



Workshop on Product-Service Systems

Sustainable Renovation

Daphne Geelen & Duygu Keskin
Industrial Design Engineering
Design for Sustainability

21/04/2009

Planning

- 20 min. PSS - Duygu
- 10 min Livinggreen & assignment
- 30 min groupwork (6x 4-5 pers)
 - Exploration, ideas, concepts
- 5-10 min Evaluation PSS: radars - Daphne
- 20 min groupwork
 - Evaluation, 10 min making presentation on overhead sheets
- 30 min presentations & discussion



Product-Service Systems

Dematerializing the economy

Duygu Keskin
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What are PSS?

Oksana Mont:

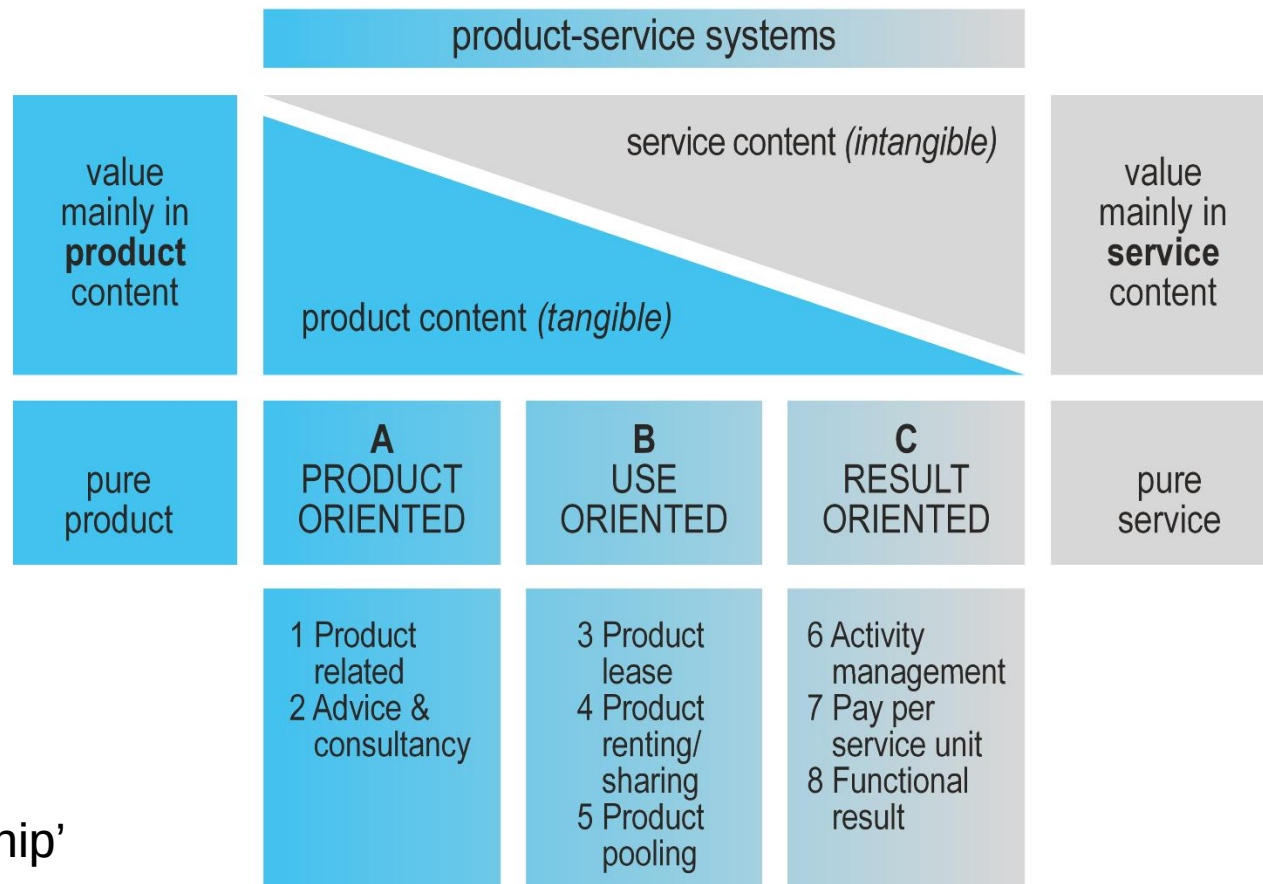
“A PSS is a system of products, services, networks of actors and supporting infrastructure that continuously strives to be competitive, satisfy customer needs and have a lower environmental impact than traditional business models.”



Factors to design/influence

- Service
- Product (existing, improved, radical new)
- Organization/network of actors
- Infrastructure (co-dependent with products)

PSS types



Based on 'ownership'



