

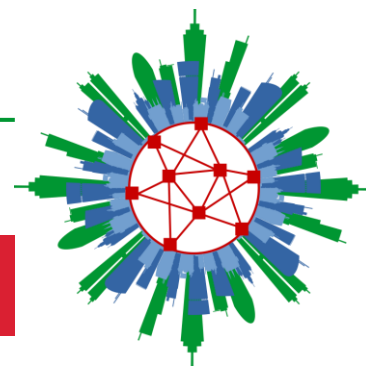


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ТЕХНОЛОГИЙН ИХ СУРГУУЛЬ

MONGOLIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

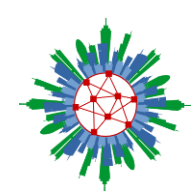
SuMoCoS

Sustainability and Mobility
in the Context of Smart Cities



Smart Mobility in the energy system, its features and challenges

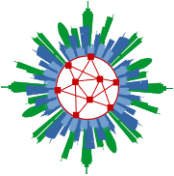
Dr. Zagdkhorol Bayasgalan, Dr.Sc. Tsetsgee Bayasgalan
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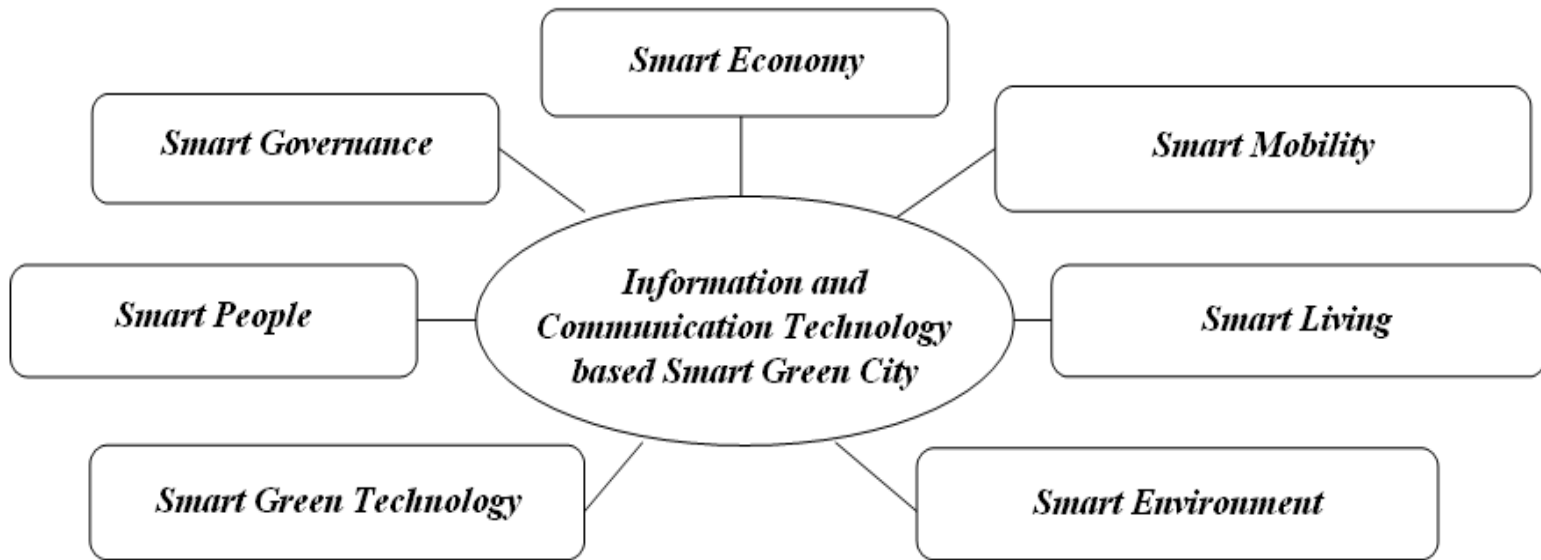
Content



- Introduction
- Smart grid concept, smart mobility in energy system
- New concept of energy system



Characters of Smart city

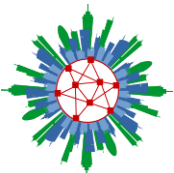


Smart Economy The economy refers to cities with "smart" industries, especially in the areas of information and communication technology as well as other industries that involve ICT in their production processes.

- Business innovation
- Competiveness of business
- Environment of finance, investment and tax
- International cooperation of the city

Smart Governance It includes political and active participation, citizenship services and the smart use of e-Government. In addition, it often relates to the use of new communication channels, such as e-government or "e-democracy"

- Transparent Governance
- Decision-making



Characters of Smart city

Smart environment Smart environment refers to the use of new technologies to protect and preserve a city's environment.

- Safety
- Building of the city
- Pollution
- Resource management
- Attractivity of natural conditions

Smart living Talking about smart living is to compile several aspects that substantially improve the quality of life of citizens.

- Cultural and living
- E-health

Smart mobility It has to do with providing the public with access to new technologies, and the use of these in everyday urban life.

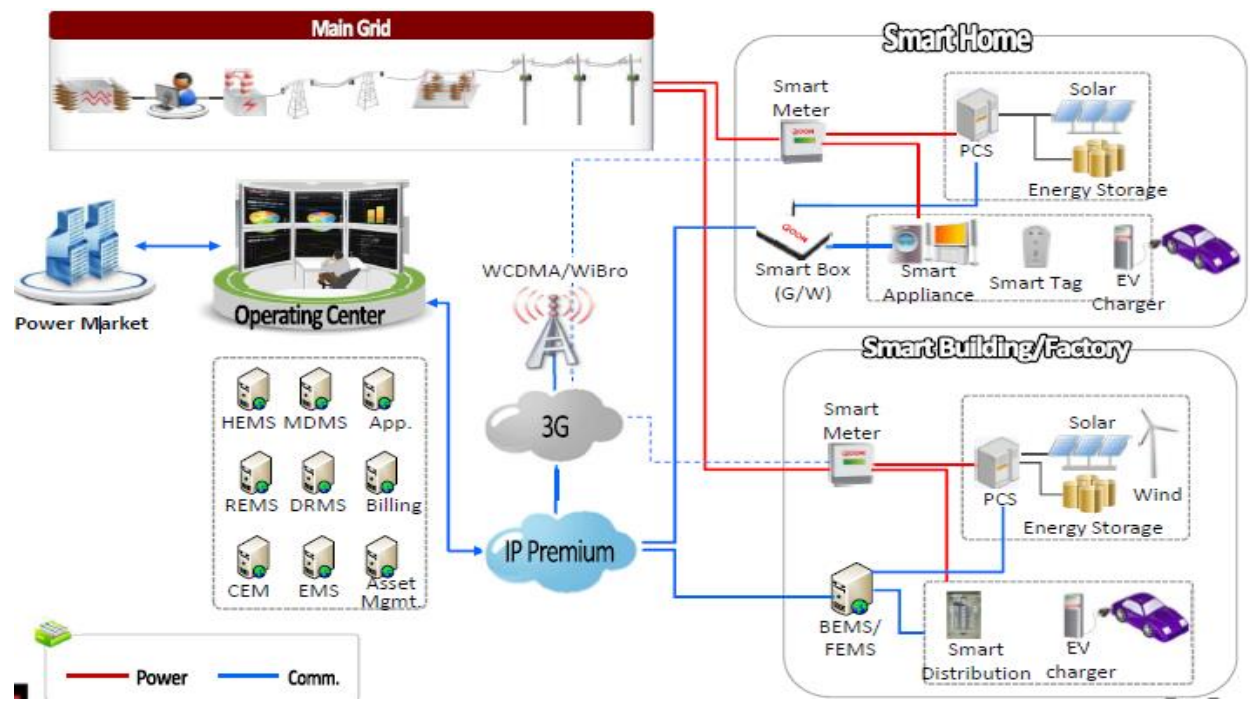
- Connectivity and ICT infrastructure
- Transport network
- **Smart Grid**

