



# The energy transition

Scientific Seminar at the Senate, Arenberg Foundation

Leuven, 20 March 2019

# The world is changing

Europe:



40%

LESS CO<sub>2</sub> EMISSIONS  
vs. 1990



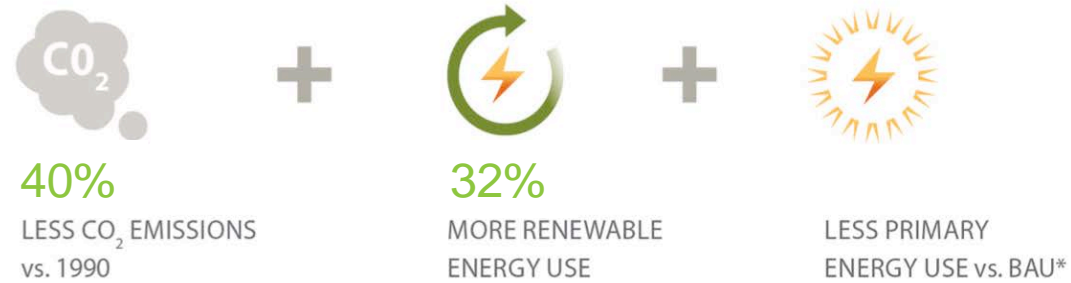
# The world is changing

Europe:



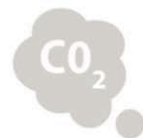
# The world is changing

Europe:



# The world is changing

Europe:



