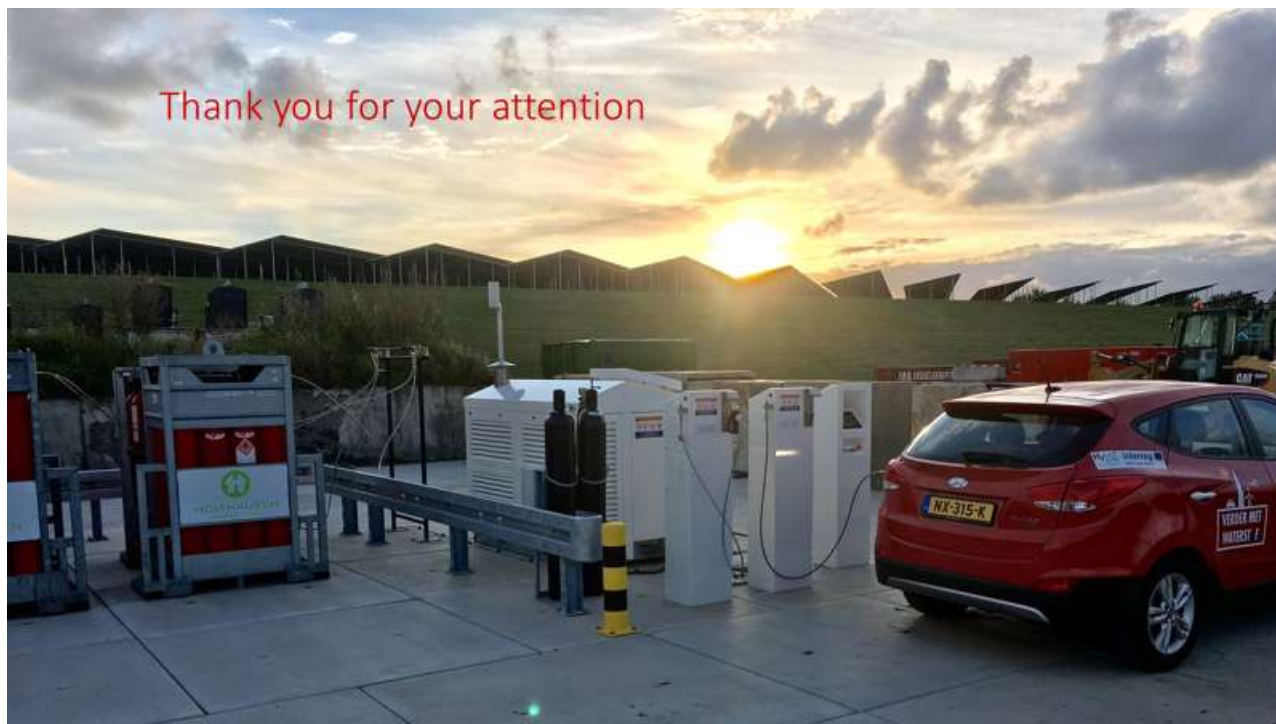


# Circularity process

**Beautiful** driving on the energy from the sun, wind and water



Thank you for your attention





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**FUEL CELLS AND HYDROGEN**  
JOINT UNDERTAKING

