

# **BA URBAN STUDIO**

## **TEMPELHOFER FREIHEIT:**

### **FROM MINISCENARIOS TO OPERATIONAL FIELDS IN THE CONTEXT OF CLIMATE CHANGE**

FACHGEBIET FÜR NACHHALTIGE STADTENTWICKLUNG UND STÄDTEBAU  
PROF. RAOUL BUNSCHOTEN



**BRAINBOX**

- 1. Enlarge a process of the miniscenarios to an operational field.**
- 2. Demonstrate what role actors play in the operational field.**
- 3. Draw up a process of energy behaviour in the frame of climate change.**
- 4. Combine all information in the Operational field.**

## **EXERCISE 02**

01

FIND OUT ABOUT **ACTORS, AGENTS AND ANGELS**  
**INVOLVED IN THE MINISCENARIOS**

## **ACTORS, AGENTS AND ANGELS**

**who are they?**

**what do they do in the miniscenarios?**

**how do they stir the processes?**



**Actors -**  
**play characters with desires within the  
miniscenarios (local)**



## **Agents -**

**set rules that affect scenarios and the  
desires set out by the actors (far away)**



**Angels -**  
are symbolic heroes and messengers  
capable of moving through different  
layers of space (everywhere).



02

## **ENERGY BEHAVIOUR OF ACTORS, AGENTS AND ANGELS**

# FESTIVAL ÜBER LEBENSKÜNST

## 17.–21. AUGUST 2011



HAUS DER KULTUREN DER WELT

RAJS AUS  
DER BIOTONE!



ENERGY BEHAVIOUR

NEIGHBOURHOOD  
SATELLITES  
ENERGY HARVESTS



ENERGY BEHAVIOUR

# ENERGY STREET FIGHT



## ENERGY BEHAVIOUR

**POWER THE CITY!  
DIE STROMAKTIVISTEN**

**ENERGY BEHAVIOUR**

http://www.energy.eu/

Bauhaus Uni Weimar Apple Google Yahoo! Google Maps YouTube Wikipedia News (793) Beliebt Wörterbuch Bibliothek Siedlungsbau Webmail Webmail CHORA BVG

Über Lebenskunst - Energie Europe's Energy Portal » Fuel Pric...

9	Nigeria	5.1
10	Algeria	4.5
11	Iraq	3.2
12	Indonesia	3.1
13	Australia	3.0
14	Malaysia	2.4
15	China	2.4
16	Egypt	2.2

[TOP](#)



### 10 Important ways to save energy & fight global warming

1. Use energy-efficient appliances, such as energy-saving lightbulbs
2. Switch to an electricity provider that offers electricity derived from renewable sources.
3. Ride a bicycle for distances under e.g. 10km. Consider a bus or train for longer distances.
4. Lower your thermostat by 4 to 5 degrees Celsius during the night and when nobody's home.
5. Make sure your home is well insulated.
6. Completely switch-off appliances that you do not use.
7. Consider going to your holiday destination by bus or train, instead of car or airplane.
8. If possible, work at home instead of an office location.
9. Support forestation programs that focus on planting indigenous trees in tropical regions.
10. Educate others. Tell people of the importance of an energy-efficient lifestyle.



[TOP 10](#) [HEATING](#) [LAUNDRY](#) [LIGHTING](#) [COOKING](#) [REFRIGERATING](#) [CARS](#) [HOUSES](#) [OFFICES](#)

[TOP](#)



There are many EU directives and communications related to energy. In this section you'll find some of the most relevant.

[European Energy Label](#)

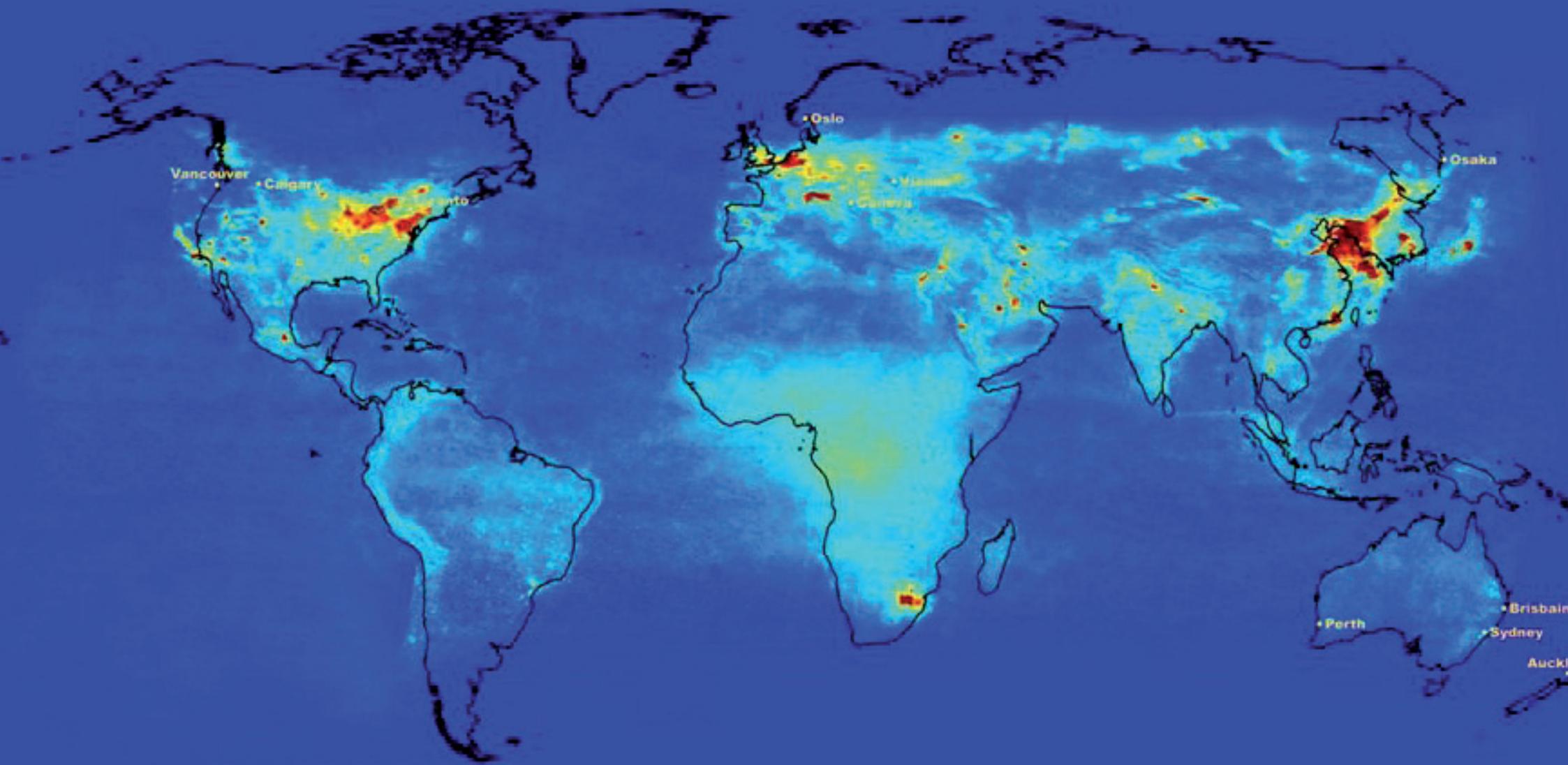
ROADMAP 2050

A PRACTICAL GUIDE TO A PROSPEROUS,  
LOW-CARBON EUROPE

[WWW.ROADMAP2050.EU](http://WWW.ROADMAP2050.EU)

**AMO  
ROADMAP  
2050**

SINCE THE INDUSTRIAL REVOLUTION, TECHNOLOGICAL BREAKTHROUGHS HAVE CHANGED THE WAY WE LIVE. AT THE SAME TIME, WE HAVE BECOME DEPENDENT ON FOSSIL FUELS FOR ENERGY. HOW CAN WE SUSTAIN OUR WAY OF LIFE AND STOP THE FURTHER POLLUTION OF THE ATMOSPHERE?



WITHOUT DRASTIC REDUCTIONS IN GLOBAL CO<sub>2</sub>  
EMISSIONS, THE EARTH'S TEMPERATURE COULD RISE  
AS MUCH AS SIX DEGREES CELSIUS BY THE END OF  
THE CENTURY...

TEMPERATURE

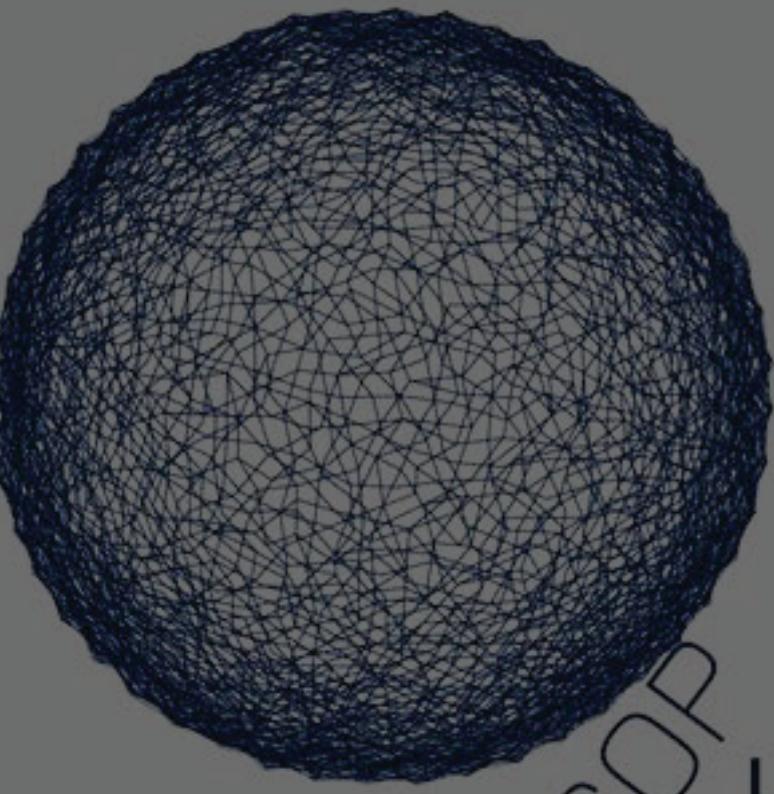
Do Nothing Scenario

2050

Today's Temperature



COPENHAGEN RECOGNIZED THE CASE FOR KEEPING  
THE RISE IN TEMPERATURE BELOW 2 DEGREES, BUT  
FAILED TO PRODUCE A BINDING AGREEMENT ...



COP  
15  
COPENHAGEN  
CLIMATE CHANGE CONFERENCE 2009

...LEAVING LEADERS WITH TARNISHED REPUTATIONS...

COP Fall



RASMUSSEN  
REPORTS POLL

Did scientists falsify research to support their own theories on Global Warming?

59%	SOMEWHAT LIKELY
35%	VERY LIKELY
26%	NOT VERY LIKELY

120% ???

CLIMATE CHANGE RESEARCH / FOX NEWS® GOP 5 NHL TOR 6 COB 7

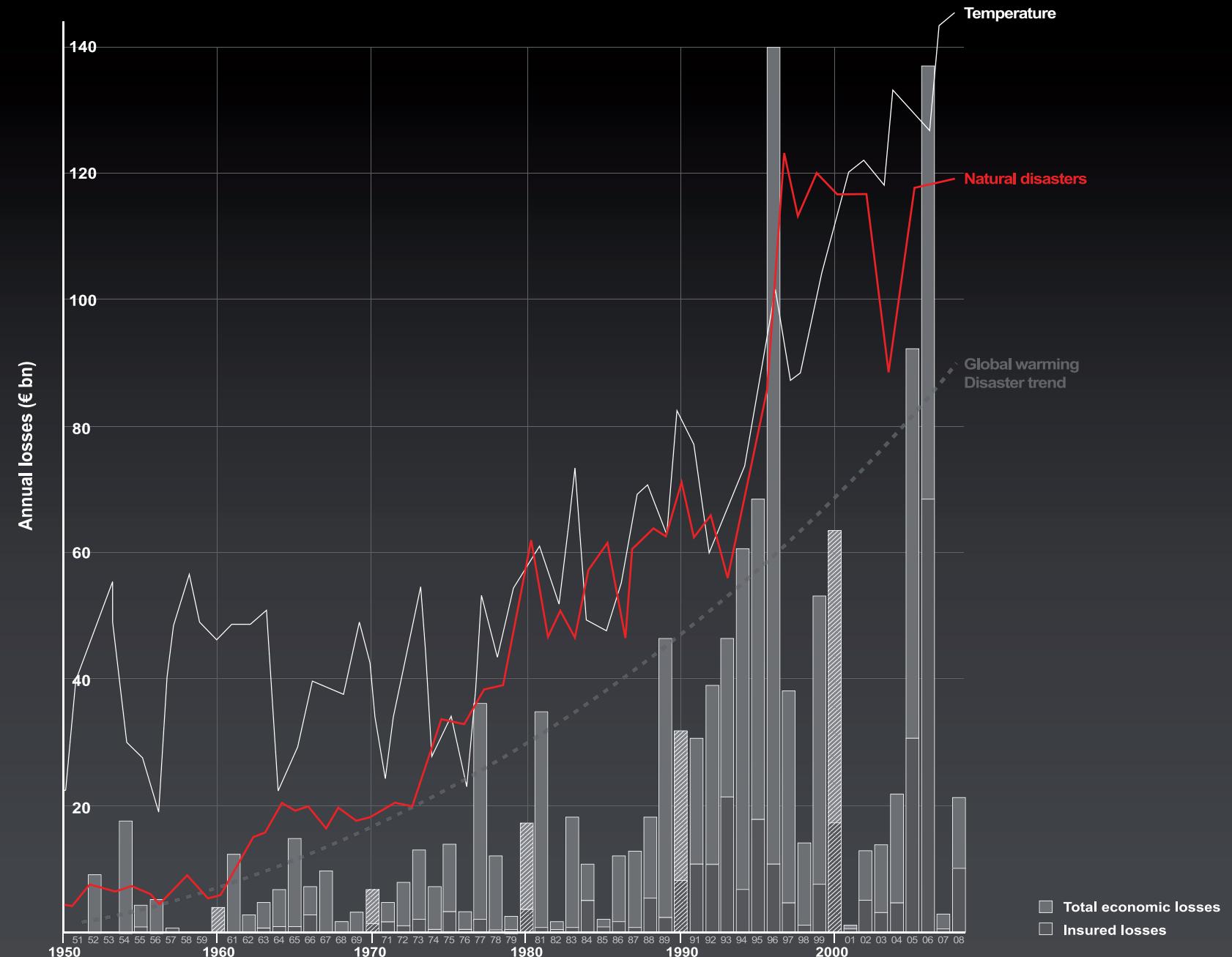
I DON'T BELIEVE IN  
GLOBAL WARMING

# 'CLIMATE INCIDENTS'

Climate Anoma



WITH THE COST ESTIMATIONS OF NATURAL DISASTERS  
EVER INCREASING, FAILURE TO ACKNOWLEDGE THE  
UNDERLYING CAUSE COULD COME AT A VERY HIGH  
PRICE.