40%

LESS CO<sub>2</sub> EMISSIONS  
vs. 1990



32%

MORE RENEWABLE  
ENERGY USE



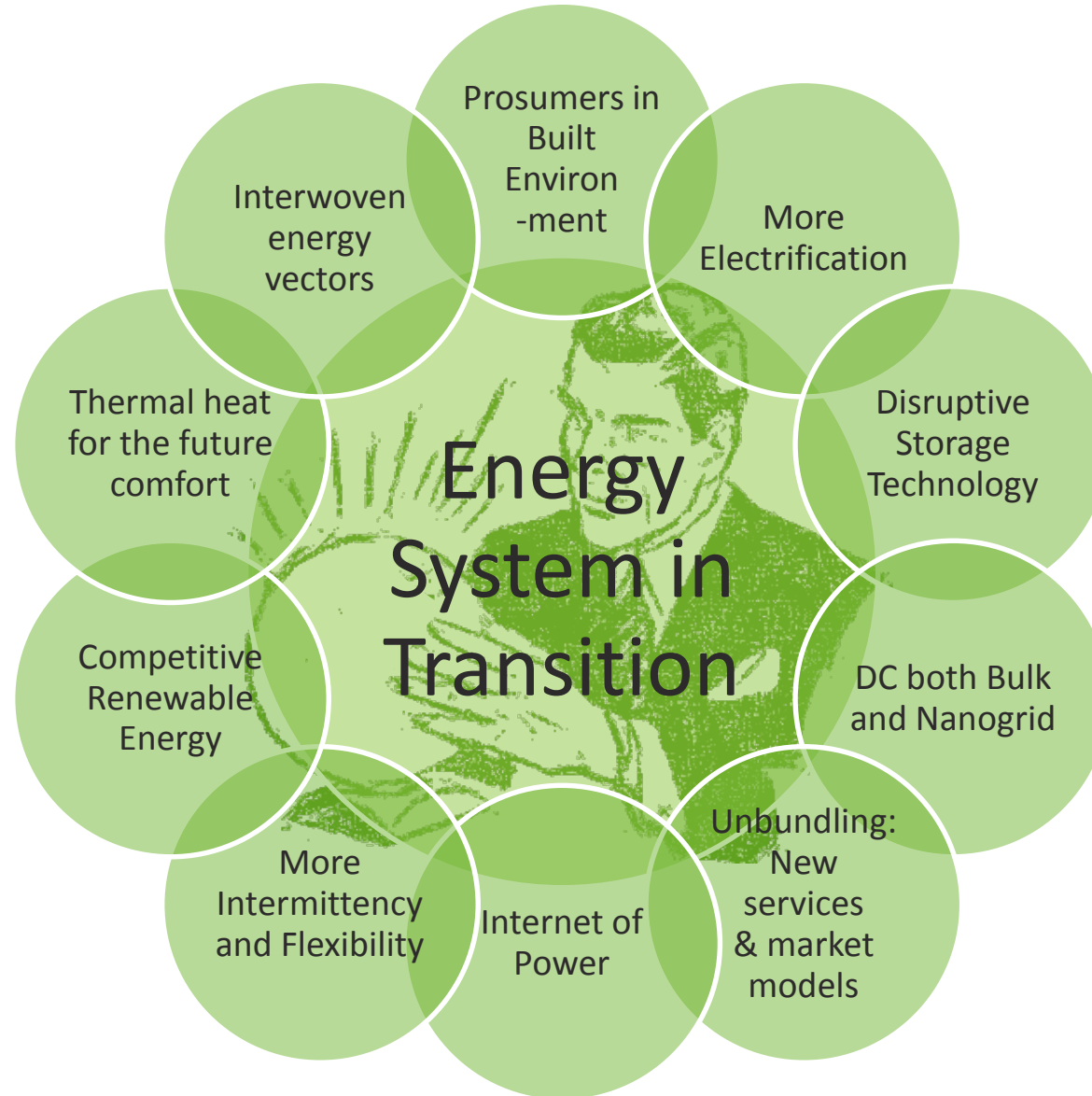
LESS PRIMARY  
ENERGY USE vs. BAU\*

By the year

2030