Some examples

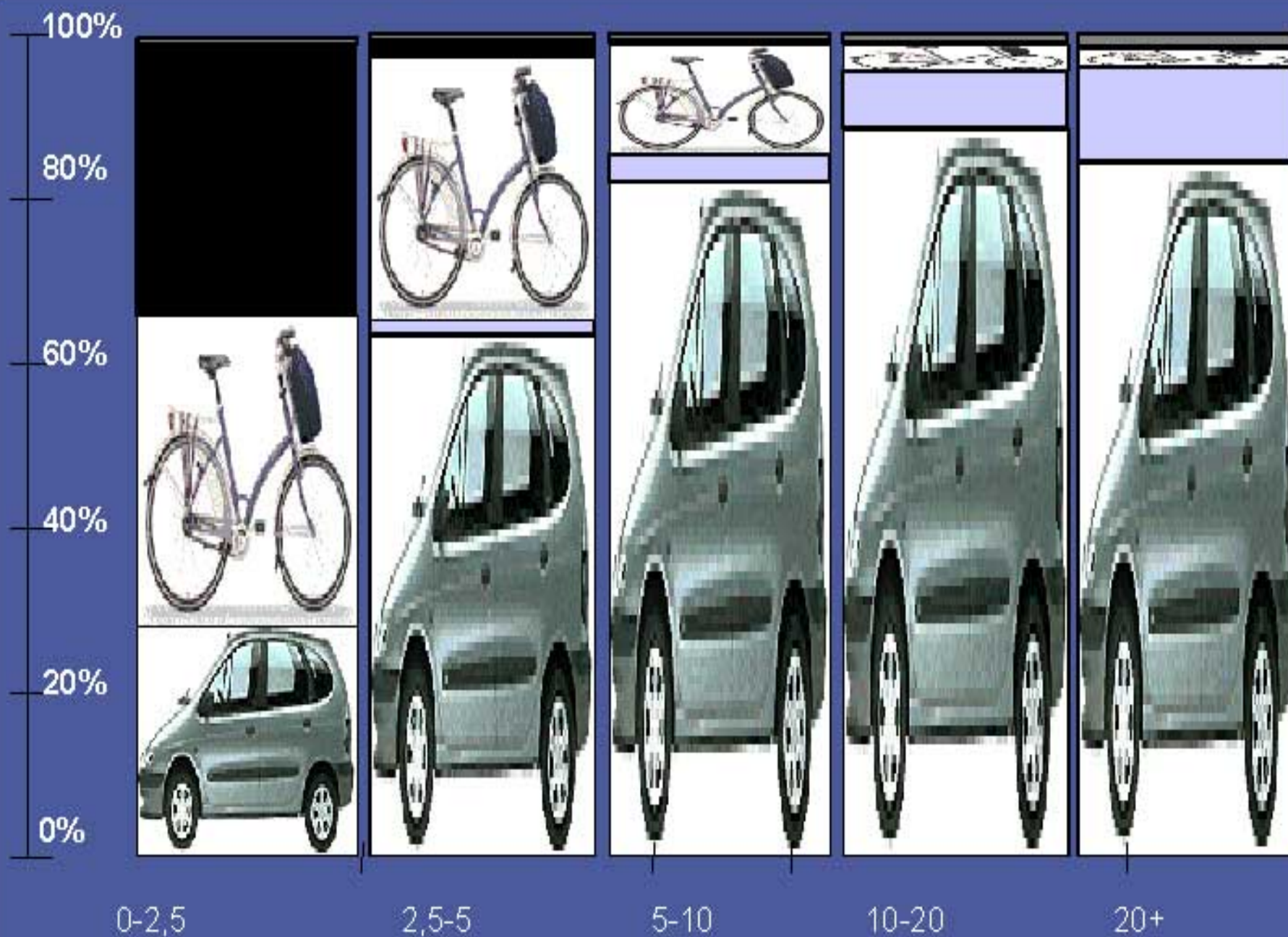
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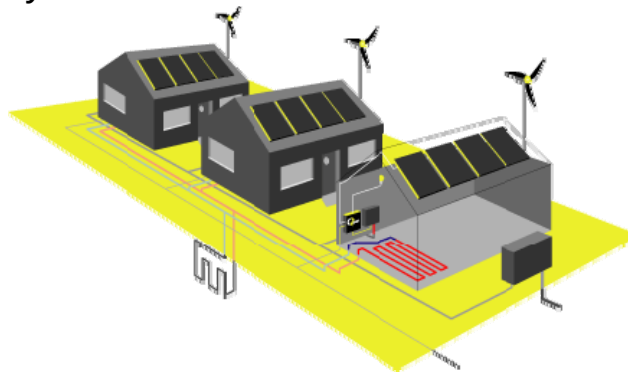


'Blue-Bicycle Plan'

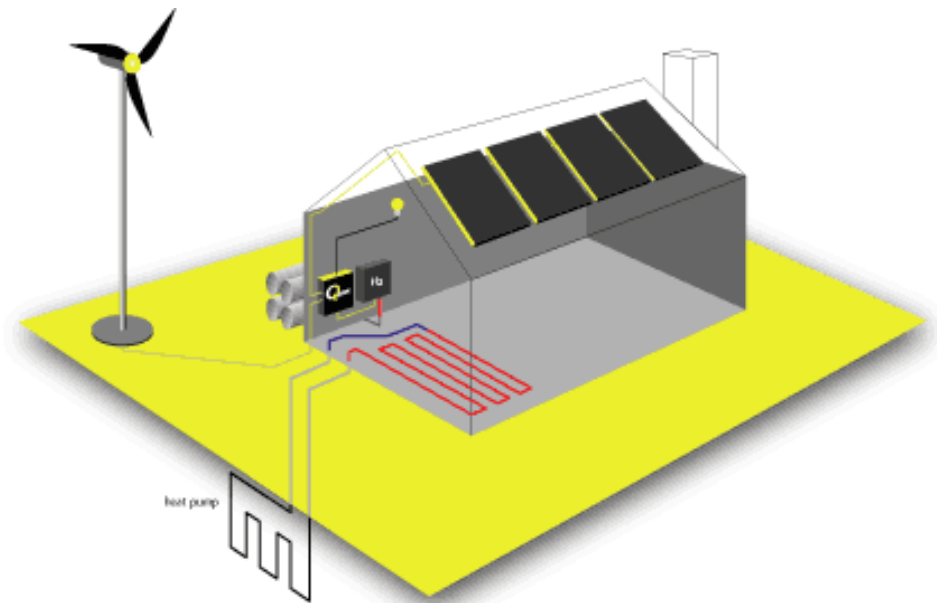


Current... Decentralized Renewable Energy

- A computer controlled energy management system for streets to optimize the energy use...
- Customers generate their energy locally from renewable resources through solar panels, micro wind turbines, etc...
- let the customers communicate with each other and exchange energy to maximize the efficiency of the system



In a *Local Energy Network* multiple houses or office buildings are connected into a cluster. Within the LEN, energy can be exchanged freely.



Q Box ... Optimizing Energy Use in Local Energy Networks



- The network interface located at the heart of building infrastructure
- Enables communication with surrounding buildings
- Measure energy production/consumption

Superfast charging



- “Super fast charging of batteries is the solution for limited battery operation time of portable and mobile devices”



... Clean energy anywhere...

Clean vehicles



- Public fast charging systems for clean electric vehicles
- Recharge in 10-30 minutes
- Zero-emission in cities
- Pilot in Rotterdam with ENECO





Why PSS?



Why PSS?

- More than 75% of GDP in US and more than 50% of GDP in Europe are generated by services NOT products
- Potential for dematerialisation >> services are intangible
- Shorter innovation cycles >> better control of products & short life time of products
- Closer relationship >> better understanding of customers

How to PSS?

- Different methods/tools: MEPPS, HiCS, DES, SDO, [system map](#), etc.
- The ultimate goal is to design SATISFACTION or SOLUTIONS not products:
 - clean clothes vs. washing machine
 - printed paper vs. printer
- Start with a need / function and develop the most efficient combination of products and services to fulfill the needs

(STAKEHOLDER) SYSTEM MAP

SCOPE:

to visualise (to design and co-design) the structure of the system,
describing the potential *stakeholders* and their *interactions*

WHAT IS:

a graphical representation containing:

- *stakeholders involved*
- *flows/interactions*: physical, informational, financial and labor performance



(STAKEHOLDER) SYSTEM MAP

WHAT IT CONSISTS OF:

- a fixed format of representation (a [map](#))
- an open library of graphic elements ([icons](#), [pictograms](#), [arrows](#) ...)
- a set of rules ([layout](#), [syntax](#) ...) to be used in order to represent the system of actors

An example...