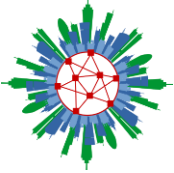
Smart people They are smart in terms of their skill and educational levels, as well as the quality of social interaction in terms of integration and public life and their ability to open to the "outside" world.

- Education
- Social
- Research and development, innovation

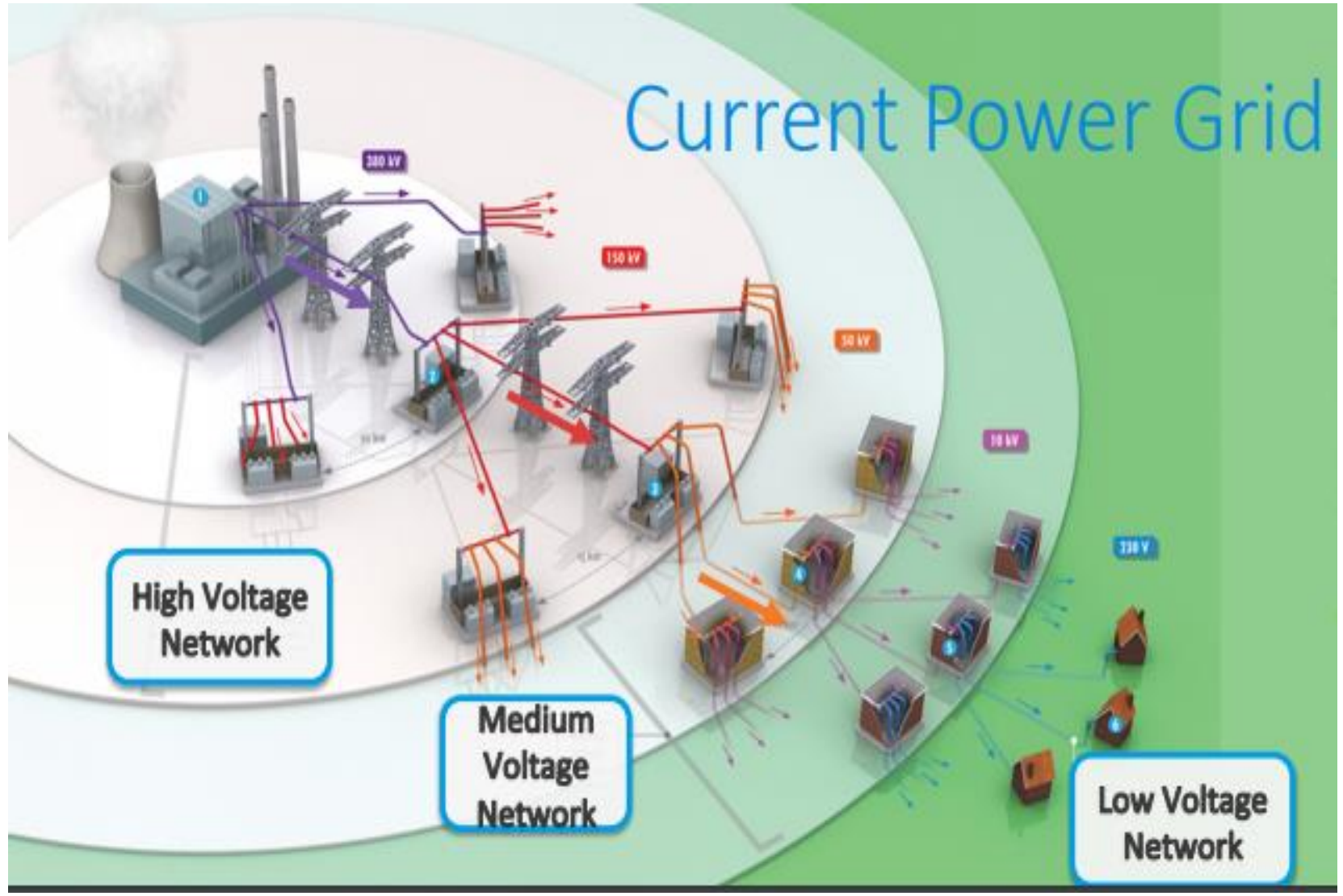
Smart technology Technological development, supported by Innovation, is essential to offer competitive products and services, R&D, promotion of innovation.