\*Business As Usual

# Megatrends



# Keeping the balance

Sustainability

Affordability

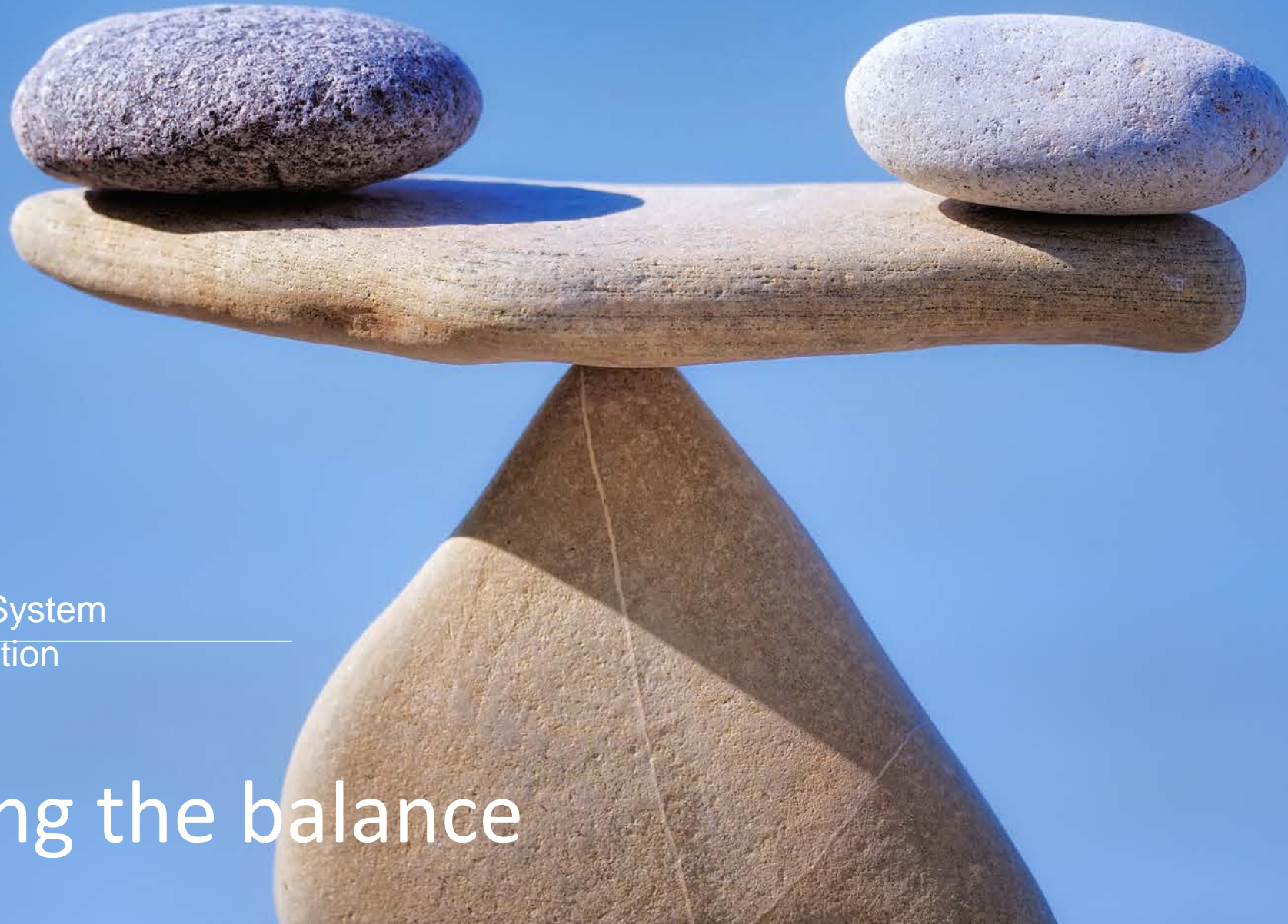
Availability

Energy Supply



Generation

Demand