To represent actors...

structure

characterisation

slogan

icon



+



+

Bio food provider =



Bio food provider



+



+

Logistic provider =



Logistic provider



+

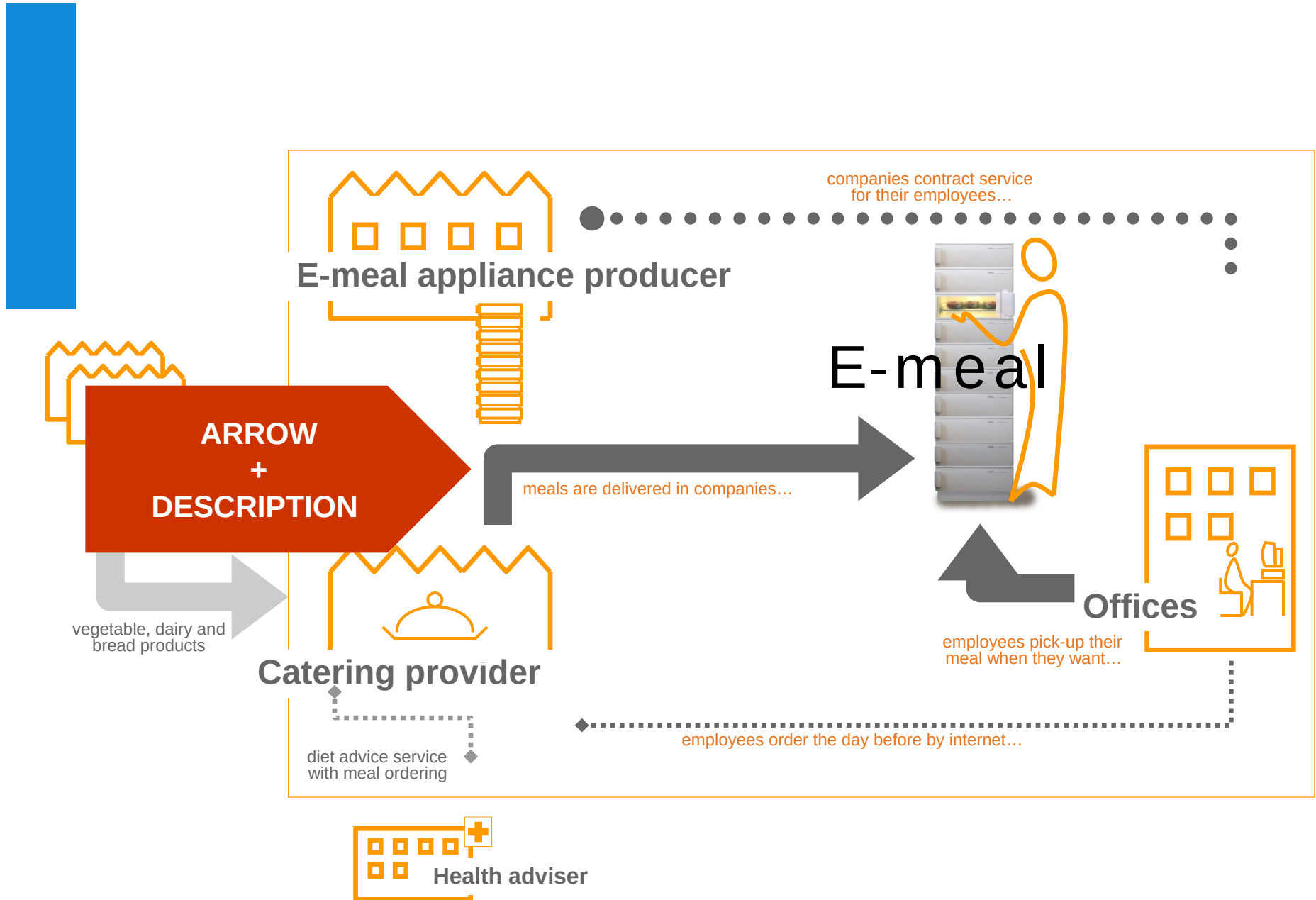


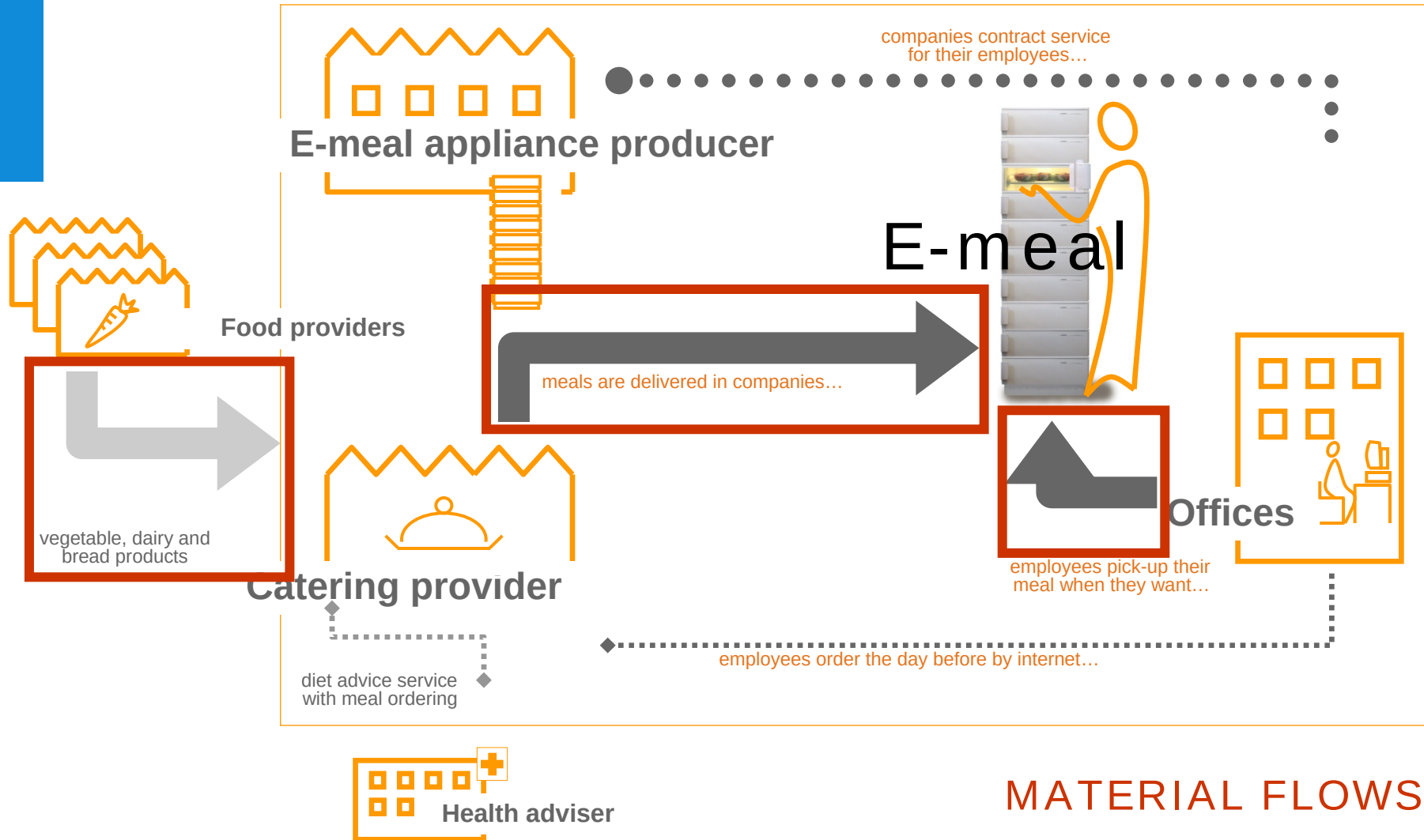
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Local delivery shop =

