(EM)*POWERING AMA

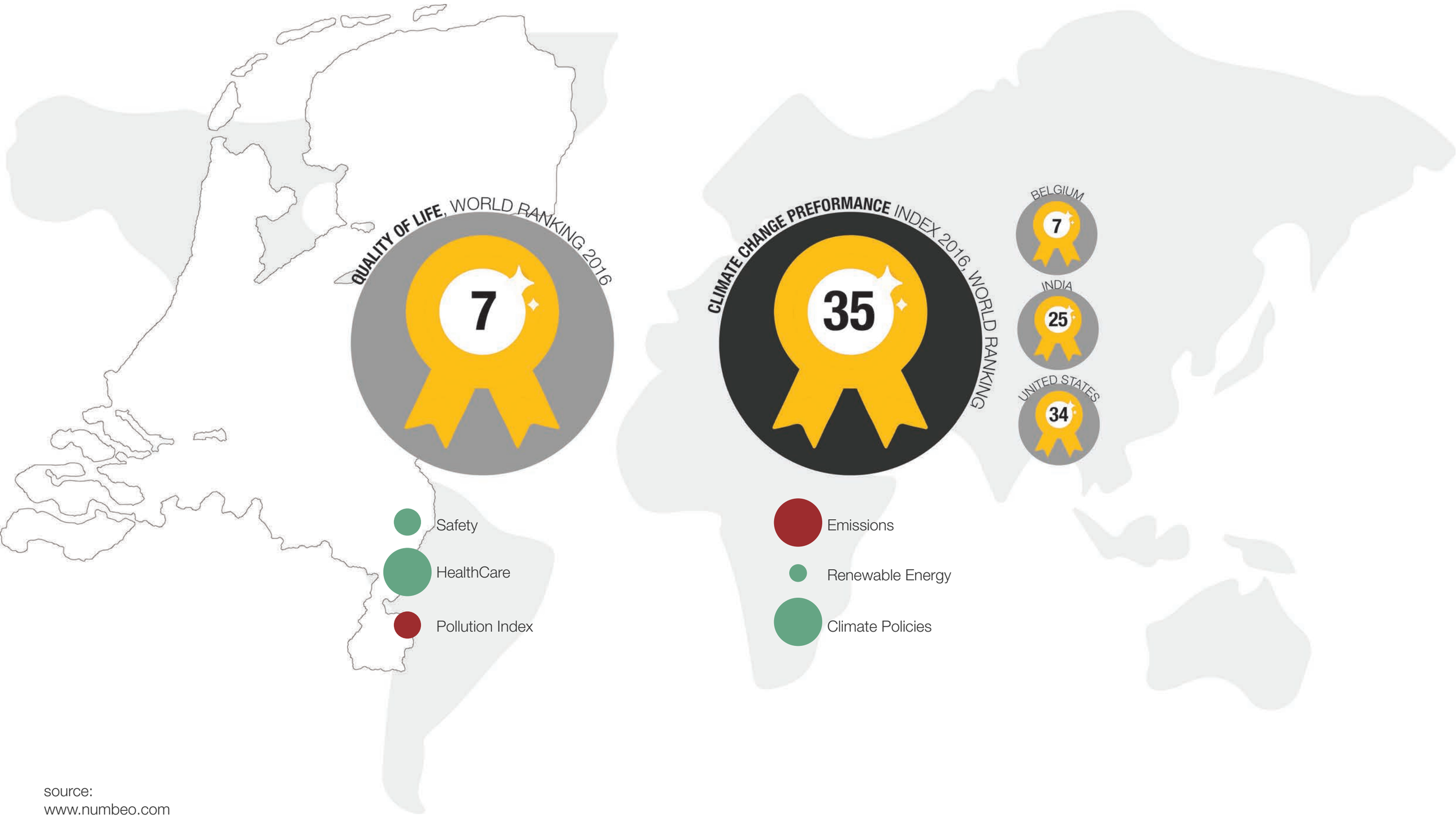
THE GREEN ENERGY TRANSITION BEYOND DUALISM

Hu Ye, Wang Yi, Karishma Asarpota, Oukje van Merle

http://www.columbusmagazine.nl/

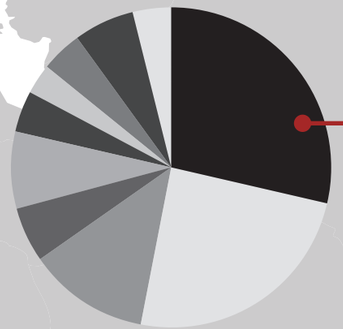
CONTEXT

NETHERLANDS IN THE GLOBAL CONTEXT



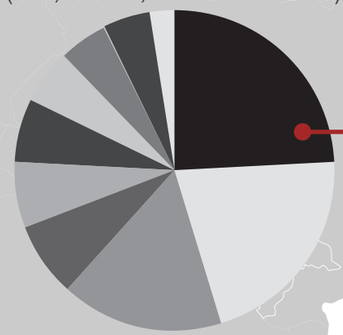
source:
www.numbeo.com
Germanwatch, Burck J., Marten, F., Bals C., *The Climate Change Preformance Index 2016*, dec. 2015

NETHERLANDS IN THE EU



28%

IMPORT MINERALS
(OIL, COAL, NATURAL GAS)



24%

EXPORT MINERALS
(OIL, COAL, NATURAL GAS)

source:
Colliers International Market Research, Top 20 Logistics ports in EU
OEC, observatory of economy complexity, http://atlas.media.mit.edu/en/

PROBLEM STATEMENT

GDP

8-10%

NATURAL GAS

25% 17 years 2034

RENEWABLE

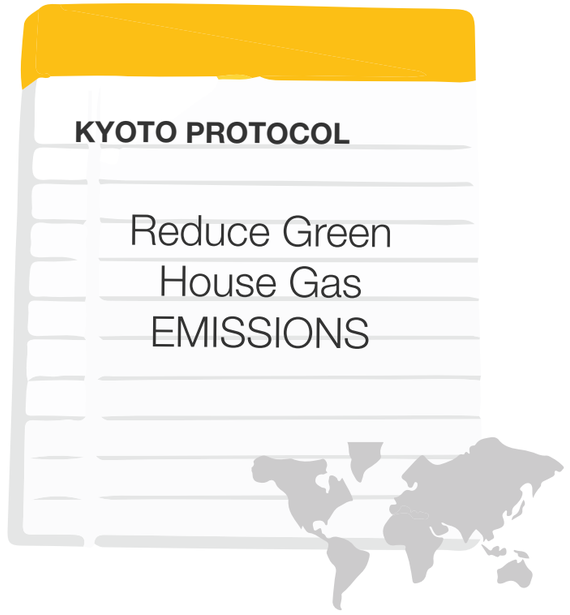
5.5%

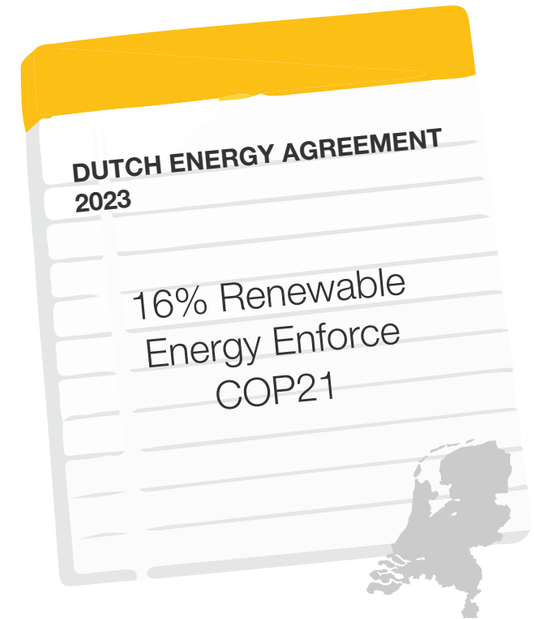
THE NETHERLANDS has a:

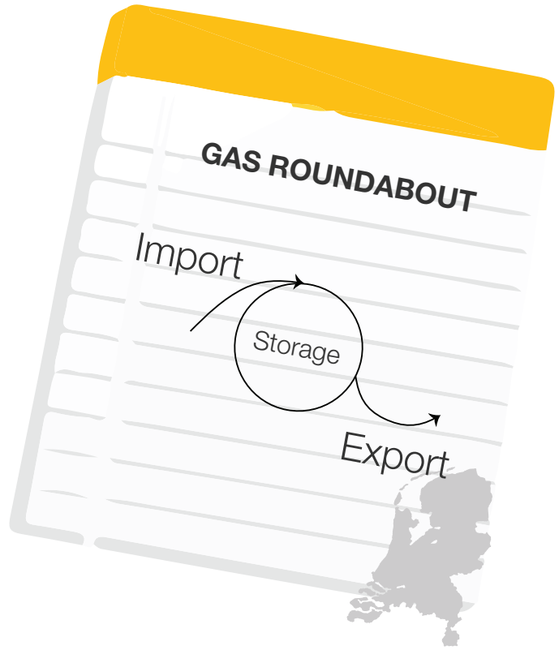
- Depencance of Economy on depleting FOSSIL FUELS
- Deterioration of the Environment due to EMISSIONS and subsequent rising temperatures
- **UNSUSTAINABLE CARBON ECONOMY**

source:
Geuns, van, J., Jong, de S., Slingerland, S. (2015) TNO, *Beeft de grond onder de voeten van de gasrotonde?* Energievoorziening 2015-2050: publieksonderzoek, Ministerie van EZ

CLIMATE POLICIES







There is an AWARENESS, but how can the policies be IMPLEMENTED and REALIZED?

Source: Geuns, van, J., Jong, de S., Slingerland, S. (2015) TNO, *Beeft de grond onder de voeten van de gasrotonde?*
http://unfccc.int/kyoto_protocol/items/2830.php
http://ozone.unep.org/en/treaties-and-decisions/montreal-protocol-substances-deplete-ozone-layer
http://www.cop21paris.org/
http://energy.sia-partners.com/dutch-energy-agreement-2013-2023
https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2020-energy-strategy

TWO FACES OF THE NETHERLANDS

VISION FOR A
NEW FUTURE

DEPENDENCE ON
THE OLD SYSTEM

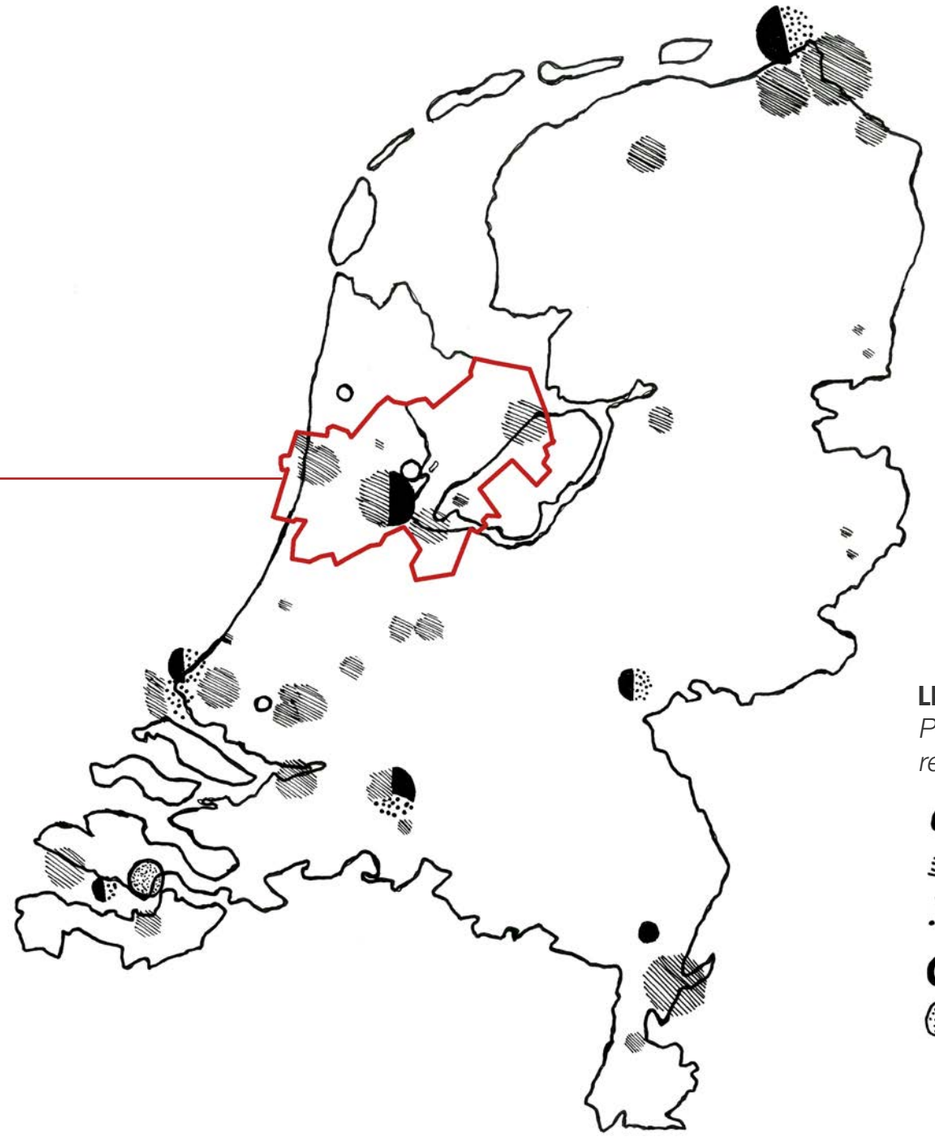
WHAT IS THE CONTRIBUTION OF AMA?

5.2%
LANDMASS

18%
POPULATION

14%
PRODUCTION

16,7%
CONSUMPTION



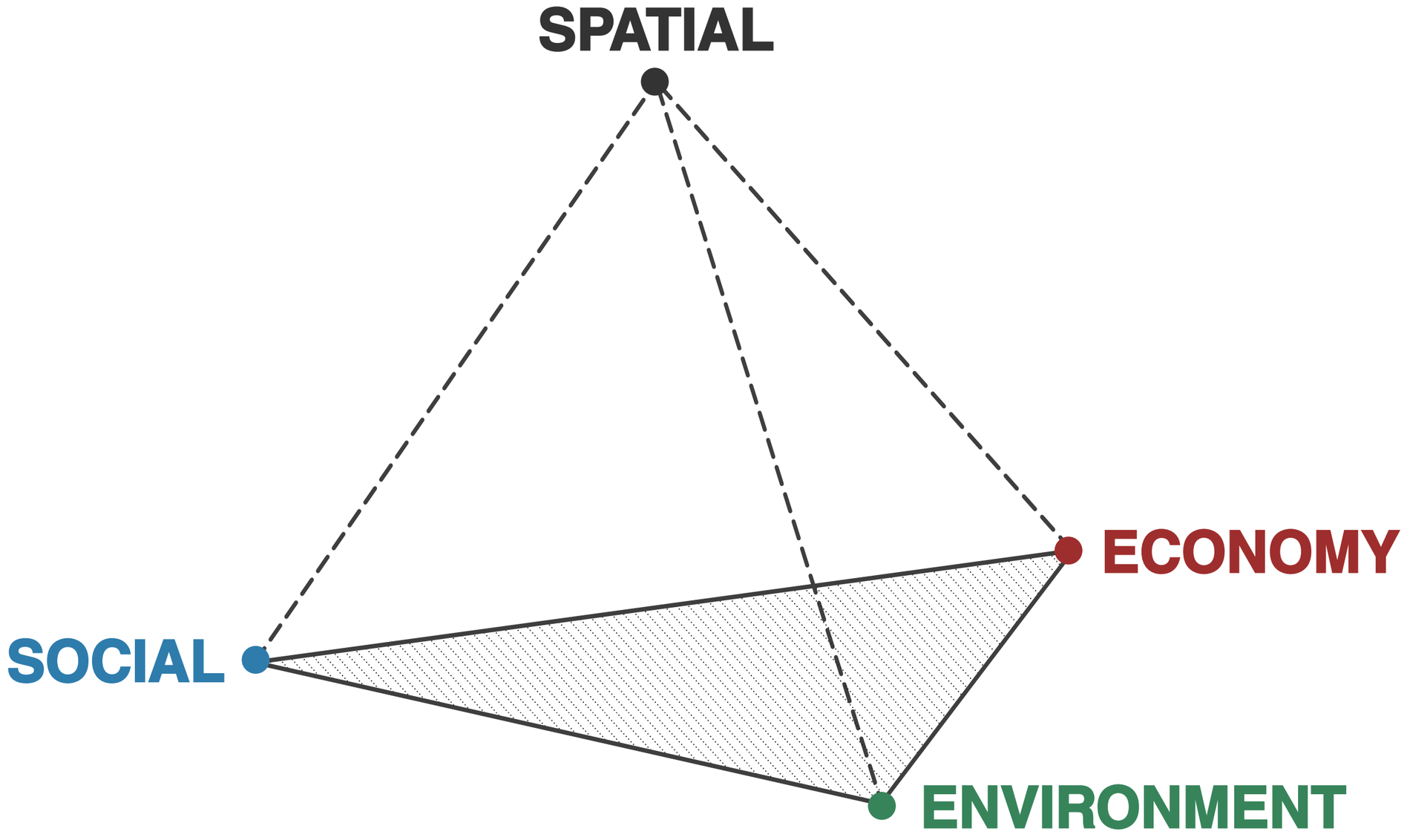
LEGEND
PowerPlants, seize and input resources, Netherlands

- Coal
- Natural Gas
- Biomass
- Waste
- Nuclear

source:
Bree, T., van et all. 2017. Economische Verkenning Metropoolregio Amsterdam 2017. Amsterdam. Gemeente Amsterdam, Economische Zaken
Noordhofff Atlasproducties. 2013. *De Bosatlas, Nederland van boven*. Groningen
www.cbs.nl

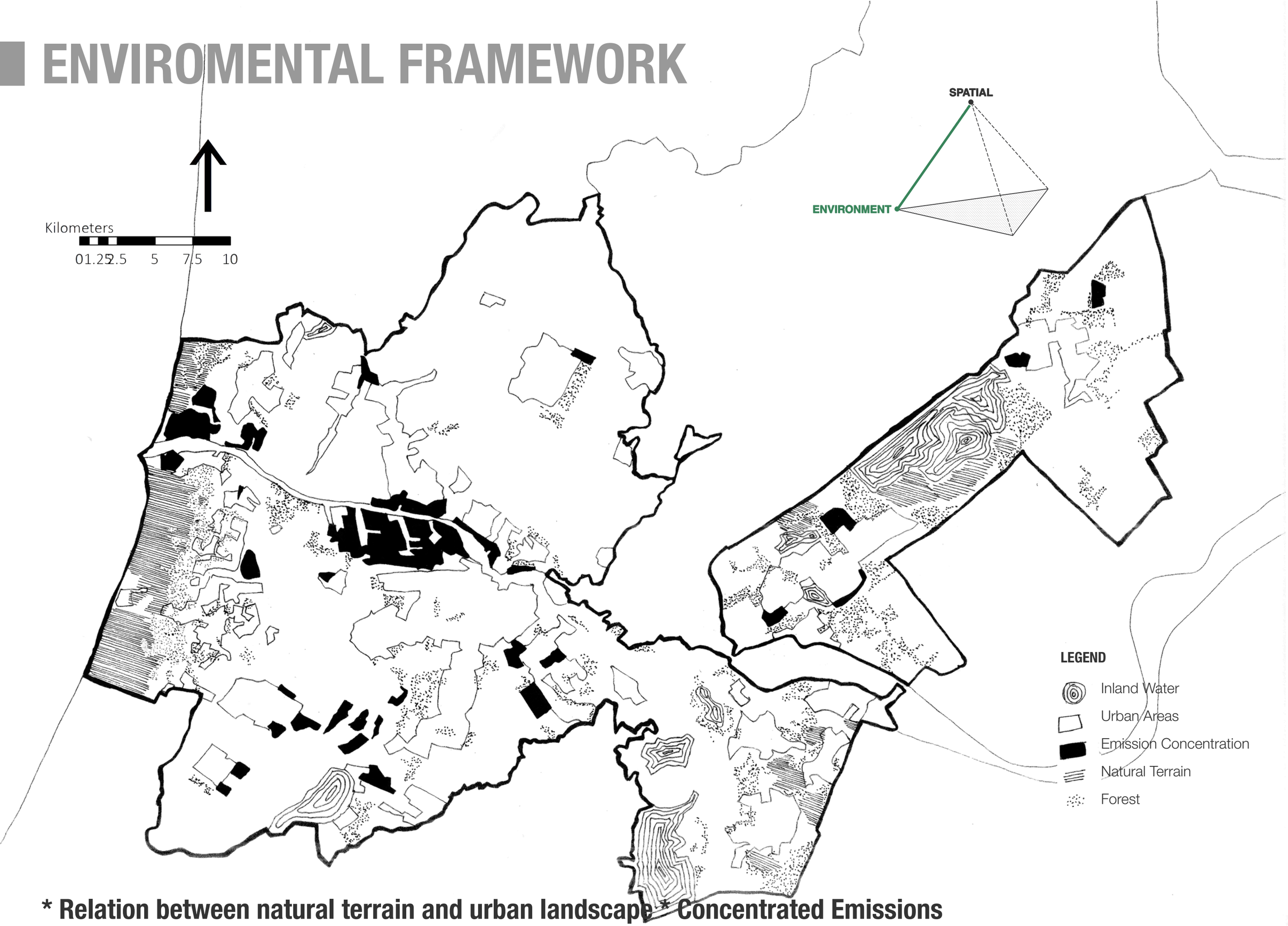
REGIONAL STRUCTURE ANALYSIS

ANALYSIS FRAMEWORK



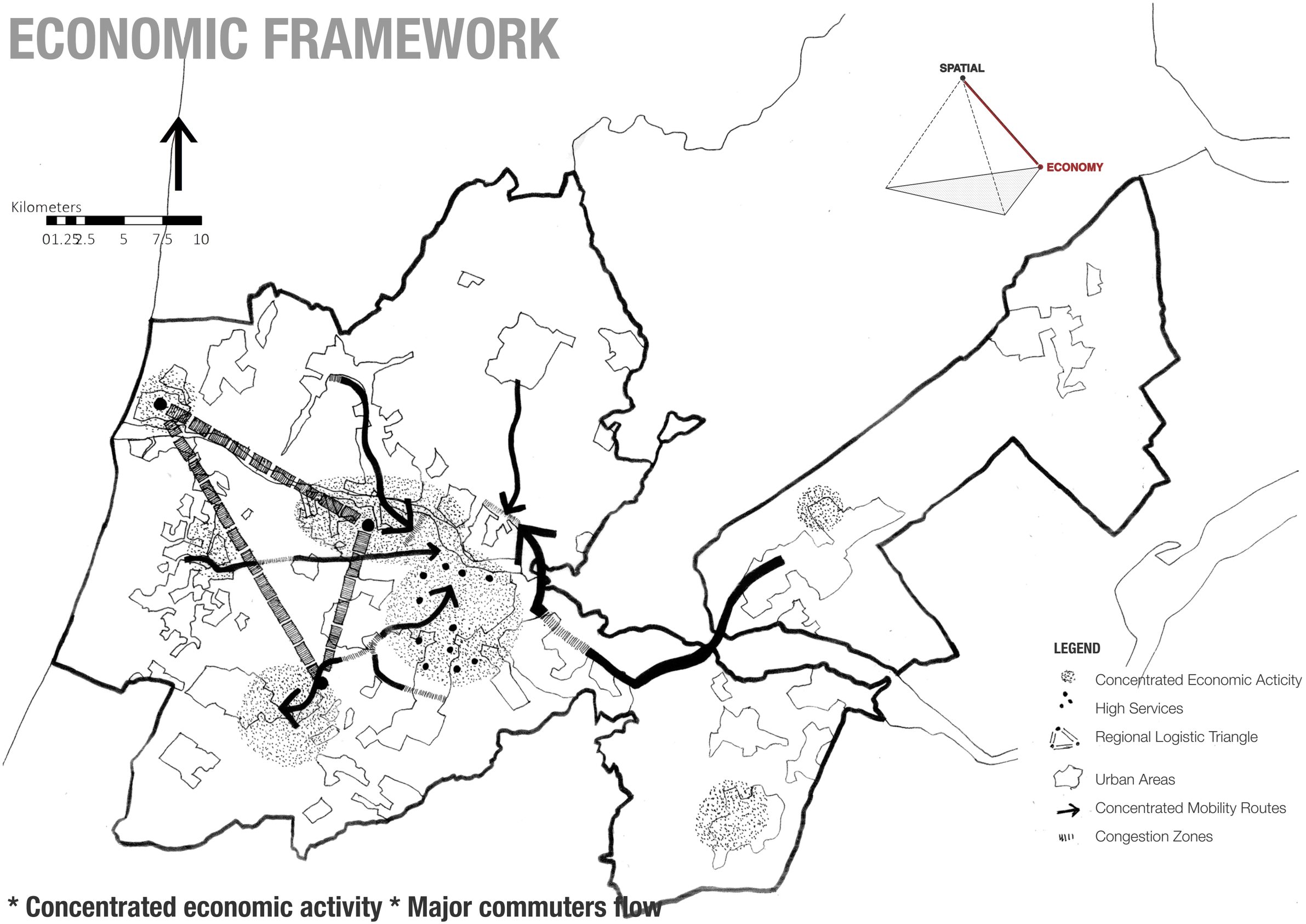
source:
NIJKAMP P. & BERGH, van den C.J.M & SOETEMAN, F.J., 1990. Regional Sustainability Development and Natural Resource Use, World Bank Economic Review, Oxford Academic.