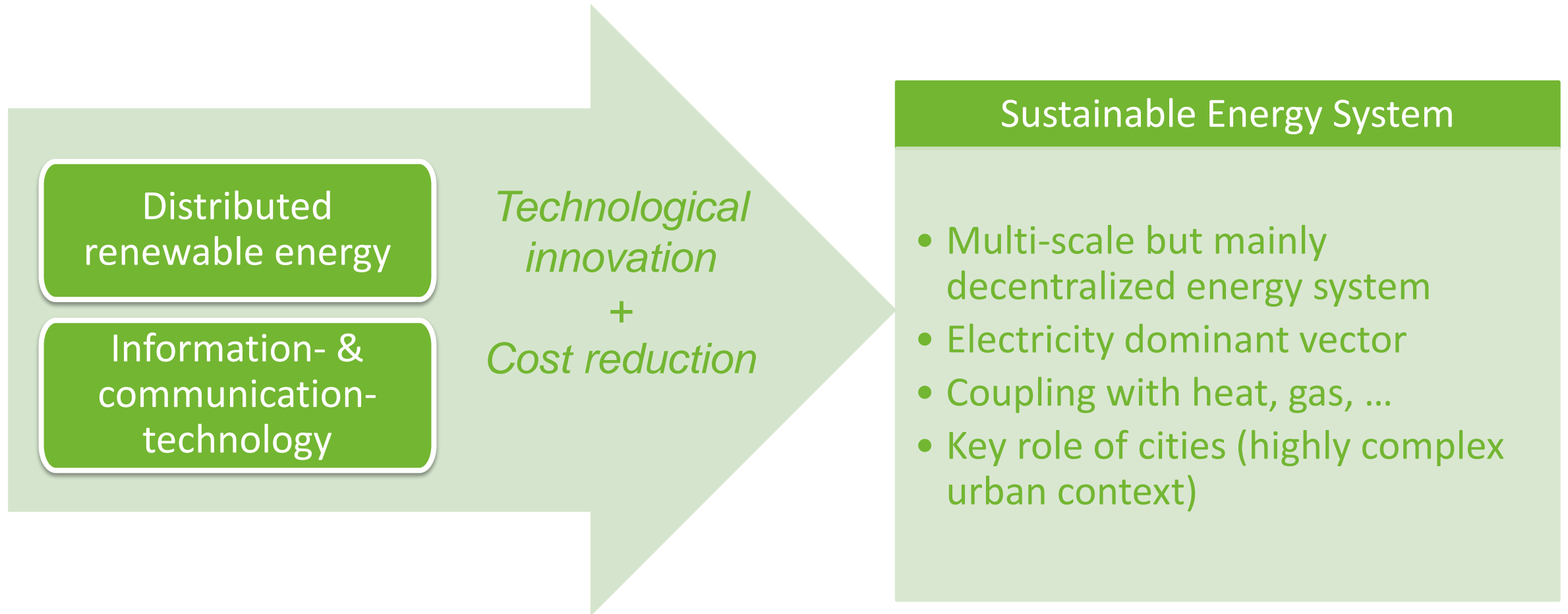


Safe System  
Operation

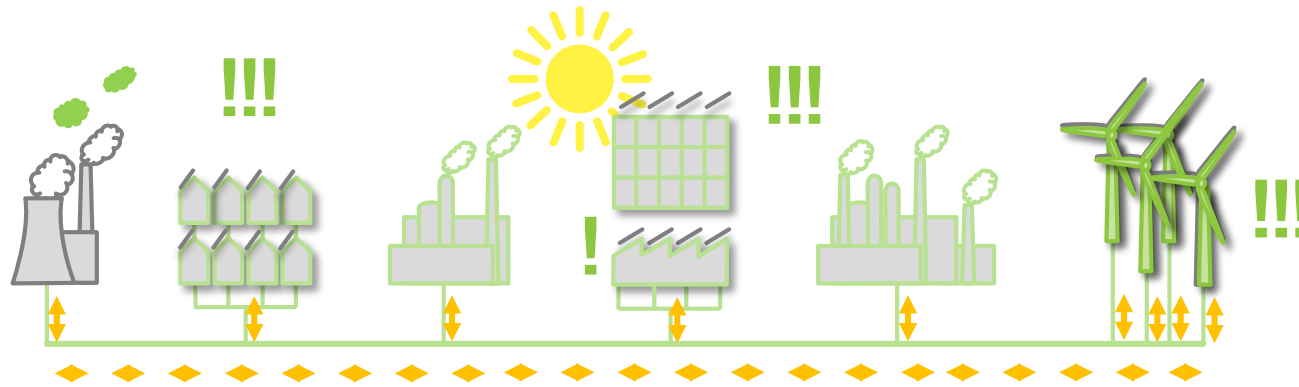
Keeping the balance



# The energy transition: EnergyVille's vision



# Challenges