OCTOBER 30, 2009: EUROPEAN LEADERS ENDORSE THE  
OBJECTIVE OF AN 80% - 95% REDUCTIONS IN CO<sub>2</sub>  
EMISSION BY 2050.

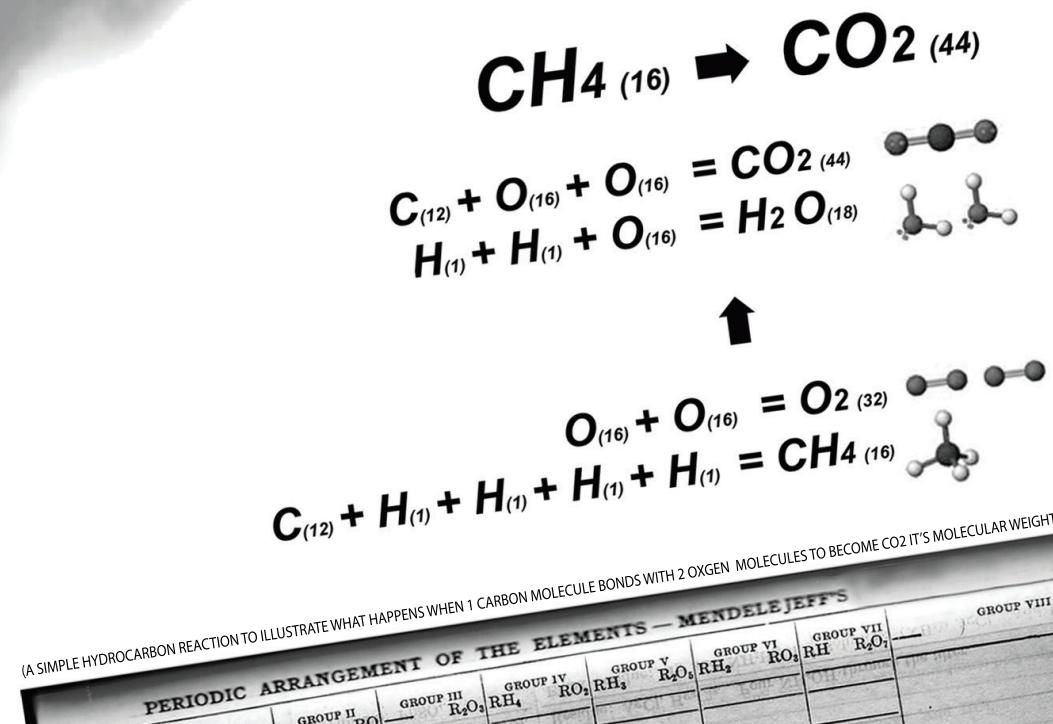
# CO<sub>2</sub> PARADOX

FOR EVERY BARREL OF OIL WE BURN THREE TIMES THE QUANTITY OF CO<sub>2</sub> IS BEING PRODUCED. THIS MEANS OUR ACTUAL CARBON FOOTPRINT IS ALMOST THREE TIMES THE SIZE OF OUR OIL CONSUMPTION FOOTPRINT!



**502kg**  
(CARBON DIOXIDE EQUIVALENT)  
CO<sub>2</sub> (44)

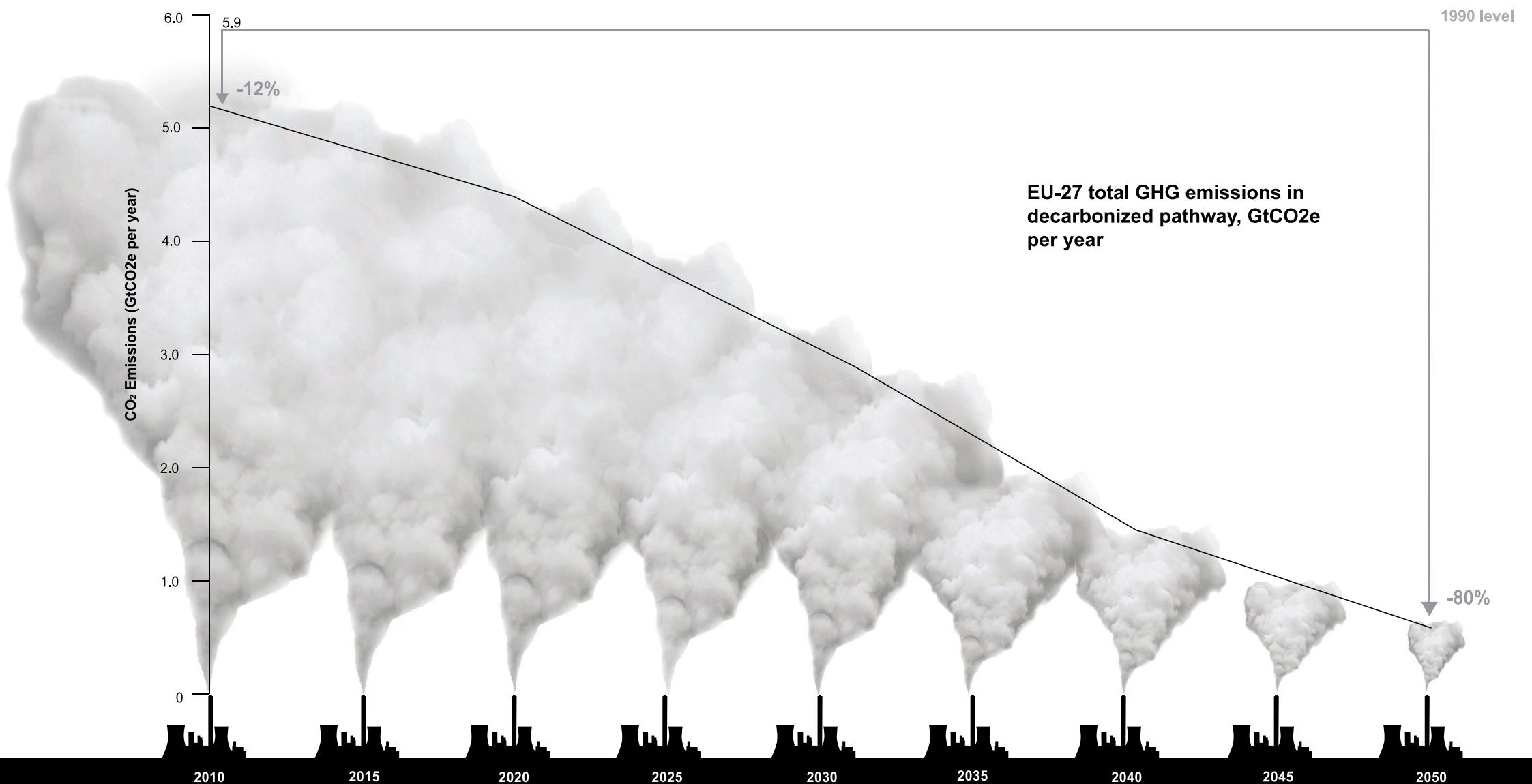
Note: Hydrocarbons exist in many forms but the principle remains the same. To demonstrate the reaction we use the simplest form of hydrocarbon: Methane (CH<sub>4</sub>). CH<sub>4</sub> reacts with two oxygen molecules to produce one carbon dioxide molecule and two water molecules.

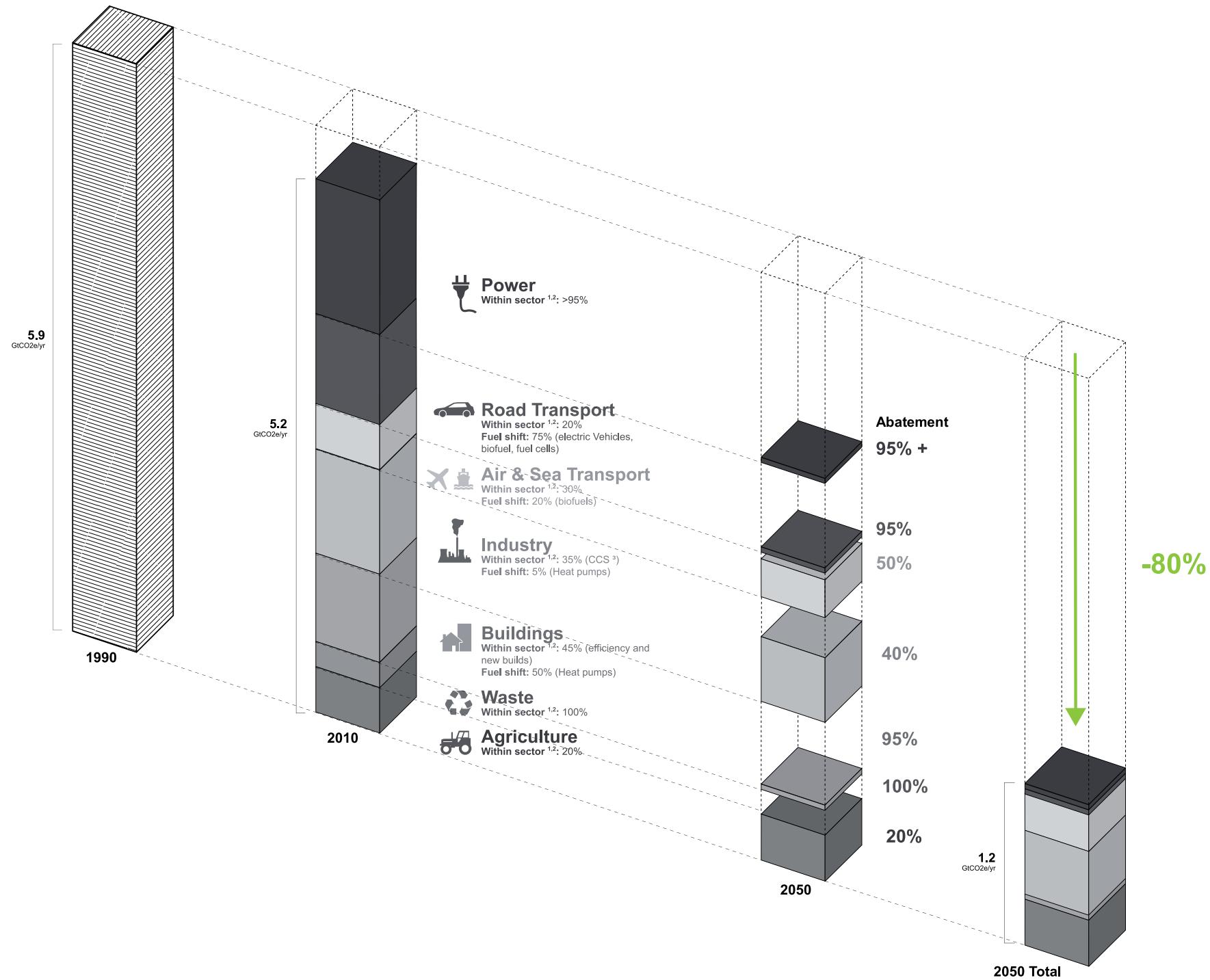


PERIODIC ARRANGEMENT OF THE ELEMENTS - MENDELEEFF'S									
SERIES	ZERO GROUP	GROUP I R <sub>2</sub> O	GROUP II RO	GROUP III R <sub>2</sub> O <sub>2</sub>	GROUP IV R <sub>2</sub> O <sub>3</sub>	GROUP V R <sub>2</sub> O <sub>4</sub>	GROUP VI R <sub>2</sub> O <sub>5</sub>	GROUP VII RH R <sub>2</sub> O <sub>7</sub>	GROUP VIII
0		Hydrogen H = 1.008							
1	He = 4.00	Lithium Li = 6.94	Glucinium (Beryllium) Gl = 9.1	Boron B = 11.0	Carbon C = 12.00	Nitrogen N = 14.01	Oxygen O = 16.00	Fluorine F = 19.0	
2	Ne = 20.2	Sodium Na = 23.00	Magnesium Mg = 24.32	Aluminum Al = 27.1	Silicon Si = 28.3	Phosphorus P = 31.04	Sulphur S = 32.06	Chlorine Cl = 35.46	
3	Ar = 39.88	Potassium K = 39.10	Calcium Ca = 40.07	Scandium Sc = 44.1	Titanium Ti = 48.1	Vanadium V = 51.0	Chromium Cr = 52.0	Manganese Mn = 54.93	
4	Krypton Kr = 82.92	Copper Cu = 63.57	Zinc Zn = 65.37	Gallium Ga = 69.9	Germanium Ge = 72.5	Arsenic As = 74.96	Selenium Se = 78.2	Bromine Br = 79.92	
5		Rubidium Rb = 85.45	Strontium Sr = 87.63	Yttrium Yt = 88.7	Zirconium Zr = 90.6	Columbium (Niobium) Cb = 93.5	Molybdenum Mo = 96.0	Ruthenium Ru = 101.7	
6	Xenon Xe = 180.2	Silver Ag = 107.88	Cadmium Cd = 112.40	Inium In = 114.8	Tin Sn = 118.7	Antimony Sb = 120.2	Tellurium Te = 127.5	Iodine I = 126.92	
7		Cesium Cs = 132.81	Bartum Ba = 137.37	Lanthanum La = 139.0	Cerium Ce = 140.25	Praseodymium Pr = 140.9	Neodymium Nd = 144.3		
8		Samarium Sm = 150.4	Gadolinium Gd = 157.3	Terbium Tb = 159.2			Erbium Er = 167.7		
9		Thulium Tm = 168.5		Ytterbium (Neoytterbium) Yb = 173.5			Tantalum Ta = 181.5	Tungsten W = 184.0	
10		Gold	Mercury Hg = 200.6	Thalium Tl = 204.0	Pb = 207.2	Bismuth Bi = 208.0	Thorium Th = 232.4	Uranium U = 238.2	