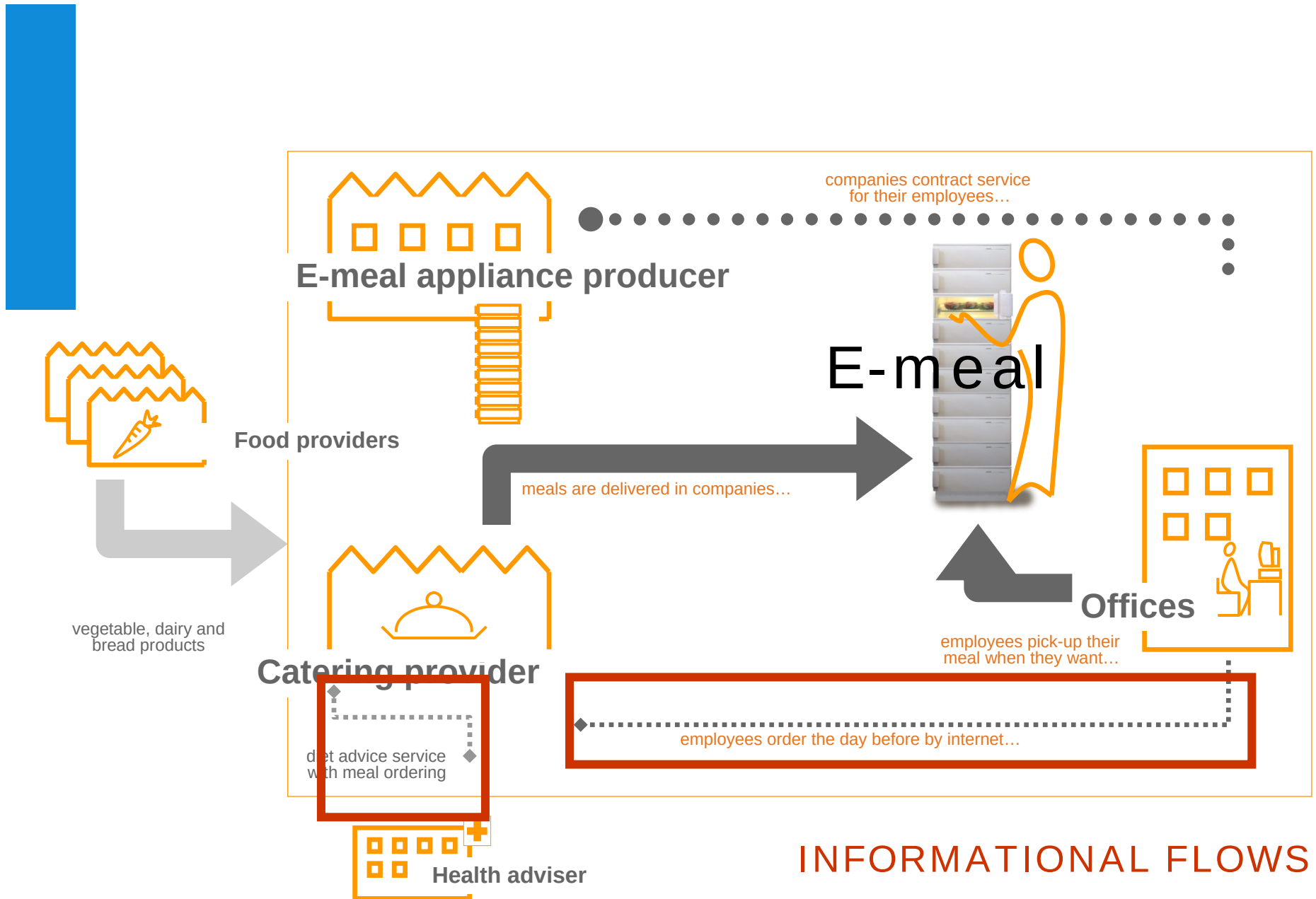


Local delivery shop

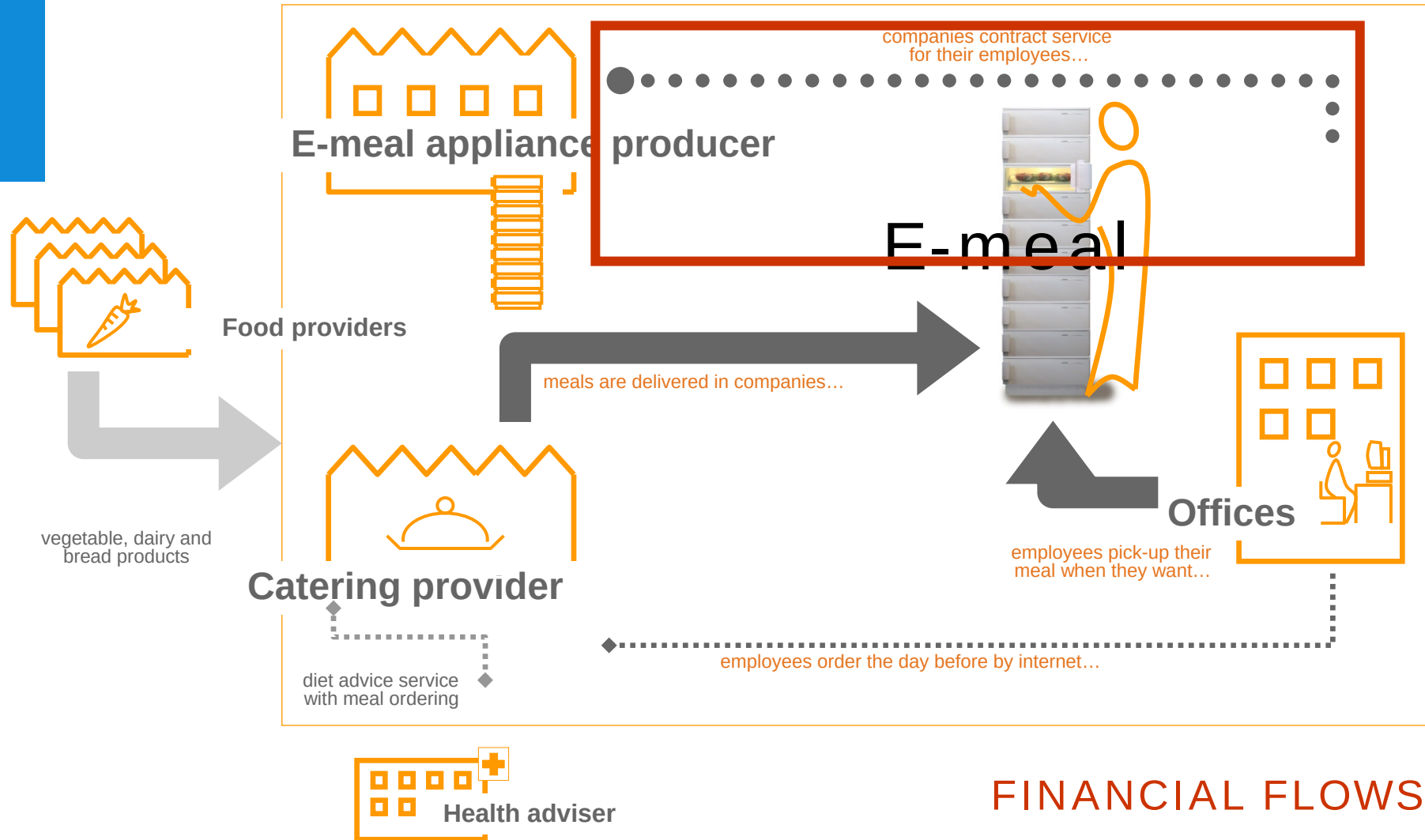




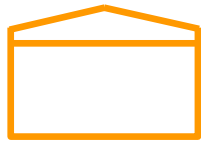
MATERIAL FLOWS



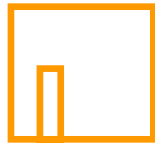
INFORMATIONAL FLOWS



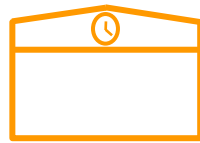
Structure icons...



**public
institution**



**local
association**



school

PUBLIC INSTITUTIONS OR ASSOCIATIONS



**individual
house**



**collective
house**

HOMES