ENVIROMENTAL FRAMEWORK



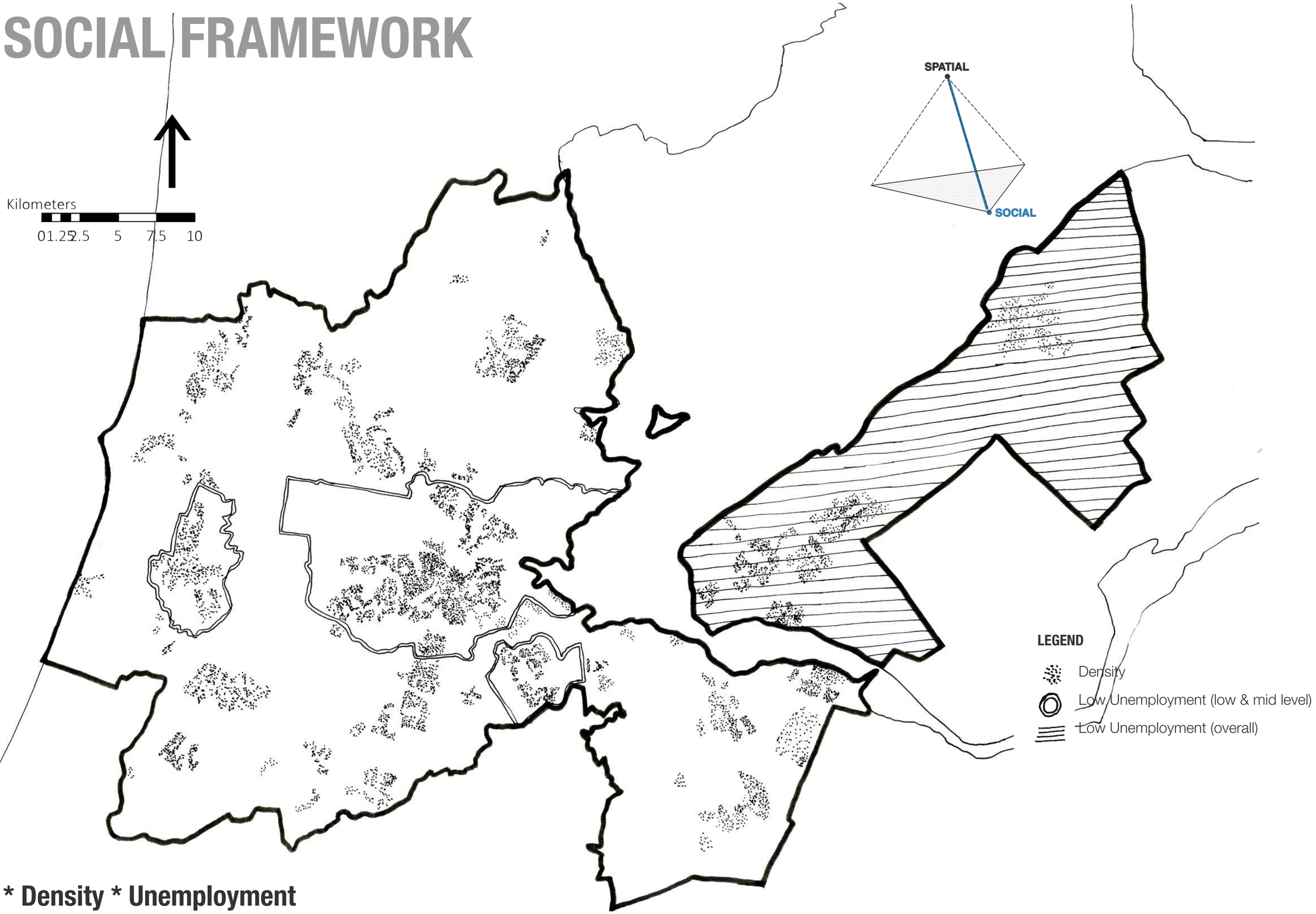
*** Relation between natural terrain and urban landscape * Concentrated Emissions**

ECONOMIC FRAMEWORK

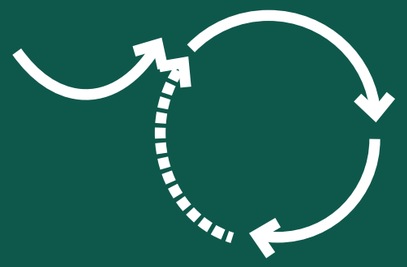


*** Concentrated economic activity * Major commuters flow**

SOCIAL FRAMEWORK

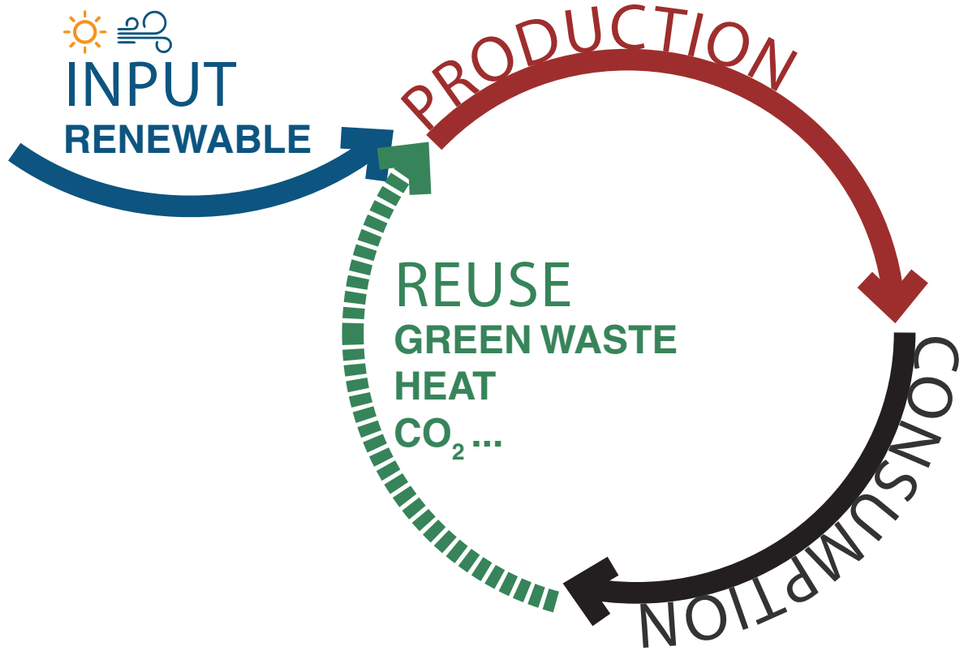


*** Density * Unemployment**



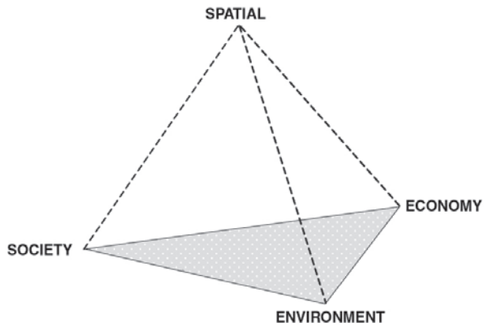
CIRCULAR ECONOMY

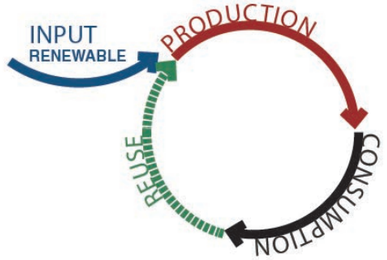
RELATIONSHIP between GREEN ENERGY and CIRCULAR ECONOMY



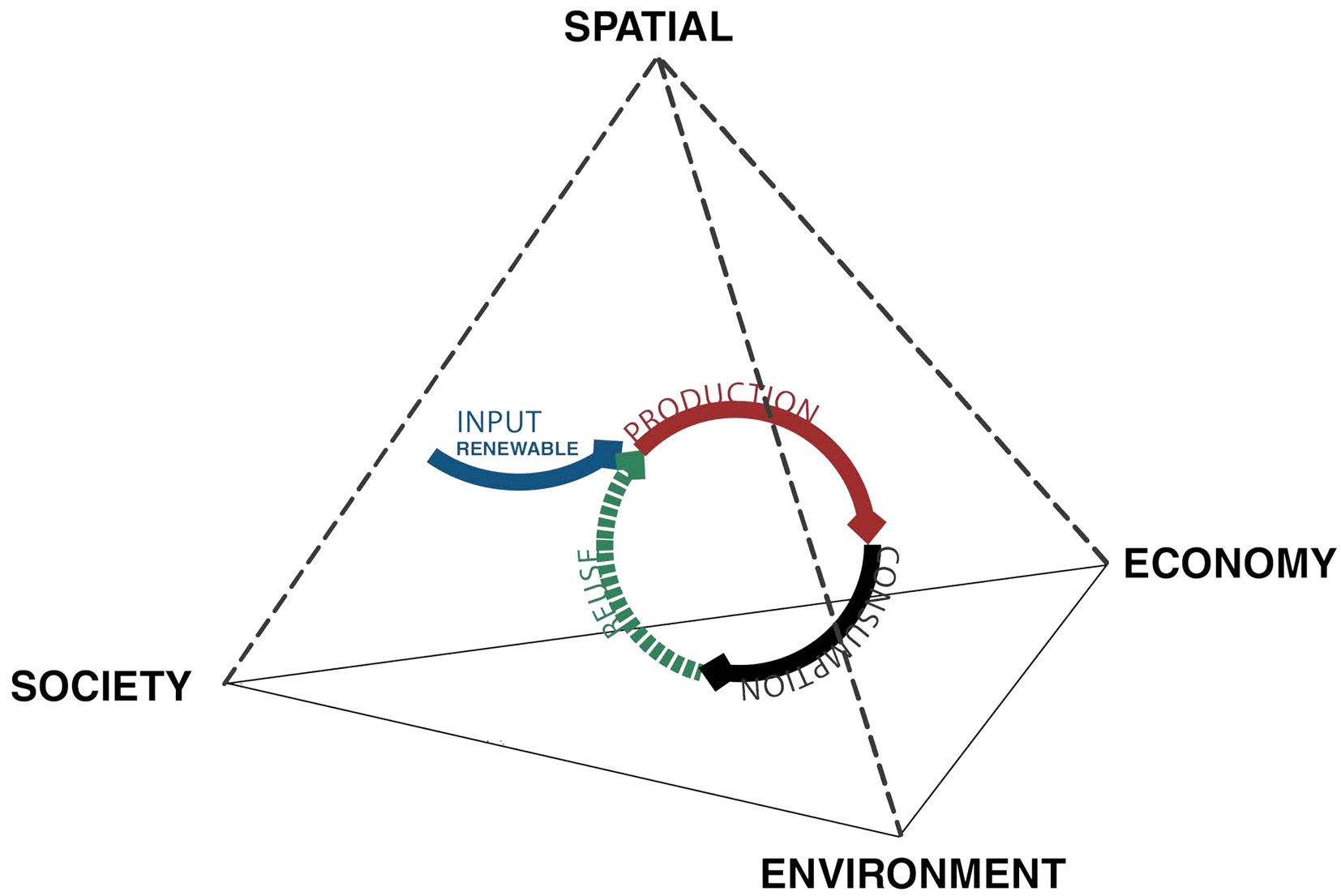
GREEN ENERGY ECONOMIC MODEL

OBJECTIVE

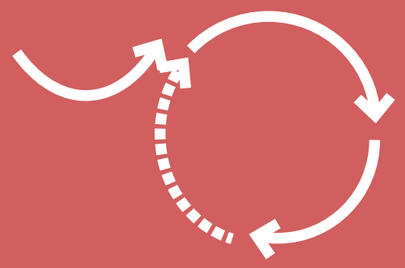




GREEN ENERGY ECONOMY as CATALYSER

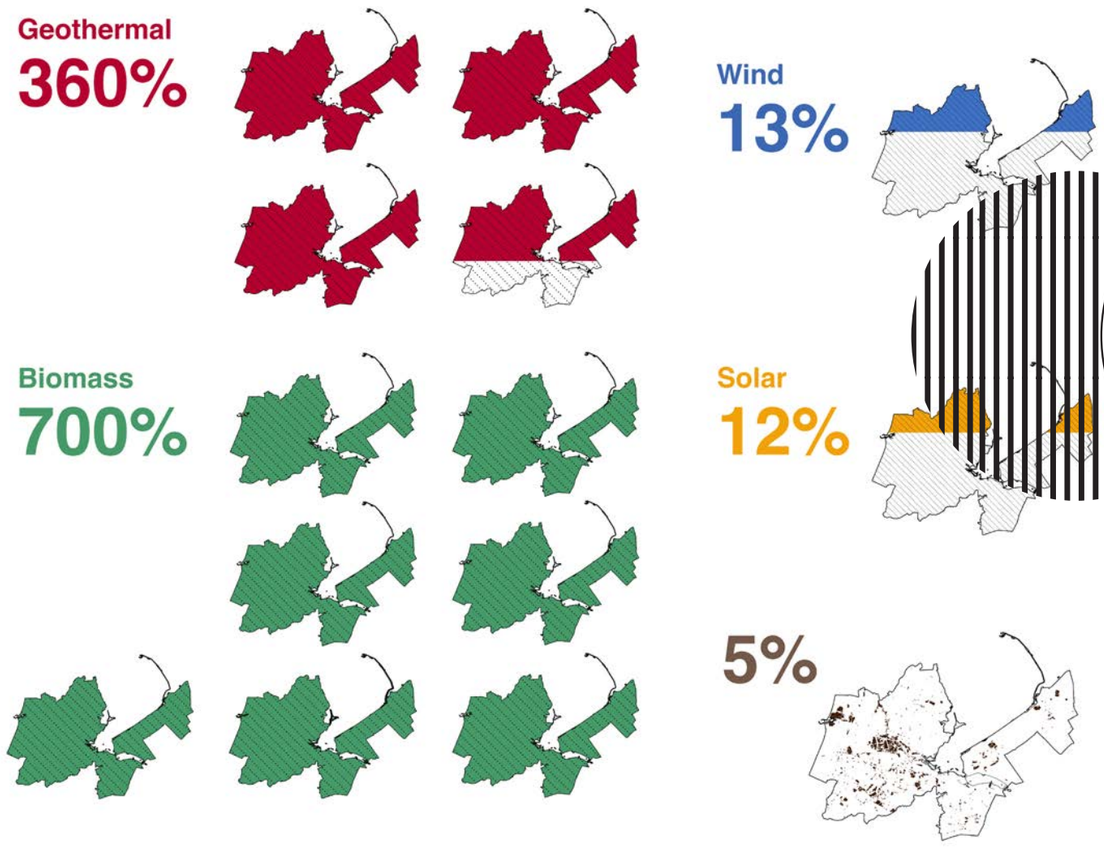


Explore the ENVIRONMENTAL, ECONOMIC and SOCIAL potential of the AMA to make a transition towards A GREEN ENERGY ECONOMIC MODEL.

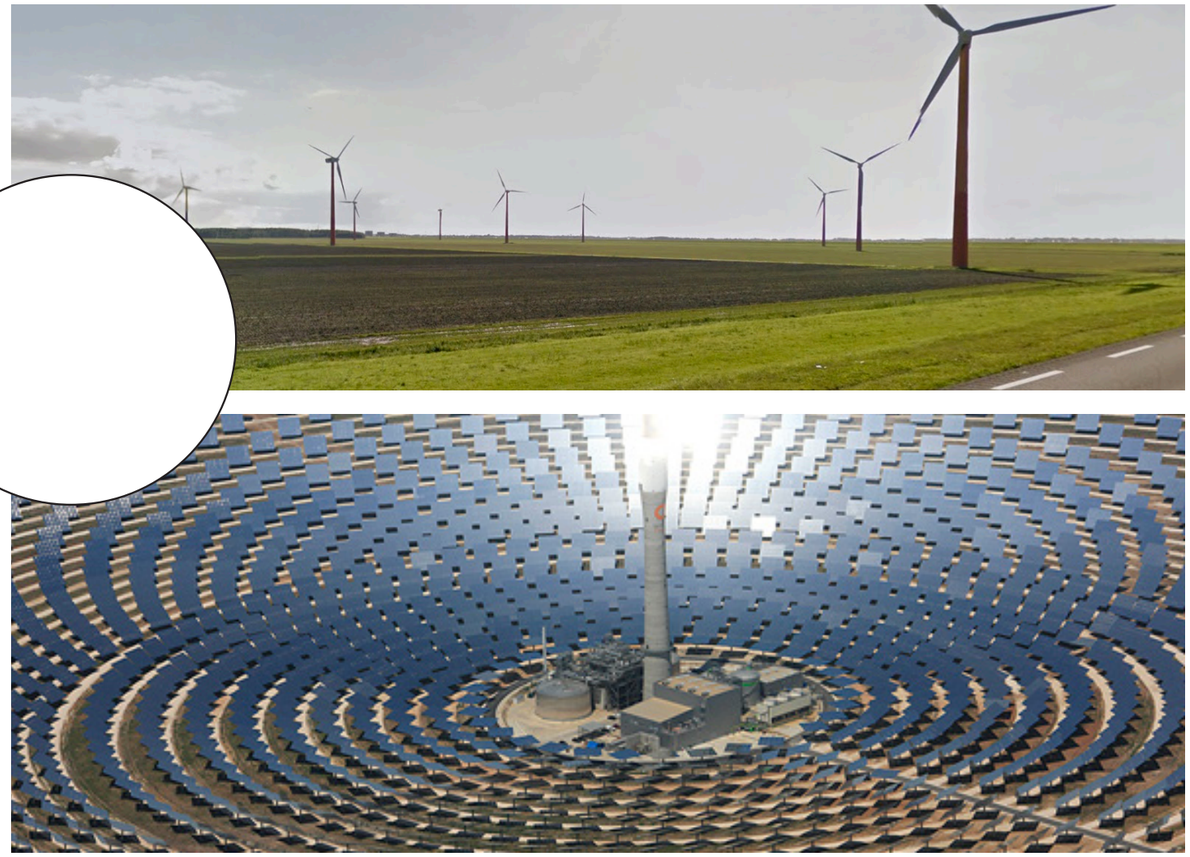


GREEN ENERGY ANALYSIS

ENVIRONMENT



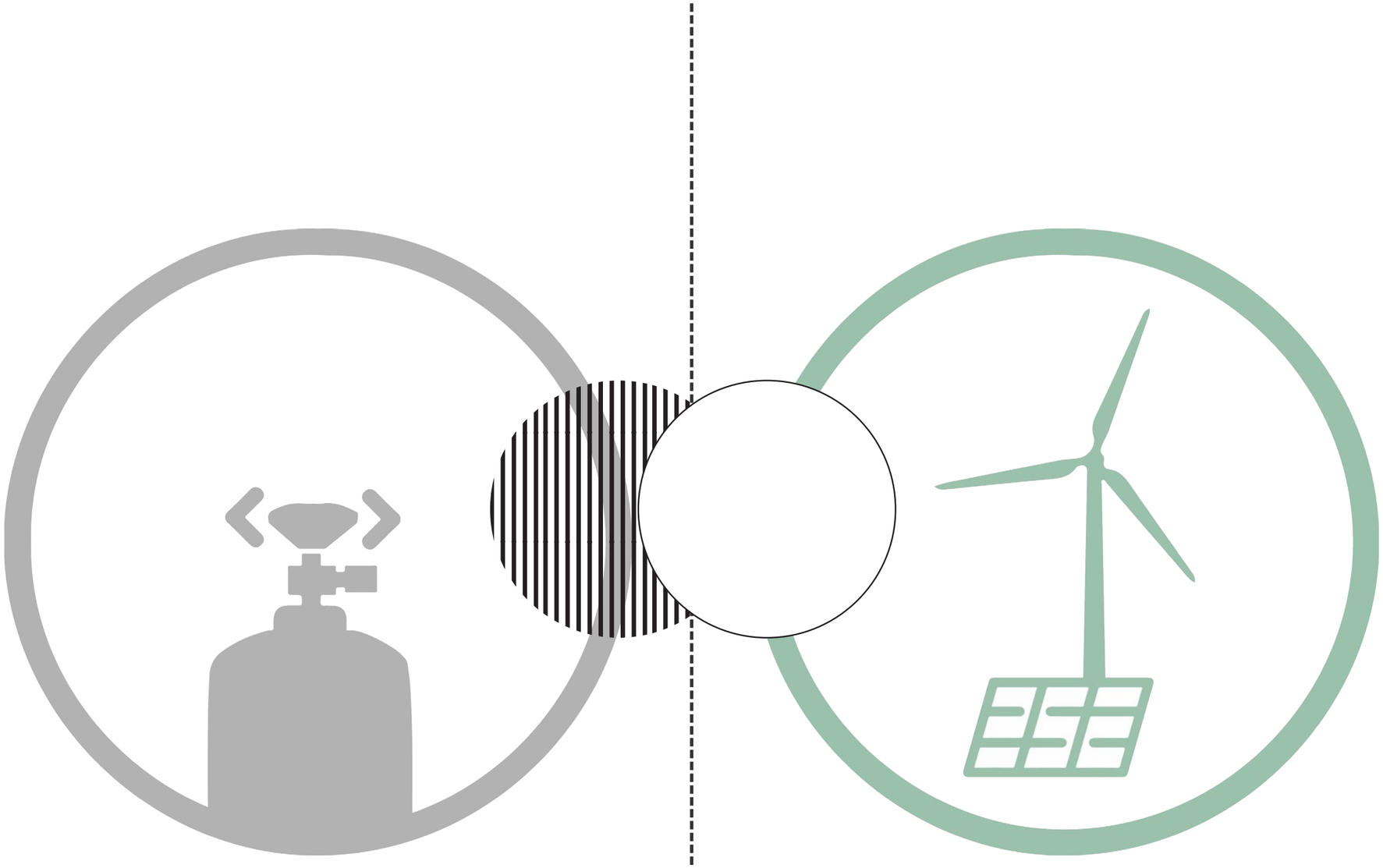
LAND NEEDED



SPATIAL QUALITY

source:
www.cbs.nl, nationaalgeoregister.n
Sijmons, D., Hugtenburg, J., van Hoorn, A., & Feddes, F. (Eds.). (2014). Landscape and energy: Designing transition.

ECONOMY



ECONOMIC INTEREST
01. PUBLIC 02. PRIVATE

DEVELOPMENT PRIORITY

source:
Sijmons, D., Hugtenburg, J., van Hoorn, A., & Feddes, F. (Eds.). (2014). Landscape and energy: Designing transition.

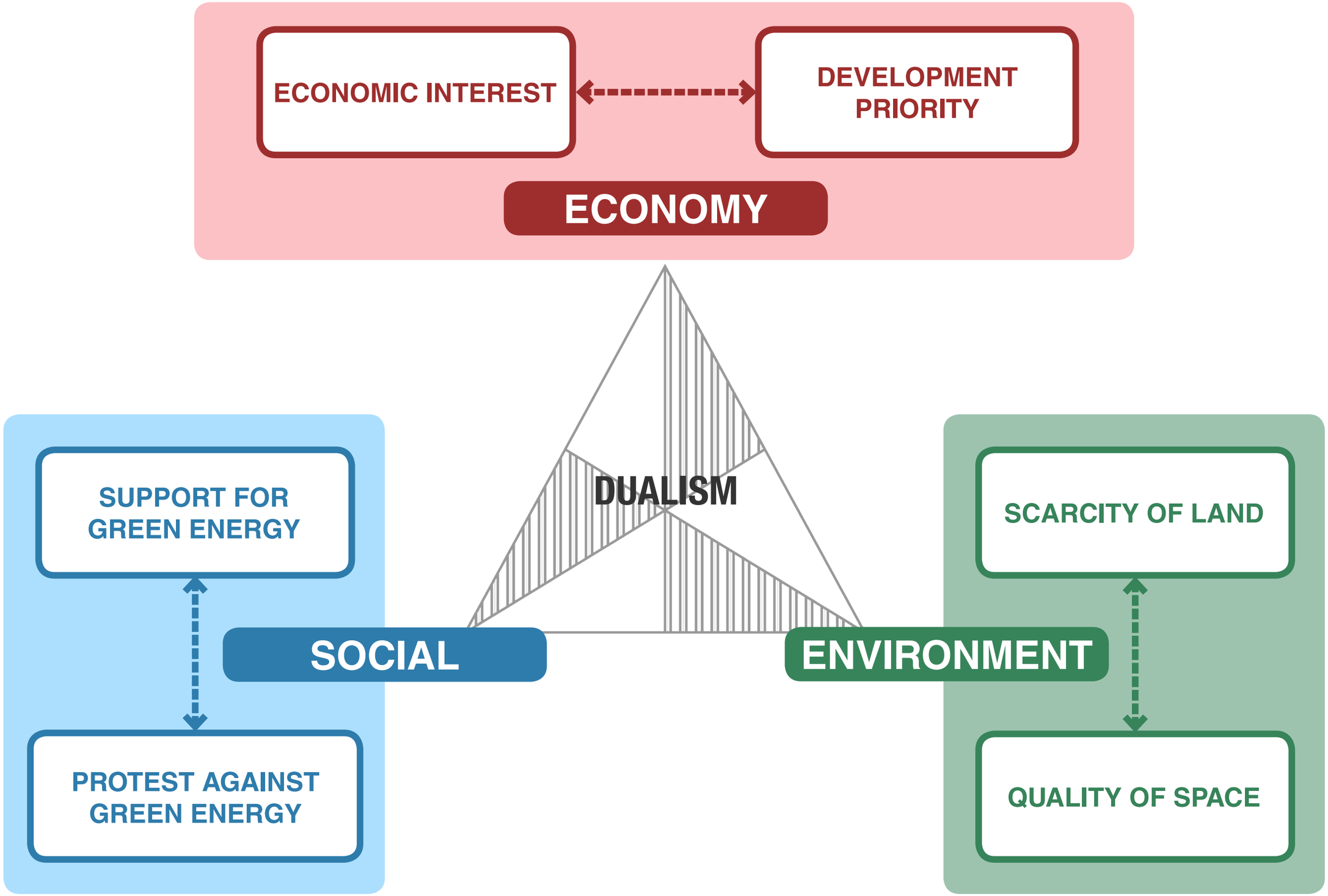
SOCIAL

PROTEST AGAINST RENEWABLES

PROTEST AGAINST GAS EXTRACTION @ GRONINGEN

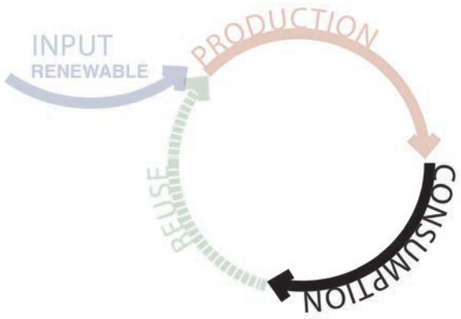
source:
By FluxEnergie/Paul Tolenaar, https://www.fluxenergie.nl/co2-opslag-in-nederland-beslist-niet-van-de-baan/
By Karin Weijs, http://www.kanaalstreek.nl/nieuws/32371/platform-storm-is-het-gepraat-zat-en-gaat-over-tot-actie/

CONCLUSION

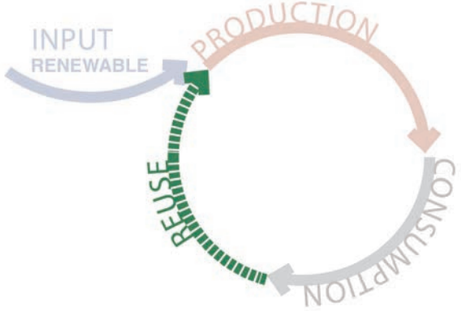

ECONOMIC INTEREST
DEVELOPMENT PRIORITY
ECONOMY
DUALISM
SUPPORT FOR GREEN ENERGY
PROTEST AGAINST GREEN ENERGY
SOCIAL
ENVIRONMENT
SCARCITY OF LAND
QUALITY OF SPACE

HOW CAN WE OVERCOME DUALISM?