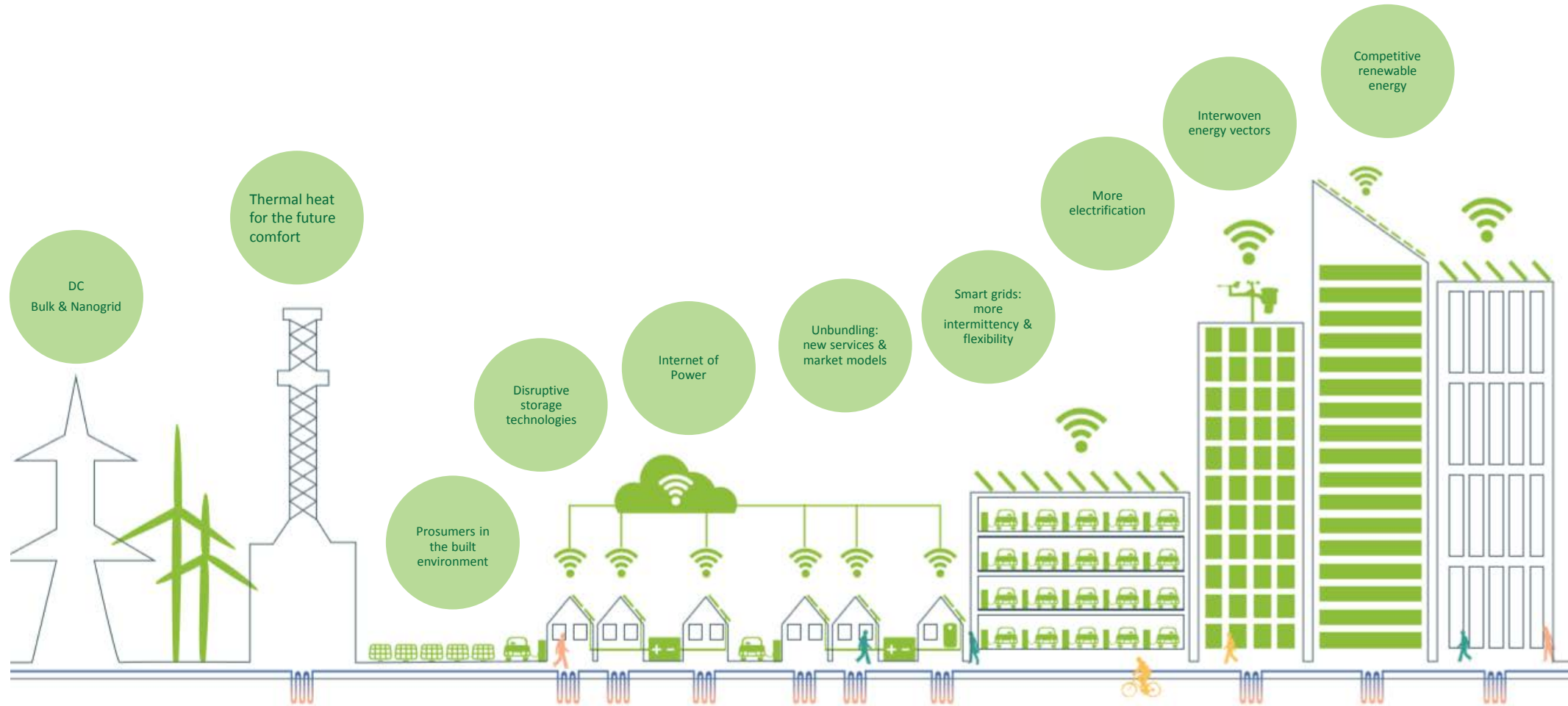


- Demand drives generation ↔ Generation drives demand
- Bidirectional flows
- Techno-economical puzzle:  
coordinated grid actions with all the players involved