CO<sub>2</sub> EMISSIONS NEED TO BE REDUCED 80% BY 2050

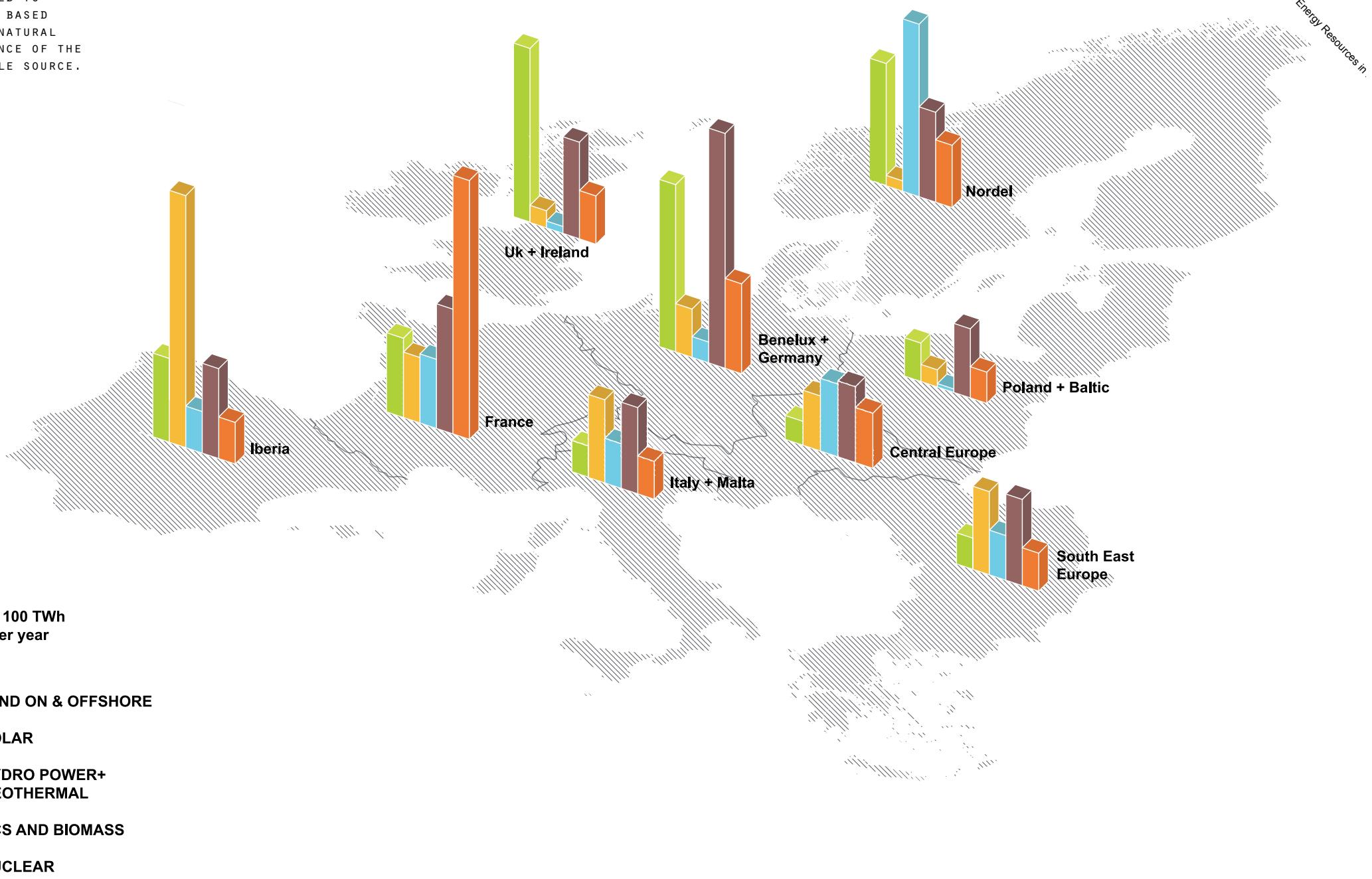
CO<sub>2</sub> Emissions in Decarbonized



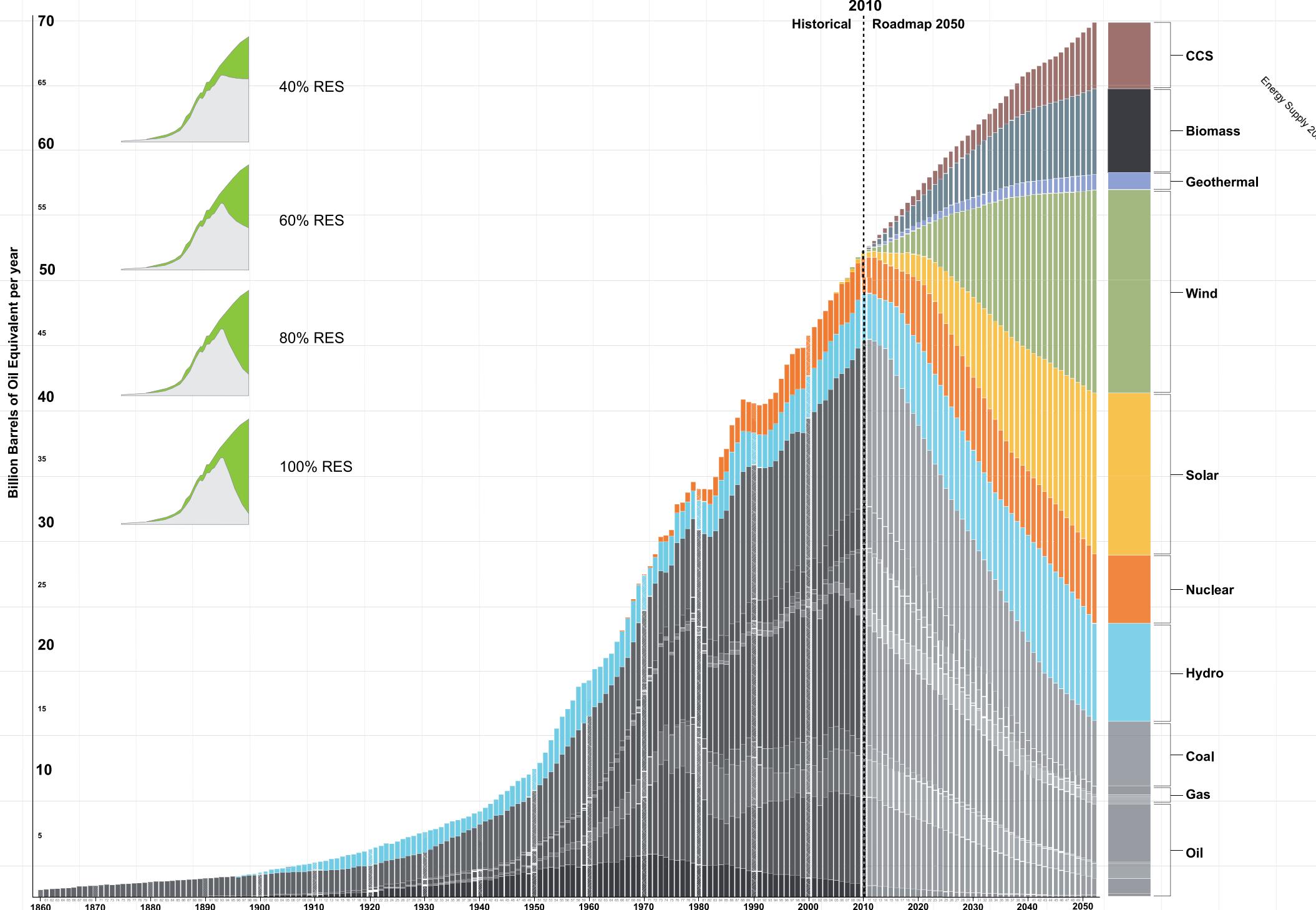


# ENERGY RESOURCES IN 2050 (HIGH RES PATHWAY)

RENEWABLE TECHNOLOGIES ARE ALLOCATED TO REGIONS BASED ON THE NATURAL OCCURRENCE OF THE RENEWABLE SOURCE.

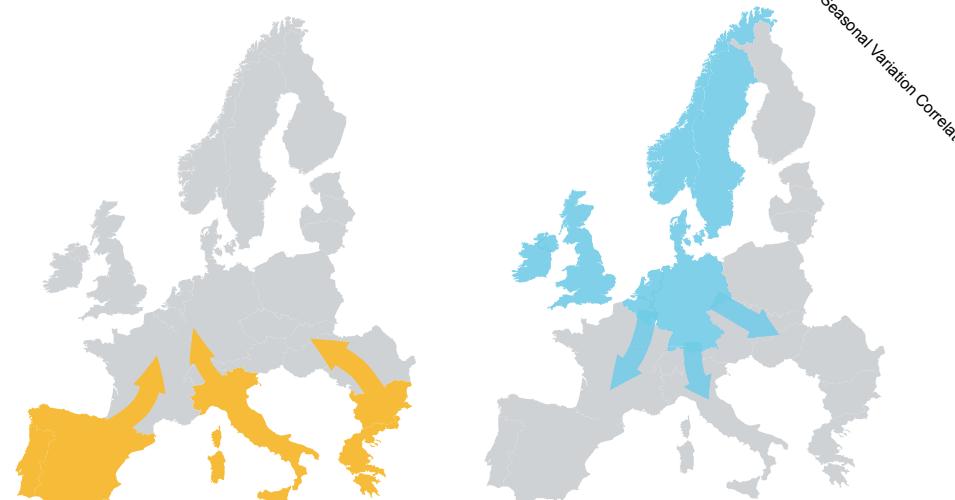
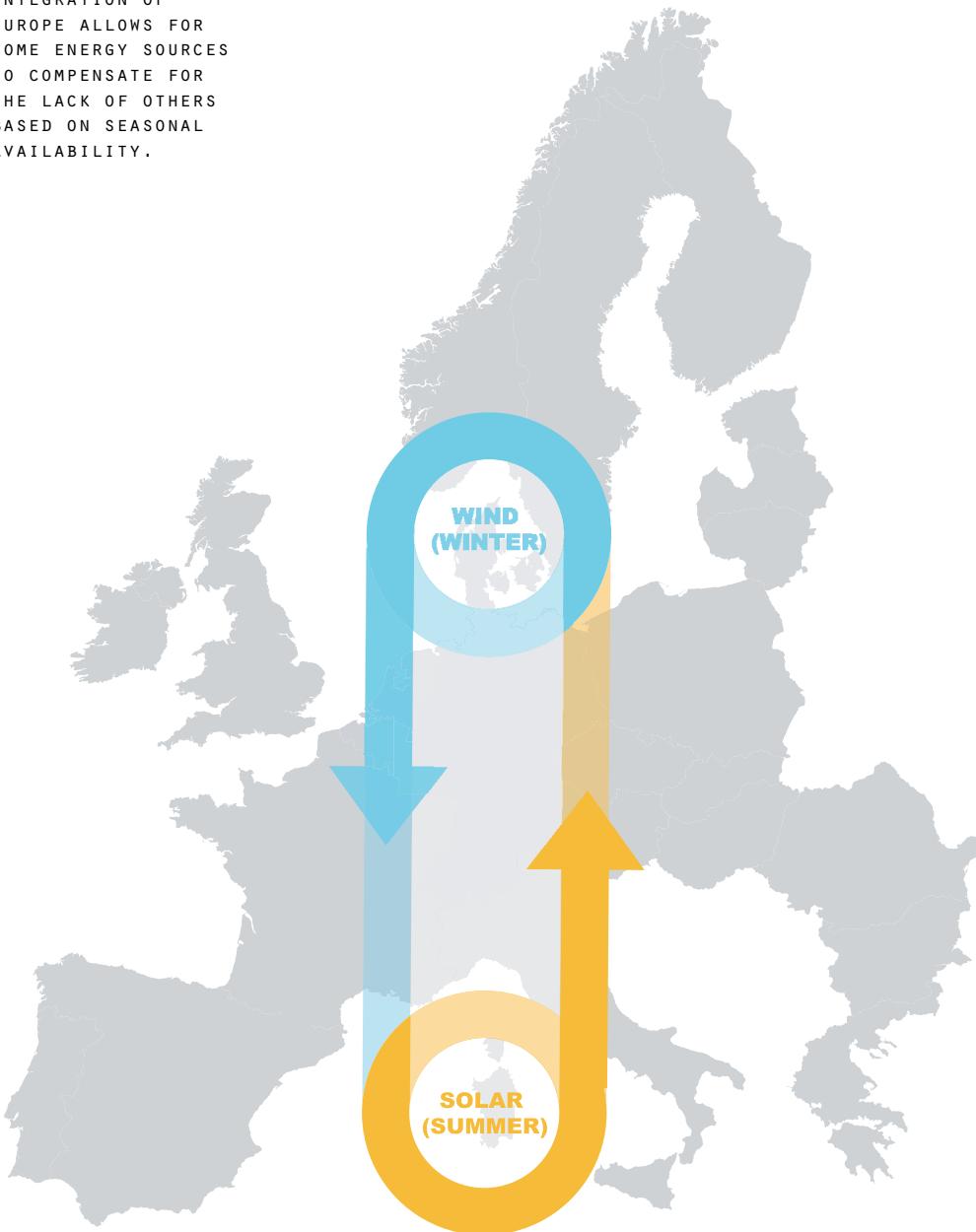


# ENERGY SUPPLY IN 2050 (HIGH RES PATHWAY)

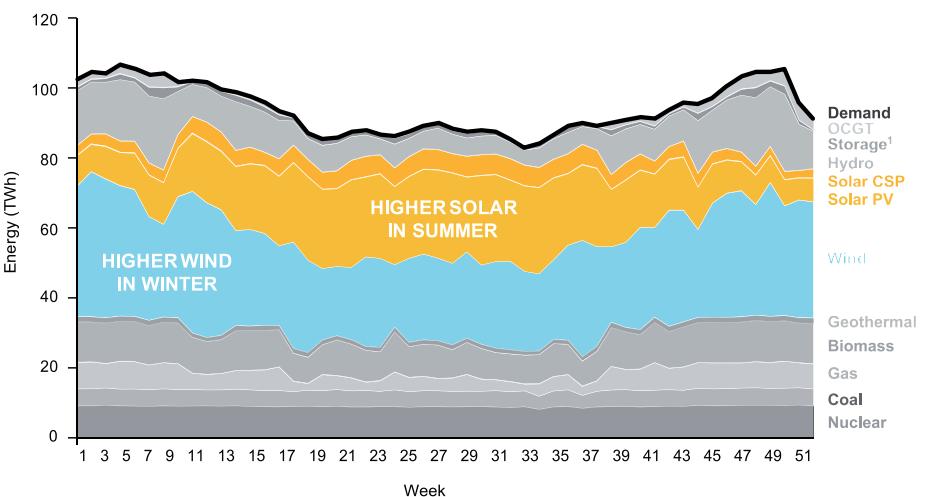


## RES DIVERSITY CONTRIBUTES TO CONSISTENT SUPPLY

OVER THE COURSE OF THE YEAR, THE INTEGRATION OF EUROPE ALLOWS FOR SOME ENERGY SOURCES TO COMPENSATE FOR THE LACK OF OTHERS BASED ON SEASONAL AVAILABILITY.