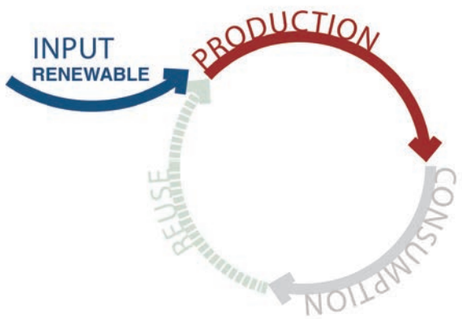
OVERCOMING DUALISM | ENVIRONMENT



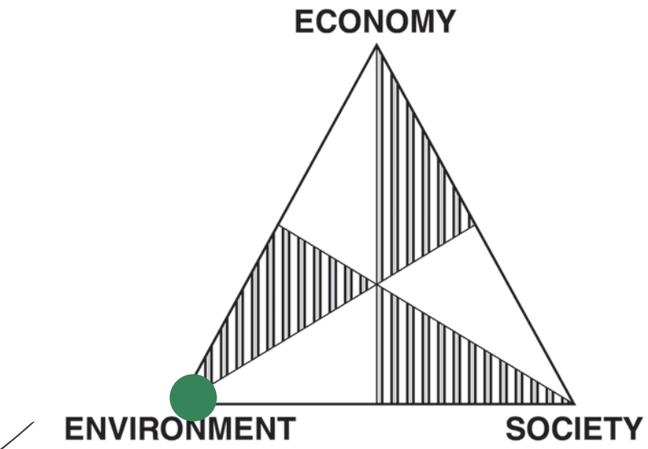
01. LESS consumption

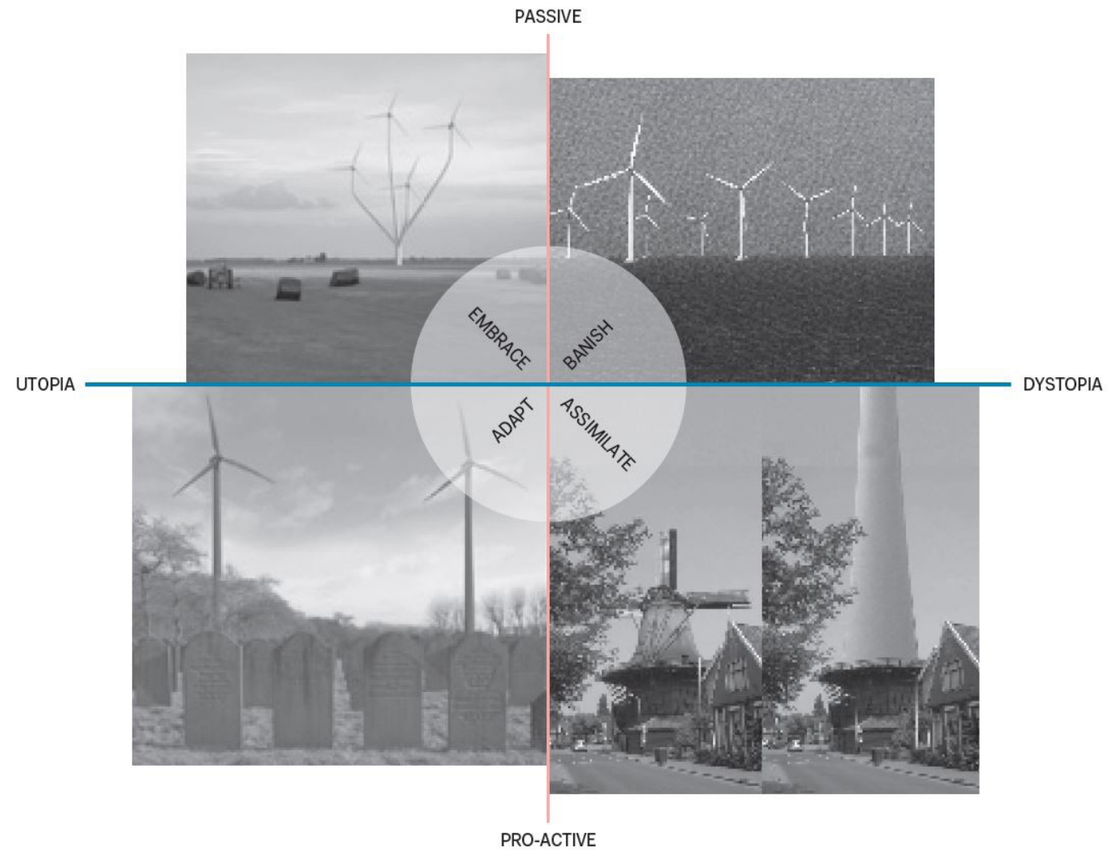


02. reuse FLOWS



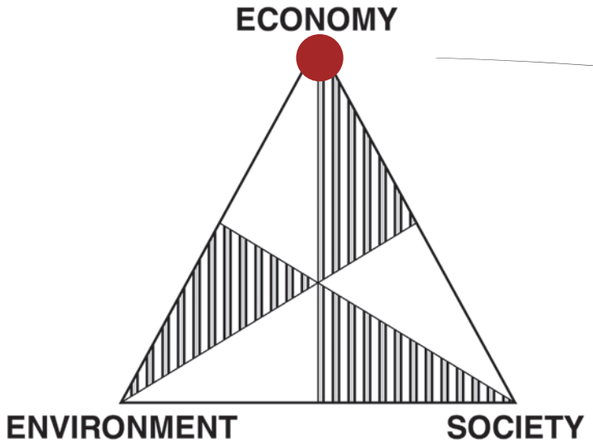
03. DESIGN ATTITUDES for integration renewables





source:
Sijmons, D., Hugtenburg, J., van Hoorn, A., & Feddes, F. (Eds.). (2014). Landscape and energy: Designing transition.

OVERCOMING DUALISM | ECONOMY

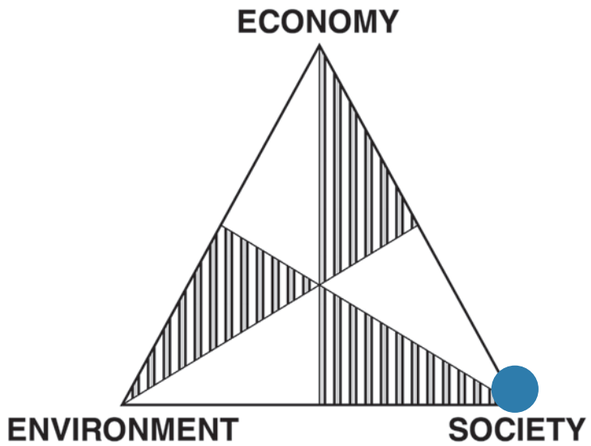


01. Set a TIMEFRAME for the gas export: use the income to INVEST in renewables and formulate POLICIES

02. BUSINESS MODELS: joint venture, co-ownership, value caputuring.

source:
Geuns, L. van, Jong, S. de, Slingerland, S. 2015. Beeft de grond onder de voeten van de gasrotonde? Leiden. TNO publications.
www.heerenveensecourant.nl, picture: Lenus van der Broek

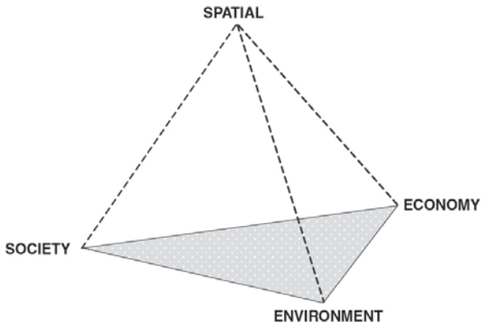
OVERCOMING DUALISM | SOCIAL

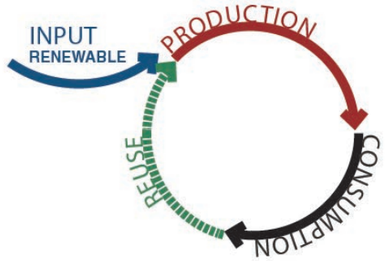


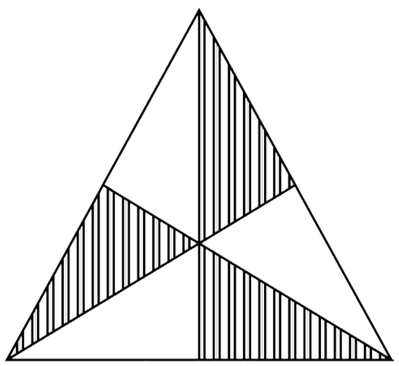
01. AWARENESS programs
02. PARTICIPANT in design process
03. Co-owner / MONETARY BENEFITS

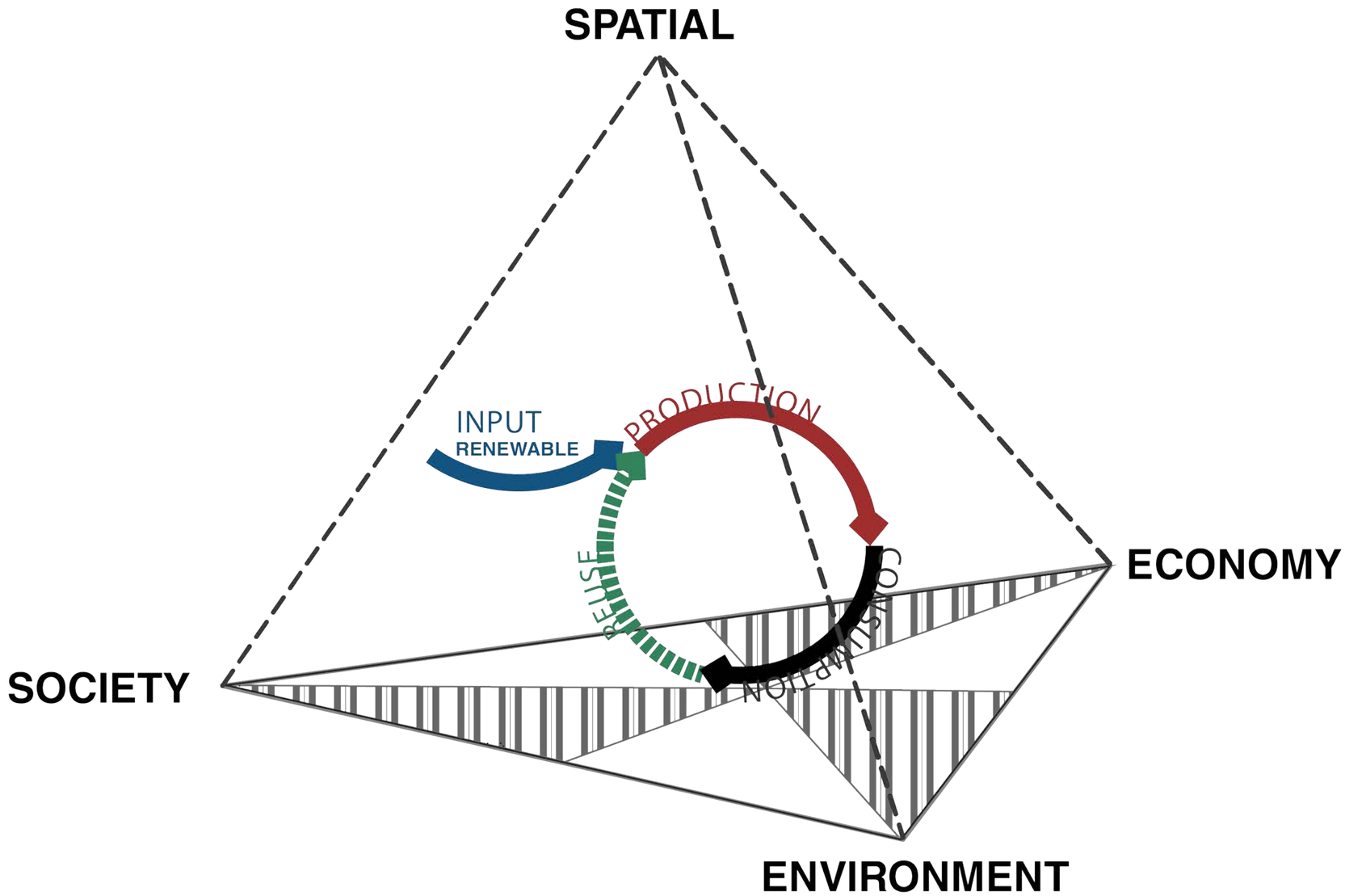
source:
Sijmons, D., Hugtenburg, J., van Hoorn, A., & Feddes, F. (Eds.). (2014). Landscape and energy: Designing transition.
www.nudge.nl, bouw mee aan een dijk van een wijk

THEORETICAL FRAMEWORK





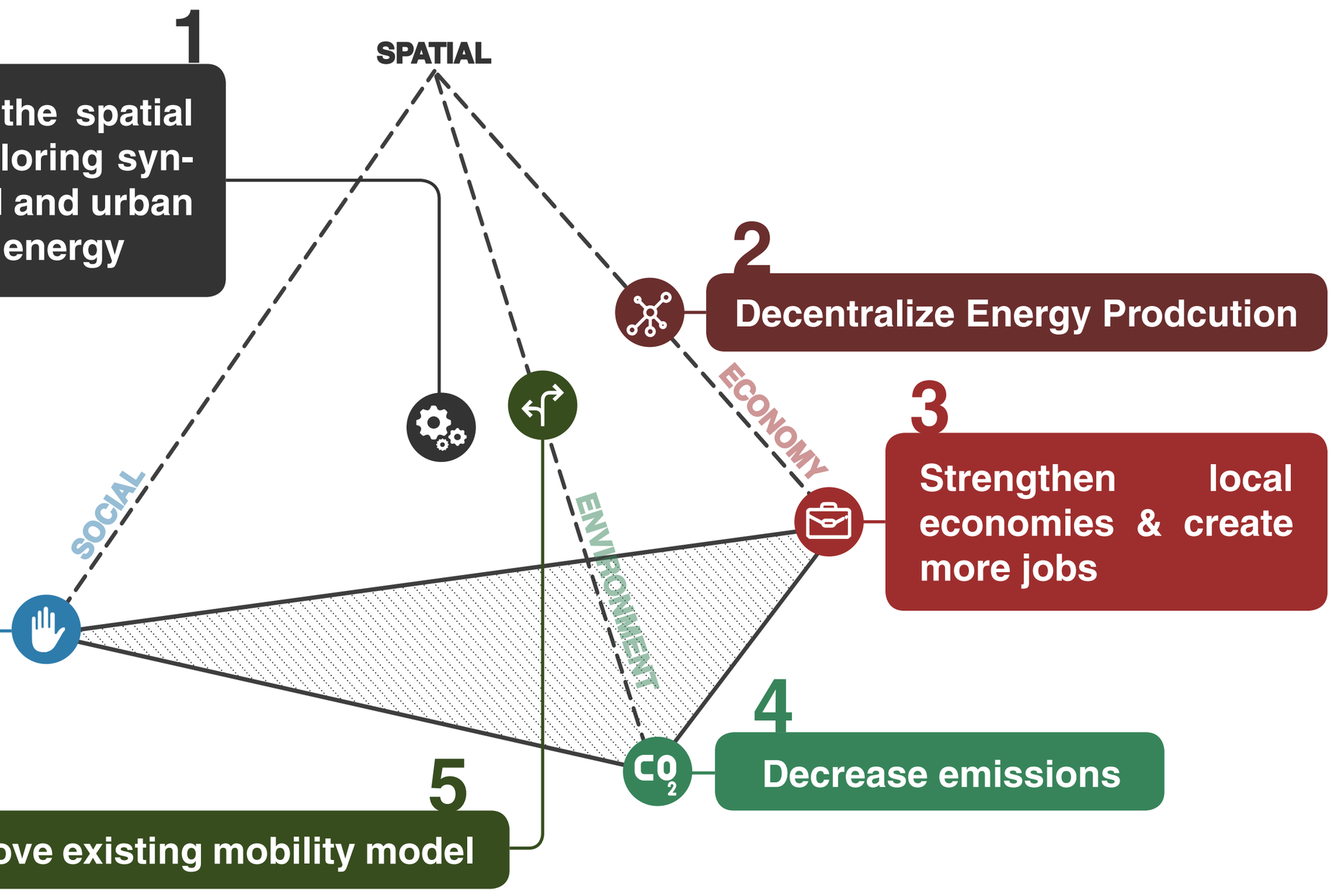




GOALS

1

Protect & strengthen the spatial quality of AMA by exploring synergies between natural and urban landscapes and green energy



2

Decentralize Energy Prodcution

3

Strengthen local economies & create more jobs

4

Decrease emissions

5

Improve existing mobility model

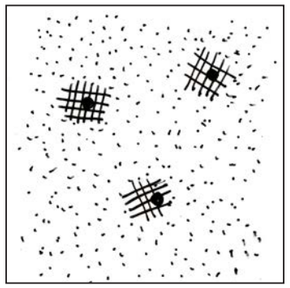
6

Stimulate acceptance, awareness by including all stakeholders in the energy transition.

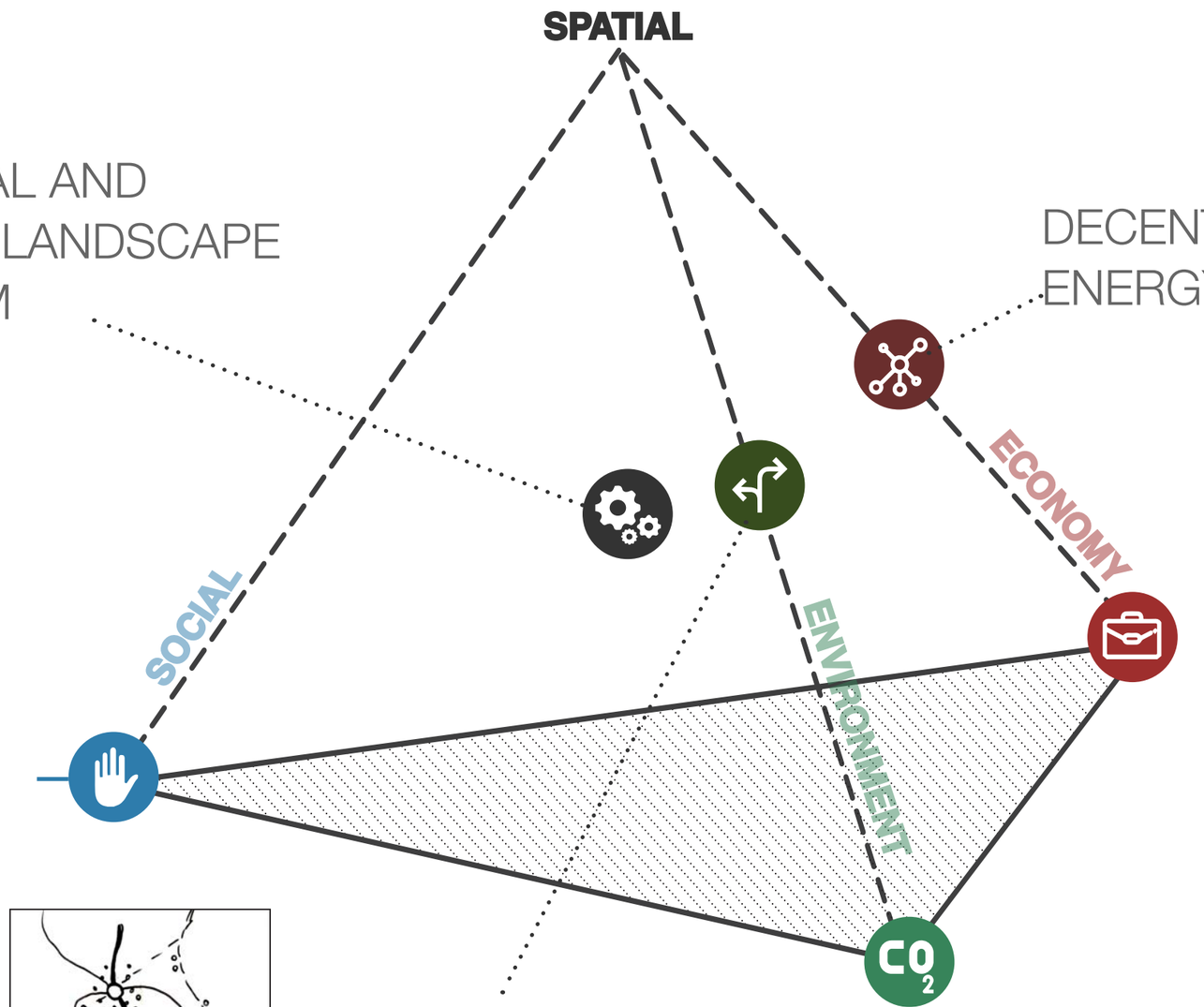
VISION

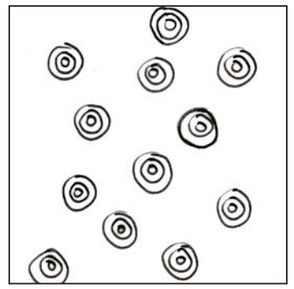
SPATIAL SYSTEMS

ENERGY TRANSITION TOUCH UPON EVERY TYPE OF LANDSCAPE

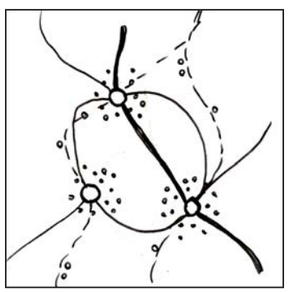


NATURAL AND
URBAN LANDSCAPE
SYSTEM





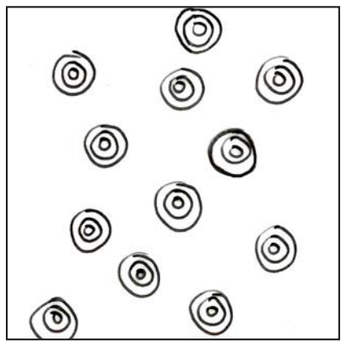
DECENTRALIZED
ENERGY SYSTEM



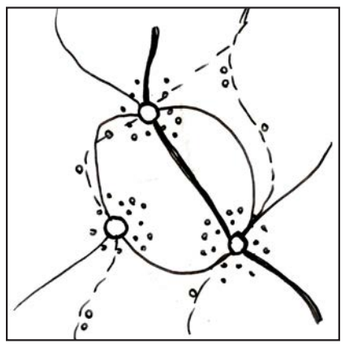
MOBILITY SYSTEM

VISION

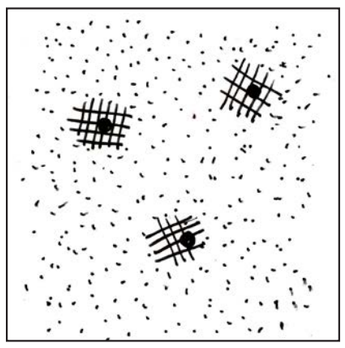
In 2040, AMA is empowered by the green energy transition through **THREE SPATIAL SYSTEMS**. Together the layers form a **SEAMLESS LANDSCAPE**: a landscape where energy production is **INTEGRATED** within the built and natural environment. Our vision goes beyond the spatial implementation of green energy transition as it shapes opportunities to strengthen AMA from an **ECONOMIC, SOCIAL AND ENVIRONMENTAL PERSPECTIVE**.