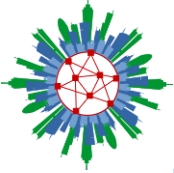
- Innovation cluster
- High technology



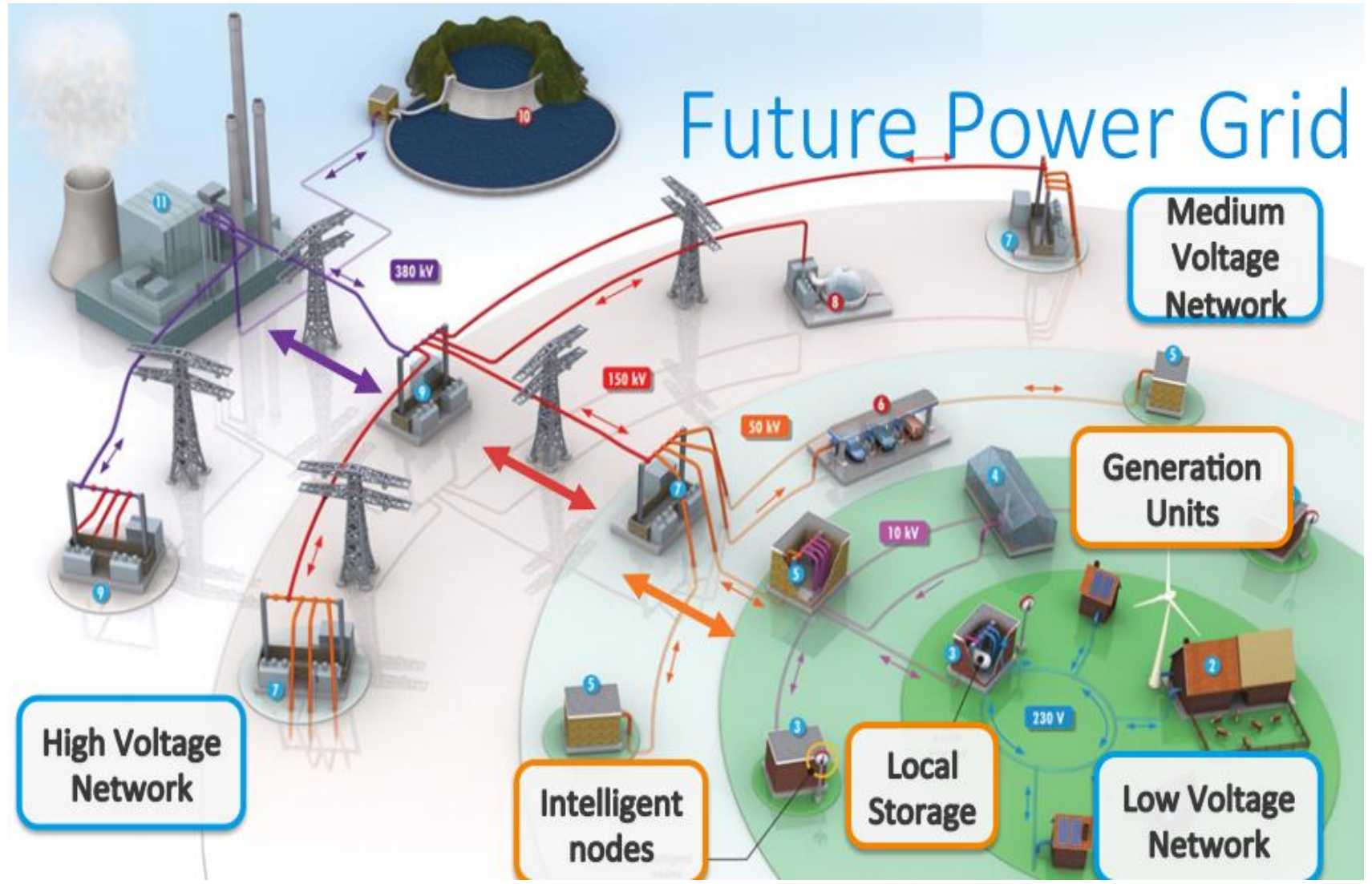


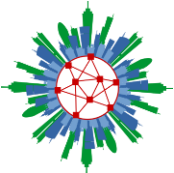
Current power energy system



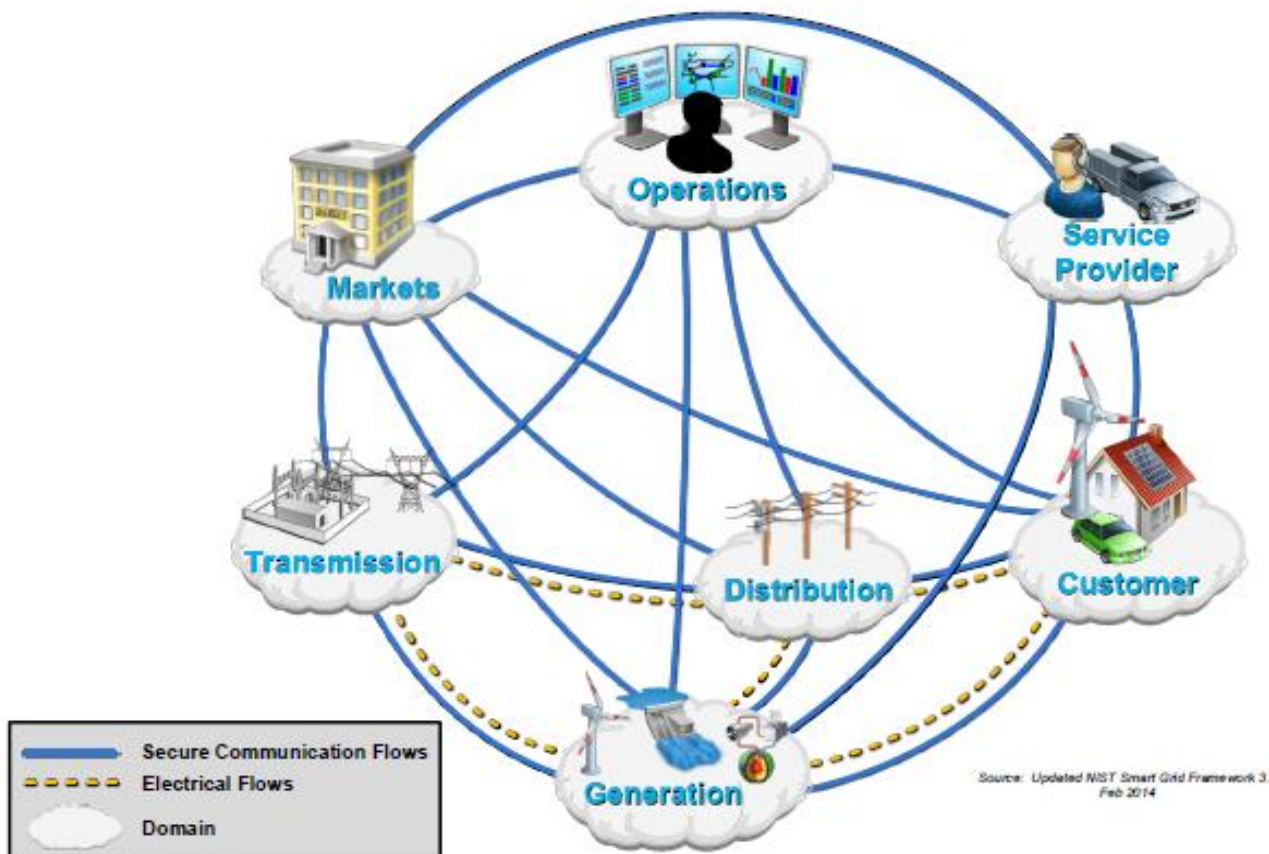


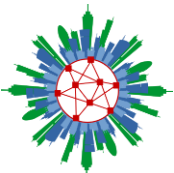
Future Power energy system



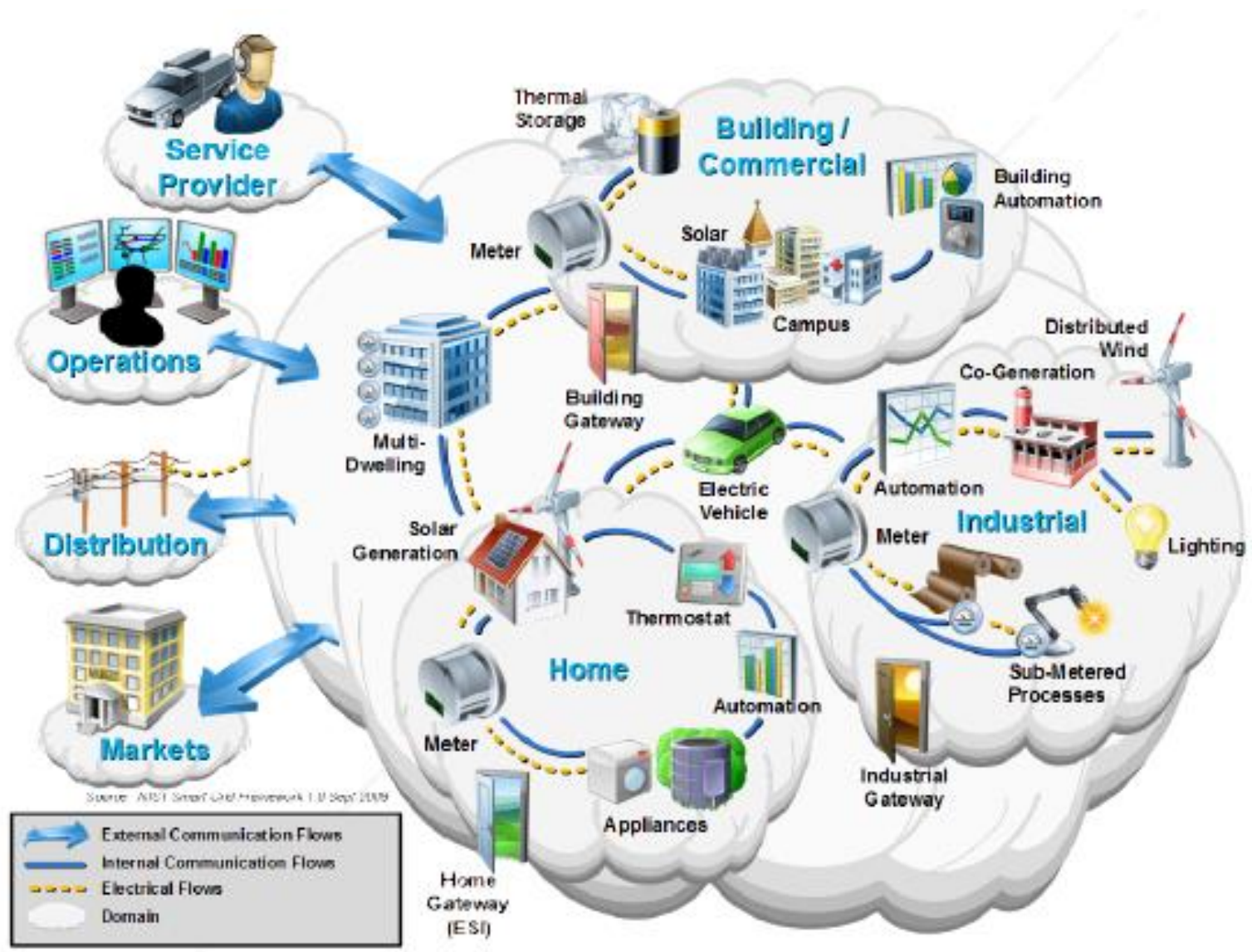