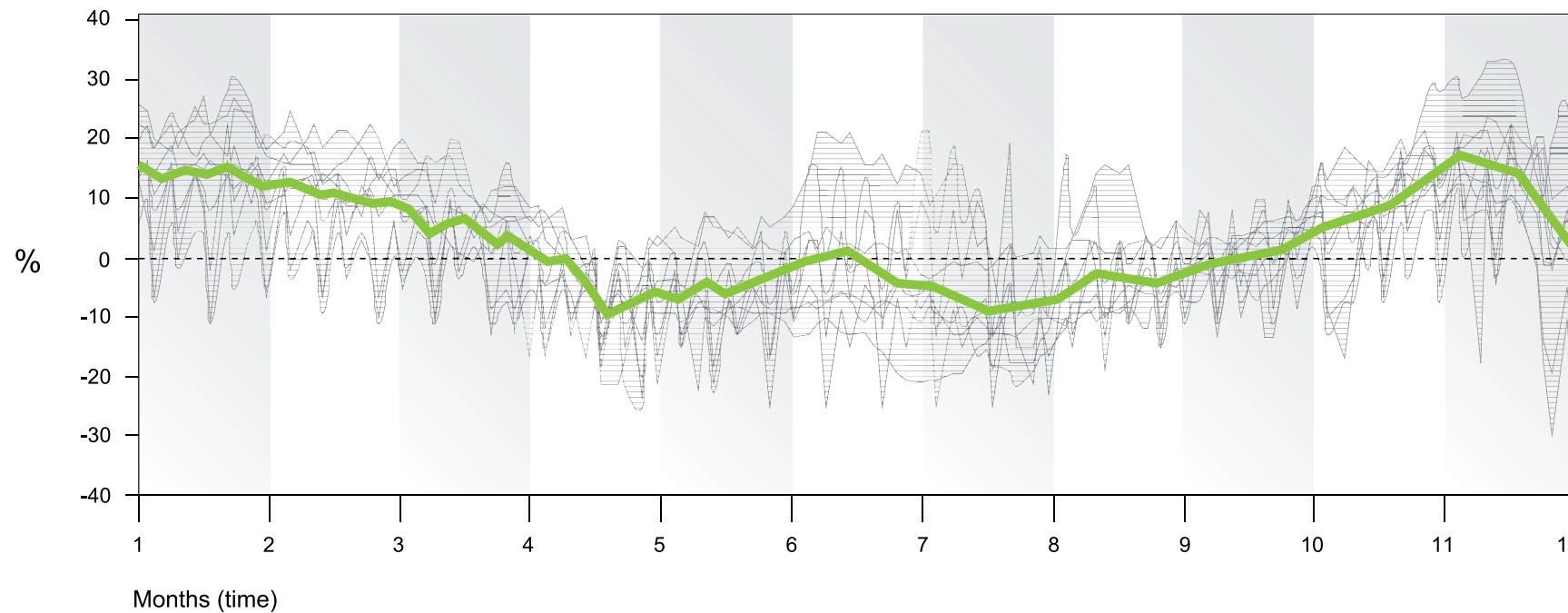


Overview of yearly energy balance, 80% RES pathway (TWh per week)

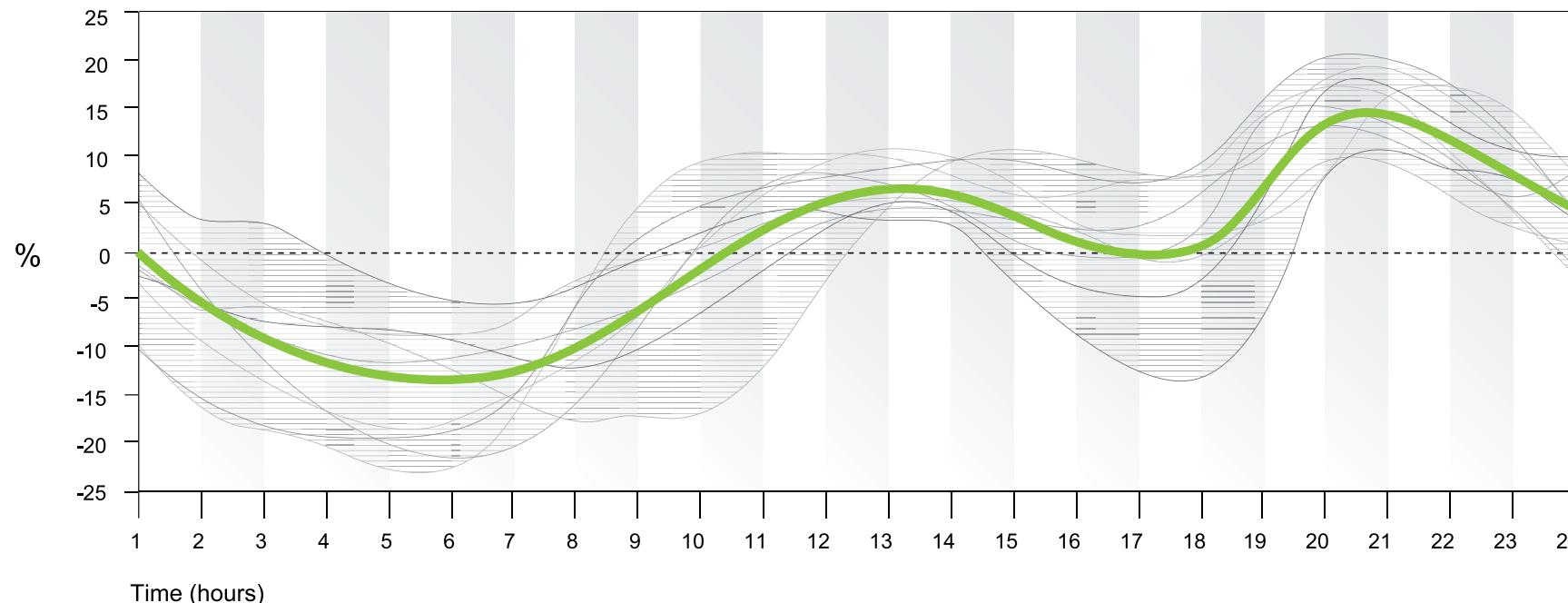


# COMBINING REGIONAL DEMAND CURVES REDUCES VOLATILITY

Regional demand variation from average over the year



Regional demand variation from average per hour on weekend day



Time (hours)

03

**COMBINE ALL INFORMATION GATHERED TO  
OPERATIONAL FIELDS**

**Miniscenarios are written on the page of everyday life. The schematic structure of a miniscenario links processes to operational fields.**

**Operational fields contain the actors, agents and angels that within their roles articulate the action-tendencies of proto-urban conditions and give them the potential to unfold.**

**,Urban Flotsam, Raoul Bunschoten'**

## **OPERATIONAL FIELDS**

## Operational Field [002]

AUTOR: CONNY GEISE



### [002] Freiräume

#### Akteure

Landschaftsplaner, Architekt, Bauherr, Gutachter, Gärtner, Stadtplaner, Bevölkerung

#### Beschreibung

Es gibt in dem Gebiet viele Freiräume, die besser genutzt werden können. Es werden mehrere Räume als Parkflächen genutzt, die dann den einen oder anderen Standpunkt von Firmen natürlich nicht mehr so attraktiv und einladend macht.

Selbst Plätze, die angrenzend Tiefagragen haben, werden als Parkflächen umgenutzt.

Es würde dem Gebiet bestimmt wieder mehr Flair geben, wenn solche Flächen als Freiräume und Grünzonen genutzt werden können und den umliegenden Gebäuden einen besseren und schöneren Empfang bieten.

#### Research Agenda

1. man sollte erforschen, wie viele Freiräume es gibt in dem Gebiet
2. wie man sie nutzen und als Grünzone umfunktionieren könnte
3. wie löst man das Problem mit Parkflächen, gibt es da Ausweichmöglichkeiten?

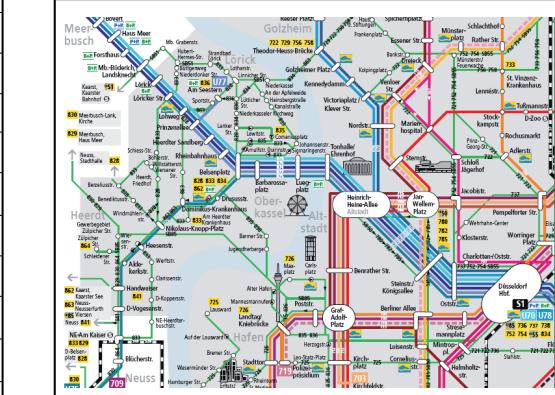
#### Links

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[www.duesseldorf.de](http://www.duesseldorf.de)

## Operational Field [003]

AUTOR: CONNY GEISE



### [003] Infrastruktur

#### Akteure

Stadtplaner, Verkehrsmanagement, Architekt, Bauherr, Rheinbahn, Bevölkerung, umliegende Firmen

#### Beschreibung

Die Infrastruktur ist schon sehr großzügig ausgebaut worden, aber bestimmte Bereiche wo viele Bürogebäude angesiedelt sind im Bereich des Seesterns, ist die Struktur noch ausbaufähig und erweiterbar.

Die Haltestellen sind zum Teil sehr weit auseinander und die Verkehrsmittel fahren nicht so regelmäßig wie in anderen Teilen der Stadt Düsseldorf.

#### Research Agenda

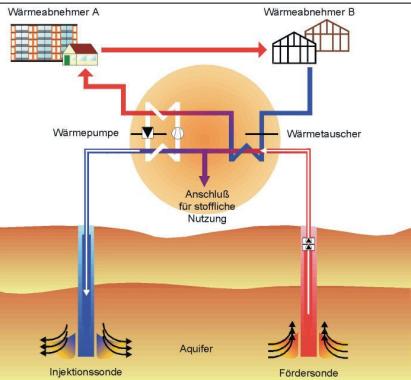
1. Erforschen, ob das Verkahrtsnetz noch weiter ausgebaut werden kann.
2. Prüfen, wie viel Ausbau noch benötigt wird und welche Anbindungen benötigt werden (Flughafen, Bahnhof, etc.)
3. werden die öffentlichen Verkehrsmittel mehr benutzt, wenn sie nähe rund regelmäßiger sind.

#### Links

[000] [000] [000] [000] [000] [000] [000]

## Operational Field [004]

AUTOR: CONNY GEISE



### [004] Geothermie

#### Akteure

Stadtplaner, Stadtverwaltung, Architekt, Bauherr,  
Bevölkerung, umliegende Firmen, Gutachter,  
Energieberater, Verbraucherzentralen

#### Beschreibung

Die Geothermie ist die im zugänglichen Teil der Erdkruste gespeicherte Wärme. Sie umfasst die in der Erde gespeicherte Energie, soweit sie entzogen und genutzt werden kann, und zählt zu den regenerativen Energien. Sie kann sowohl direkt genutzt werden, etwa zum Heizen und Kühlen im Wärmemarkt (Wärmepumpenheizung), als auch zur Erzeugung von elektrischem Strom oder in einer Kraft-Wärme-Kopplung.

#### Research Agenda

1. Erforschen, ob man es zum Kühlen und Heizen verwenden will, oder zur Erzeugung von Strom.
2. Prüfen, wo die Möglichkeit bestünde diese System zu integrieren.
3. Wo kann man diese Energien verwenden und wo werden sie hingeleitet.

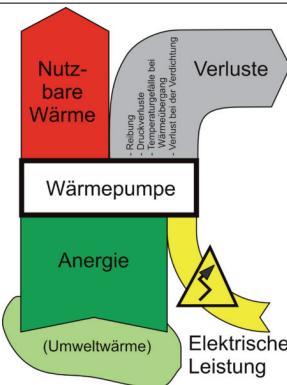
#### Links

[www.geothermie.de](http://www.geothermie.de)  
[www.geothermie-zentrum.de](http://www.geothermie-zentrum.de)  
[www.geothermie.nrw.de](http://www.geothermie.nrw.de)  
 Zentrum für Geothermie in Bochum

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## Operational Field [005]

AUTOR: CONNY GEISE



### [005] Wärmepumpe

#### Akteure

Stadtplaner, Stadtverwaltung, Architekt, Bauherr,  
Bevölkerung, umliegende Firmen, Gutachter,  
Energieberater, Verbraucherzentralen

#### Beschreibung

Die Wärmepumpe ist eine Maschine, die unter Zufuhr von technischer Arbeit Wärme von einem niedrigeren zu einem höheren Temperaturniveau pumpt. Bei der Wärmepumpe wird die auf dem hohen Temperaturniveau anfallende Verflüssigungswärme zum Beispiel zum Heizen genutzt (Wärmepumpenheizung). Dagegen wird bei der Kältemaschine die Abkühlung eines Kältemittels beim Entspannen und Verdampfen genutzt, um ein Fluid abzukühlen.

Es können Gase wie Propan, Propylen, Ammoniak, Kohlendioxid, Wasser für Wärmepumpen eingesetzt werden.

#### Research Agenda

1. Erforschen, wie es verwendet werden soll und kann.
2. Prüfen, wo die Möglichkeit bestünde dieses System zu integrieren.
3. Wo kann man diese Energien verwenden und wo werden sie hingeleitet bzw. gebraucht.