01. DECENTRALIZED ENERGY SYSTEM

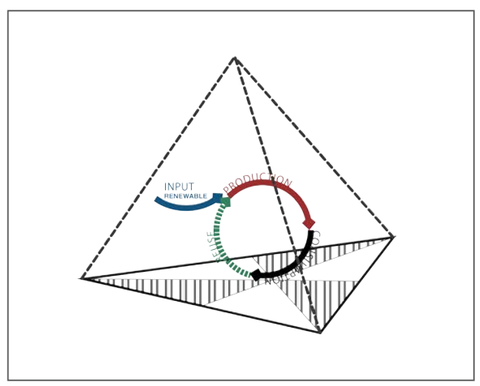


02. MOBILITY SYSTEM



03. NATURAL AND URBAN LANDSCAPE SYSTEM

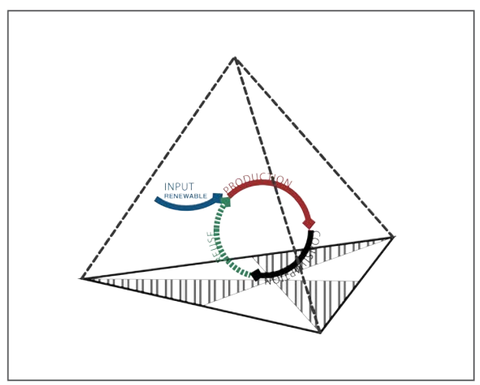
DESIGN APPROACH

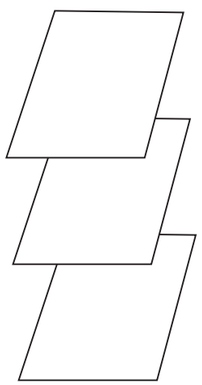


THEORETICAL
FRAMEWORK

DESIGN APPROACH

BEYOND DUALISM



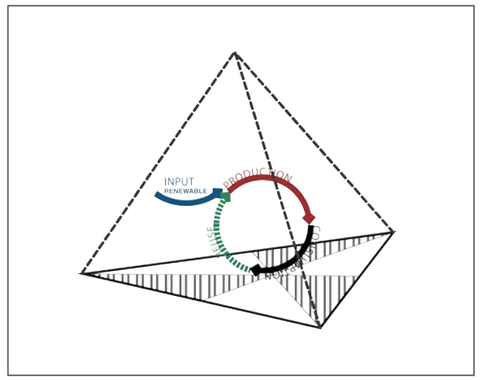


THEORETICAL
FRAMEWORK

SPATIAL
SYSTEMS

DESIGN APPROACH

BEYOND DUALISM



THEORETICAL FRAMEWORK

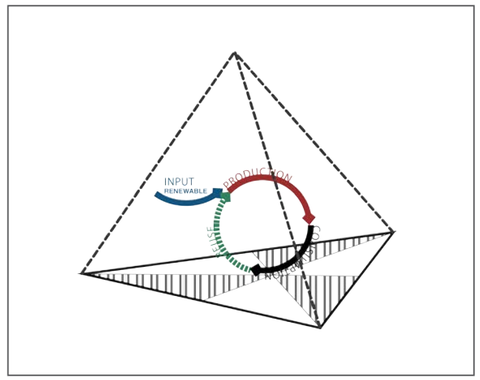
SPATIAL SYSTEMS

VISION

DESIGN PRINCIPLES

DESIGN APPROACH

BEYOND DUALISM



THEORETICAL FRAMEWORK

SPATIAL SYSTEMS

VISION

DESIGN PRINCIPLES

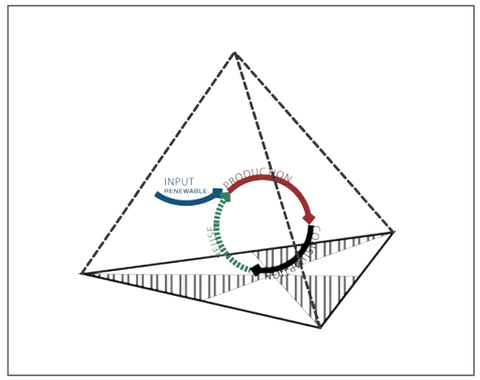
IMPLEMENTATION

POLICIES & PARTNERSHIP

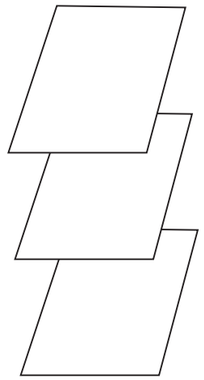
KEY PROJECTS

DESIGN APPROACH

BEYOND DUALISM



THEORETICAL FRAMEWORK



SPATIAL SYSTEMS

VISION

IMPLEMENTATION

DESIGN PRINCIPLES

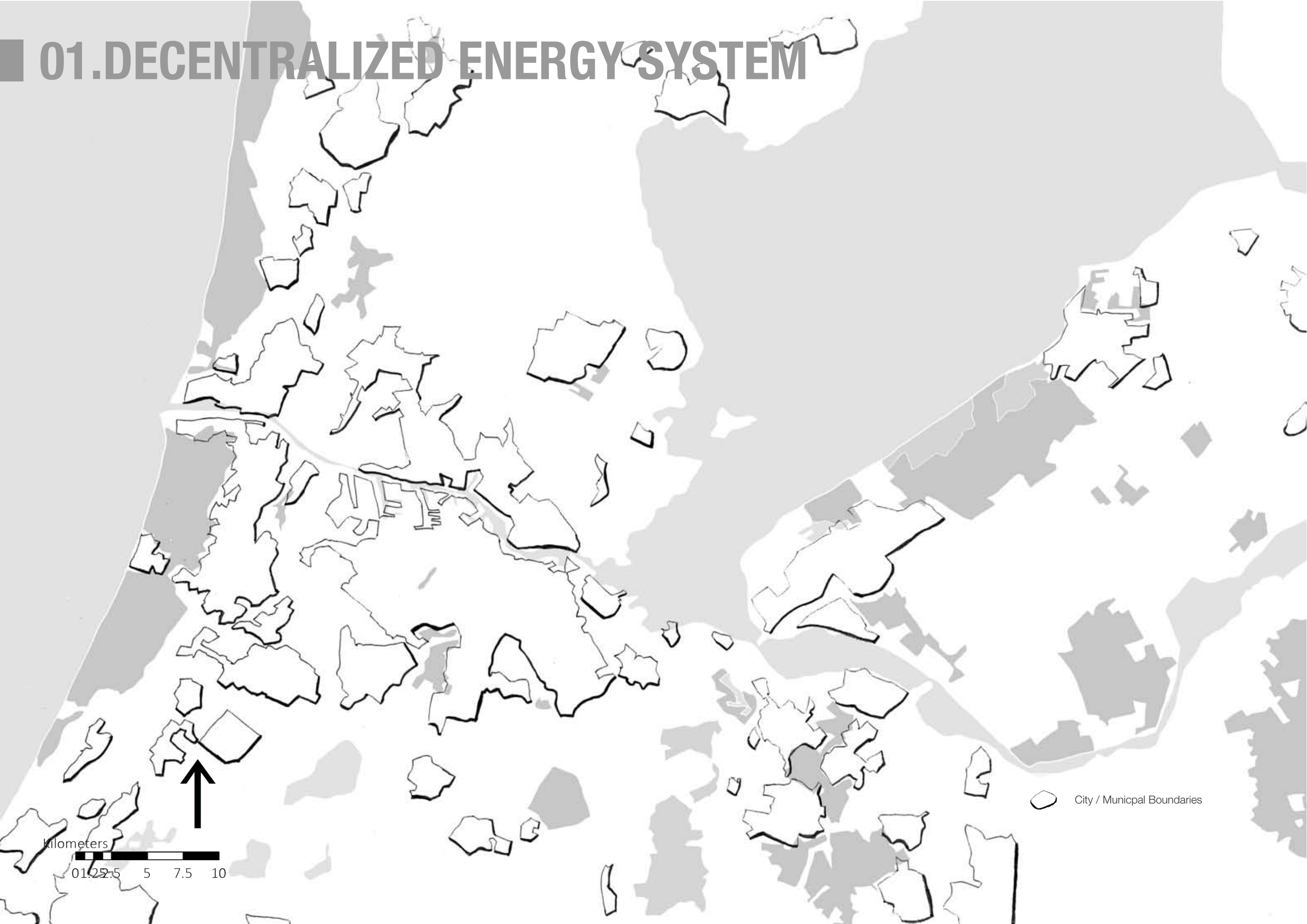
POLICIES & PARTNERSHIP

KEY PROJECTS

ENERGY TRANSITION LANDSCAPES

SYSTEMS & IMPLEMENTATION

01.DECENTRALIZED ENERGY SYSTEM



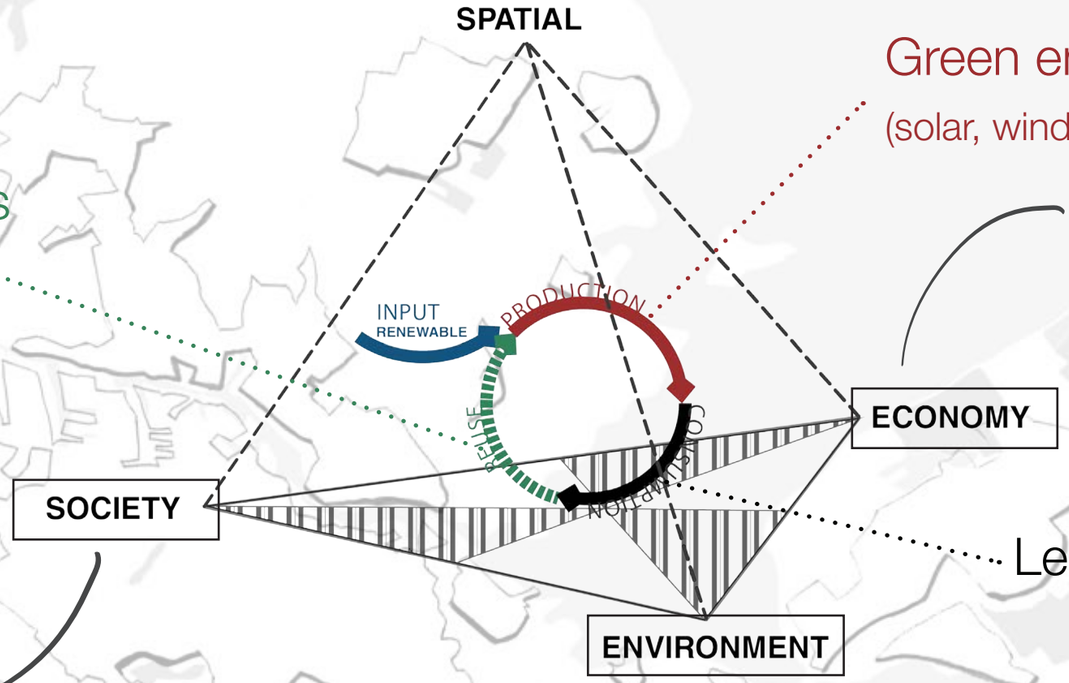
01.DECENTRALIZED ENERGY SYSTEM | THEORETICAL FRAMEWORK

GOAL 2040: Residential areas are running on 100% renewables

Reuse of local potentials

(residual heat, biomass)

- Local jobs providing.
- Citizens involvement.



Green energy production per city.

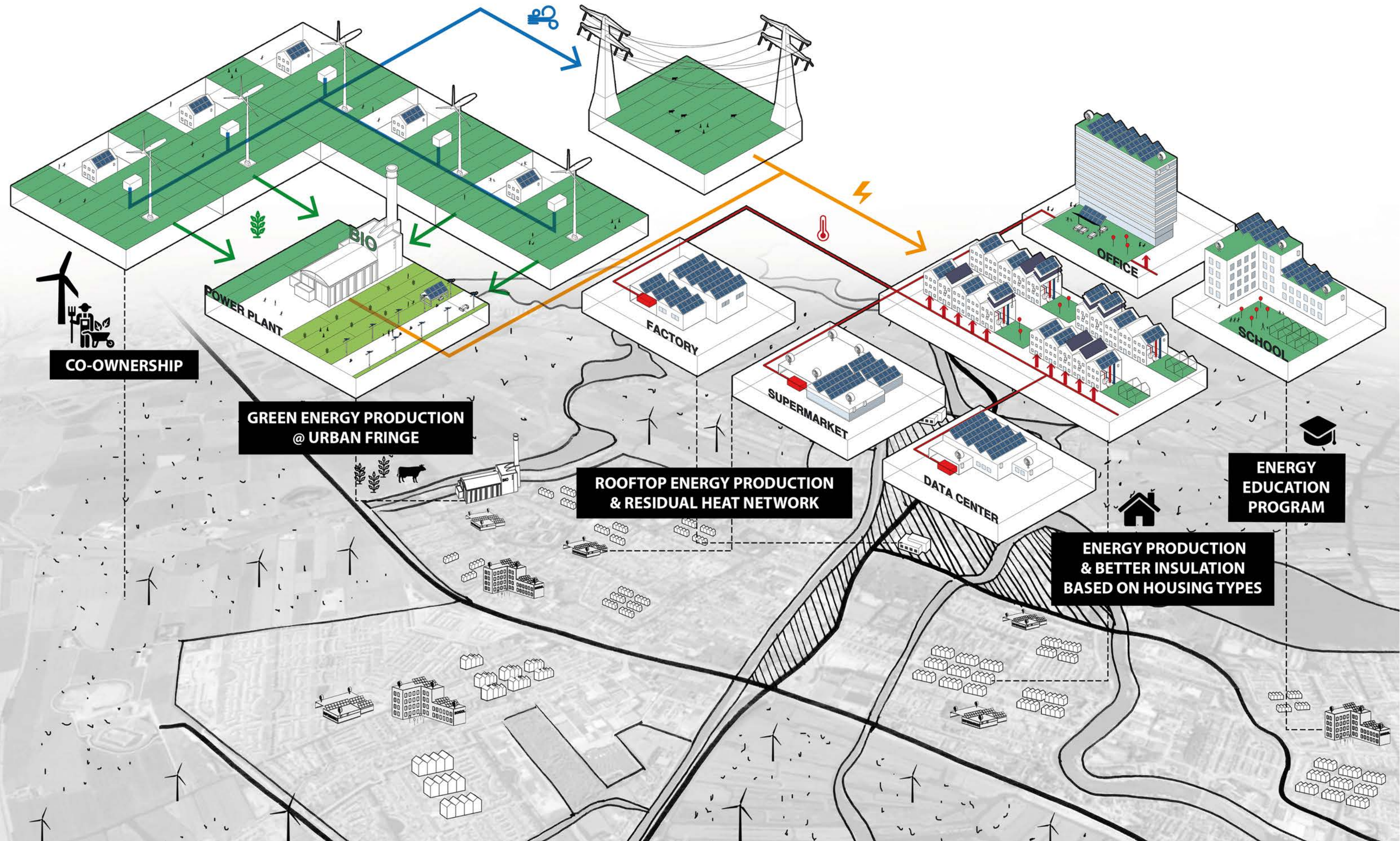
(solar, wind, geothermal)

- **Empower Municipalities.**
- **Create local economic value, co-ownership**

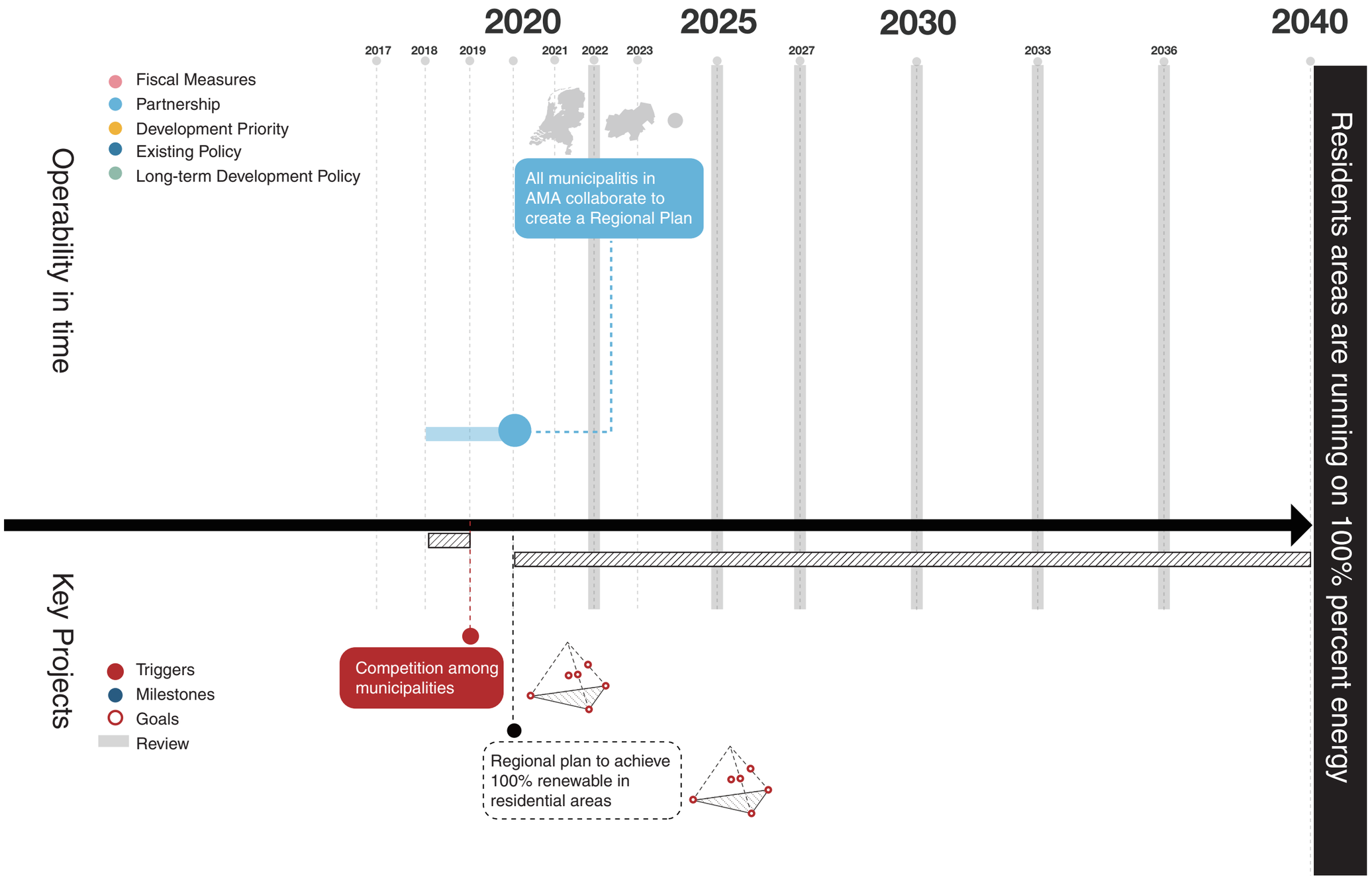
Less consumption, better insulation

Integrate production into existing built environment

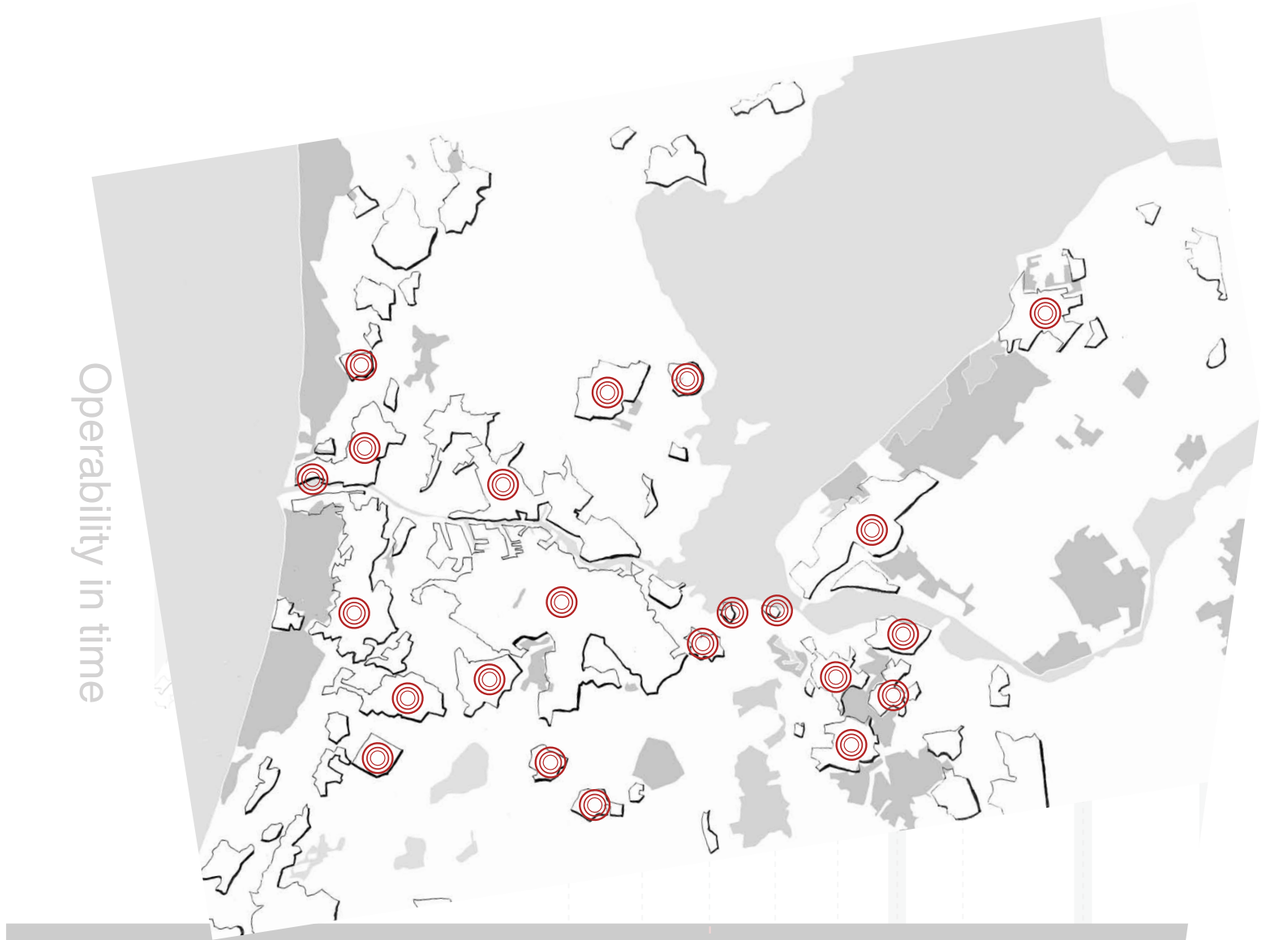
01.DECENTRALIZED ENERGY SYSTEM | DESIGN PRINCIPLES



01.DECENTRALIZED ENERGY SYSTEM | IMPLEMENTATION



01.DECENTRALIZED ENERGY SYSTEM | IMPLEMENTATION



Operability in time

Key Projects

- Triggers
- Milestones
- Goals
- Review

Competition among municipalities

Regional plan to achieve 100% renewable in residential areas

DESIGN COMPETITION MUNICIPALITIES AMA

January 2018, Amsterdam

Dear Municipality,

In December all Municipalities within the **Amsterdam Metropolitan Area** have come to the agreement to collaborate on the ***decentralized energy goal for 2040***. We, the board of the **Metropolitan Region Amsterdam**, would like to congratulate you on this achievement! We see a future where residential areas have shaped a system to be fully self reliable when it comes to energy production.

We are pleased to announce that the next phase will include a competition between the municipalities! This competition is formed to gather innovative ideas on how to implement a new decentralized energy system. We have received a fund from the national government to make the transition possible and collaborate on a new regional plan for AMA

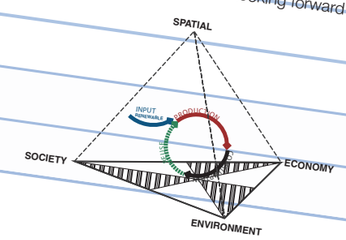
After a year we will gather all ideas and formulate an overarching regional plan. The regional plan will have projects that will strengthen every municipality within the AMA. Besides the implementation of the regional plan, there will be allocated fund for projects. that aptly respond to the requirement of the design brief

Requirements:
Projects should be embedded within the green energy transition model.
* Projects should integrate renewable energy into the current built environment and be able to Quantify the amount of added energy.by these sources
* Projects should take into account the reuse of flows (co2, residual heat, biomass) and quantify the amount of energy savings by implementing the reuse of flows.
* Projects should reduce energy consumption and quantify the overall reduction in energy consumption
* Projects should stimulate the local economy and provide jobs. estimate the amount of jobs and local turnover.
* Show projects/actions to involve citizens within the process.
*. The projects should demonstrate the inclusion of all the stakeholders involved through innovative business models.
* Collaborative Projects that propose solutions across municipality boundaries are also welcome.

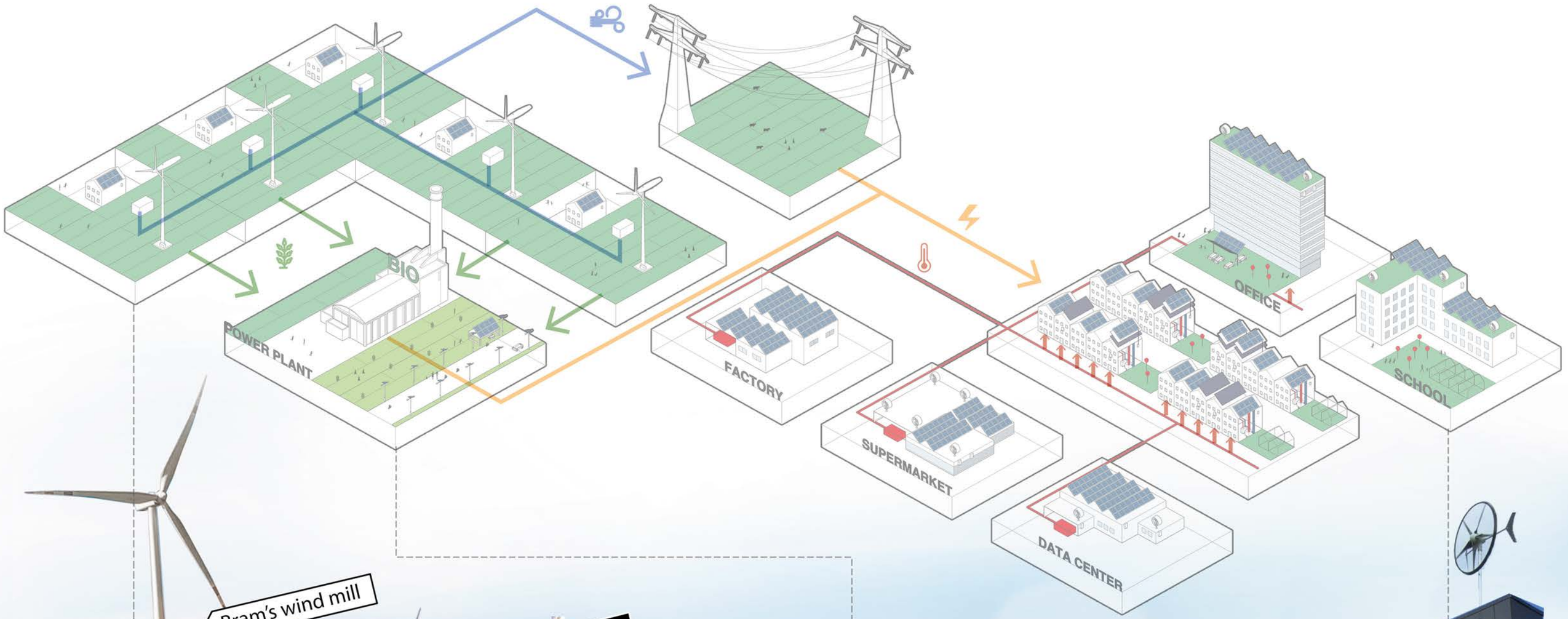
With the design brief we send you design principles and inspirational ideas that show examples of how the decentralized system can work. We ask you to formulate a set of projects that fit the requirements of the design brief. So let the completion get started! We are looking forward to your contribution.