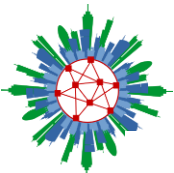
Conceptual Model



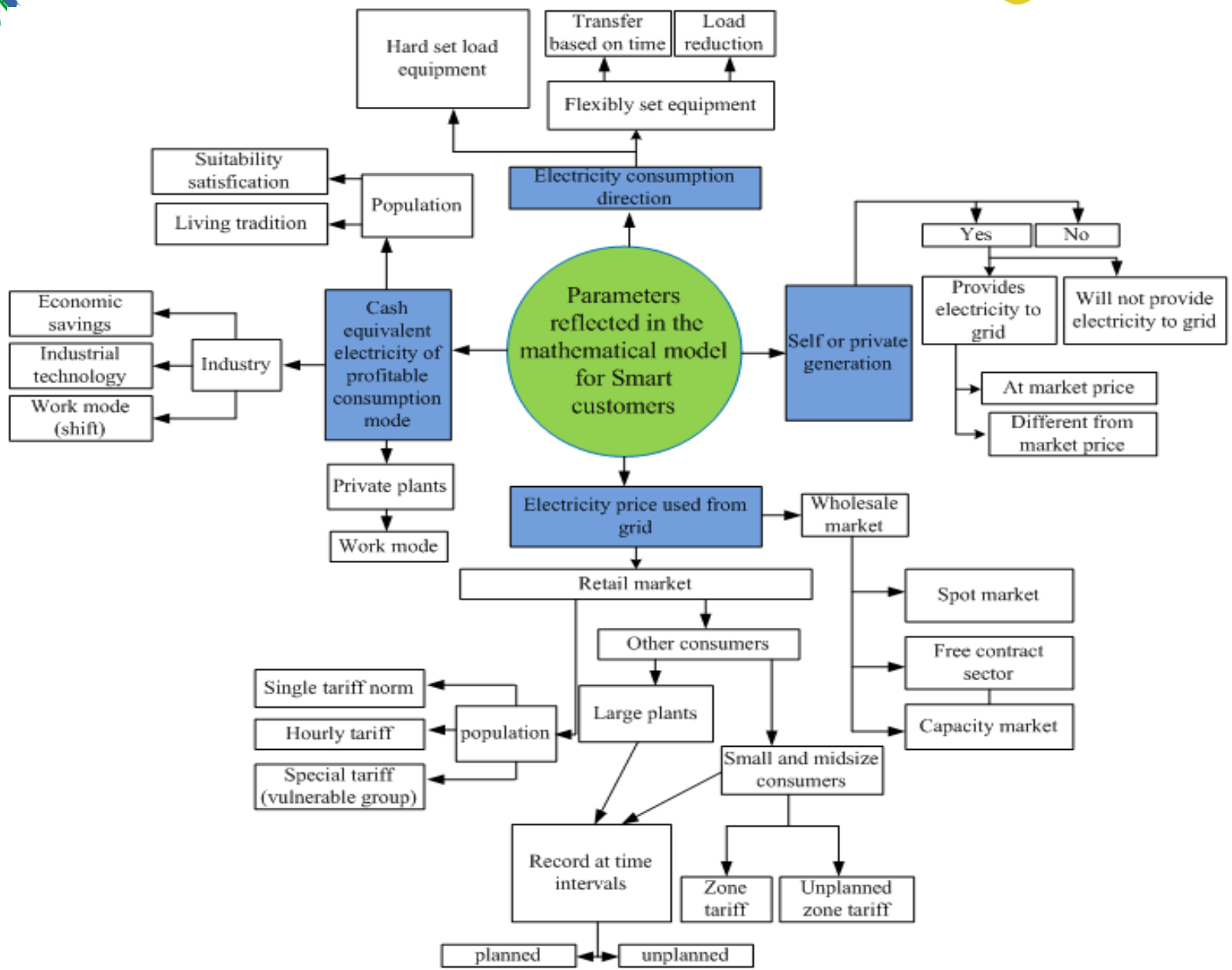


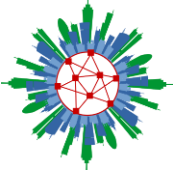
Smart user



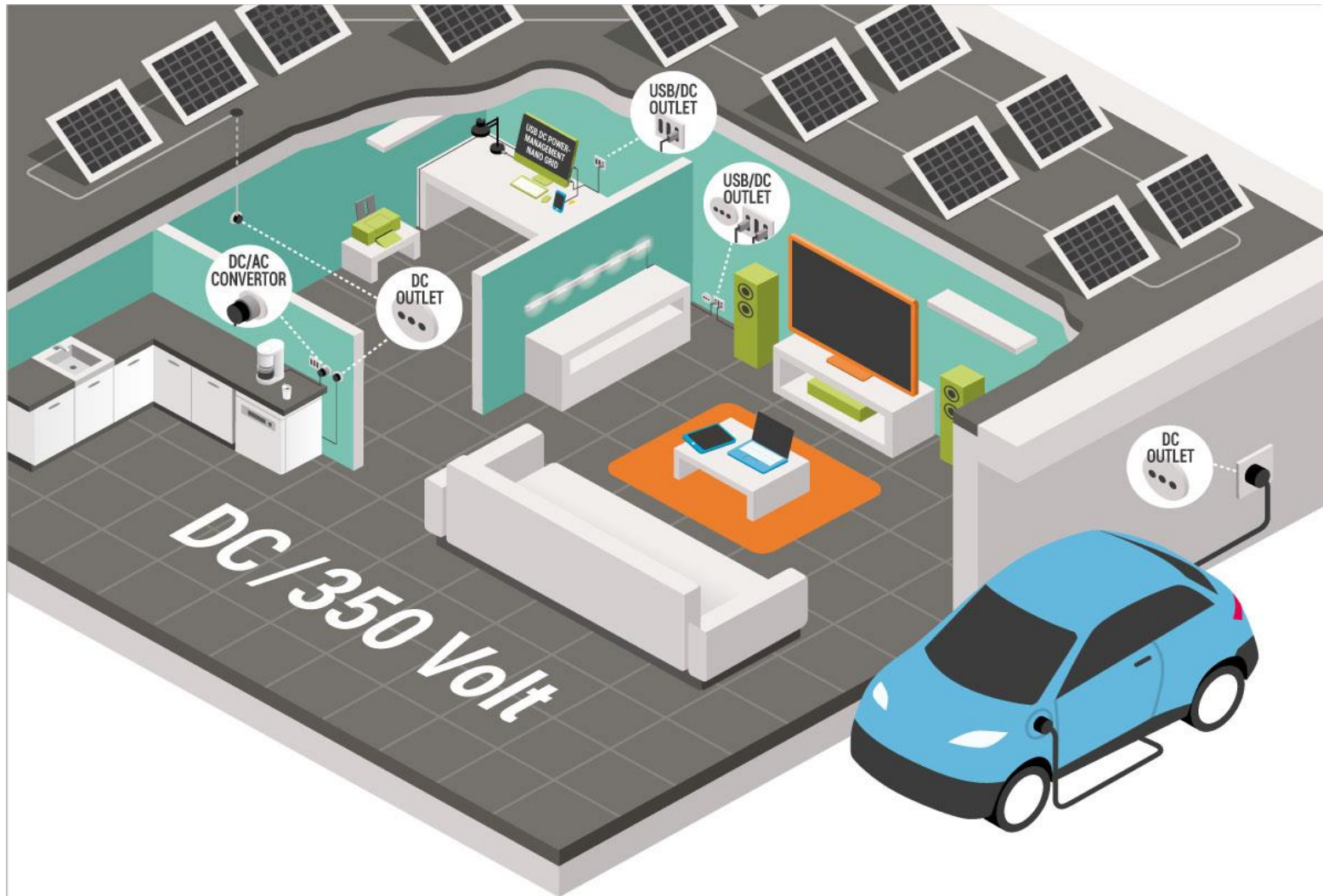


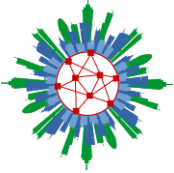
Model





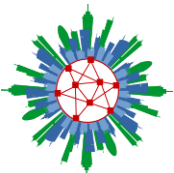
Smart DC building grid





Liquid Hydrogen Carrier





Tokyo Olympic Games; start Green Hydrogen Economy

GRENATEC
Green Renaissance through Advanced Technology

AIIB
ASIAN
INFRASTRUCTURE
INVESTMENT
BANK

ADB
Asian Development Bank
FIGHTING POVERTY IN ASIA AND THE PACIFIC

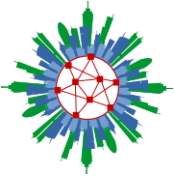
TOKYO METROPOLITAN GOVERNMENT
TOKYO 2020