# From a classic model...



# ...towards a sustainable energy supply



# Zooming in...

- Prosumers
- IoT
- Electric vehicles



# Prosumers at the heart of the energy transition

- Decentralized production
- Consumer-side flexibility & flex trading



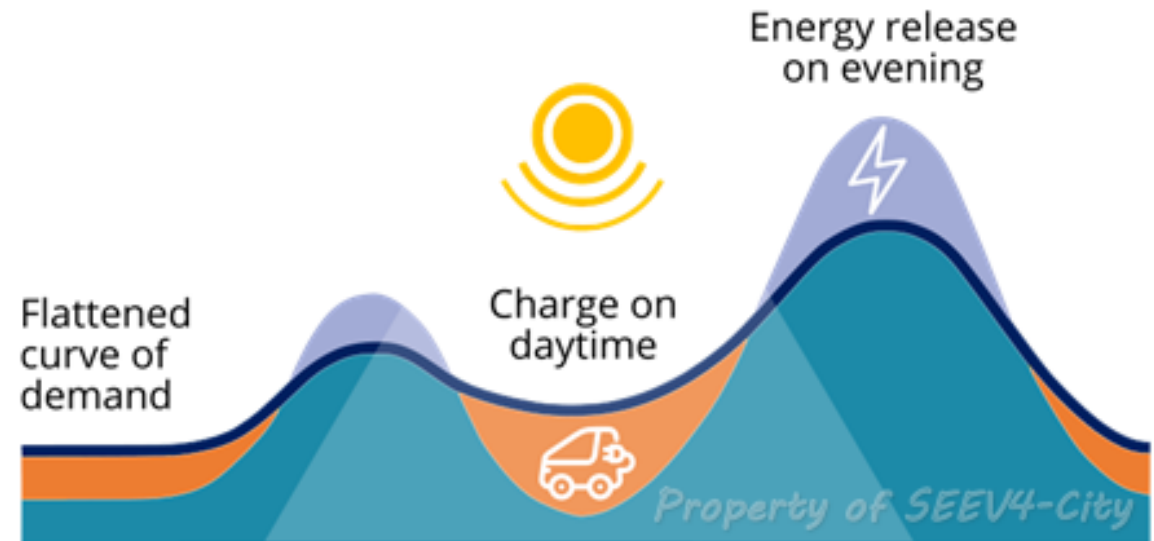
# IoT

- All devices communicate with each other & share information
- Greater efficiency
- Automation, security, comfort



# Electric vehicles as an integral part of the energy system

- Environmentally Friendly
- Positive Price Evolution
- Smart Devices
- Flexible Buffer Load



- Intelligent integration of electric vehicles is key!



# Energy as a service

- Comfort is key
- Integrated: temperature, appliances, transport
- Seamless
- Integrated in the built environment
- Insurance approach

POWER TO THE PEOPLE  
CONTROLLED BY YOU



# Keeping the balance



Security

Privacy

Stable Performance

Big Data

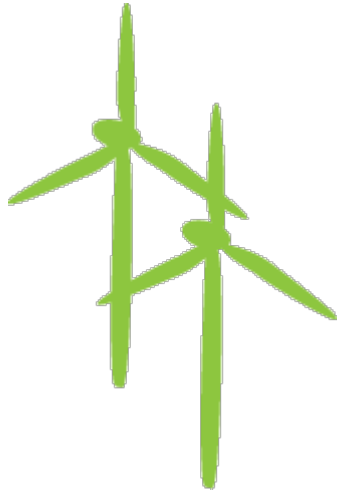
Market & Regulation





# About EnergyVille: Technology and much more

# Flemish energy research collaboration by:



VITO



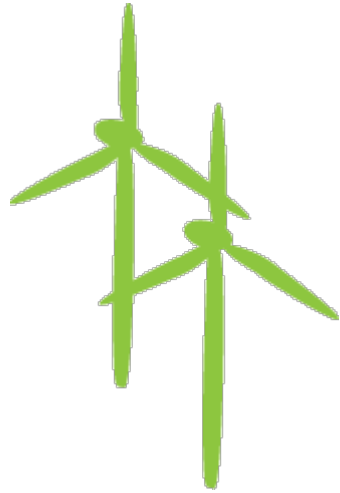
KU Leuven



imec

UHasselt

Flemish energy research collaboration by



Energy *Ville*

# EnergyVille - Mission

EnergyVille is a top research institute to outline the trajectory towards a **market-based, sustainable energy system for large urban areas**. This comprises **Basic, Applied** and **Industry-driven** research, both **theoretical** and **experimental**.

EnergyVille serves the community by:

- developing technologies and methodologies resulting in new products and services
- assisting in human capital development
- giving science-based policy input from local to global level.





Campus  
EnergyVille

# Home Base





# Labs

- Battery Testing Lab
- Home Lab
- Smart Grid Infrastructure Lab
- Thermo Technical Lab
- Medium Voltage Lab
- PV Metrology Lab
- DC Lab
- Power Electronics Lab
- Smart Grid Emulation Lab