Kind Regards,

The Board
Metropolitan Region Amsterdam



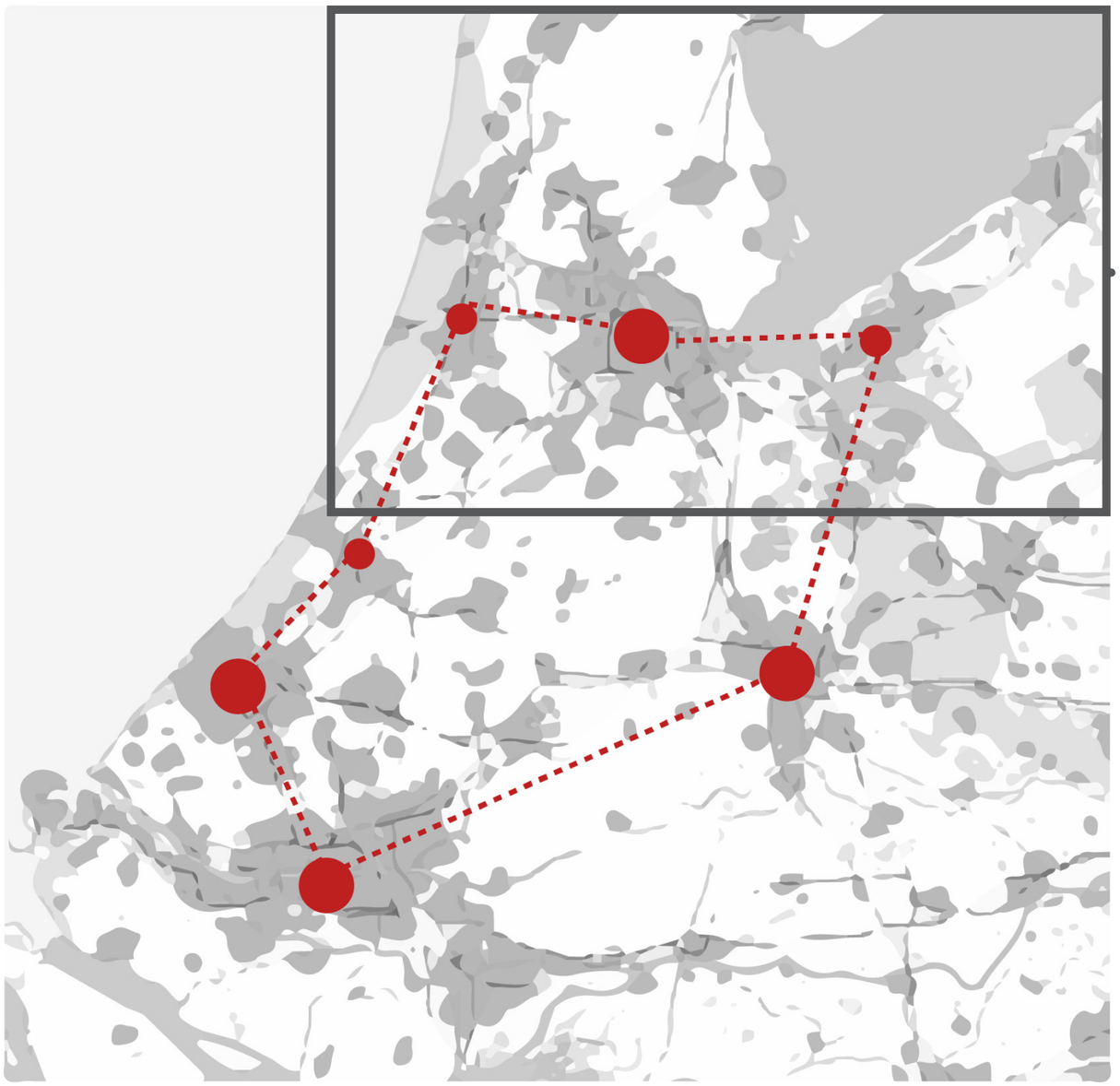
01.DECENTRALIZED ENERGY SYSTEM



02. MOBILITY SYSTEM

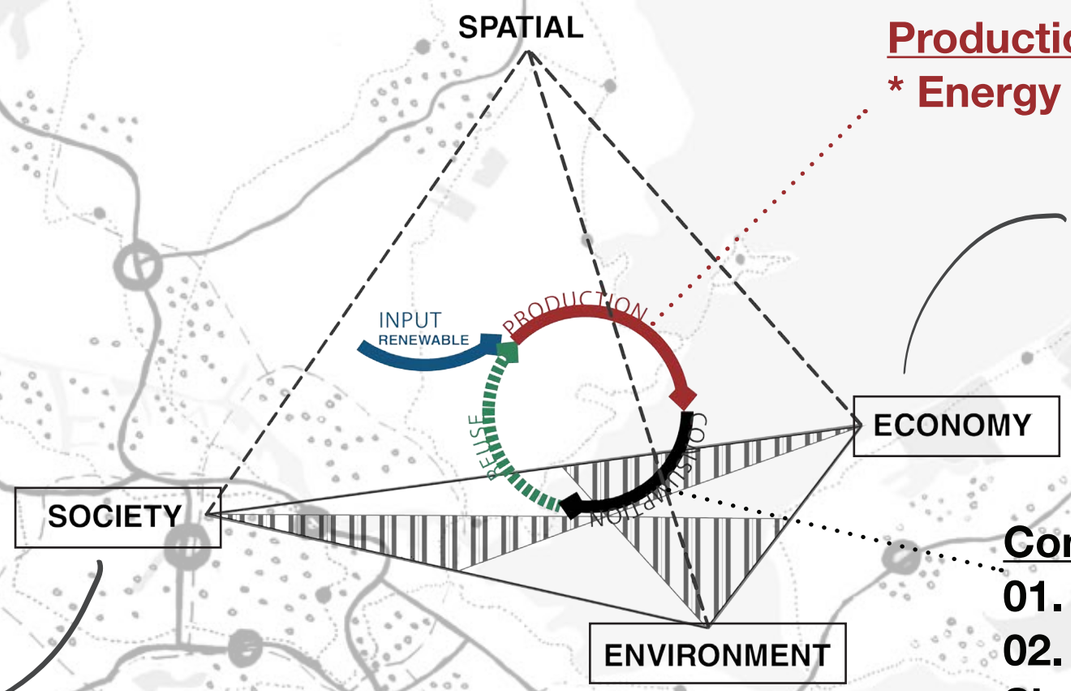
02. MOBILITY SYSTEM | OUTSIDE AMA

FLEXIBLE MOBILITY SYSTEM IN RANDSTAD



02. MOBILITY SYSTEM | THEORETICAL FRAMEWORK

GOAL 2040: Extend the flexible sharing network & Adapts roads to generate electricity



Production
*** Energy generating roads (highway)**

- Joint Venture at R&D mobility lab and execution

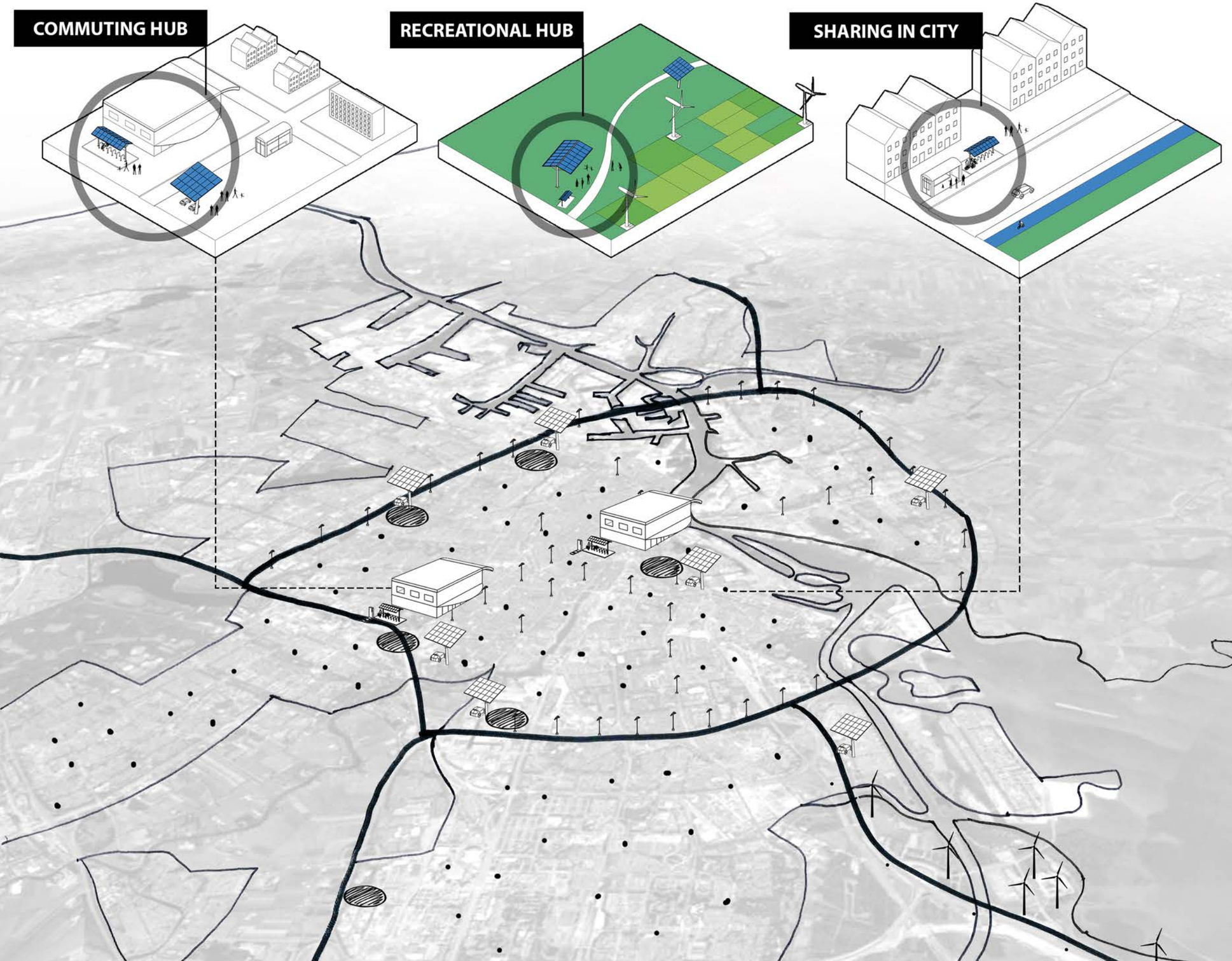
Consumption
01. Cheaper public transport
02. Flexible sharing network: Sharing commuter & recreational hubs, small and large
03.Flexible sharing subscription

- Providing jobs
- Recreational hubs for citizens

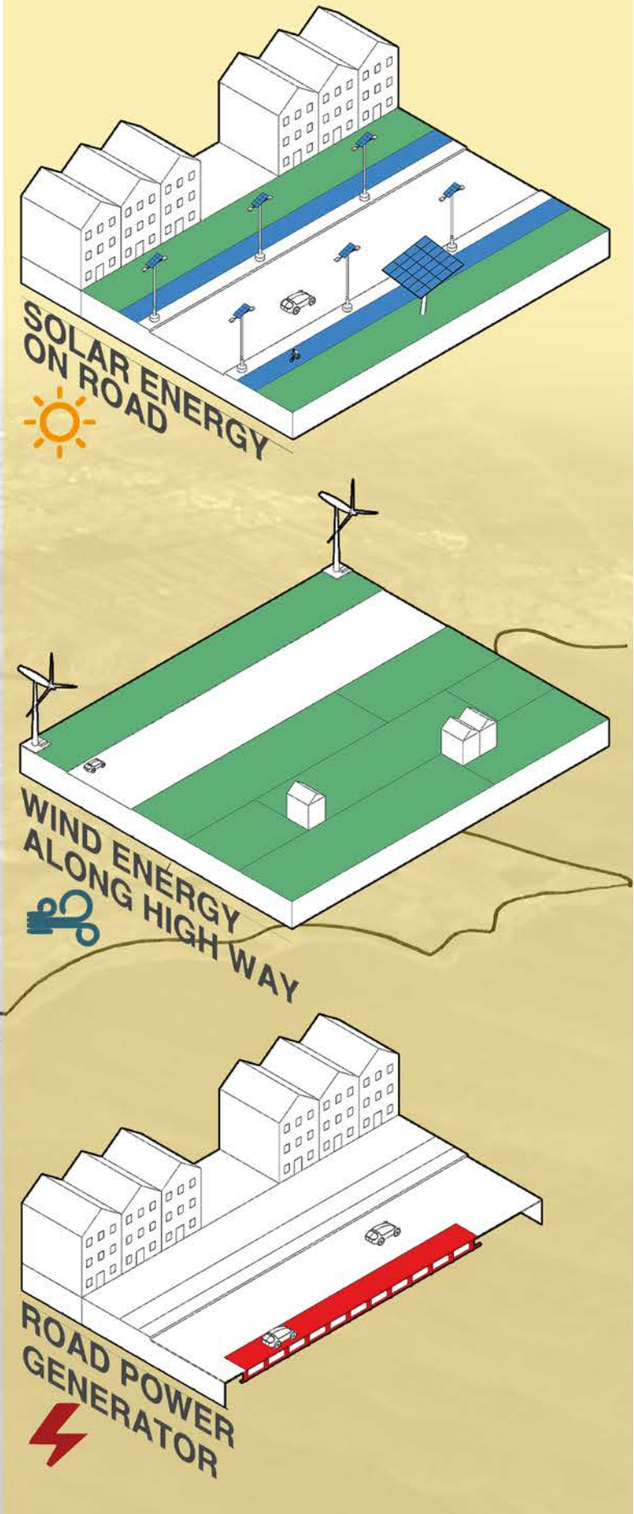
Integrate production into existing built environment - roads

02. MOBILITY SYSTEM | DESIGN PRINCIPLES

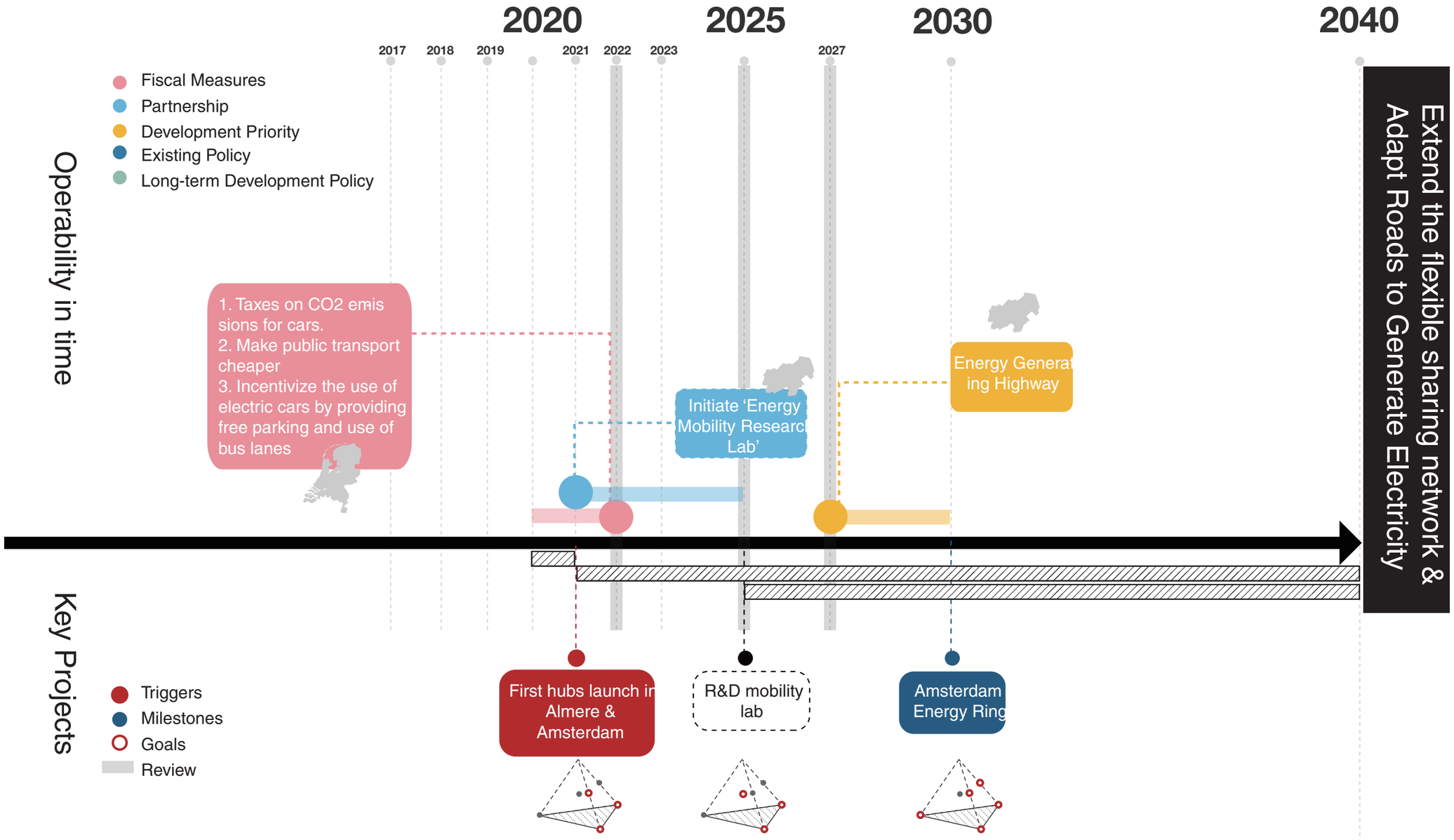
CONSUMPTION:



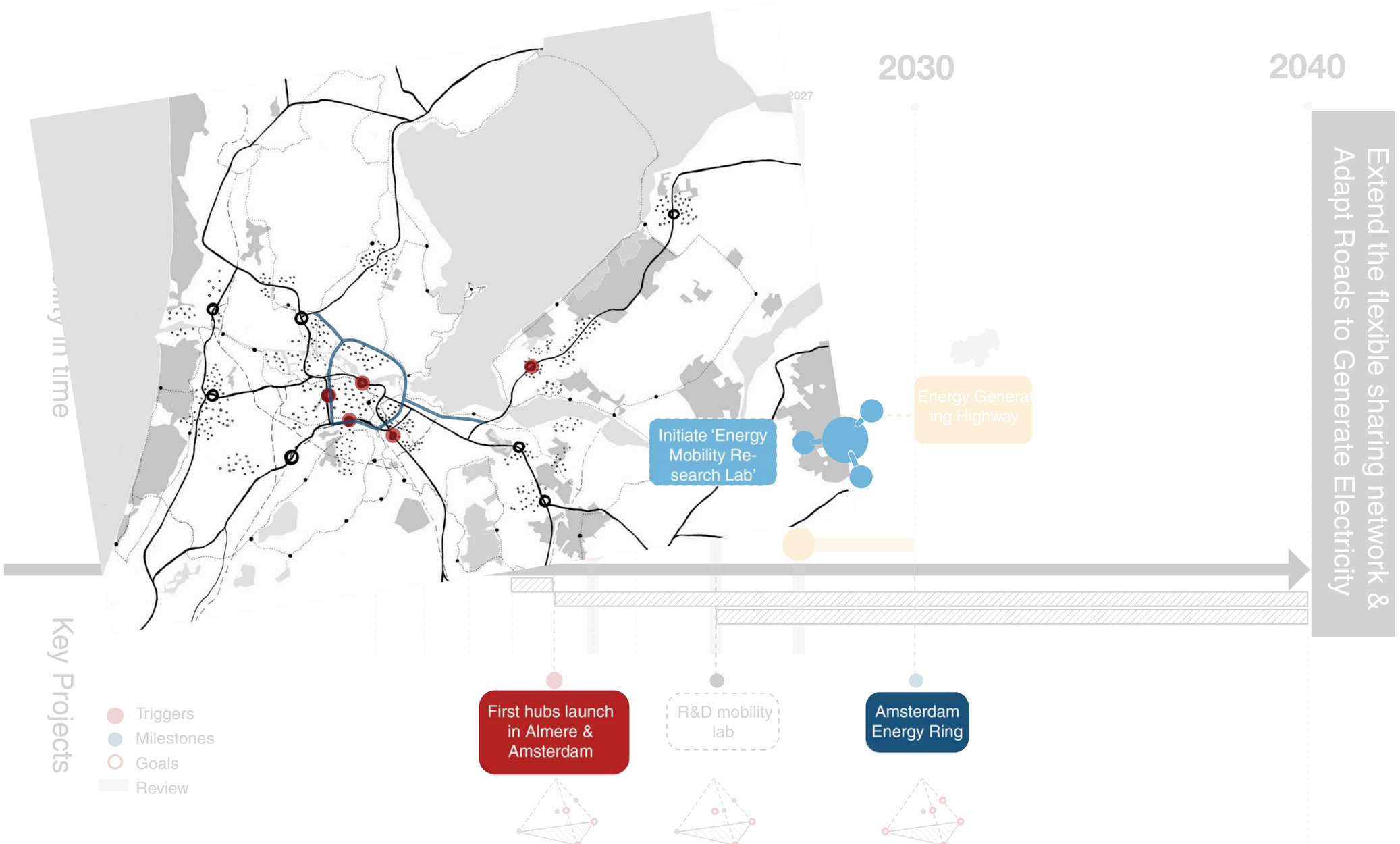
PRODUCTION:



02. MOBILITY SYSTEM | IMPLEMENTATION



02. MOBILITY SYSTEM | IMPLEMENTATION



02. MOBILITY SYSTEM

03. LANDSCAPE

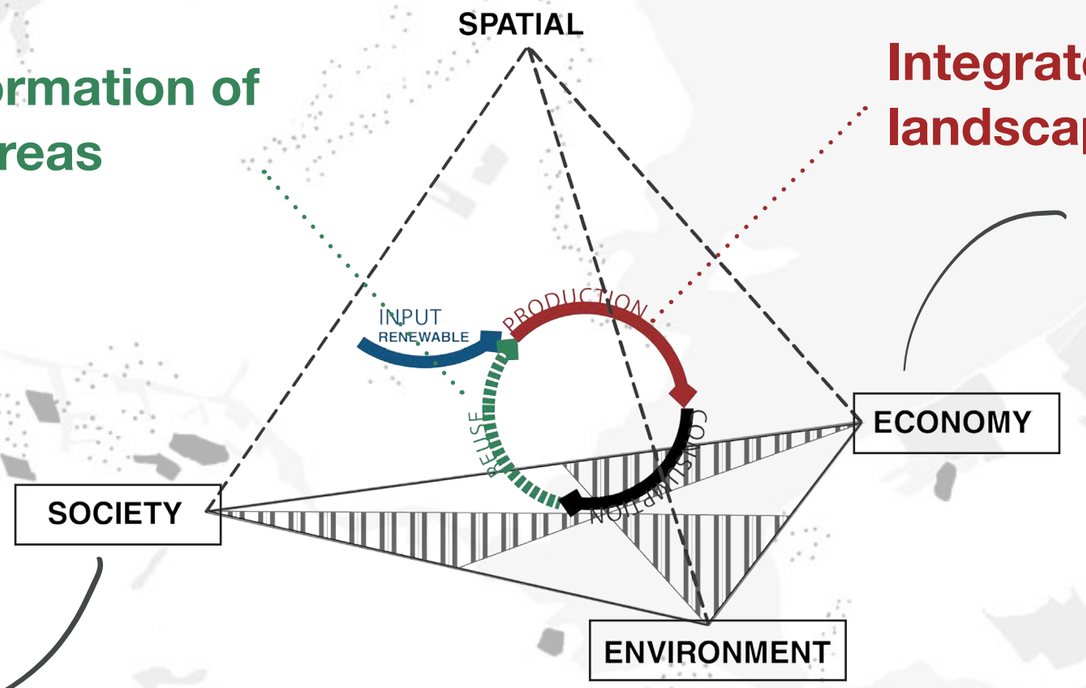
03. LANDSCAPE | THEORETICAL FRAMEWORK

GOAL 2040: Enhance spatial quality through energy transition landscape

Transformation of fossil areas

Integrate wind energy within landscape structure

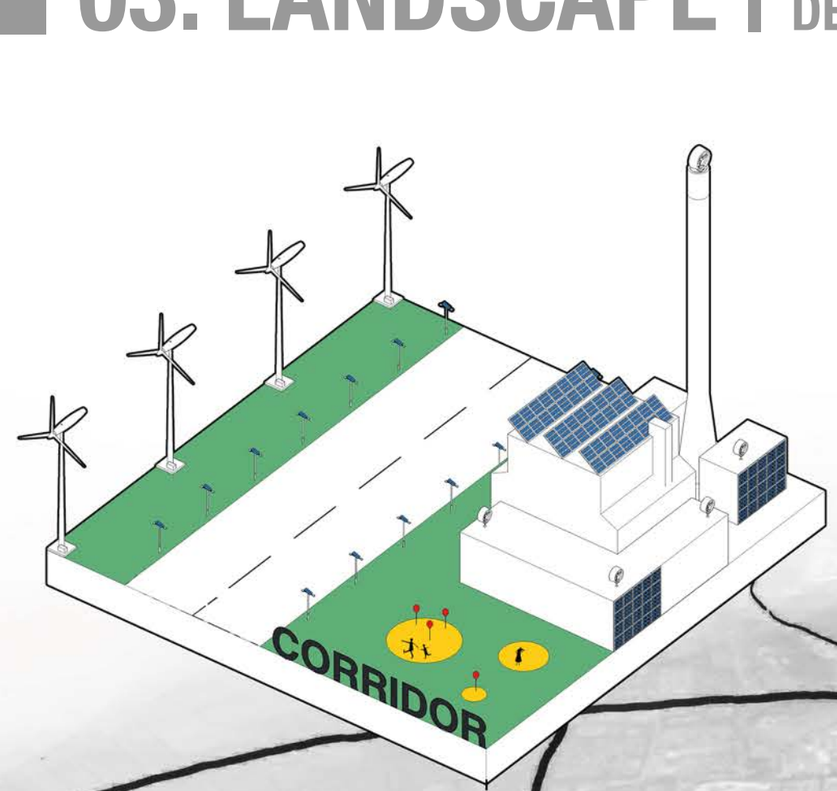
Develop post fossil areas through value capturing