#### Links

[www.energieagentur.nrw.de/waermepumpen](http://www.energieagentur.nrw.de/waermepumpen)  
[www.waermepumpe.de](http://www.waermepumpe.de)  
 Stadt Düsseldorf

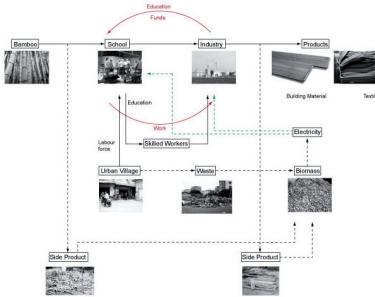
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# EXERCISE 02

## OPERATIONAL FIELD [0802]

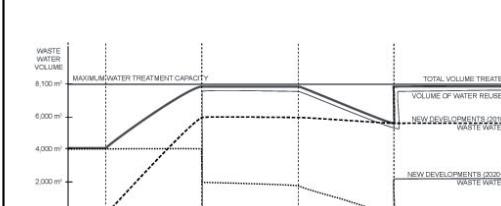
Authors: xxx

### [0802] Title



### Actors, agents and angels:

Landschaftsplaner, Architekt, Bauherr, Gutachter, Gärtner,  
Stadtplaner, Bevölkerung



### Description:

Es gibt in dem Gebiet viele Freiräume, die besser genutzt werden können. Es werden mehrere Räume als Parkflächen genutzt, die dann den einen oder anderen Standpunkt von Firmen natürlich nicht mehr so attraktiv und einladend macht. Selbst Plätze, die angrenzend Tiefagragen haben, werden als Parkflächen umgenutzt. Es würde dem Gebiet bestimmt wieder mehr Flair geben, wenn solche Flächen als Freiräume und Grünzonen genutzt werden können und den umliegenden Gebäuden einen besseren und schöneren

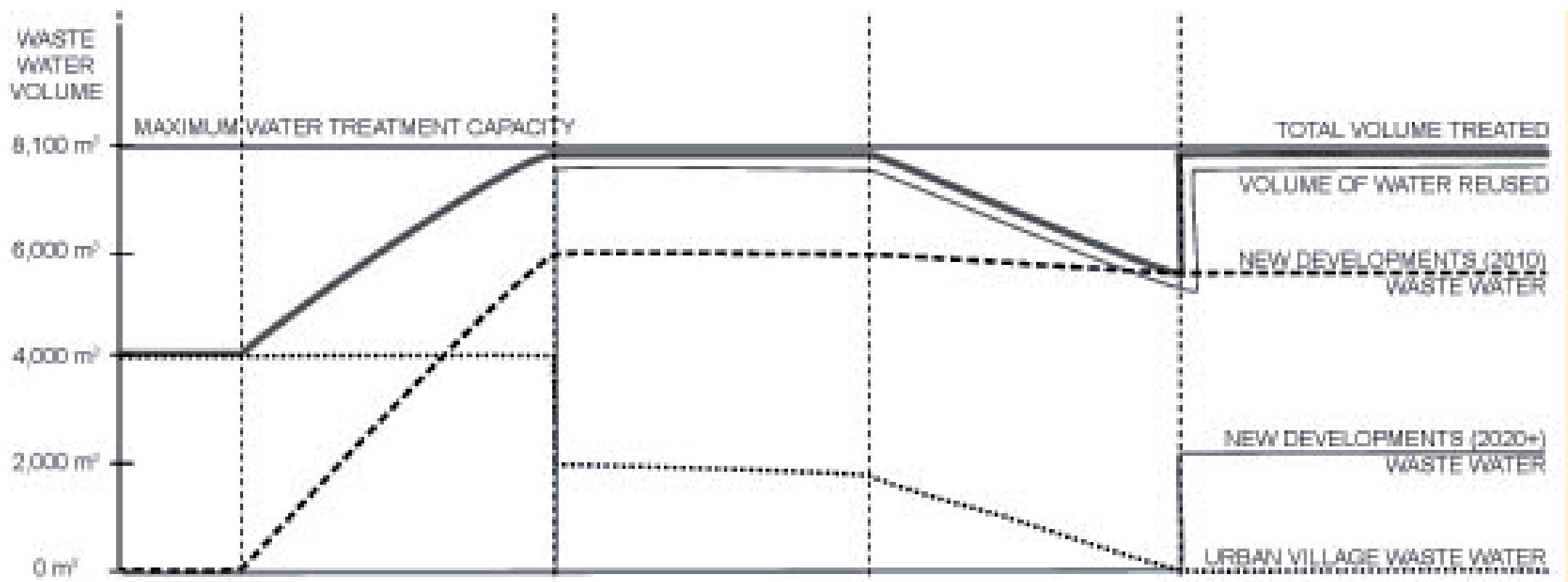
### Research Agenda

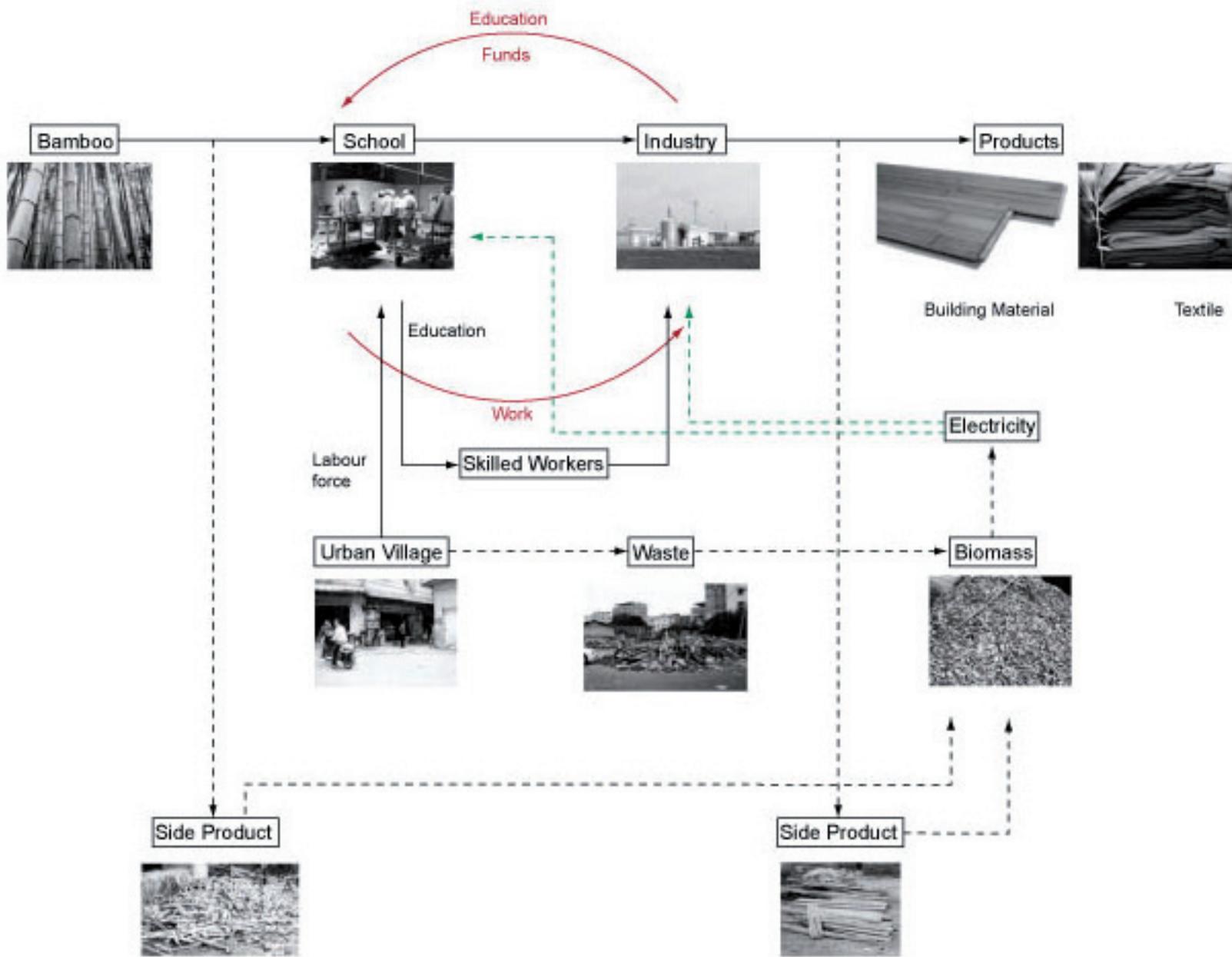
1. man sollte erforschen, wie viele Freiräume es gibt in dem Gebiet
2. wie man sie nutzen und als Grünzone umfunktionieren könnte
3. wie löst man das Problem mit Parkflächen, gibt es da Ausweichmöglichkeiten?

### Links

[www.duesseldorf.de](http://www.duesseldorf.de)

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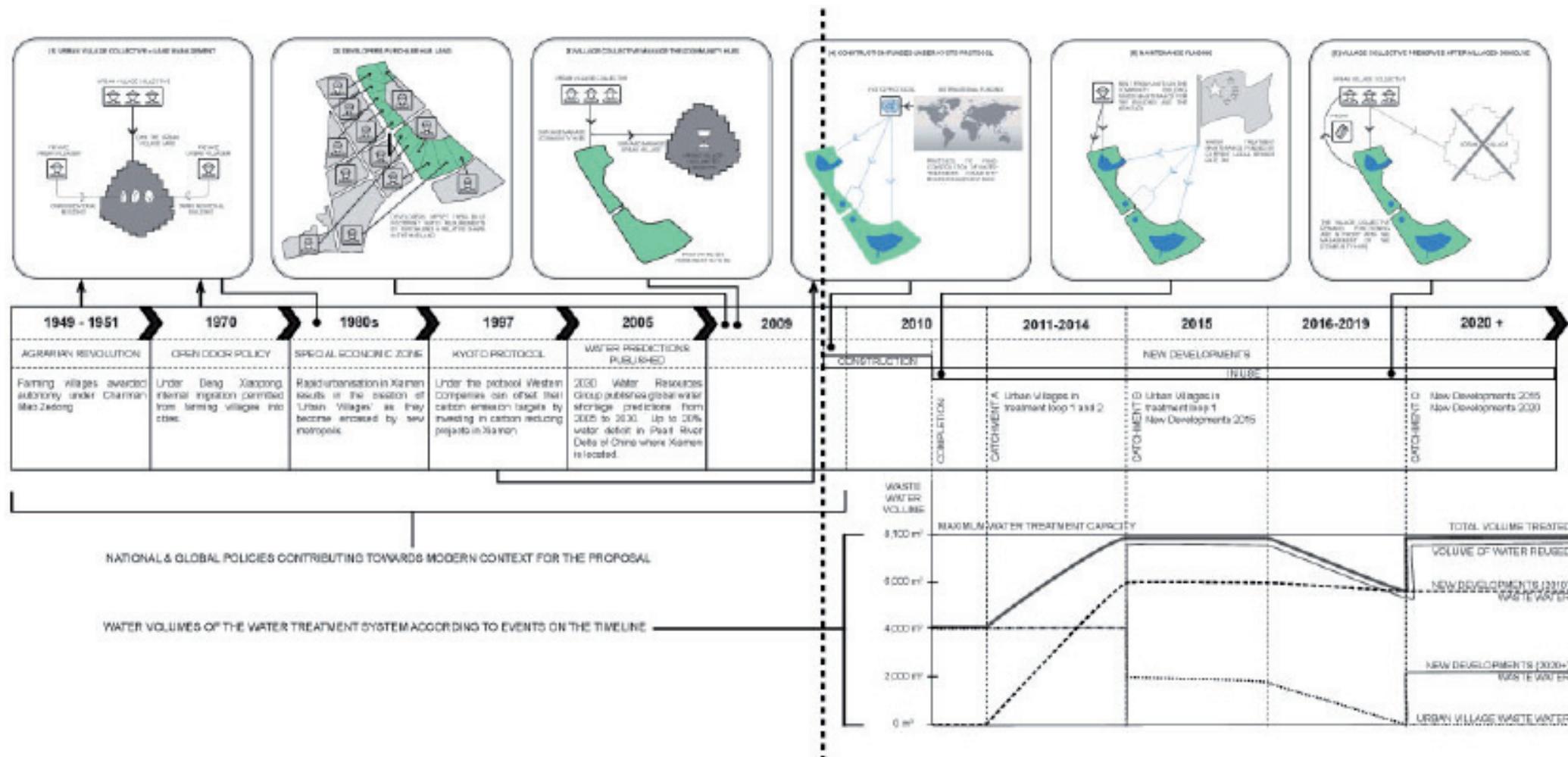




### Operational Diagram of Bamboo Industry and Education System

School interacts with bamboo industry. School trains for potential workers and would be financially supported by industry that will enable to provide free or low educational fees for migrant workers. Industry could also provide teachers for the school.

## TIME SCALE



# EXERCISE 02 / OPERATIONAL FIELDS

Miniscenarios > Actors, agents &angels > Energy behaviour > Operational fields

## Energetic processes

The second exercise looks at the individual processes of the miniscenarios in relation to energy behaviour and climate change. The city but also everybody of us is confronted with energy behaviour in our everyday lifes. Which category of energy behaviour fits to one of the processes in the miniscenario? Who are the actors, agents and angels that stir these processes related to energy? We will be looking at all these processes not only on the microscale of the miniscenarios but also on the bigger scale of the whole city.

The task is to select six different processes of the miniscenarios and visualize them with graphs and diagramms. All the information will be collected in an Operational field that forms together with the miniscenario the database of the Urban Gallery.

## The exercise includes the following steps:

1. Enlarge one process of the miniscenarios to an operational field.
2. Demonstrate what role actors, agents and angels play in the operational field.
3. Draw up a process of energy behaviour in the frame of climate change
4. Visualize the process with graphs (time) and diagrams (space)

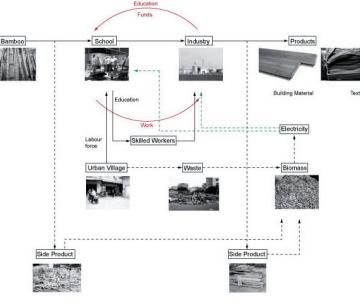
## Deliverables and Presentation

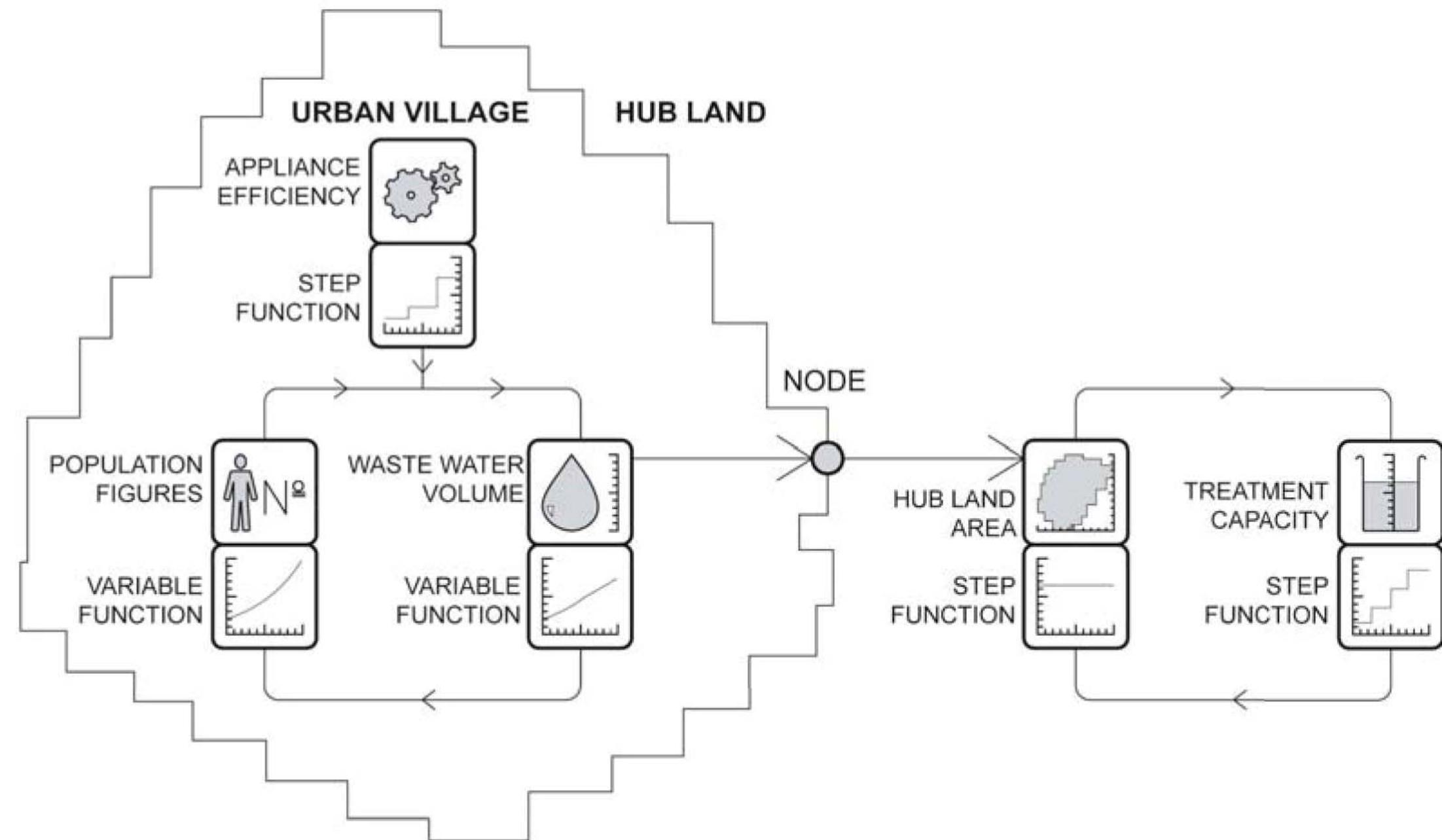
1. Every group prepares 6 operational fields and uploads them including graphs, diagrams and a short description onto the Urban Gallery website.
2. Print operational fields on A4 and hand in before the presentation.
2. Pecha Kucha presentation (1min per operational field) on Wednesday 2nd November (2pm).