# EnergyVille 2

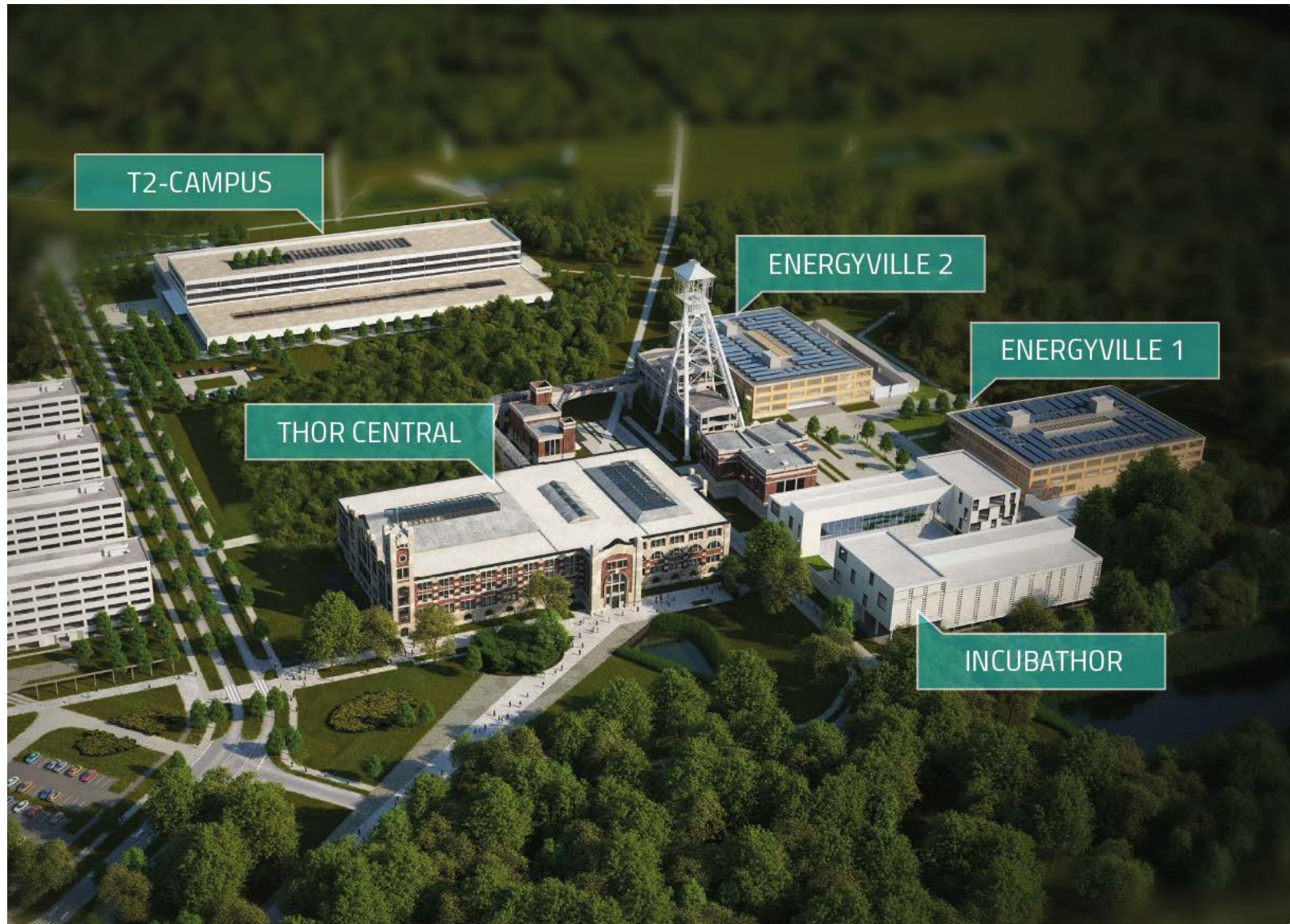


# EnergyVille 2

- Thin Film PV Lab (TFPV Lab)
- PV Module Lab (PV Module Lab)
- PV Reliability Lab
- Outdoor PV Metrology Lab
- Other Lab Facilities
- Battery Lab
- Dry Room in the Battery Lab