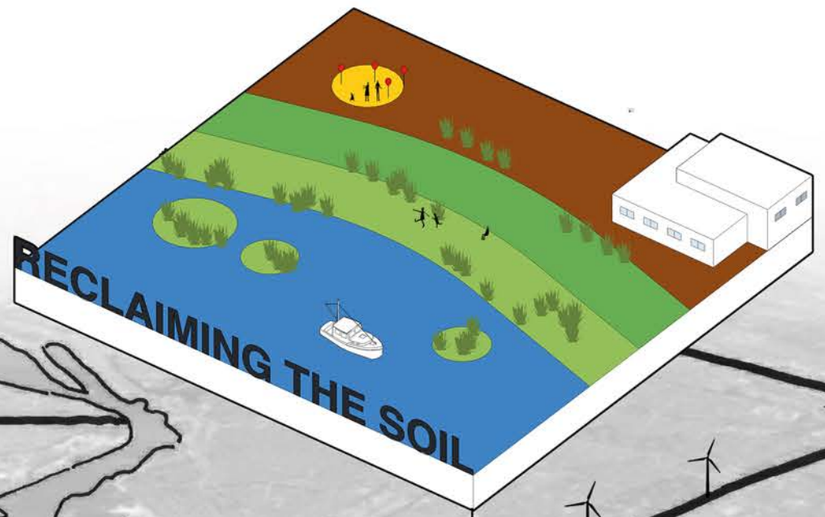


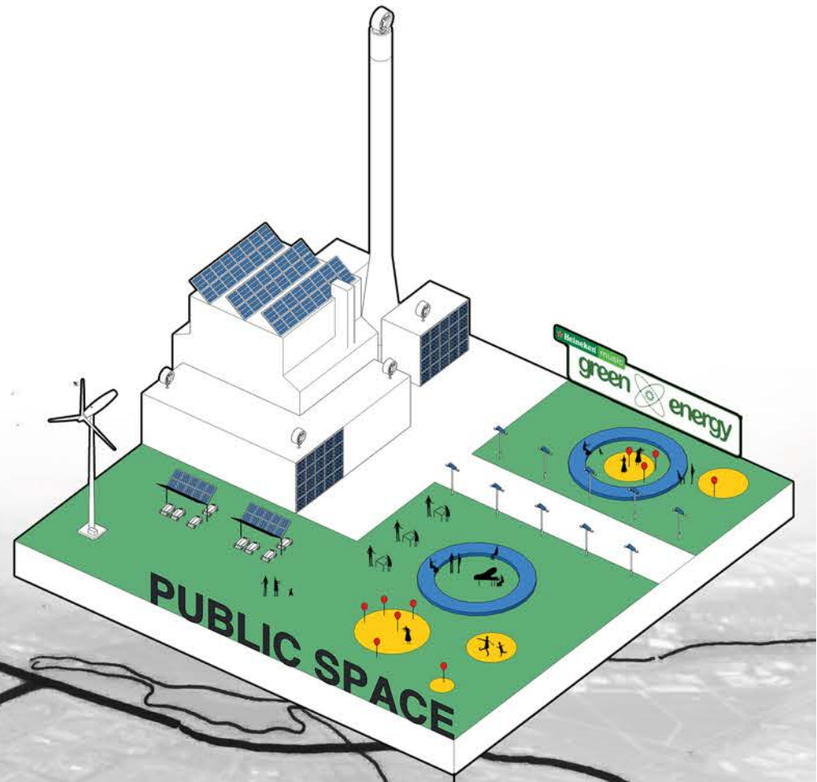
Strengten recreational areas by synergies between energy, recreation, art, agriculture.

Close down of power plant(s) & clean soil

03. LANDSCAPE | DESIGN PRINCIPLES POST-FOSSIL





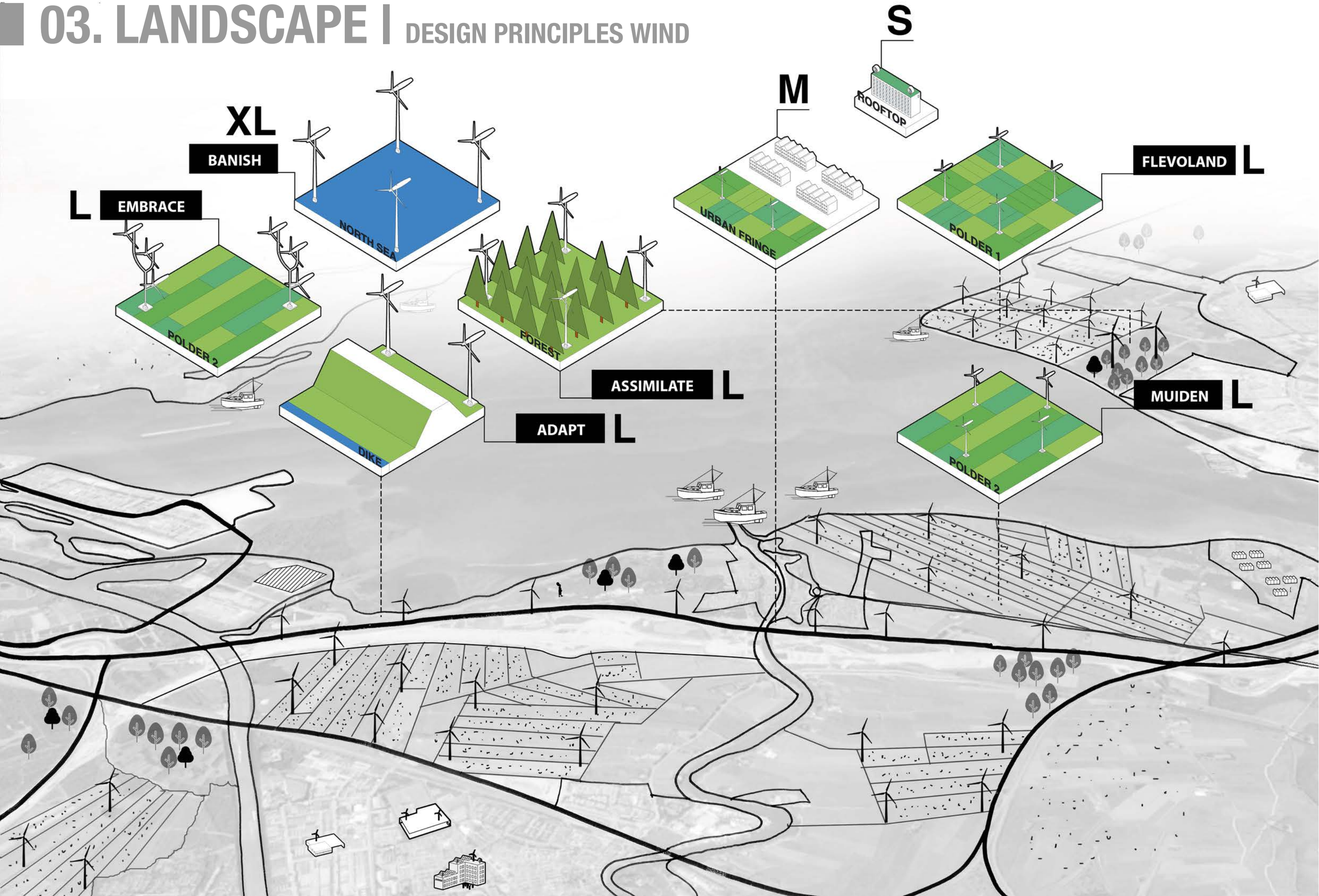


CONNECTING CITIES THROUGH TRASITION LANDSCAPE

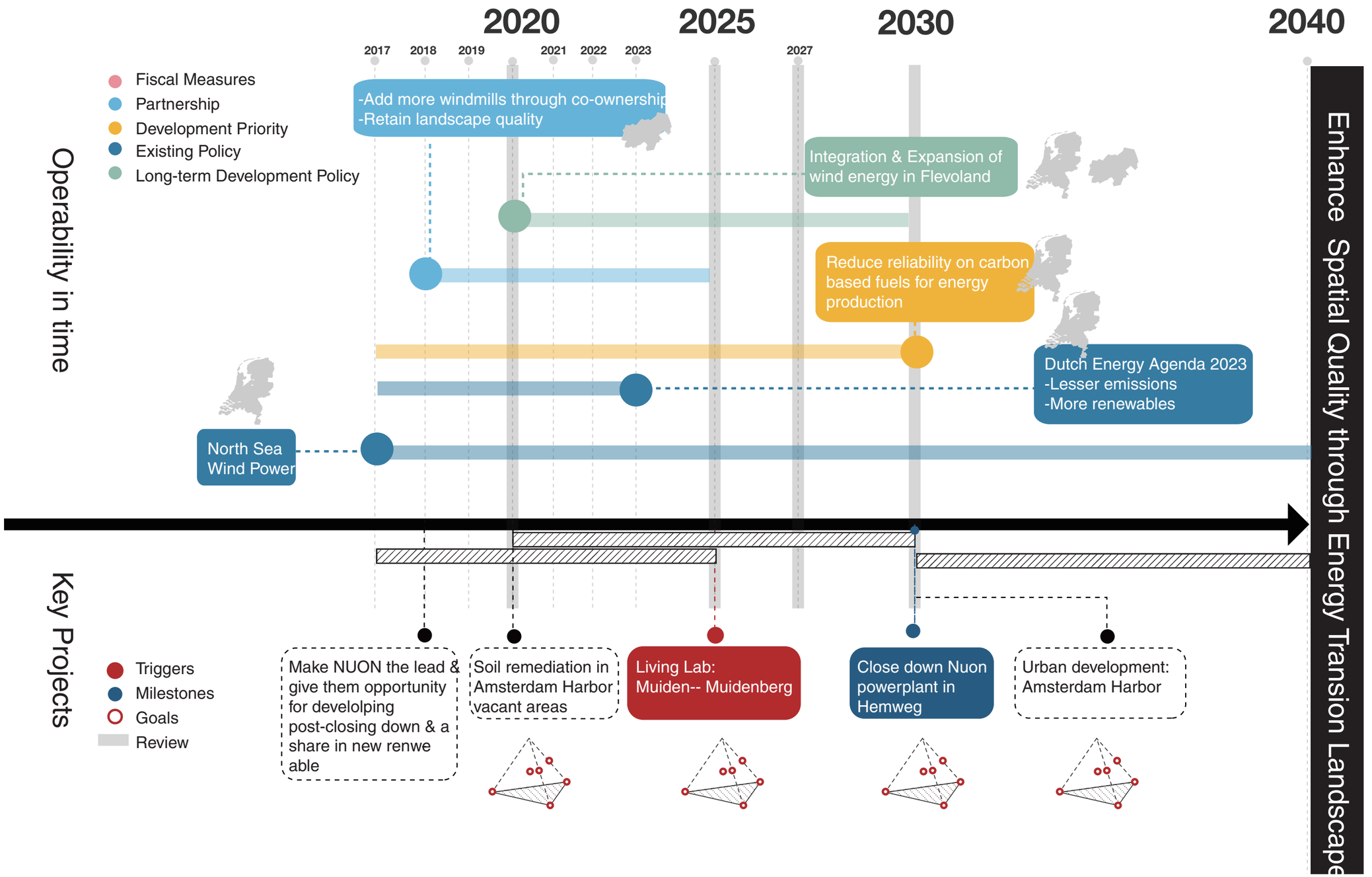
SOIL REMEDIATION ON POST-FOSSIL LANDSCAPE