**industrial
company**



**services
company**



**local
shop**



**mobile
shop**

COMPANIES AND STORES

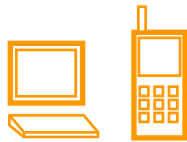
Characterization icons (activities) ...



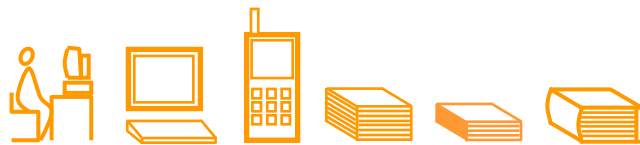
EATING



TRANSPORTING

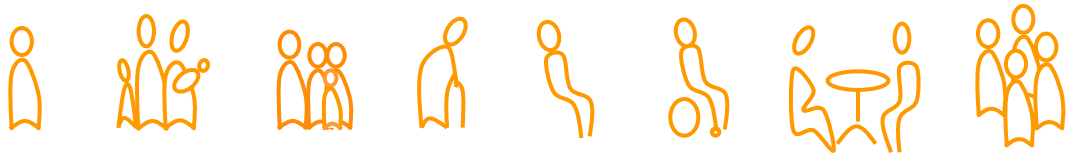


COMMUNICATING



WORKING IN OFFICE

Characterization icons (people) ...

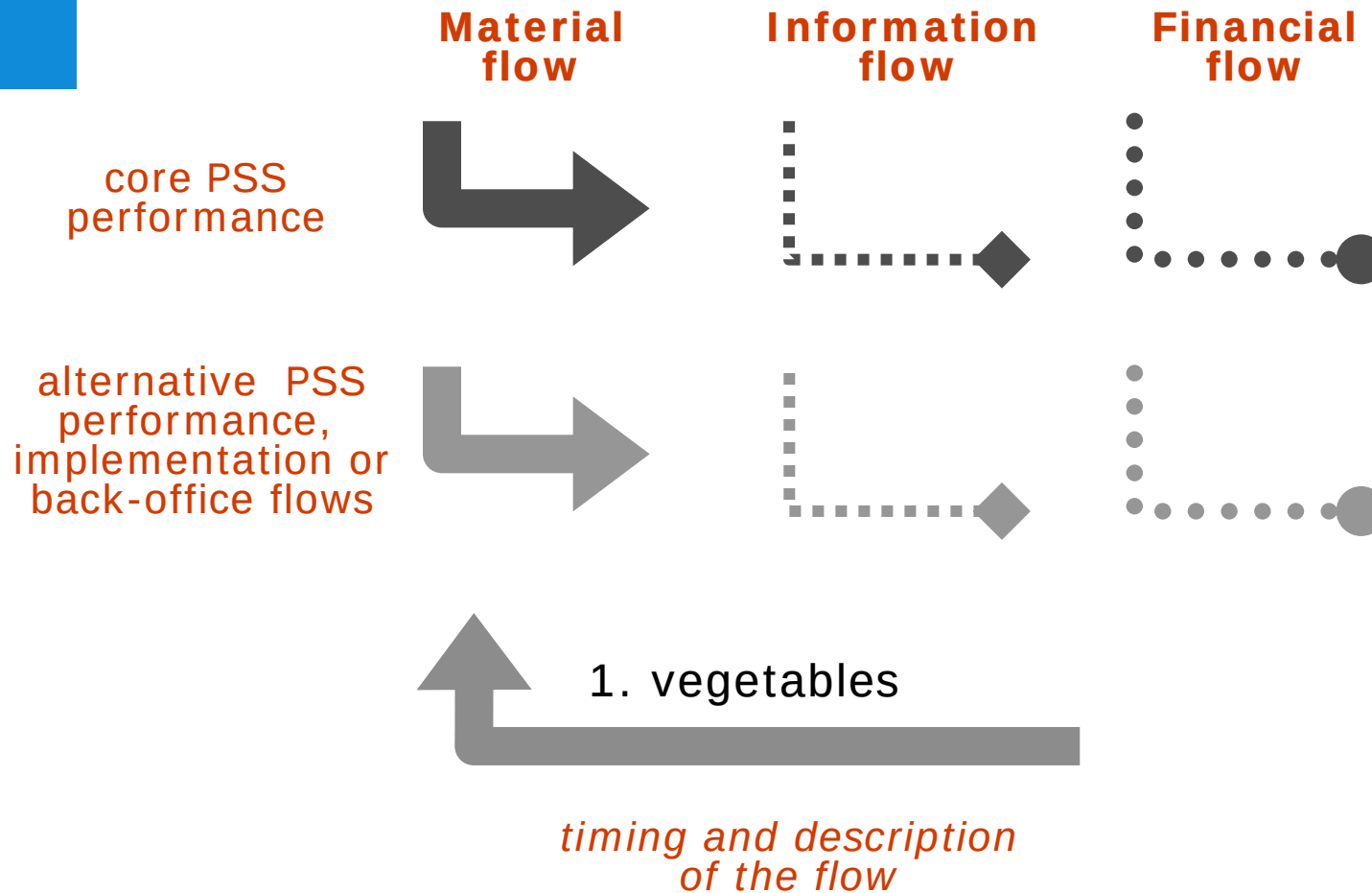


GENERAL PEOPLE



PEOPLE AT WORK

Flows...