H
HYDROGEN

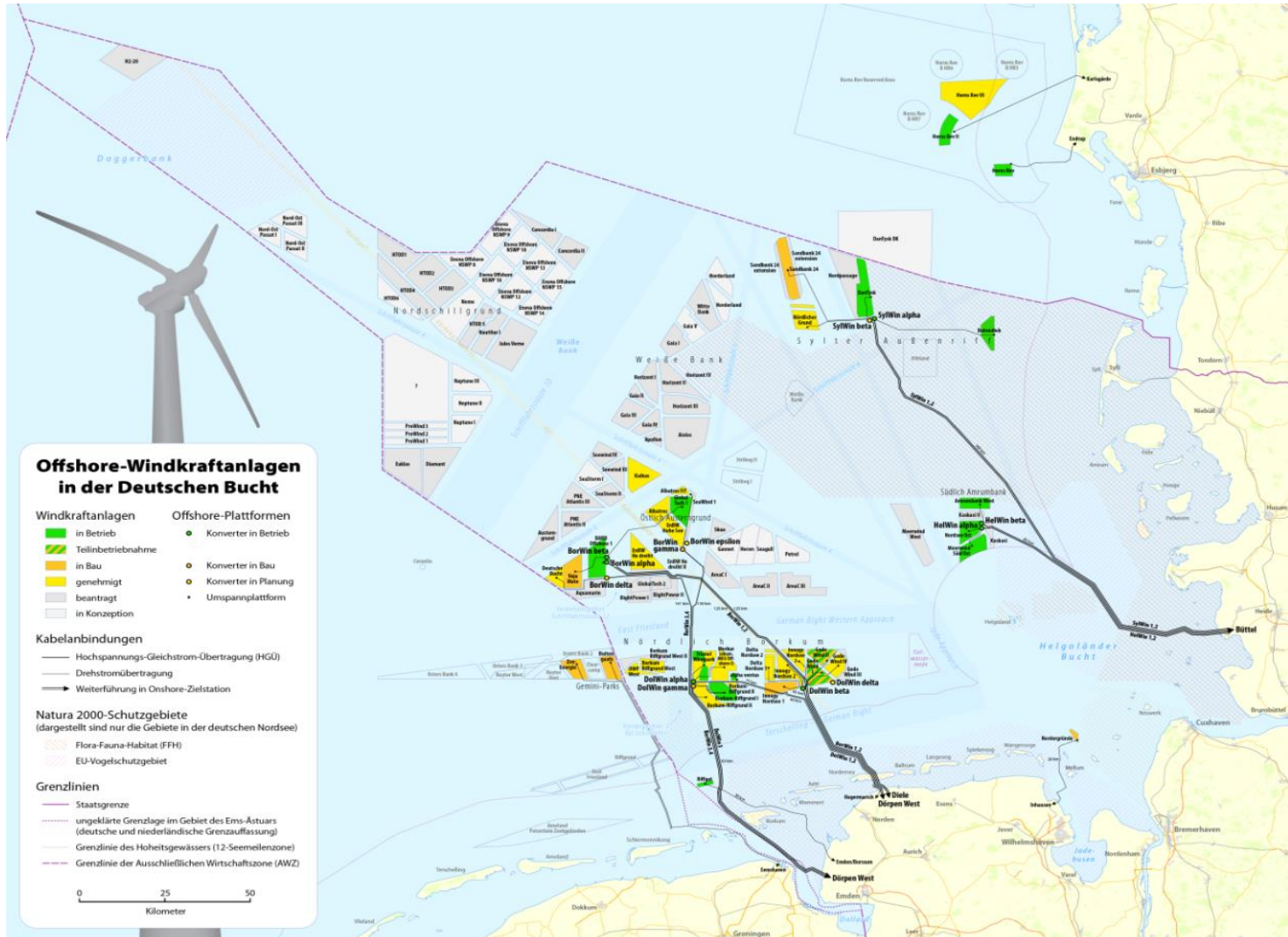
Pipeline Hydrogen Australia-China (~2035)

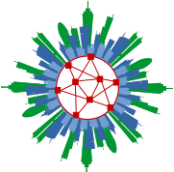
Shipborne Hydrogen Australia-Japan (~2025)

K Kawasaki
Powering your potential



Offshore Wind Development Germany



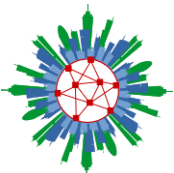


Eemshaven; The Energy Harbor



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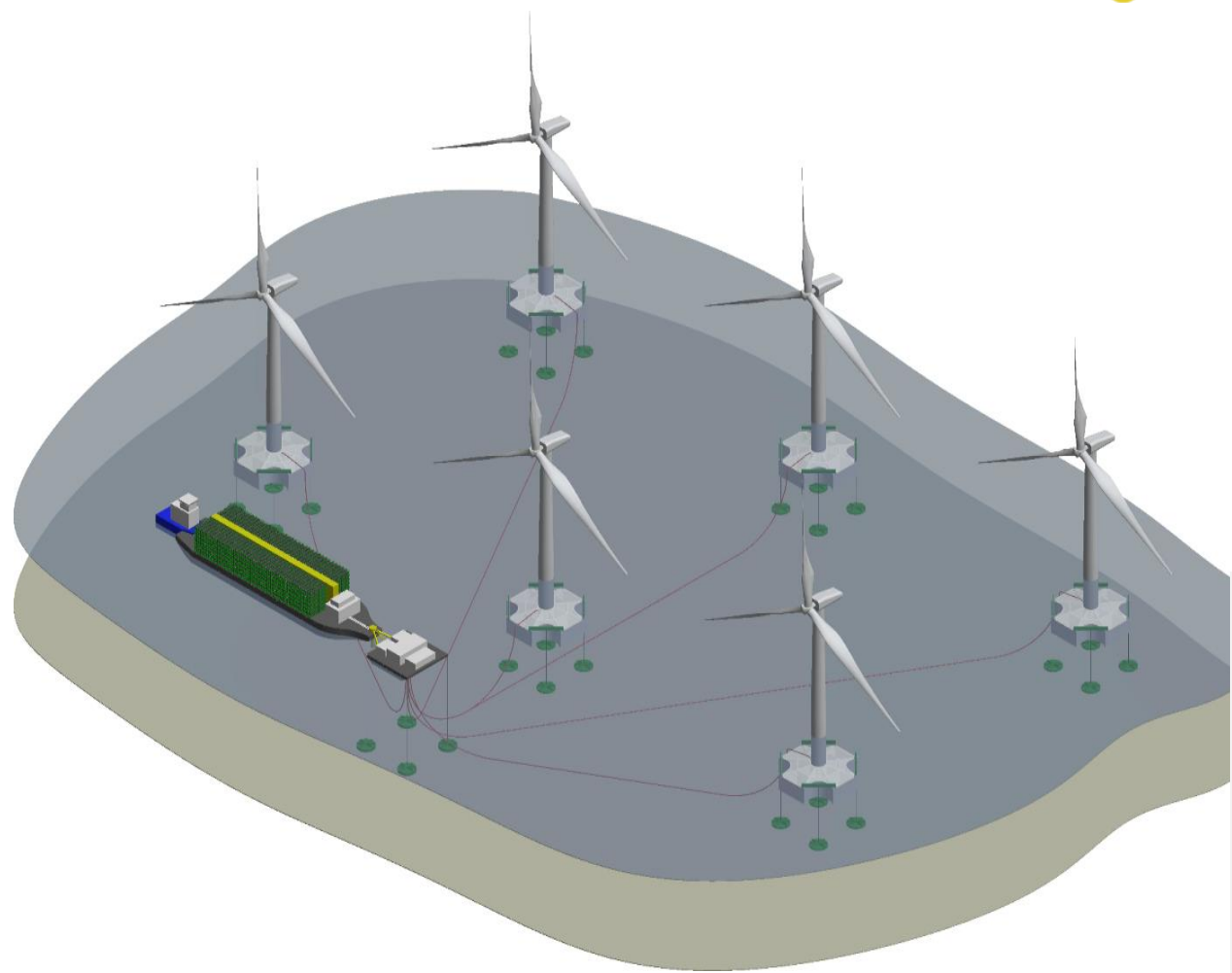