REUSE VACANT PLOT FOR PUBLIC EVENTS

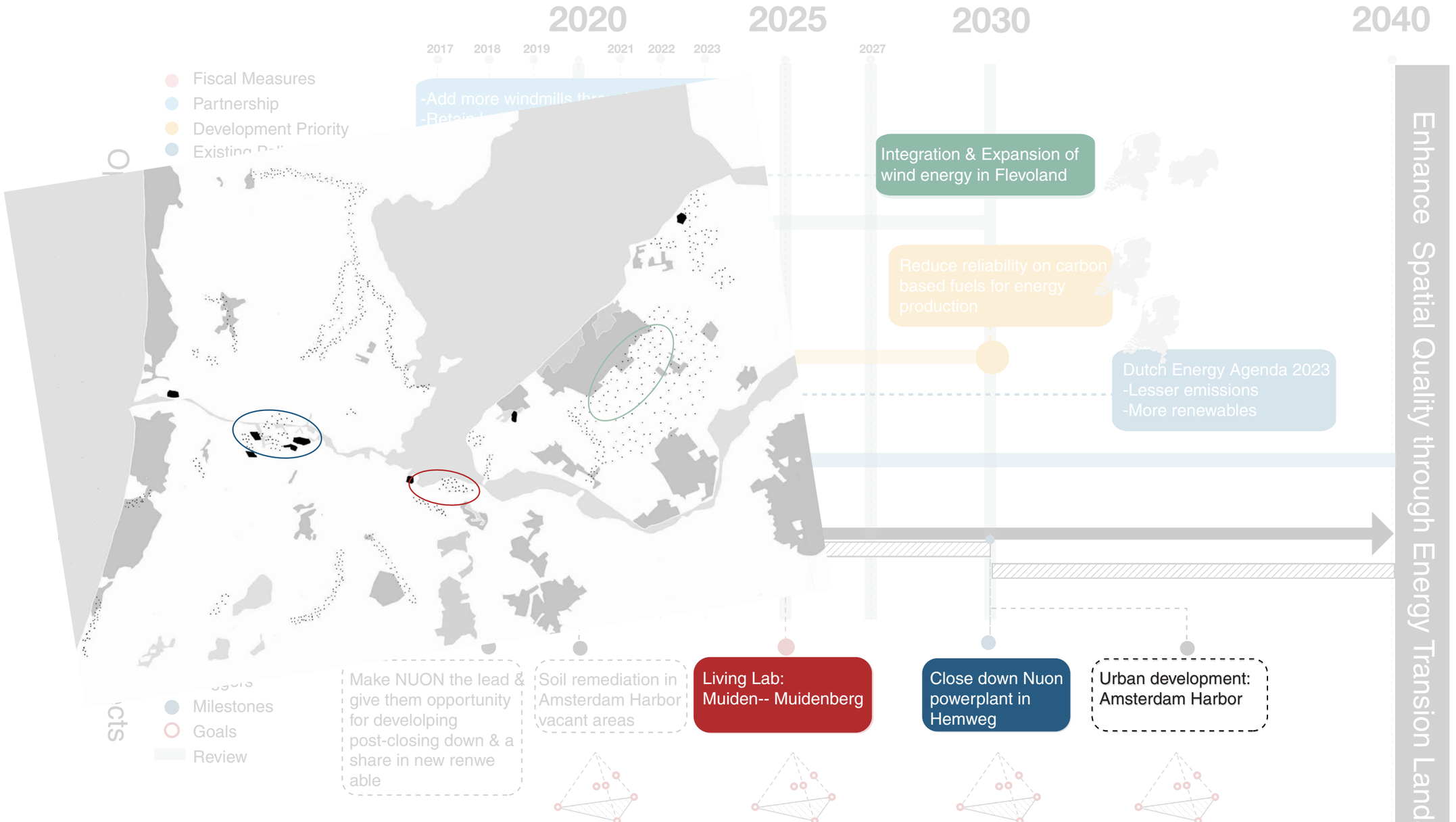
03. LANDSCAPE | DESIGN PRINCIPLES WIND



03. LANDSCAPE | IMPLEMENTATION POST-FOSSIL & WIND

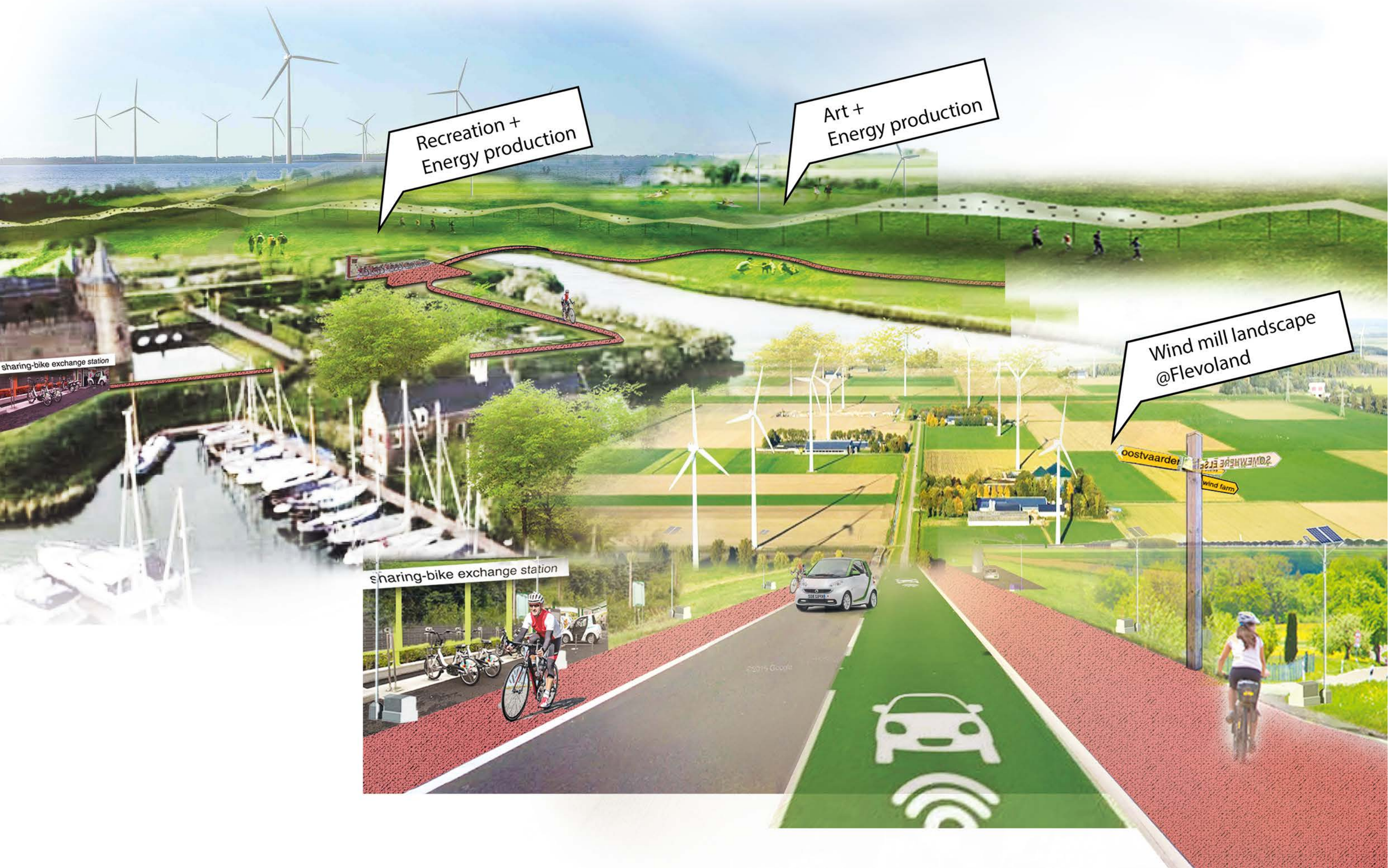


03. LANDSCAPE | IMPLEMENTATION POST-FOSSIL & WIND



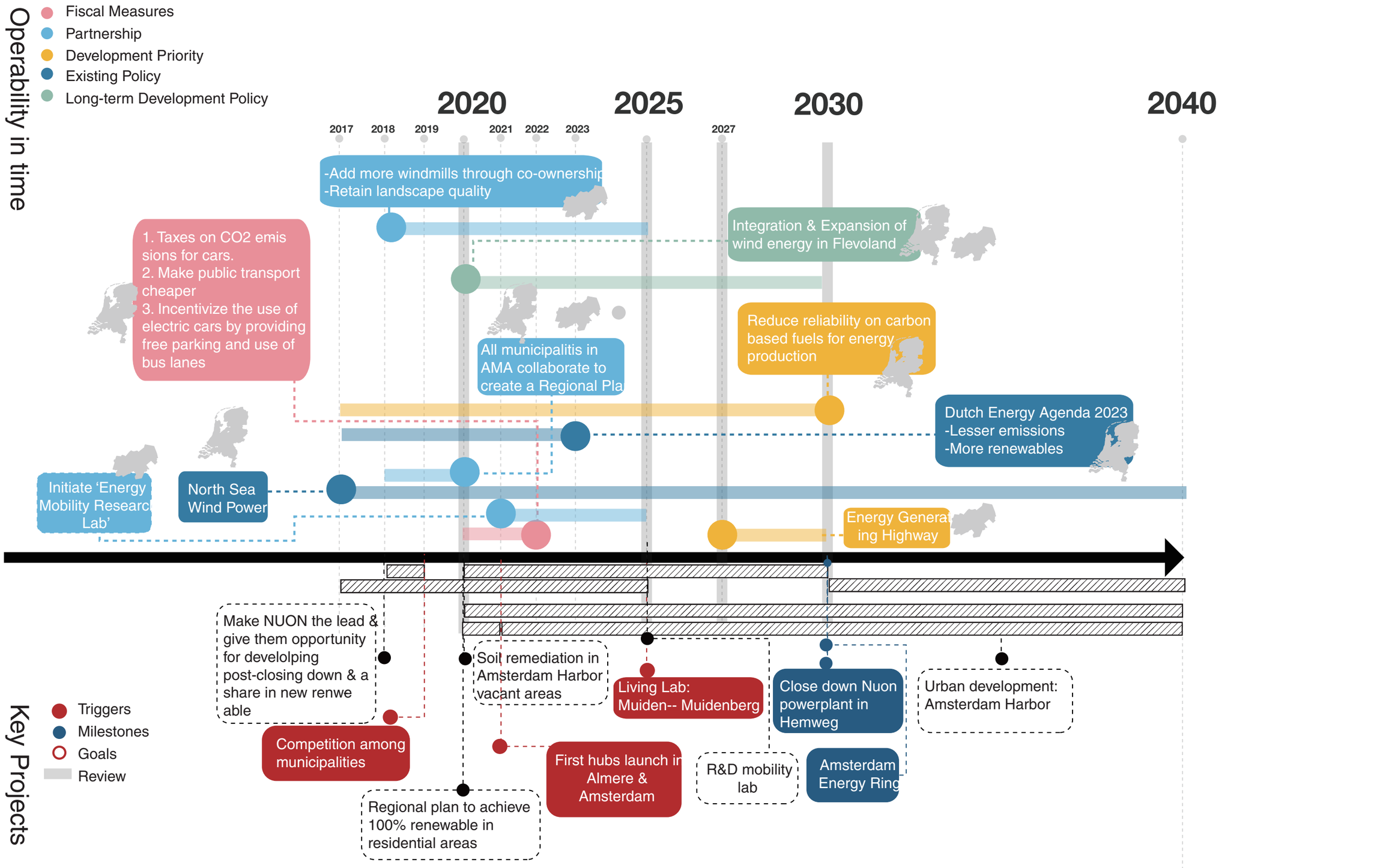
03. LANDSCAPE | POST-FOSSIL

03. LANDSCAPE | WIND

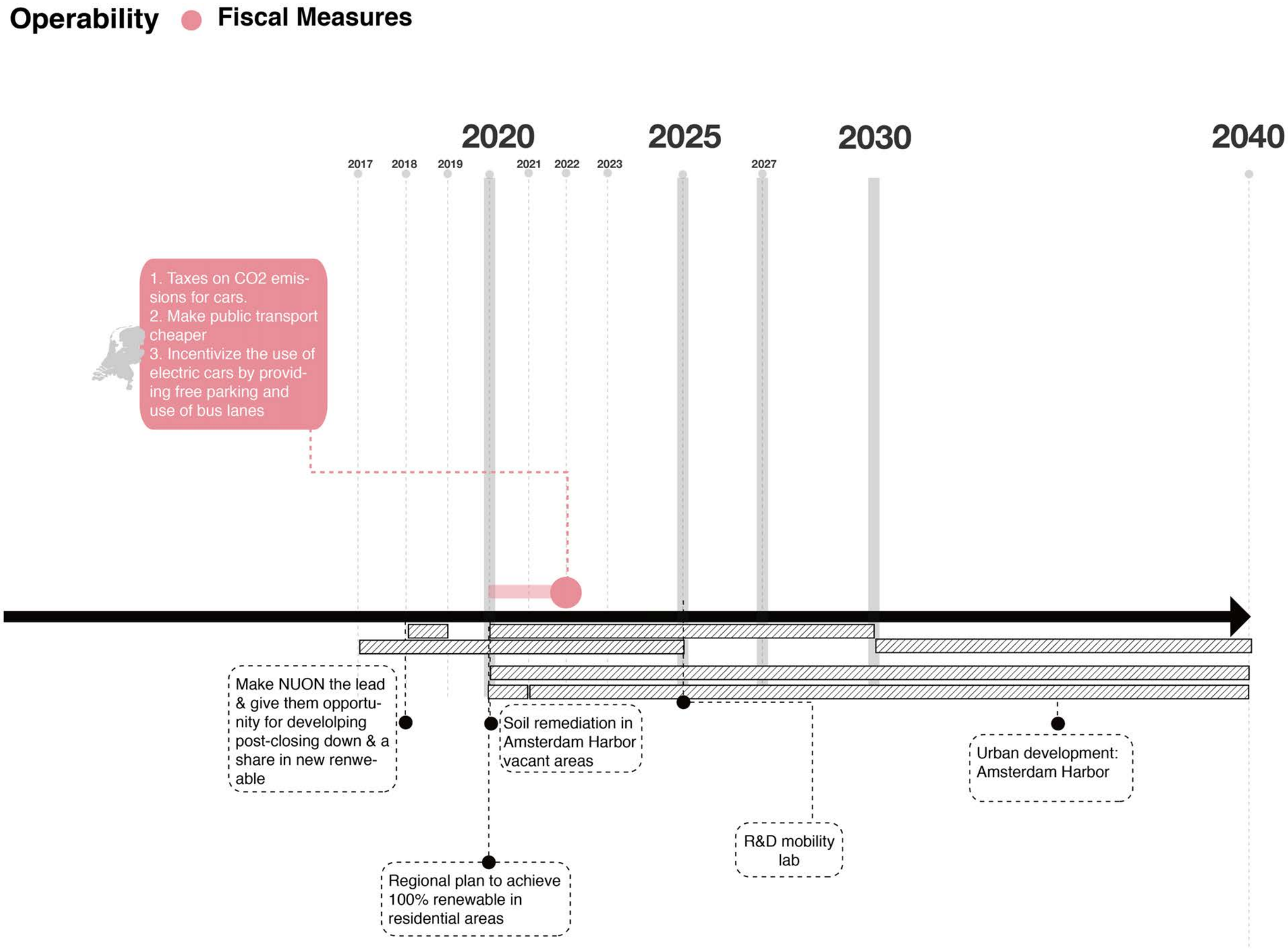


INTEGRATED SYSTEMS

OVERARCHING STRATEGY



OVERARCHING STRATEGY



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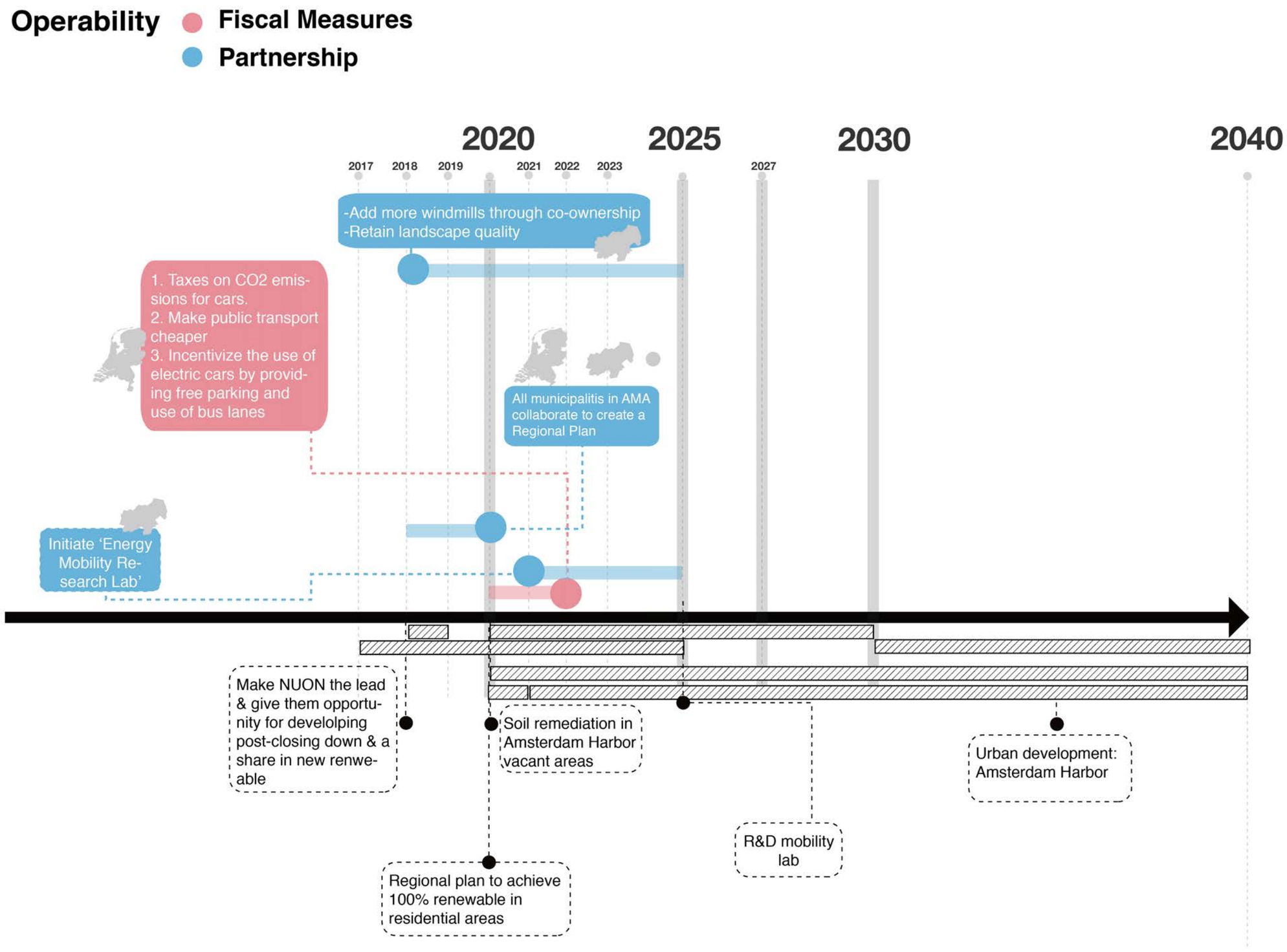

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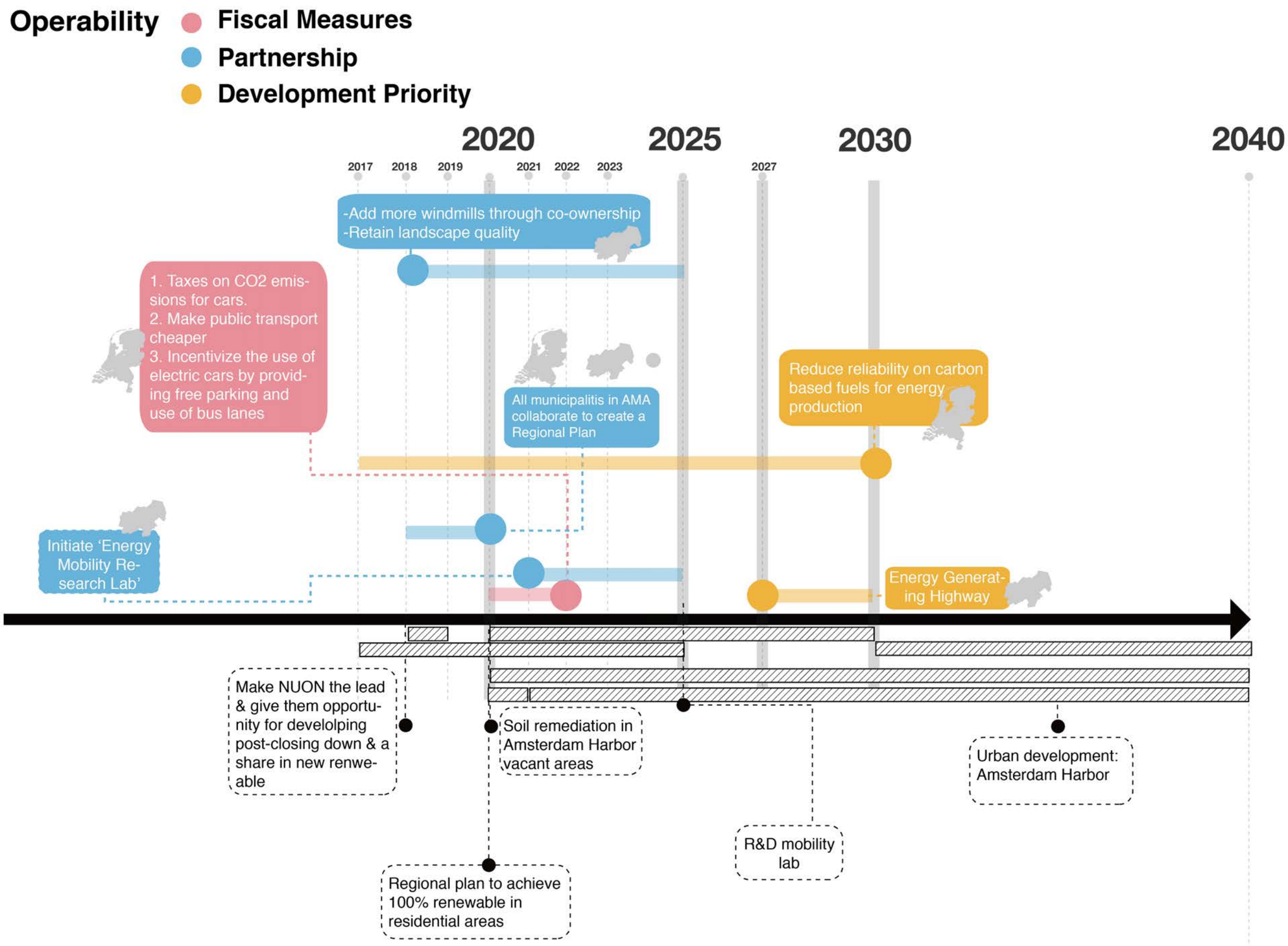

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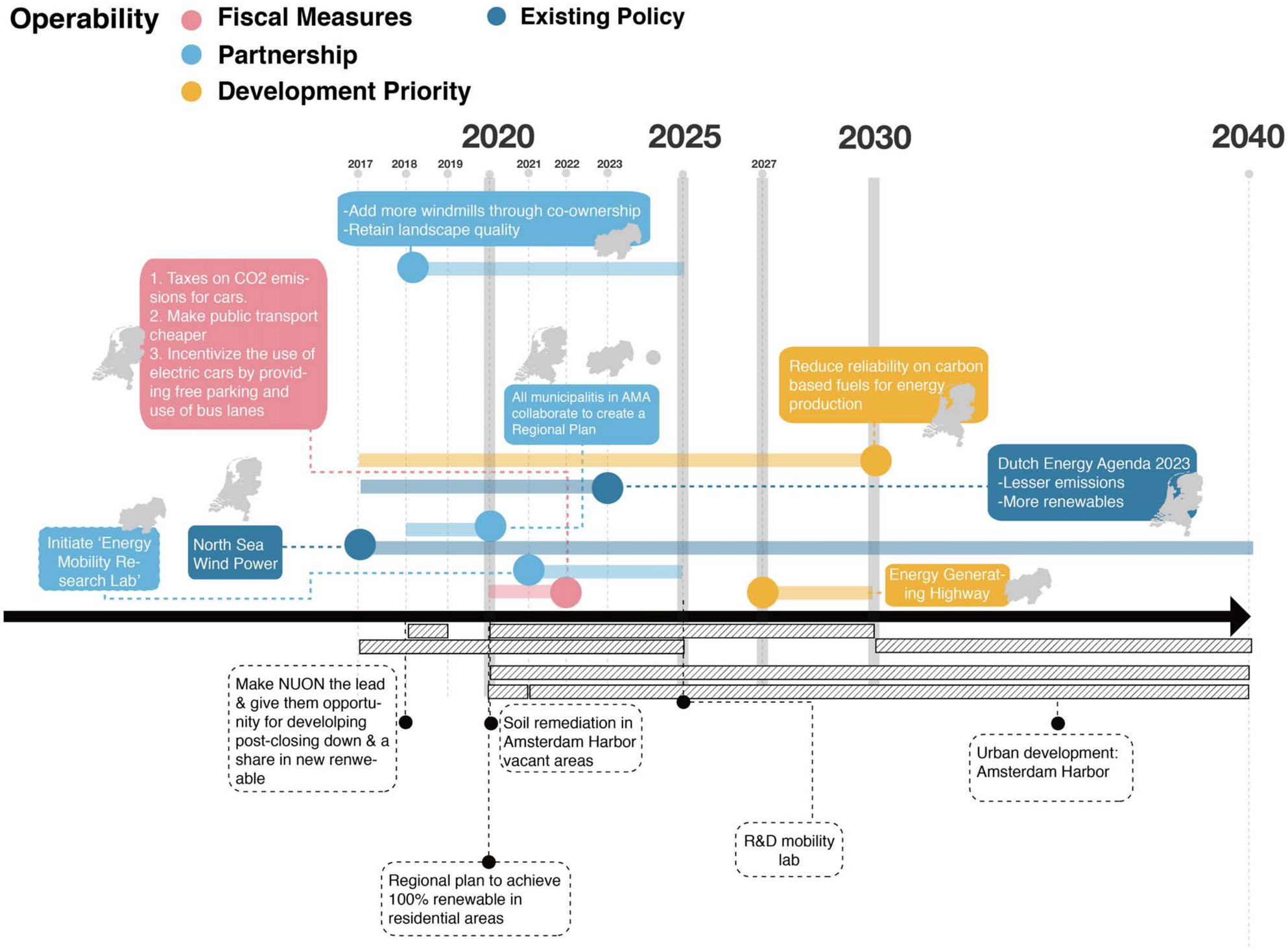

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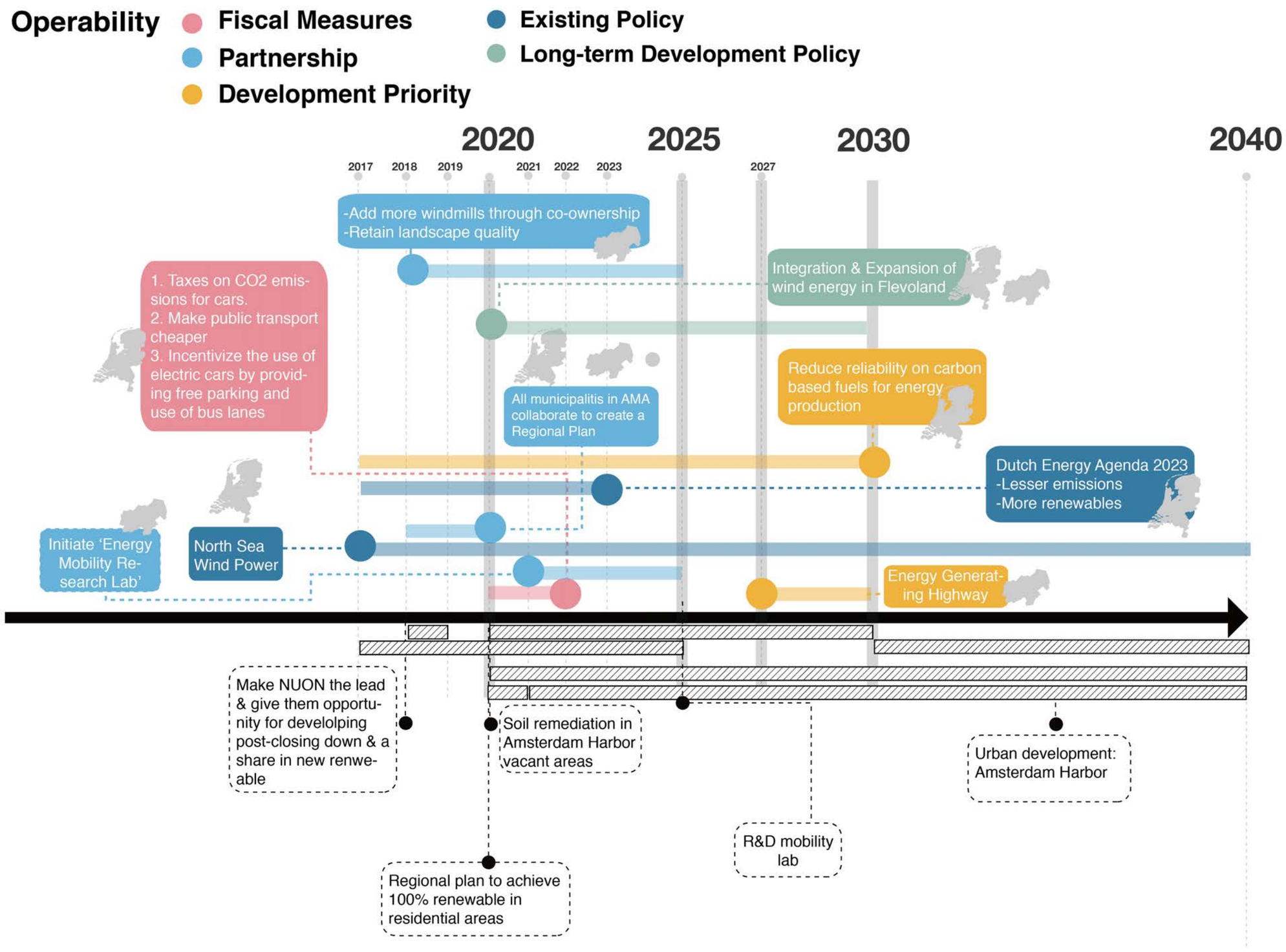

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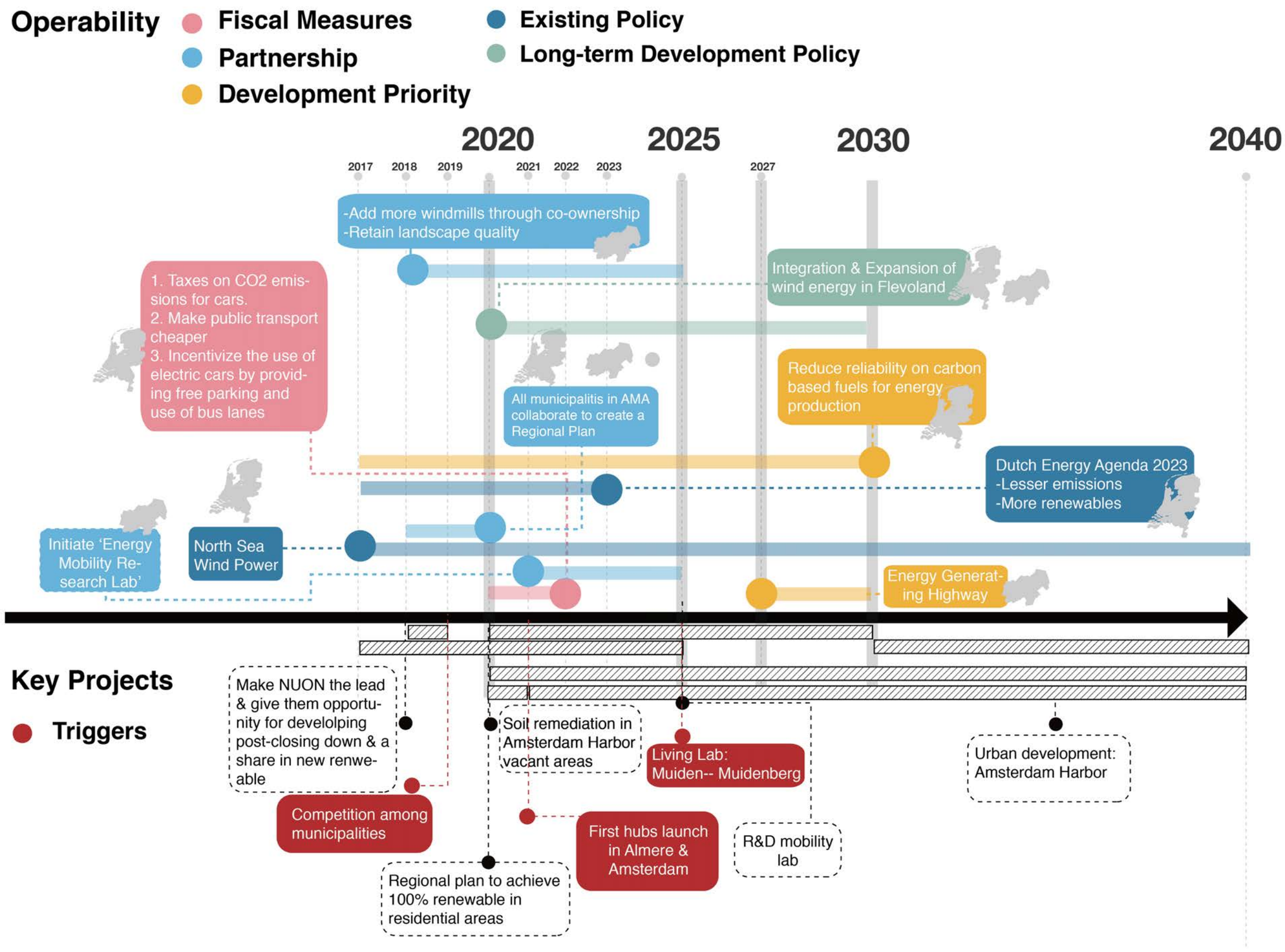

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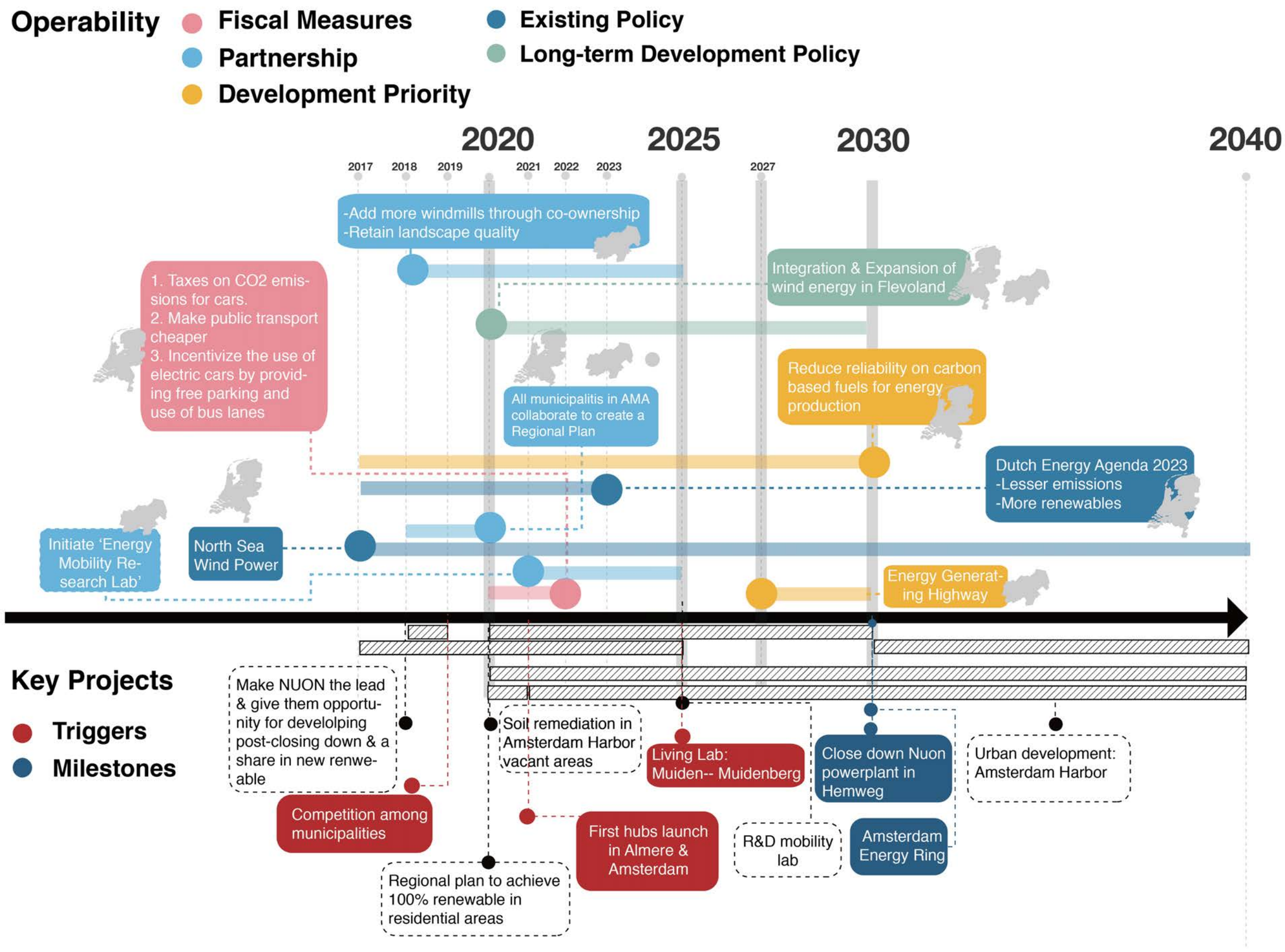
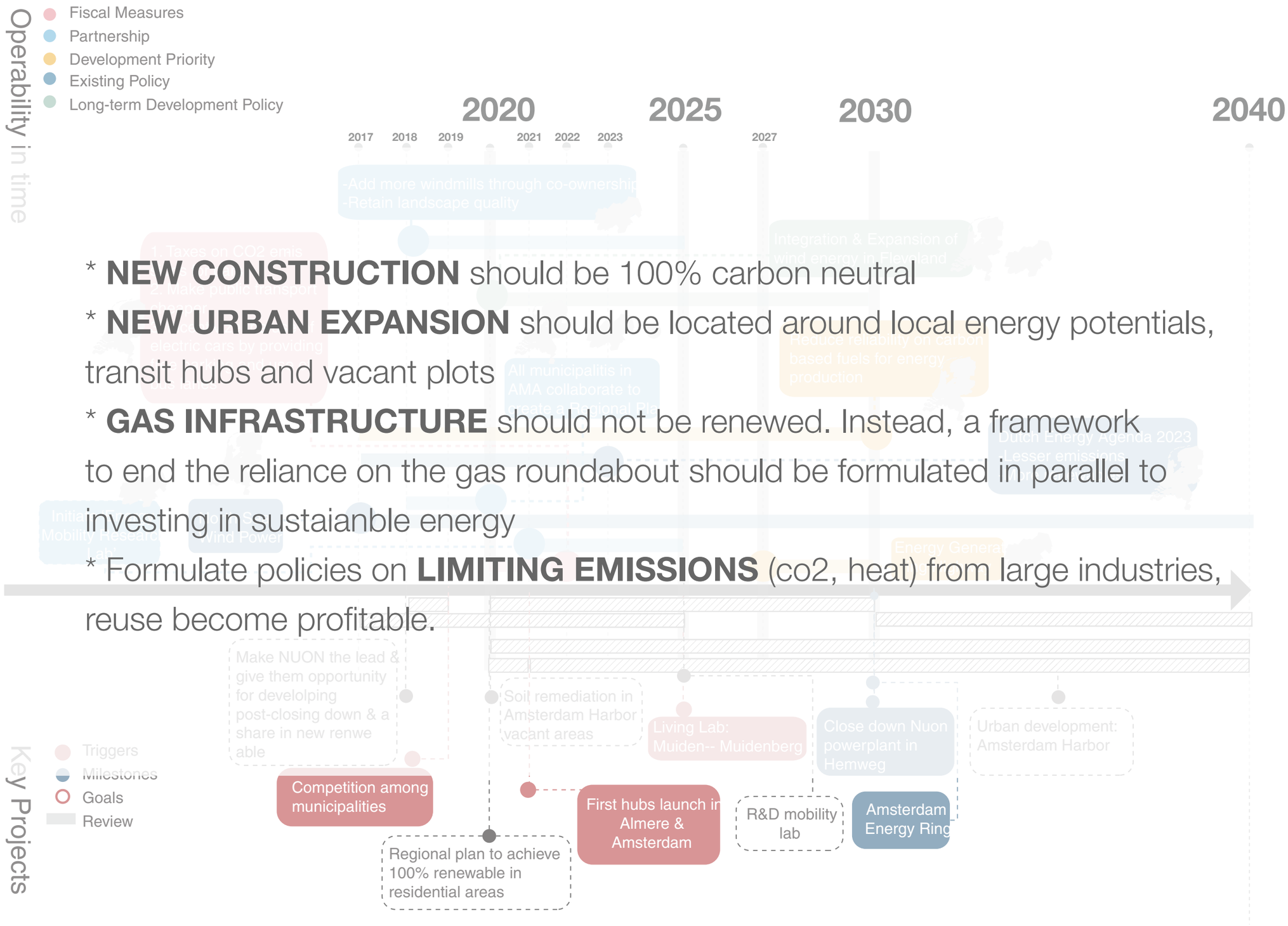


OVERARCHING POLICY



* **NEW CONSTRUCTION** should be 100% carbon neutral
* **NEW URBAN EXPANSION** should be located around local energy potentials, transit hubs and vacant plots
* **GAS INFRASTRUCTURE** should not be renewed. Instead, a framework to end the reliance on the gas roundabout should be formulated in parallel to investing in sustaianble energy
* Formulate policies on **LIMITING EMISSIONS** (co2, heat) from large industries, reuse become profitable.