# EXERCISE 02

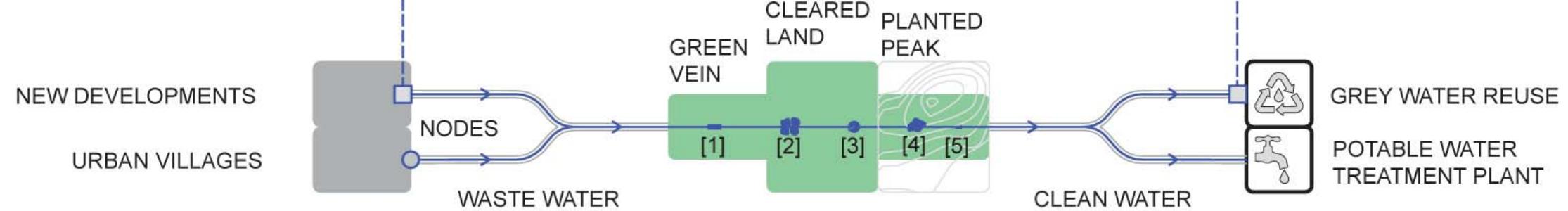
- 1 diagramm (space)**
- 2 graph (time based)**
- 3 actors, agents & angels**
- 4 process discription**
- 5 research agenda**
- 6 hyperlinks**

## EXERCISE 02

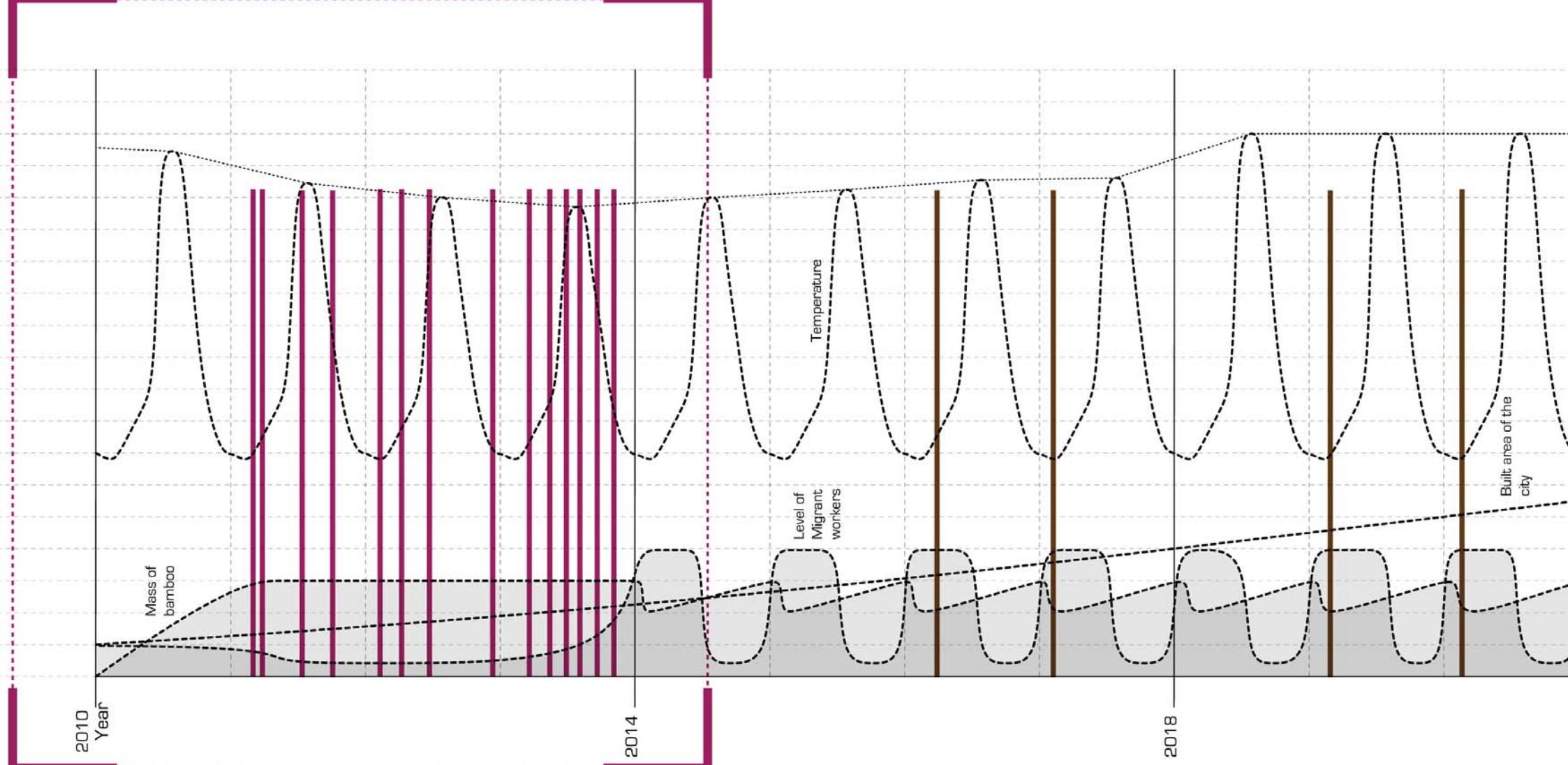
<b>OPERATIONAL FIELD [0802]</b>	
Authors: xxx	
<b>[0802] Title</b>	
<b>1</b>	<b>Actors, agents and angels:</b>
	Landschaftsplaner, Architekt, Bauherr, Gutachter, Gärtner, Stadtplaner, Bevölkerung
<b>3</b>	
<b>2</b>	<b>Description:</b> <p>Es gibt in dem Gebiet viele Freiräume, die besser genutzt werden können. Es werden mehrere Räume als Parkflächen genutzt, die dann den einen oder anderen Standpunkt von Firmen natürlich nicht mehr so attraktiv und einladend macht. Selbst Plätze, die angrenzend Tiefagragen haben, werden als Parkflächen umgenutzt. Es würde dem Gebiet bestimmt wieder mehr Flair geben, wenn solche Flächen als Freiräume und Grünzonen genutzt werden können und den umliegenden Gebäuden einen besseren und schöneren</p>
<b>4</b>	
<b>Research Agenda</b>	
<ol style="list-style-type: none"> <li>1. man sollte erforschen, wie viele Freiräume es gibt in dem Gebiet</li> <li>2. wie man sie nutzen und als Grünzone umfunktionieren könnte</li> <li>3. wie löst man das Problem mit Parkflächen, gibt es da Ausweichmöglichkeiten?</li> </ol>	
<b>5</b>	
<b>Links</b>	
www.duesseldorf.de	[000] [000] [000] [000] [000] [000] [000]
<b>6</b>	

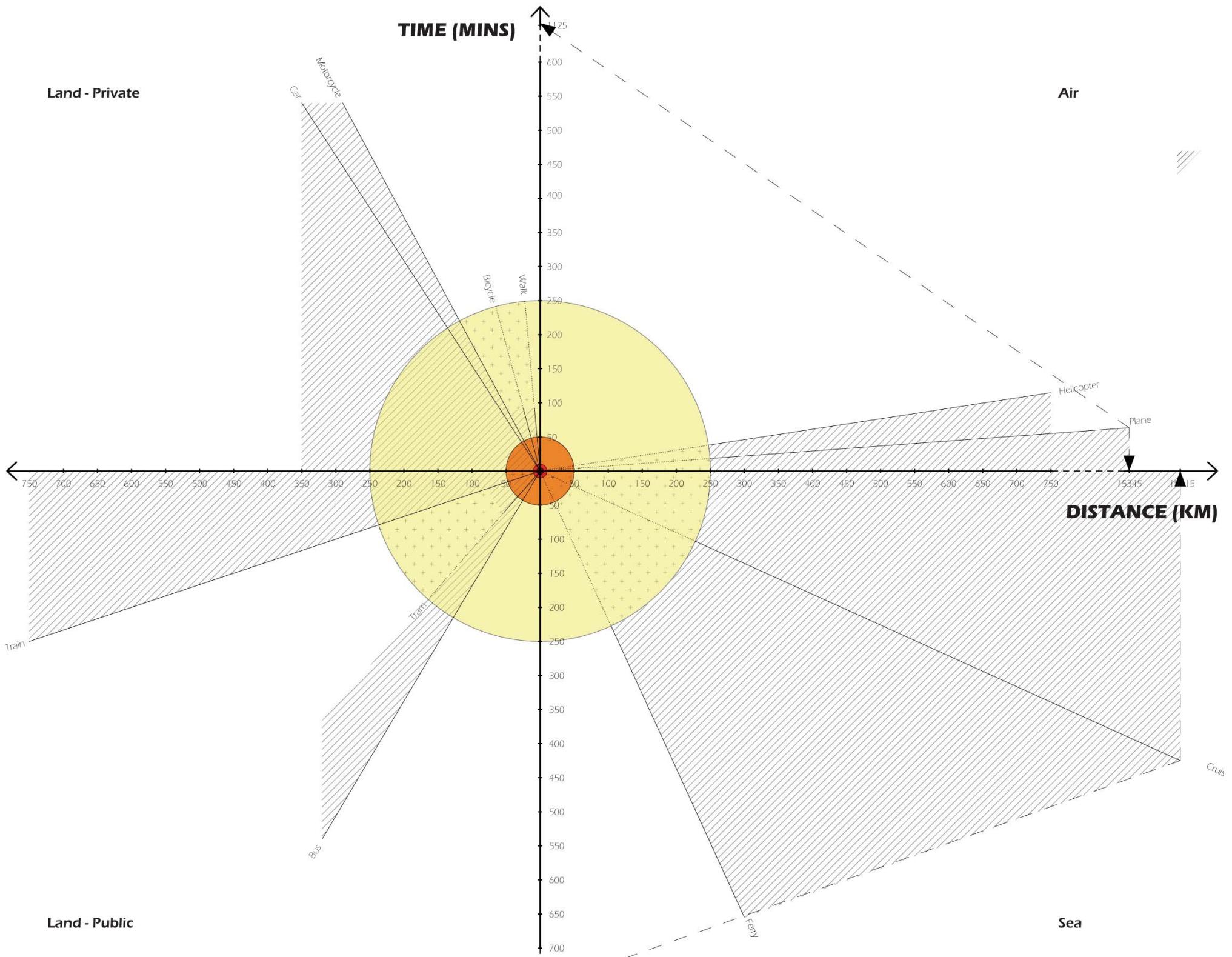


[ LOOPE KEY 2015 ]



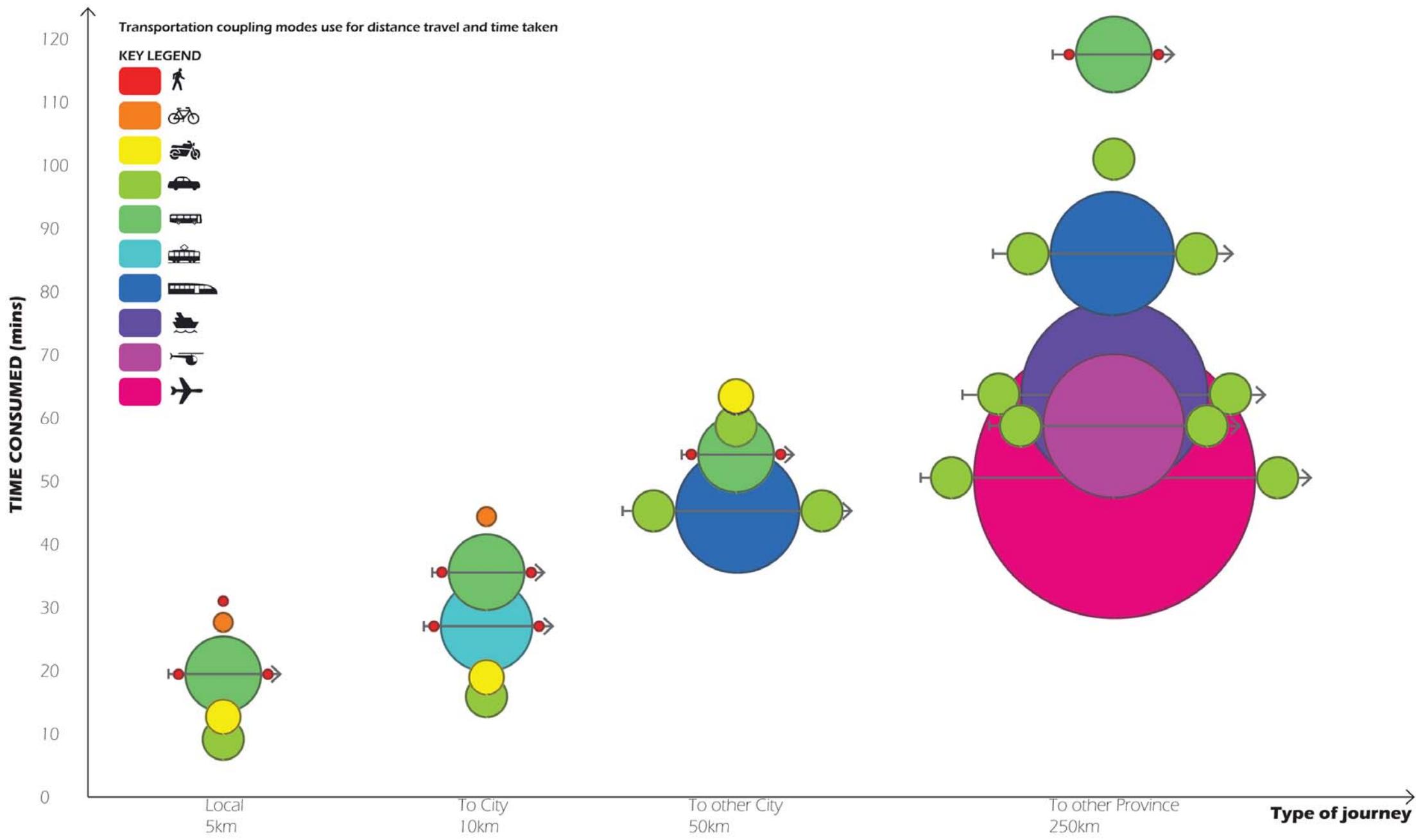
Start up  
placement of  
infrastruc-  
ture and  
growth of  
first crop to  
maturity.