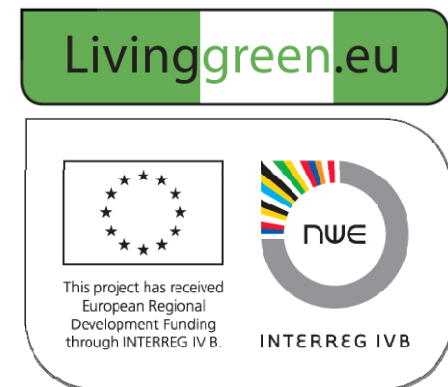
Any questions so far?

Livinggreen

Products and services for sustainable renovation

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Design for Sustainability

21/04/2009



Livinggreen.eu

Aim

To promote sustainable renovation with

- Demonstration projects in cultural heritage buildings
- Transfer of knowledge and know-how to house owners, contractors and SME's in the construction sector



Livinggreen.eu

Partners

Demonstration projects

The White Rose, Delft ➔ 16th century patrician house

National Trust, London ➔ 19th century stable yard

City of Ludwigsburg ➔ 20th century industrial building

City of Lille ➔ 20th century industrial building

EcoHuis Antwerpen ➔ 20th century industrial building

Knowledge/research

Espace Environnement, Charleroi ➔ Reno-teams

TU Delft - IDE, Delft ➔ Livinggreen Labs



Livinggreen Labs

Organised by TUDelft, IDE

- Design of innovative products and services that facilitate/trigger sustainable renovation
- Co-design approach
- Formulate guidelines on effectiveness of the method
- Themes:
 - Energy use
 - Water use
 - Materials use
 - Architectural value
 - Climate robustness