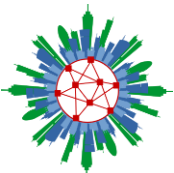


Offshore wind-hydrogen



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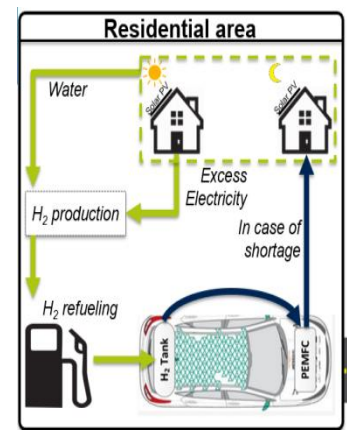


Green Hydrogen Markets -

Chemical Feedstock



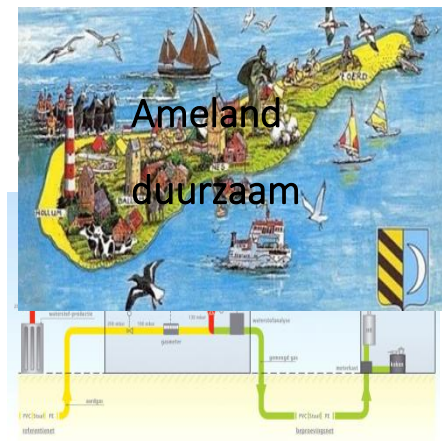
Electricity Balancing

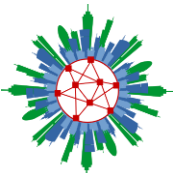


Transport

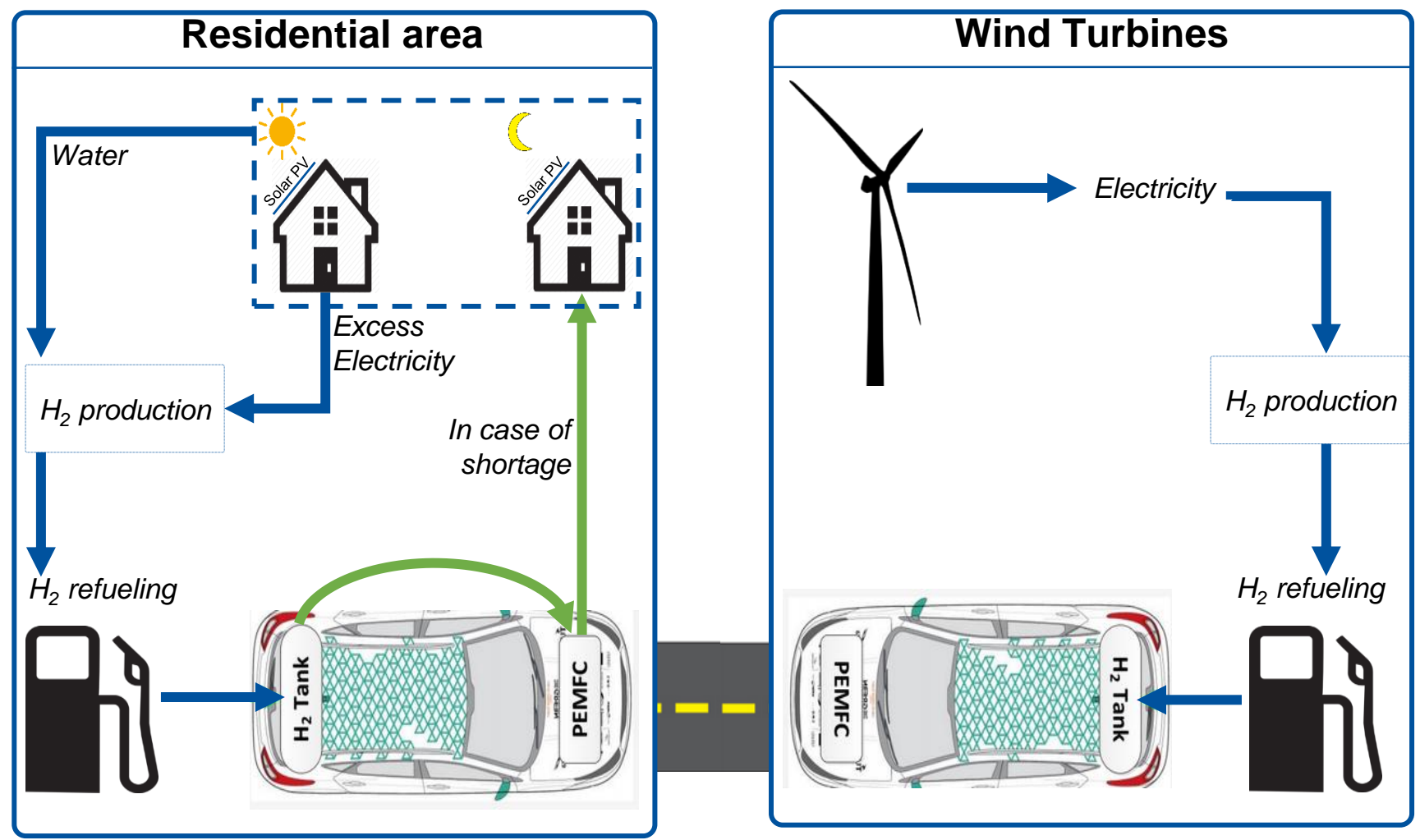


Heating

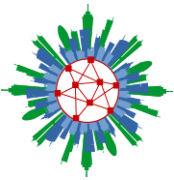




Car as home power plant



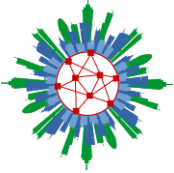
Source: *The Green Village: accelerating innovation for a sustainable future*
www.thegreenvillage.org