## 4.1 Transportation Modes

### Coupling Type of Transportation Modes



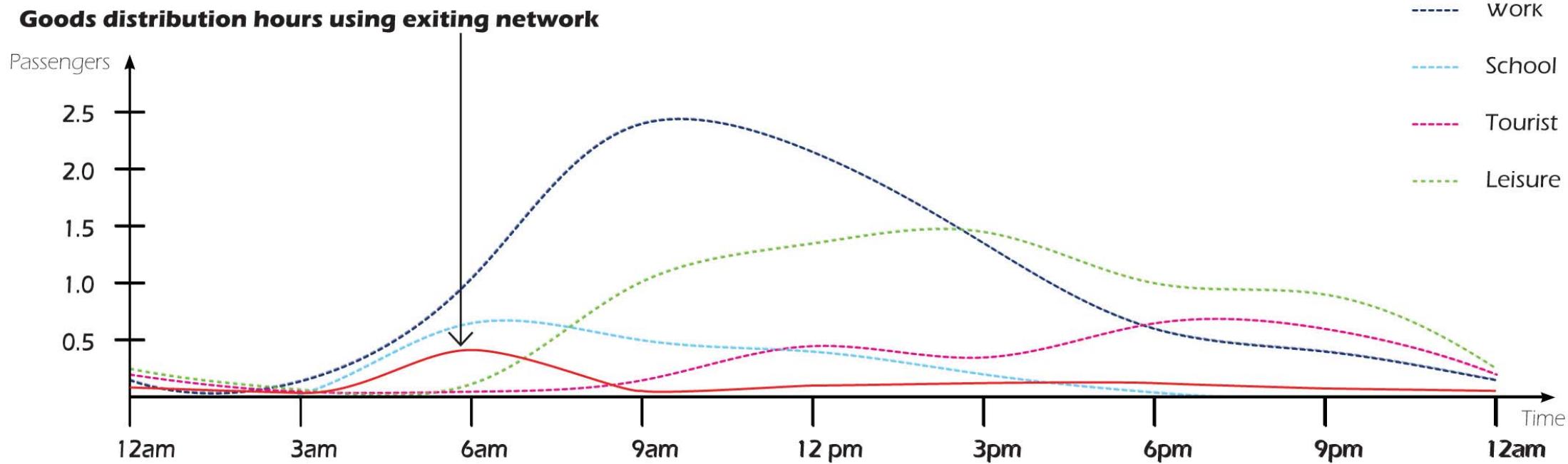
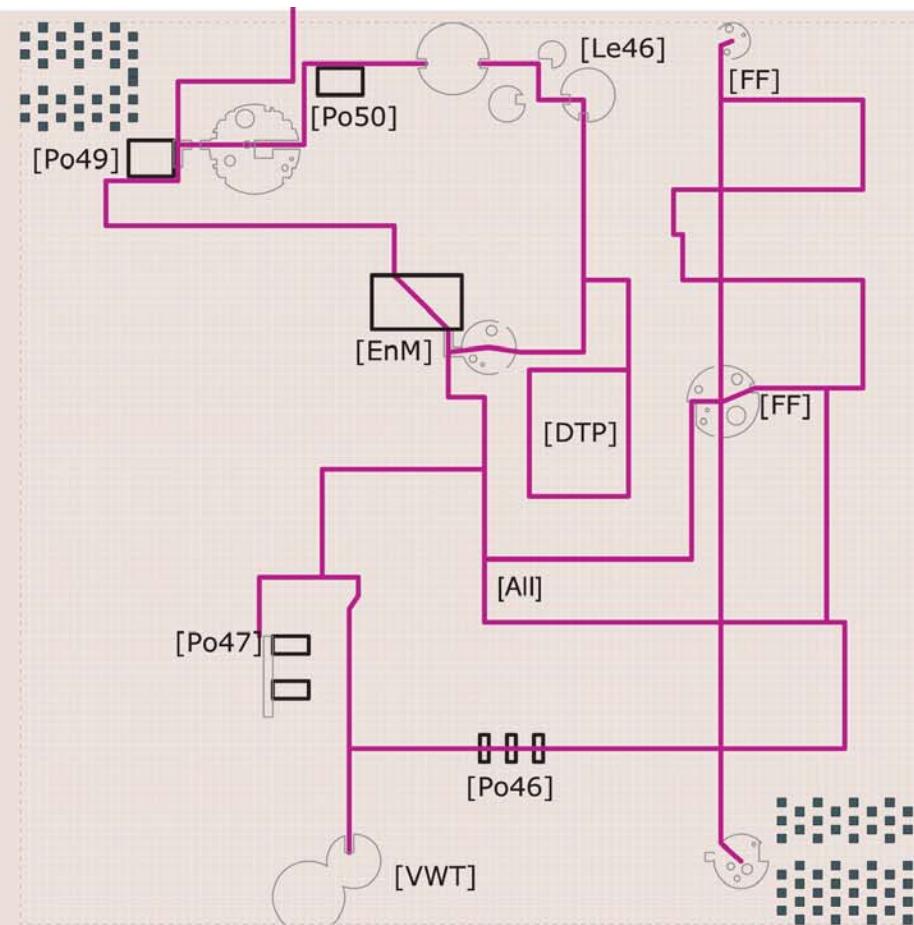
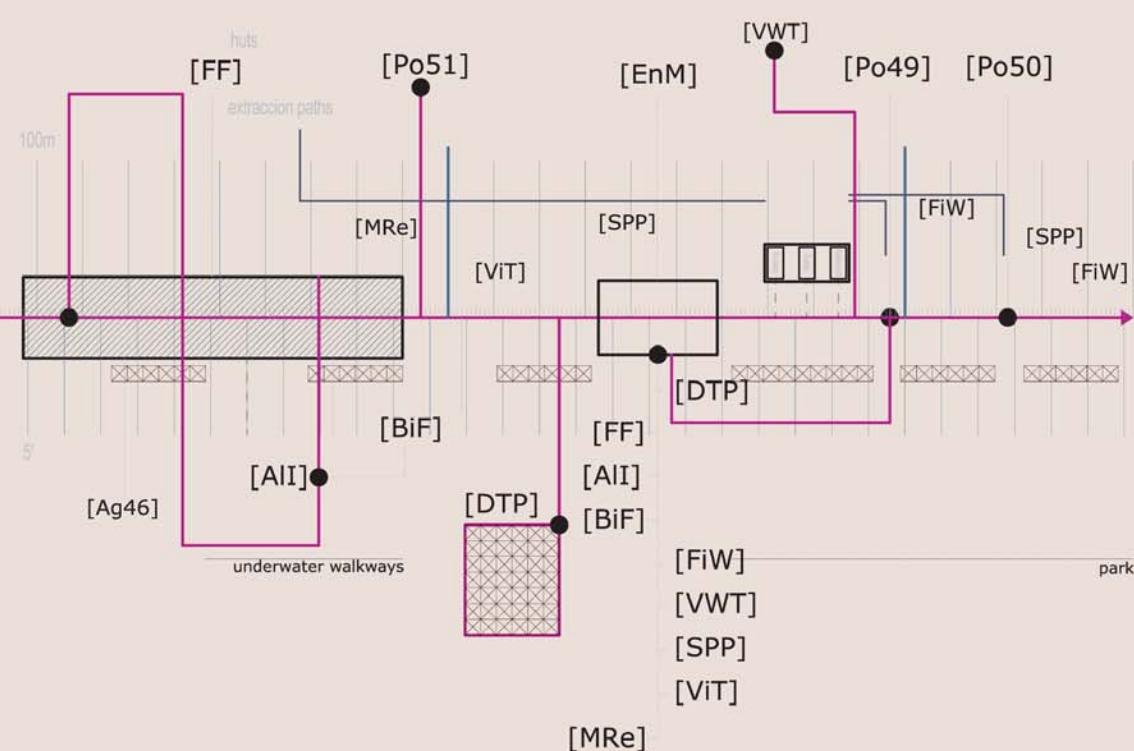
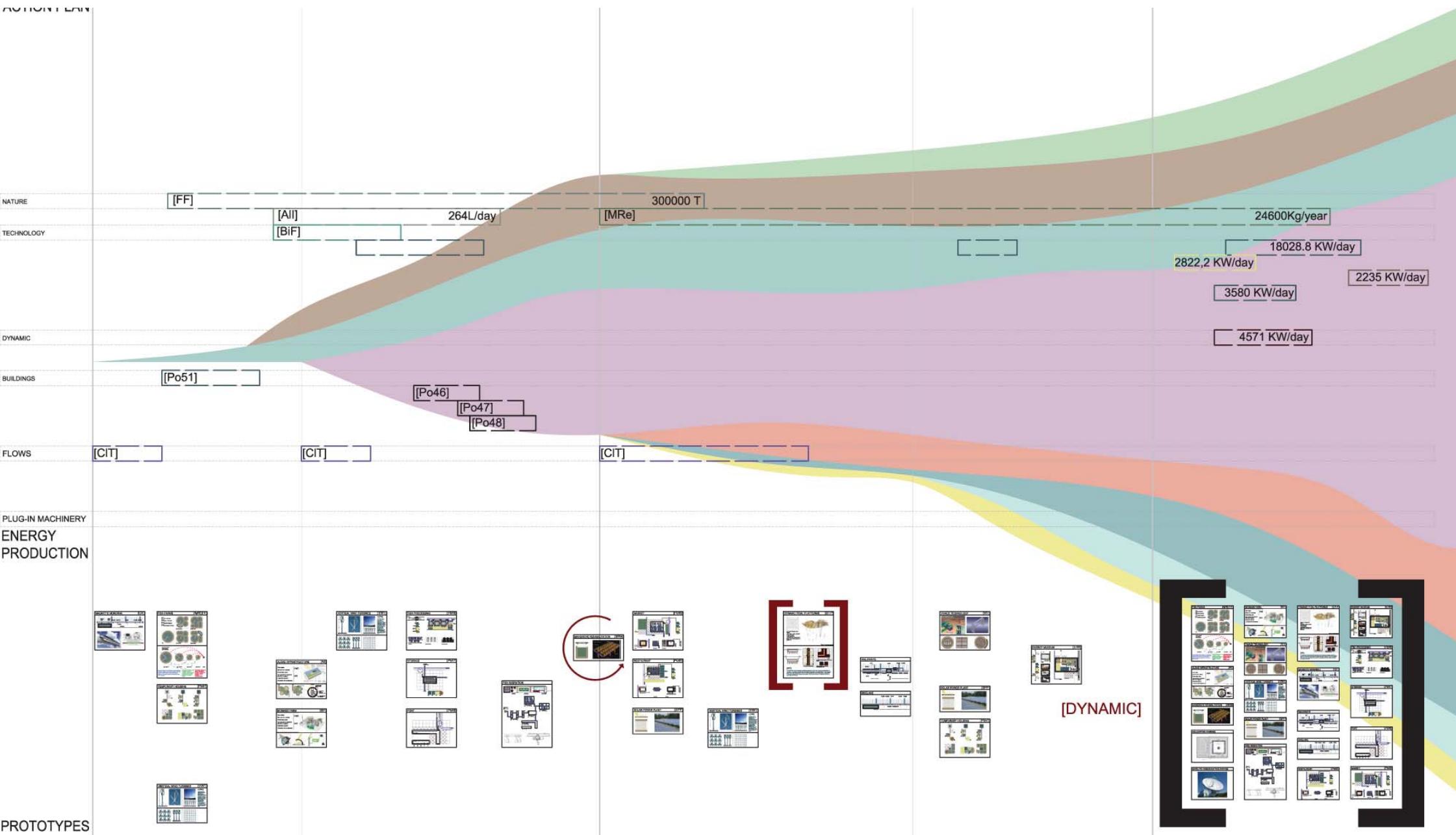
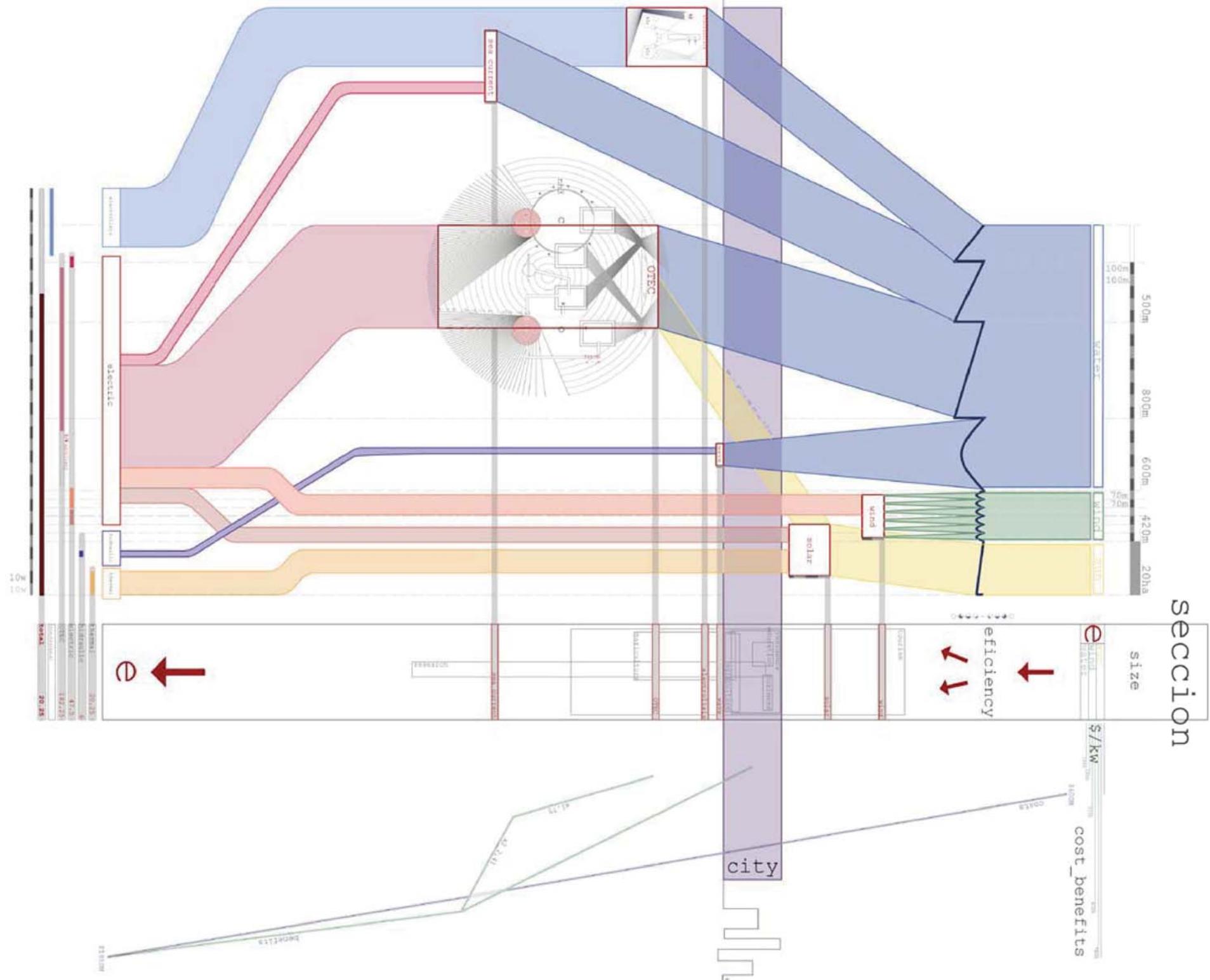


Diagram 1: Travelling purpose hourly distribution in Xiamen projection 2010

# PEOPLE









#### Nature's Gifts

If nature is well looked after, nature will look after us. Let us contribute and help secure a healthy future.