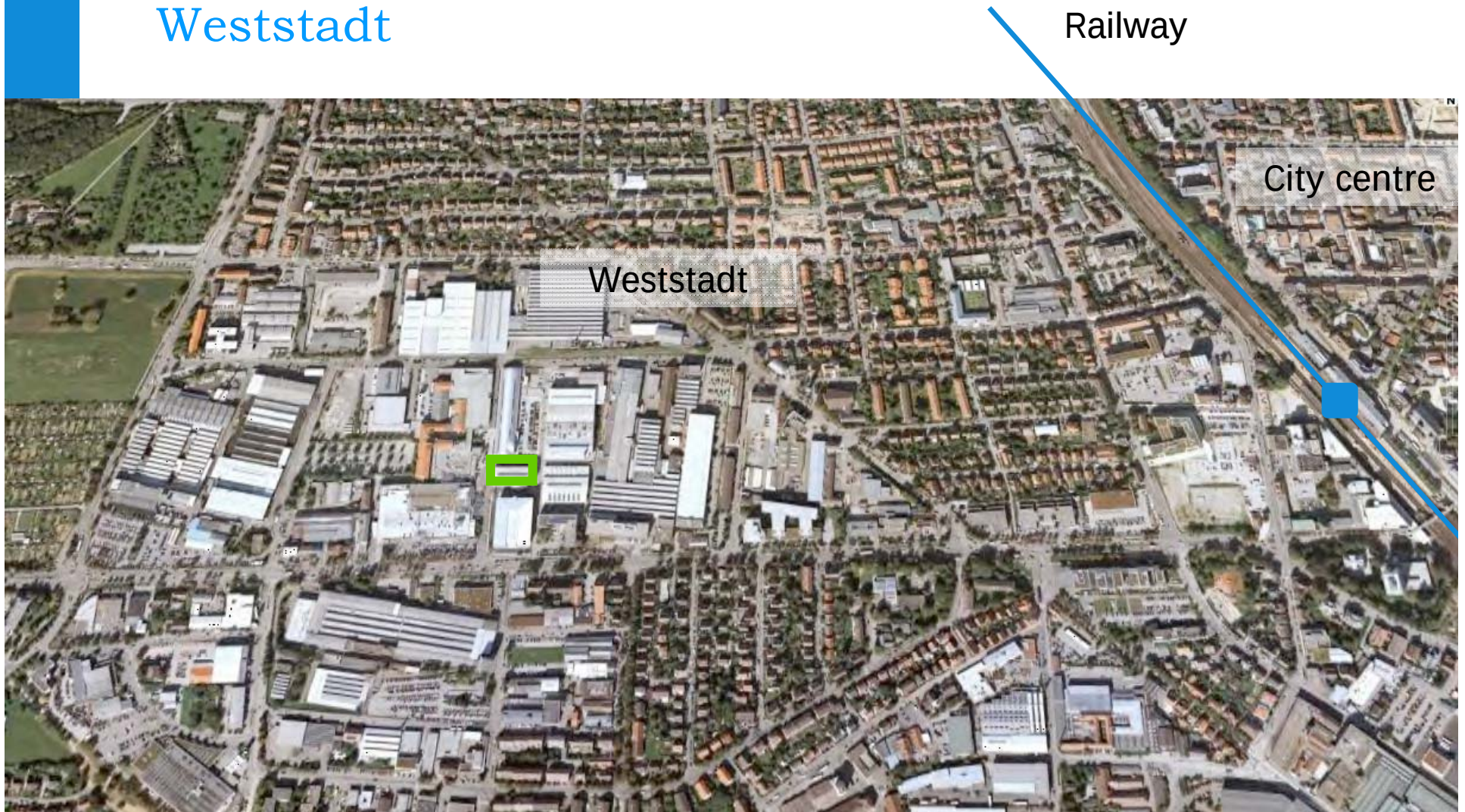
Ludwigsburg

Livinggreen Lab on Energy



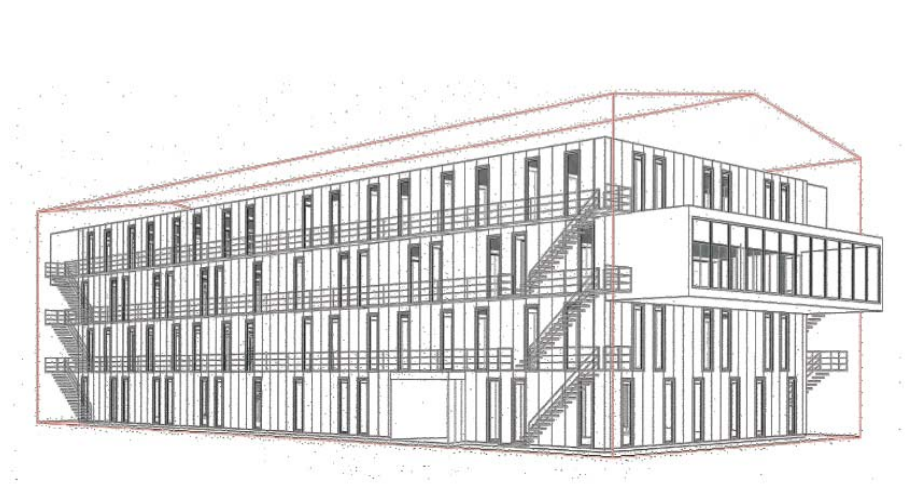
Ludwigsburg

Weststadt



Ludwigsburg

2Z building renovation



Ludwigsburg

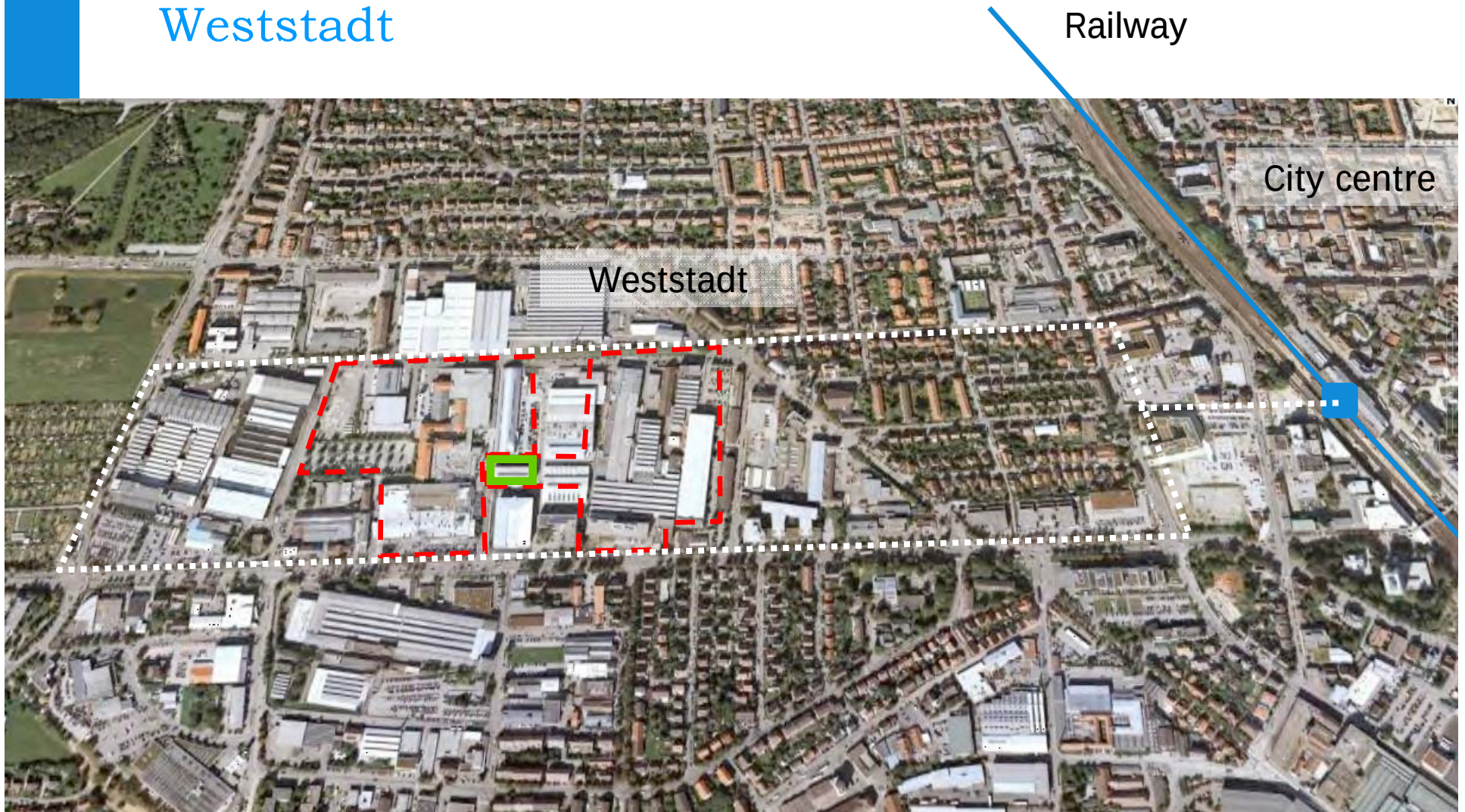
2Z building renovation

- Energy & building department of Ludwigsburg municipality
 - Advice, expertise, examples/exhibition
 - Permits