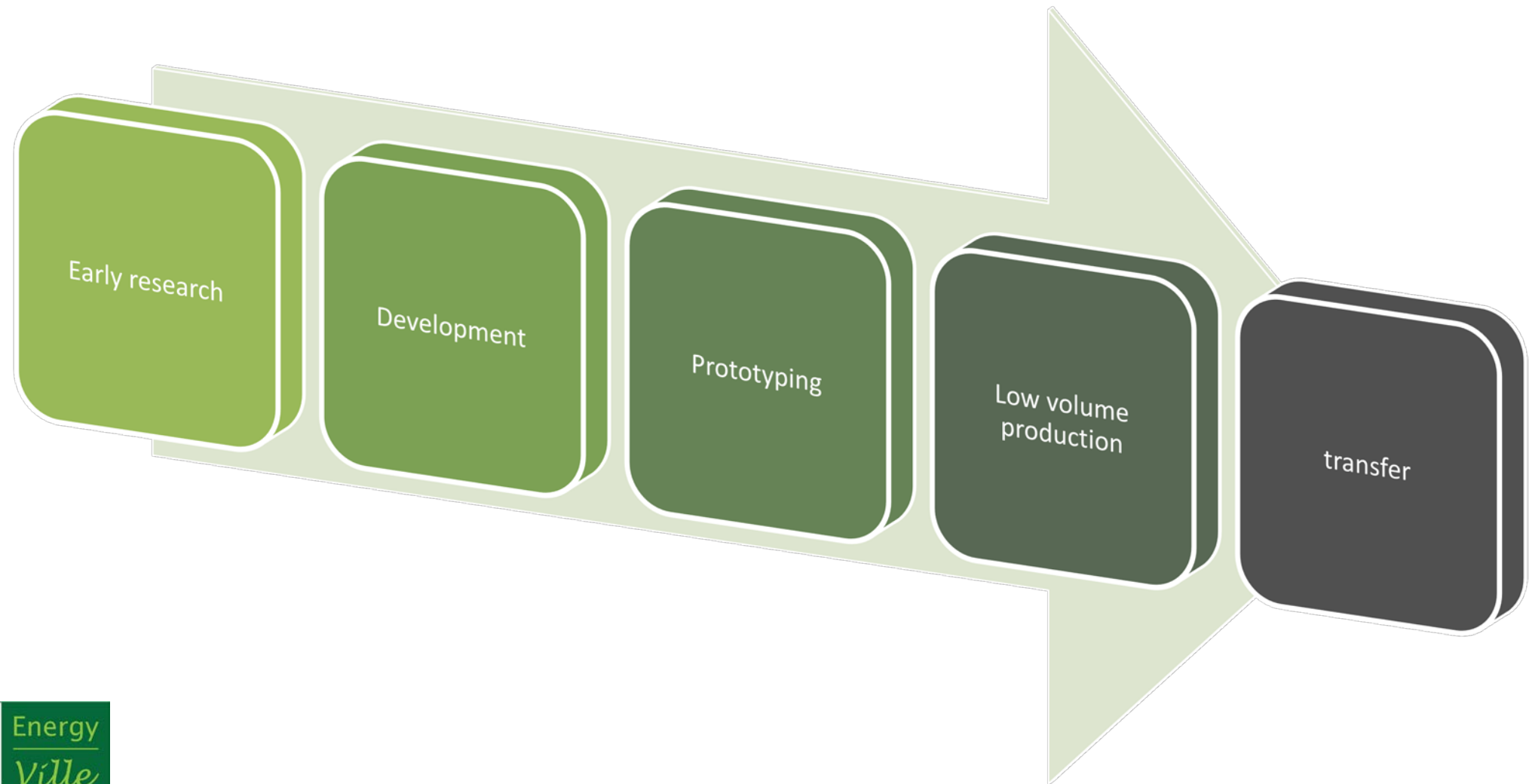


# Eco-system: Thor Park





# Innovation chain





More info?

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