#### Waste Separation

Kitchen and garden waste should be separated from other waste.



#### Collection of Biogenous Waste

Separate collection of biogenous waste allows meaningful utilisation of renewable energy.

## The complete ecological cycle



#### New Life / Closed Circuit

Water, the sun and our natural fertiliser give rise to new life in nature. This closes the ecological circuit.



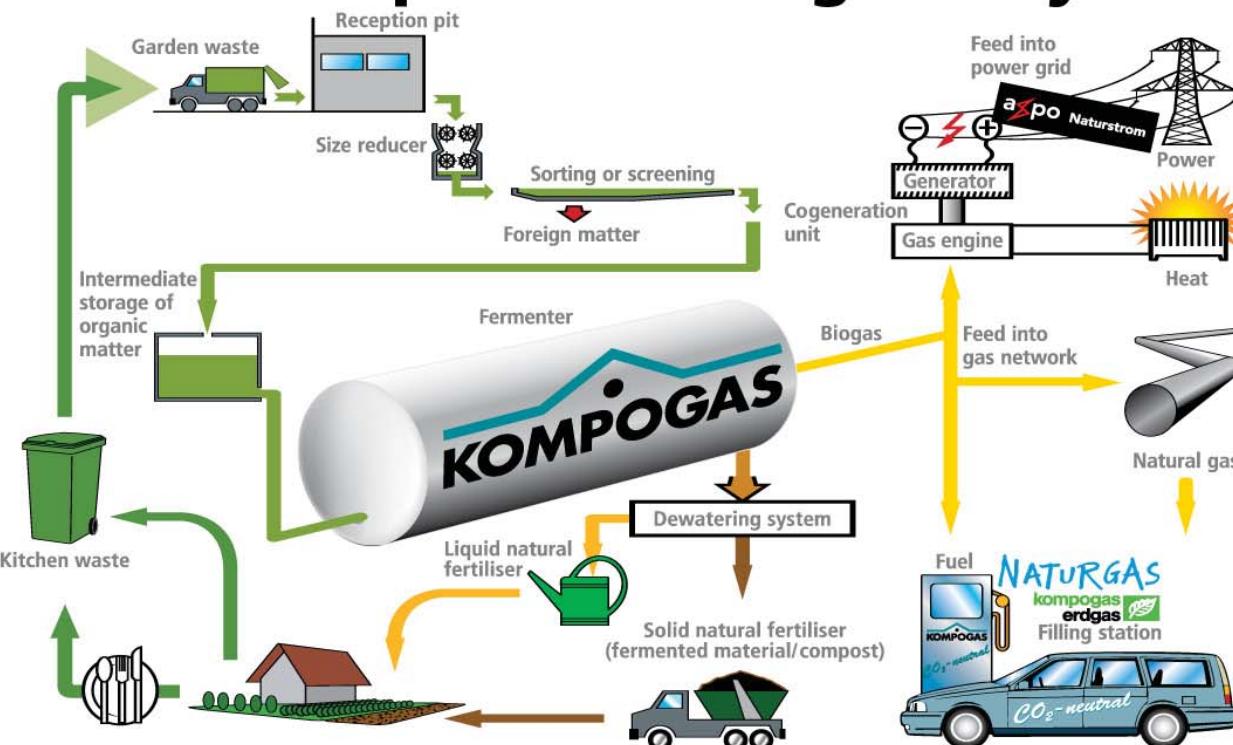
#### Liquid Natural Fertiliser\*

Dewatering of the fermented material supplies – beside compost – also a liquid natural fertiliser, which can be applied directly to farmland.



#### Compost\*

The enclosed KOMPOGAS process produces high-grade, hygienic compost, free from weed seeds.



**When new life grows from compost, we have disposed of our waste properly**

#### Gas Filling Station

High quality, ecologically beneficial, non-polluting and CO<sub>2</sub>-neutral gas is available at specially equipped fuel stations.



#### Gas Processing

Biogas can also be converted to a high quality KOMPOGAS and fed into the natural gas supply network.



#### Cogeneration unit

The power unit is driven by gas, reclaimed from the fermenter.



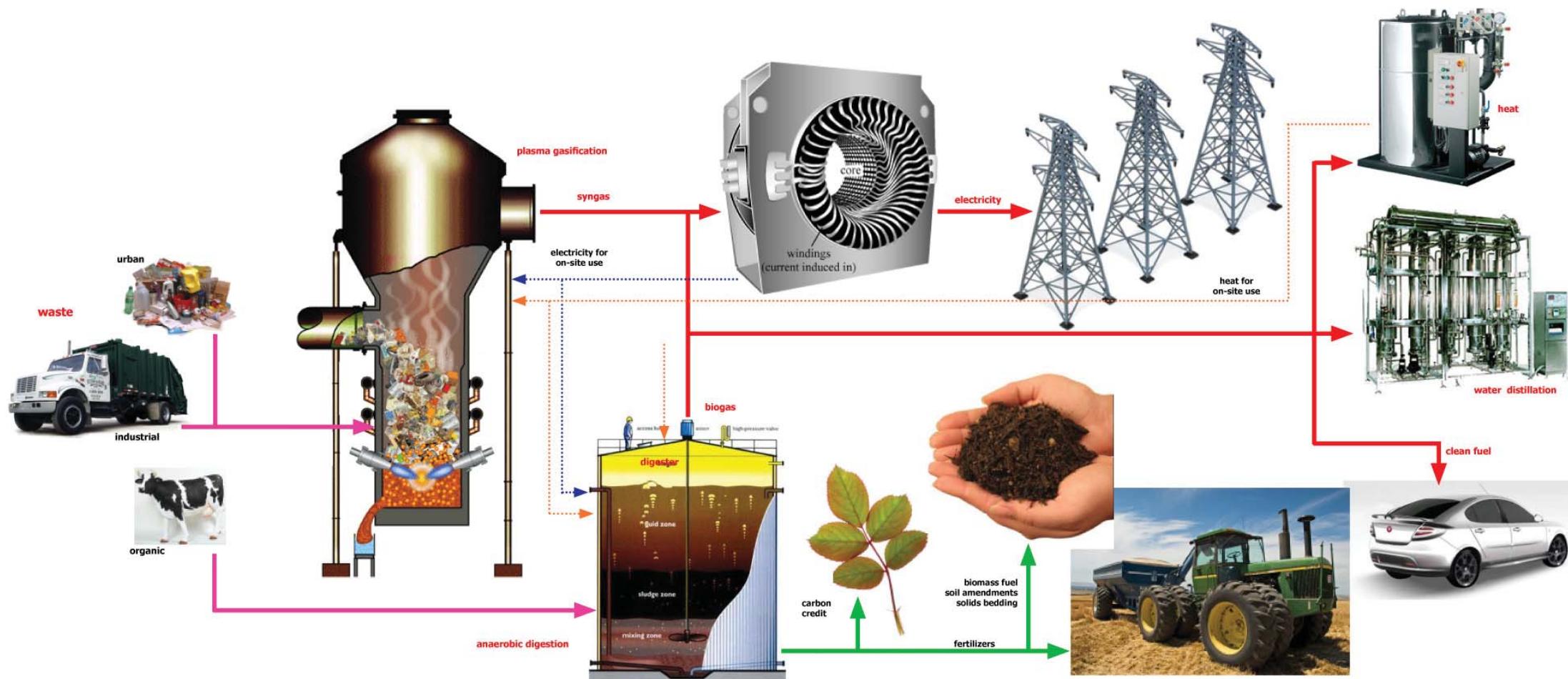
**Reception**  
All biogenous waste is received in the reception pit.



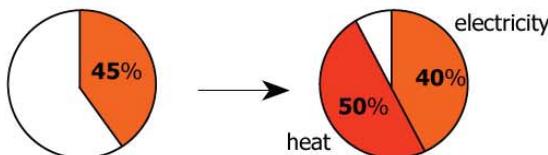
**Undesirable Matter**  
Care is taken at the plant to remove all undesirable matter such as batteries, metals, glass, plastics, etc., as farmland must not be used as dumping site.



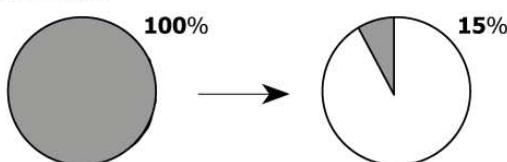
**Fermenter**  
In the fermenter, the reduced biogenous matter is fermented for 15 to 20 days at 55 to 60 degrees Celsius in the absence of oxygen.



### use of primary energy



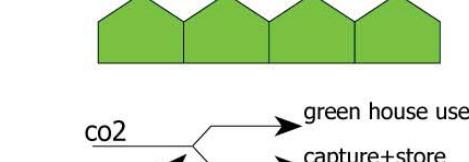
### CO<sub>2</sub> emission



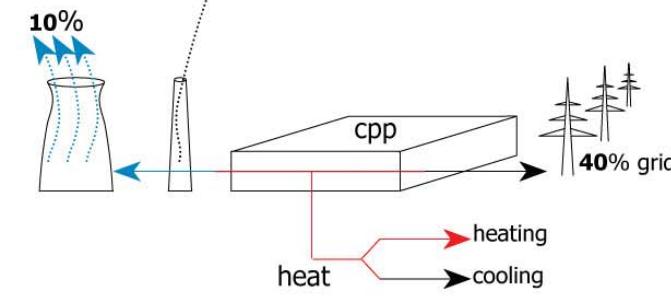
### energy price drops



### efficiency

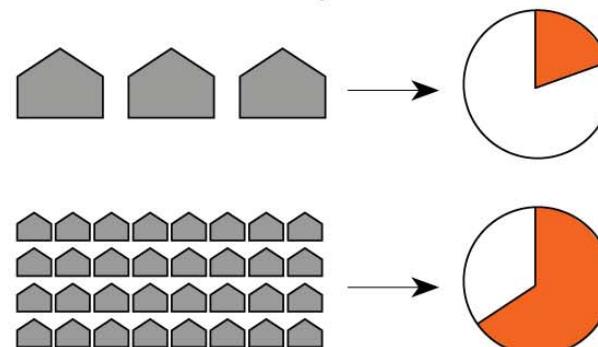


co<sub>2</sub> → green house use  
→ capture+store

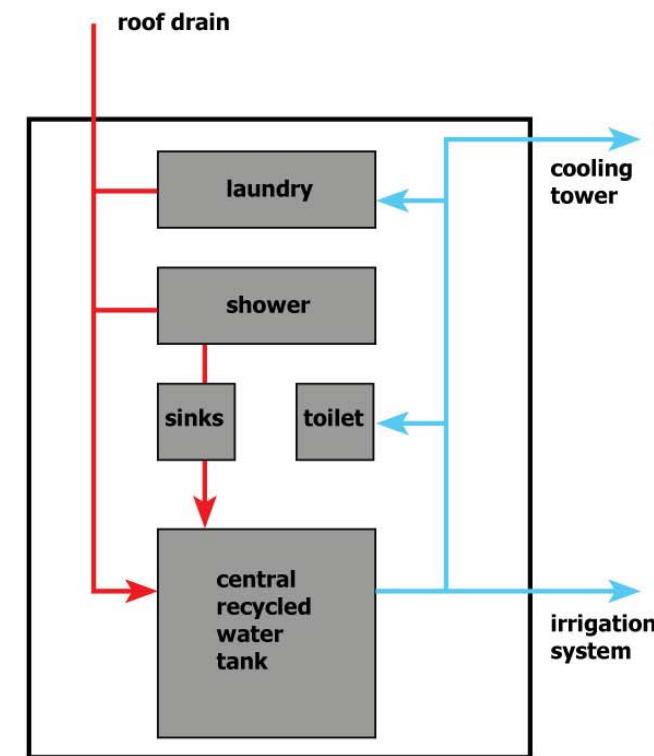


**90% more efficient coal fire power**

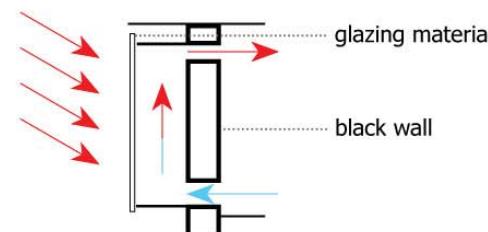
### energy savings depend on the amount of installed systems



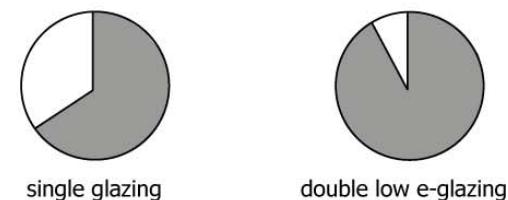
### 60% less energy for water treatment



### 1. solar control: trombe wall



### annual energy savings Kwh/m<sup>2</sup>/yr



### reduction of city potable water usage