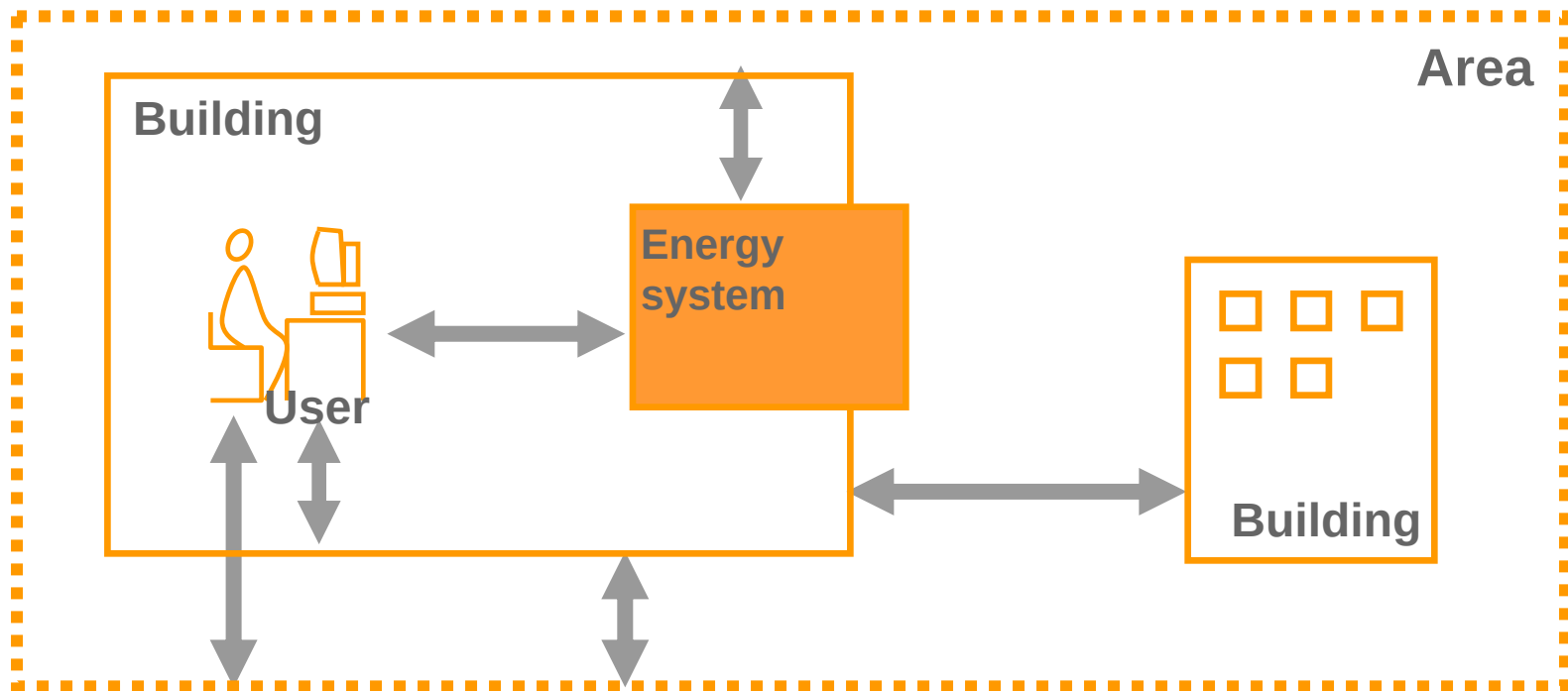
Ludwigsburg

Weststadt



Assignment

- Design/come up with products and services related to energy use or generation for Ludwigsburg's Future LAB
- Focus your design on one or a combination of relations





Lets PSS now...

When is a PSS sustainable?

PSS

- Must be more efficient than a product solution (planet)
- Must be better value for money (profit)
- Must be more convenient, increase quality of life, better quality/function, secure employment (people)

Obstacles & drivers

- PSS ARE NOT SUSTAINABLE PER SE

You have to look at the whole system and check if it moves towards sustainability (people, planet, profit)

- BE AWARE OF REBOUND EFFECTS

You may end up with more consumption. E.g. Energy saving light bulbs

Most PSS cases were originally not environmentally driven – and most successful, if a company developed a new business idea in a new field

Evaluation product service systems

- Sustainability Design Orienting (SDO) toolkit

Sustainability Design Orienting toolkit

Criteria

Environmental criteria

- transportation/distribution reduction
- resources reduction
- waste minimisation/valorisation
- conservation/biocompatibility
- toxic reduction

Sustainability Design Orienting toolkit

Criteria

Socio-ethical criteria

- improve employment/working conditions
- equity and justice in relation to stakeholders
- enable responsible/sustainable consumption
- favour/integrate weak and marginalized
- improve socio-ethical cohesion
- empower/enhance local resources

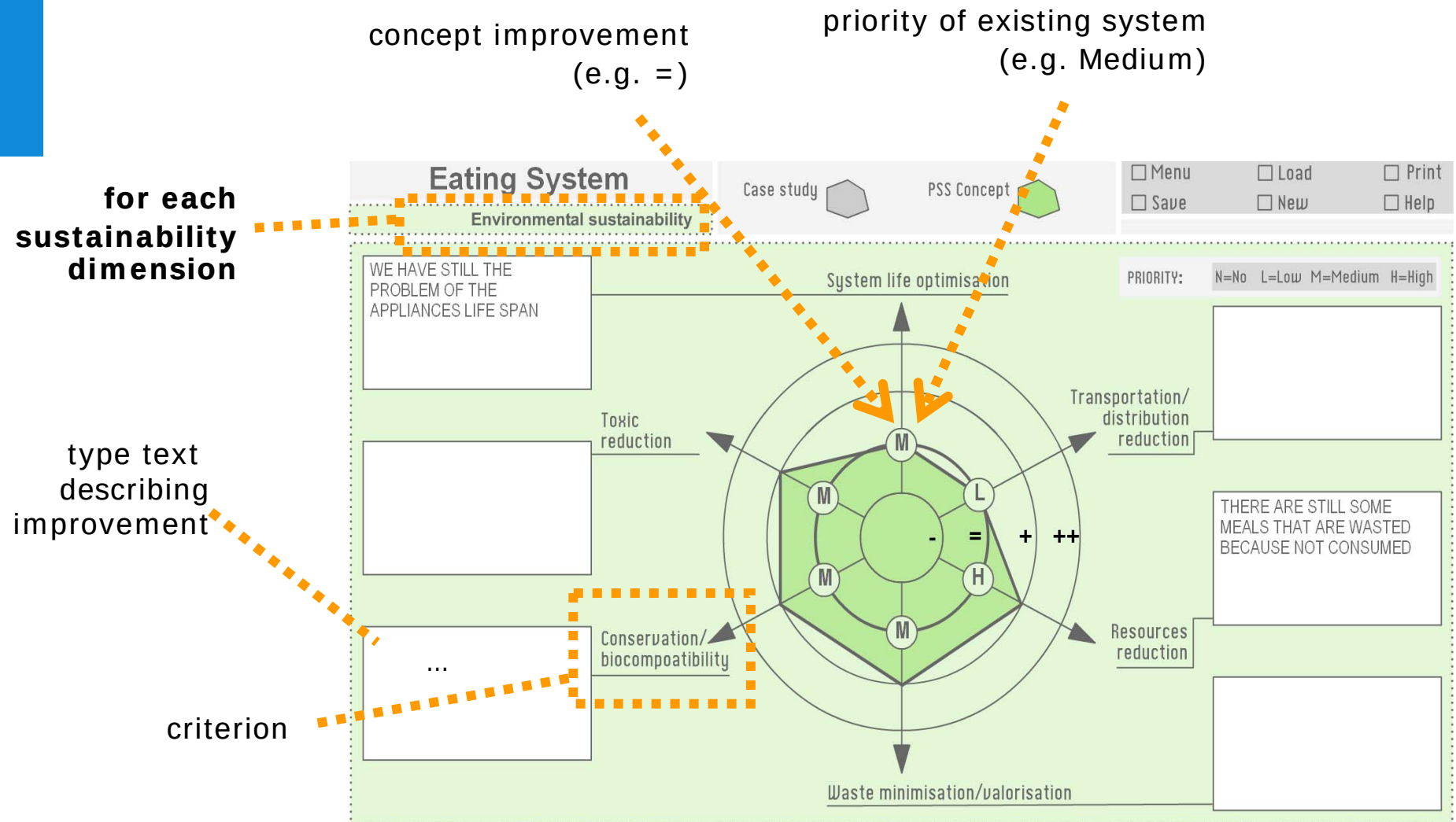
Sustainability Design Orienting toolkit

Criteria

Economic criteria

- market position and competitiveness
- profitability / added value for companies
- added value for customers
- long term system development / risk
- partnership / co-operation
- macro-economic effect

Visualisation of progress in concept





Lets evaluate now...