VISION

City / Municpal Boundaries

Post Fossil Landscape
Wind Landscape

Train
Highway
Biking/Recreational route
Trainstation sharing hub
Recreational Sharing hub
City sharing hubs

kilometers
0 1.25 2.5 5 7.5 10

ENERGY TRANSITION LANDSCAPES

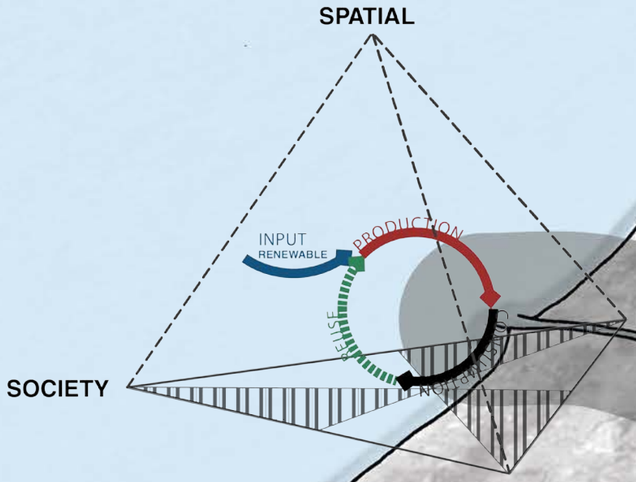
01. Decentralized Energy Landscape
Energy integrated built environment, system providing local economy, jobs and citizens involvement. Empowering municipalities.

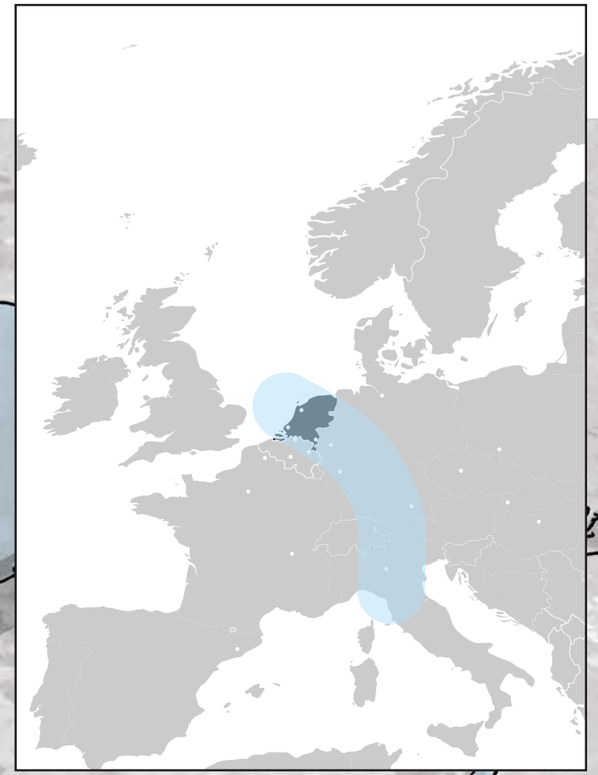
02. Mobility Energy Landscape
Energy integrated into mobility system and a flexible sharing system within the Randstad.

03. Post Fossil Landscapes
Transformation of former fossil fuel energy landscapes, creating new values for citizens

04. Wind Energy Landscape
Energy integrated into agriculture landscape: combination of recreation, nature and art, empowering farmers.

2040 AND FURTHER

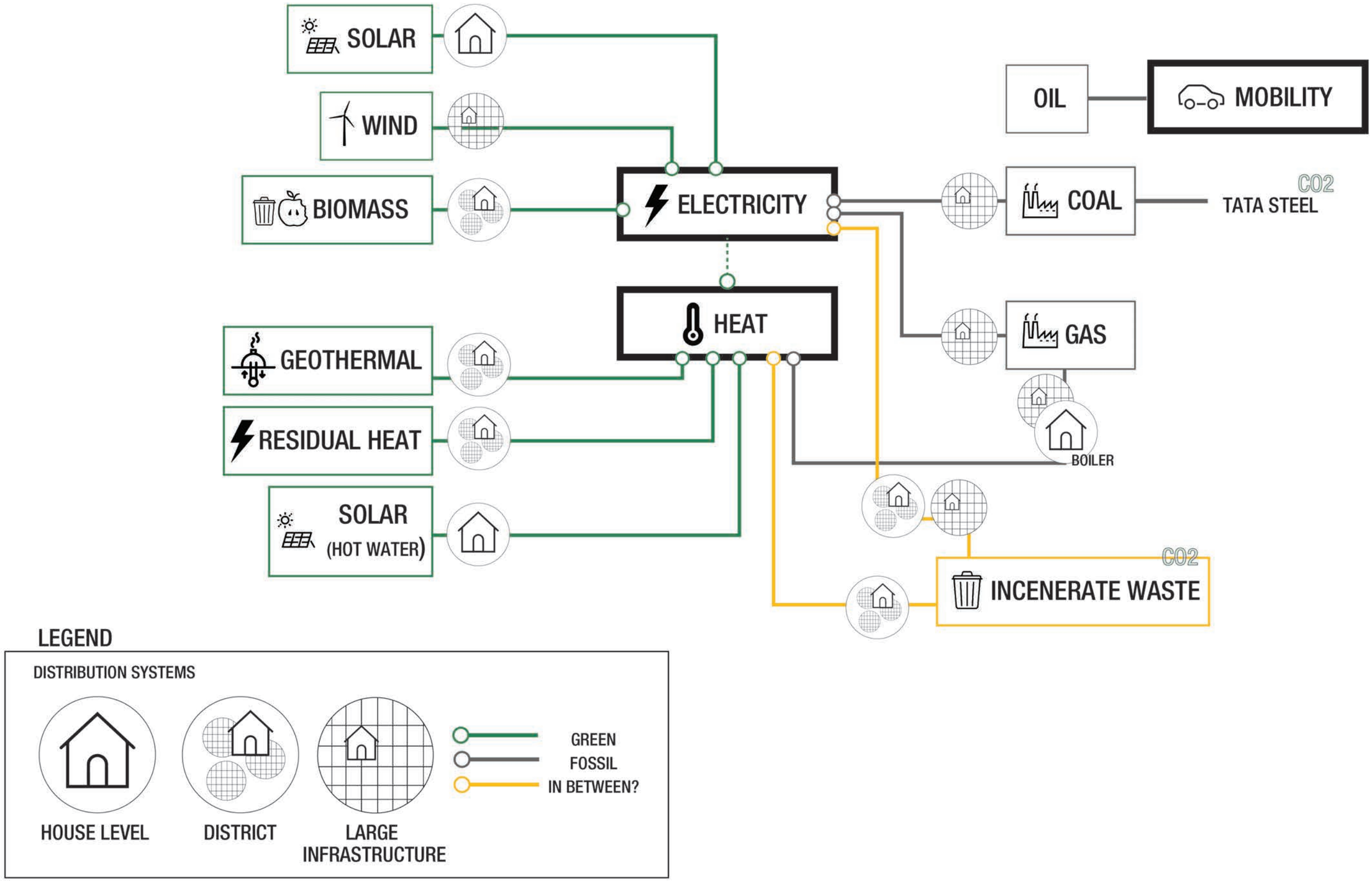




THE GREEN ENERGY TRANSITION BEYOND DUALISM

THANK YOU

source:
www.decorrespondent.nl, illustration by Cliff van Thillo



LEGEND

DISTRIBUTION SYSTEMS

HOUSE LEVEL

DISTRICT

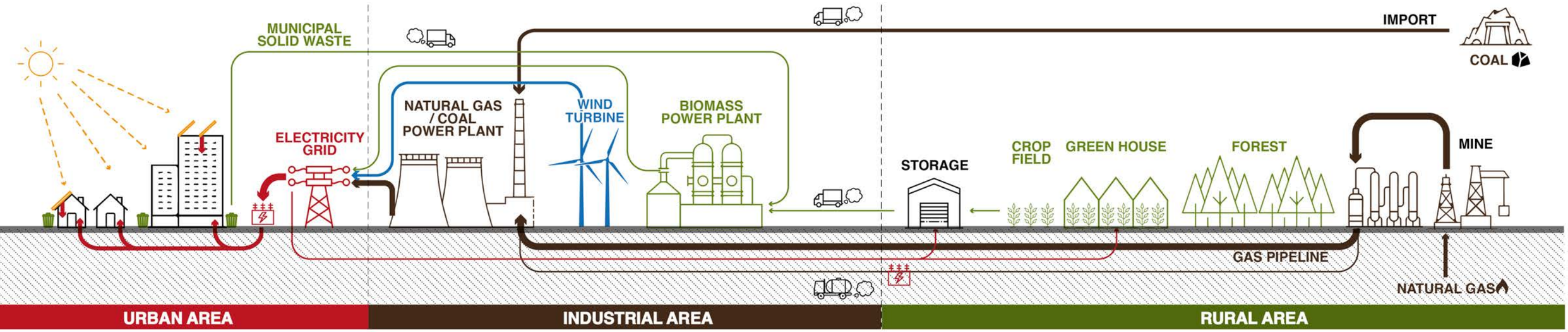
LARGE INFRASTRUCTURE

GREEN

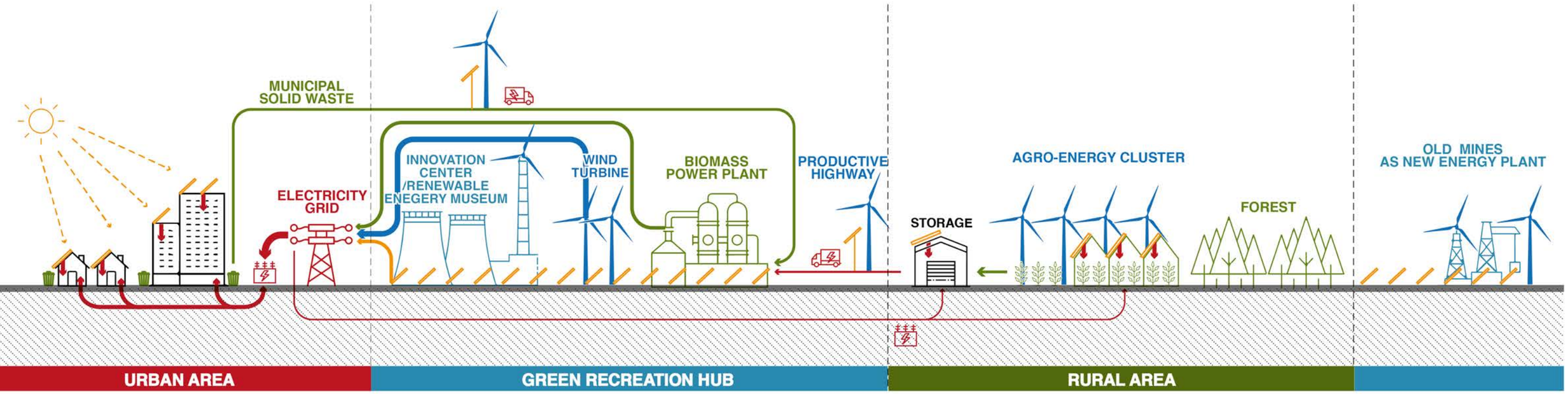
FOSSIL

IN BETWEEN?

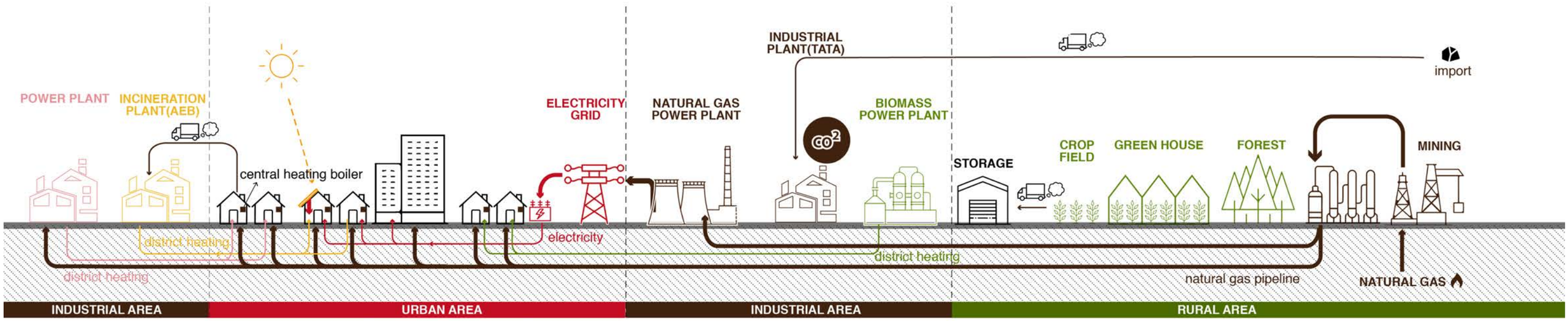
CURRENT



PROPOSED



CURRENT



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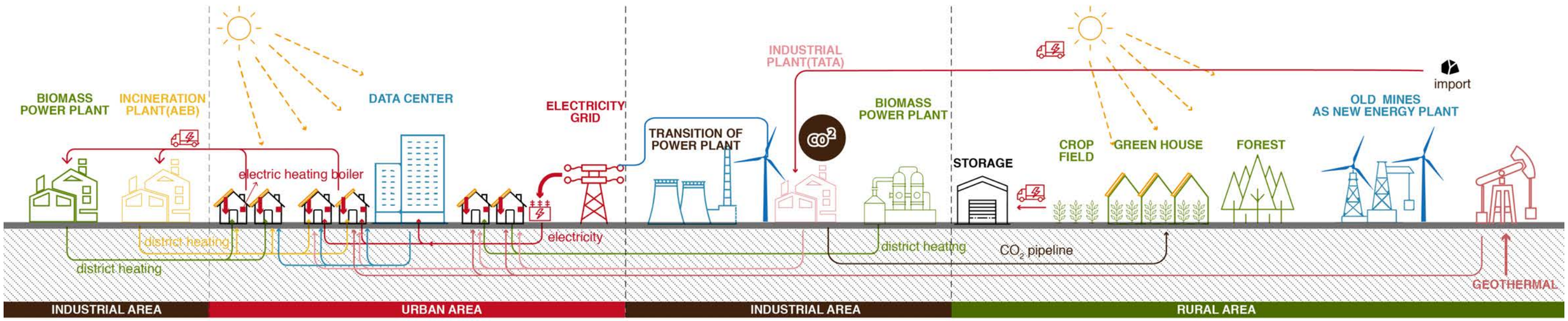

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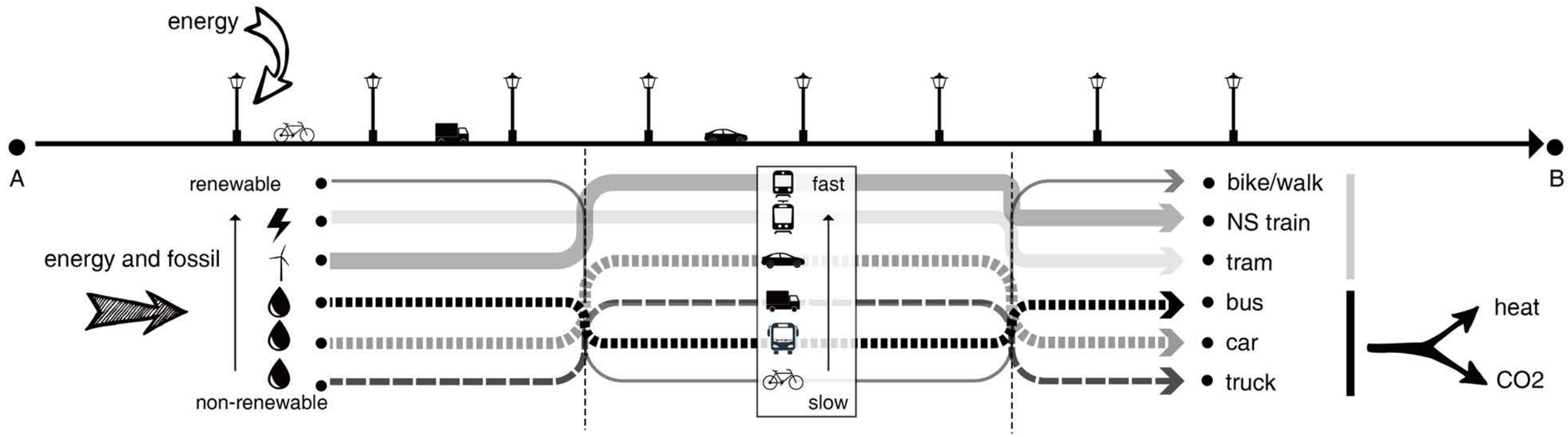
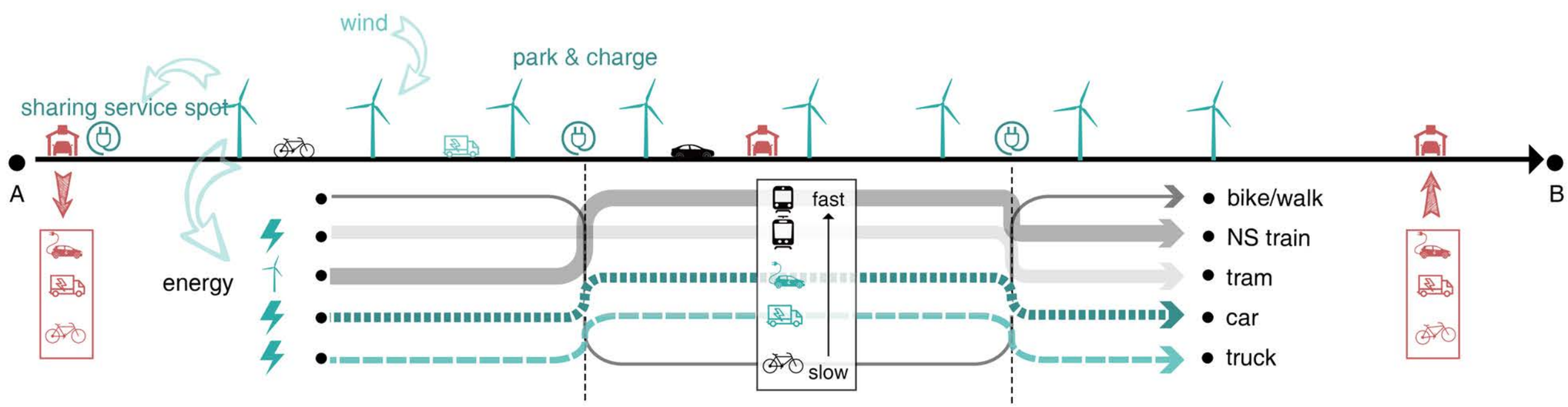


FUTURE

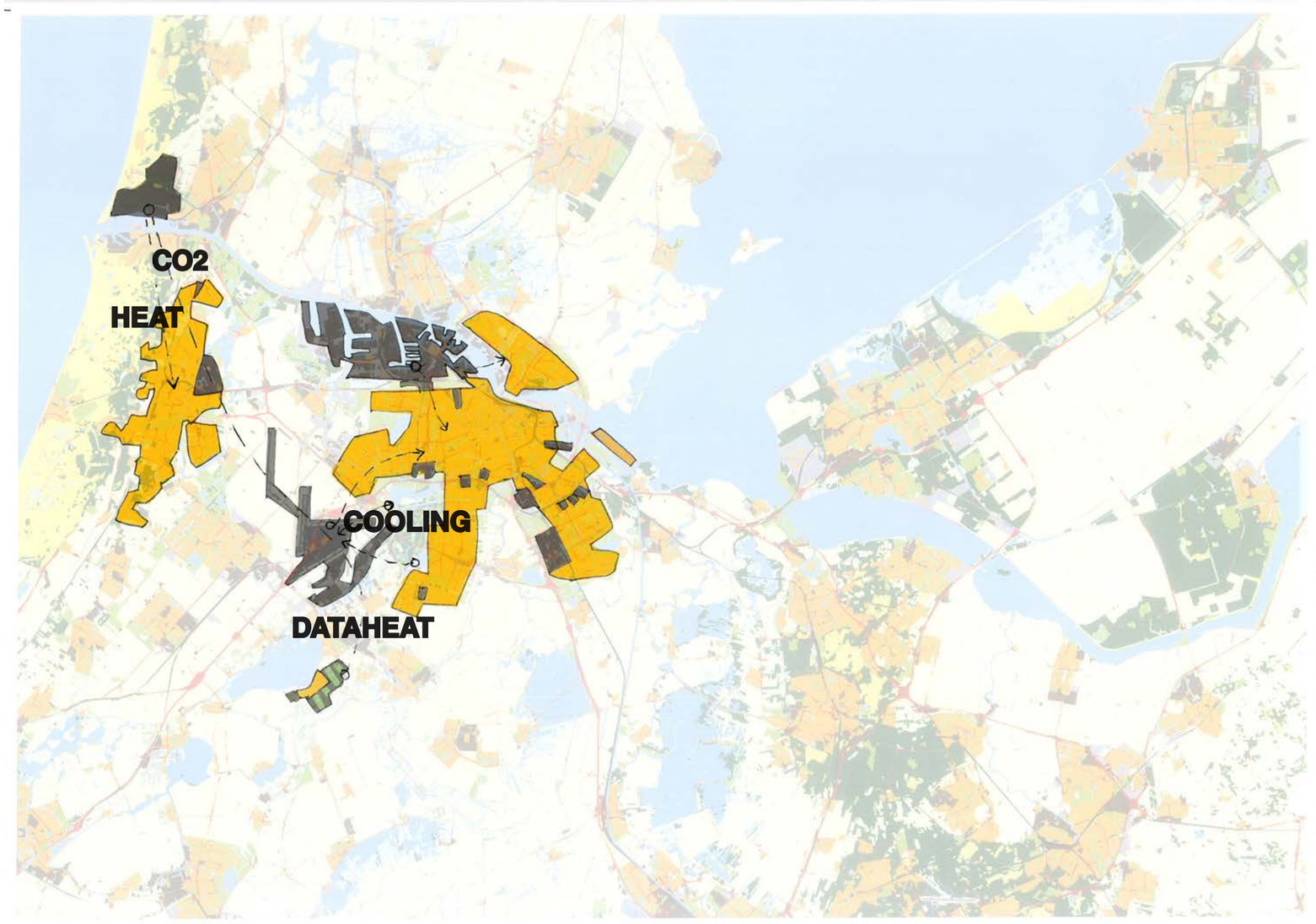


NEW BUILD

Almere: geothermal
Haarlemmermeer: geothermal
Amsterdam: vacancy

Cities densify
Growth realised at enrgy source

BIGGER FLOWS



JOBS

Short term:
- adjustment in built environment
- wind on sea
- proces technology
- energy saving projects

Long term:
- solar
- smart grids
- reuse of co2

Total in 2020: (between 2015-2020) zo'n **113.000 FTE**

source:
Geuns, van, J., Jong, de S., Slingerland, S. (2015) TNO, *Beeft de grond onder de voeten van de gasrotonde?*