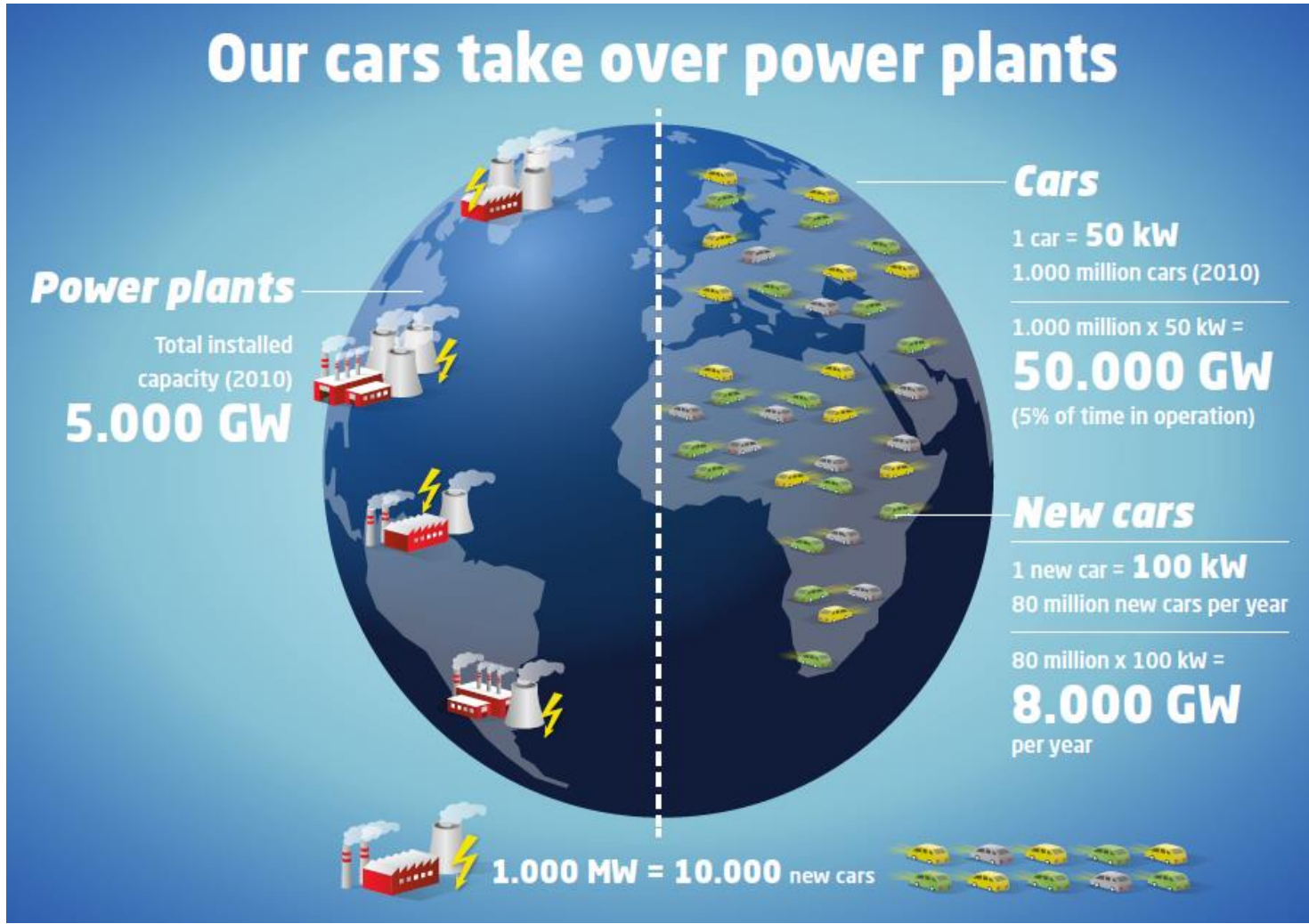
Car park power plant



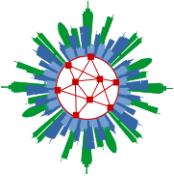
Source: <https://www.youtube.com/watch?v=q-q0N-OixMo>



Future concept of power plant

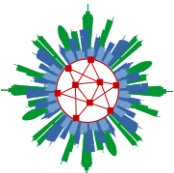


Source: Van Wijk, A. J. M., & Verhoef, L. (2014). *Our car as power plant*. IOS Press.



Challenges

1. IoE for Energy and Transportation
2. New Business models in Services and interaction of the companies into the smart city
3. Regulations, standards, safety and tax issues
4. Consumer perception – all users becoming a smart user as prosumer



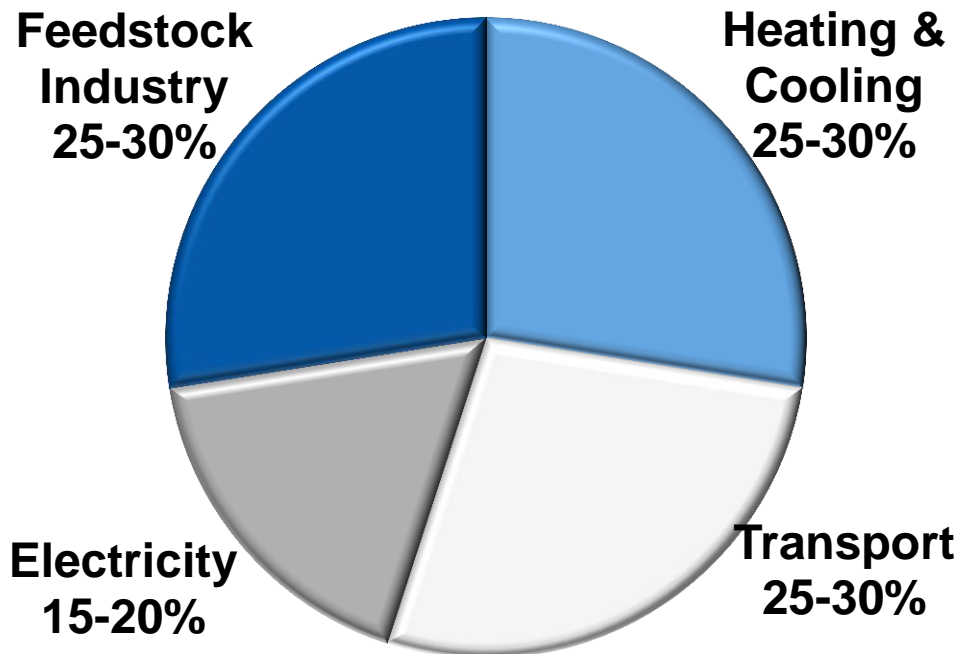
Worldwide energy system trends

All electric with hydrogen



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Trends



Energy Savings, Heat Pump, Thermal Storage

Electric, Autonomous, Hydrogen

Renewable, DC smart grids, Hydrogen

Electric, Digital, 3D Printing, Bio Based, Hydrogen



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