Sustainable Consumption: Realising Sustainable Solutions

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Structure of the presentation

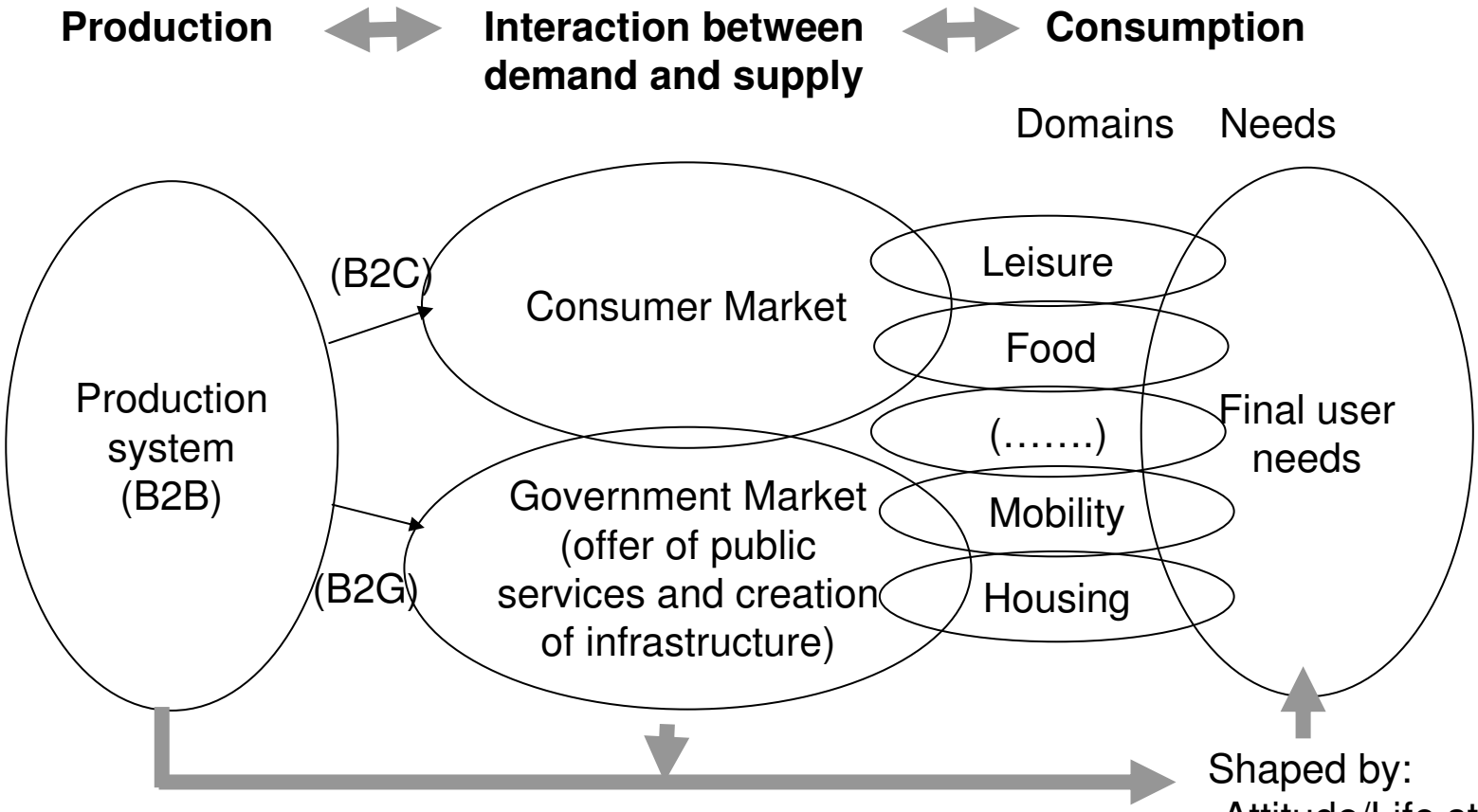
- Sustainable Consumption and Production: A Review
- Priority Areas of Concern: EIPRO
- Contribution of Product-Services: SusProNet
- Towards the Future: the SCORE! Project

Sustainable Consumption and Production: A Review

- It is not about…
  - Designers developing sustainable solutions (and who then run away)
  - LCA specialists calculating hot spots (and think that they have then organised a move to sustainability)
- It is about ensuring that consumers have..
  - Needs/Attitude/Life style
  - Opportunities/Pressure/Life context
  - Abilities/Behavioural control /Influence on life

  …that stimulate Sustainable Consumption
- And about…
  - Acknowledging that different levels of change need different approaches

Sustainable Consumption



Sustainable consumption behaviour is a function of e.g.:

a) Needs, Opportunities and Abilities (Vlek et al.), or
b) Attitude, Social pressure and Behavioural control (Montalvo Corral)
- User awareness hence needs to be understood in the user's context !

Adapted from: project Life Cycle Approaches to Sustainable Consumption, AIST, Japan **WITH THANKS !**

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Levels of change

What	Sustainability gains	Approaches
1. Optimise systems	Marginal (<50%)	Awareness raising
2. Redesign systems	Factor 2 (50%)	Awareness raising + offers of (more) sustainable solutions
3. Innovate systems	Substantial (>>50%)	Awareness raising + offers of (inherent) sustainable solutions+ adapting context and framework conditions

A system is the the combination of:

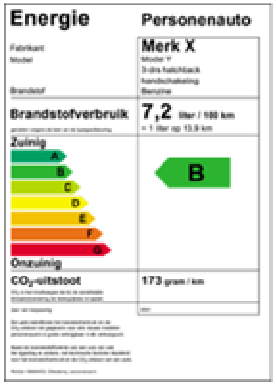
Context and framework conditions

Production structure ↔ **Interaction between demand and supply** ↔ **Consumption structure**

Levels of change, examples

What	Approaches
1. Optimise systems	Awareness raising
2. Redesign systems	Awareness raising + offer of sustainable solutions
3. Innovate systems	Awareness raising + offer of sustainable solutions+ adapting context and framework

1. Car energy label



2. Car sharing system

Mobility Carsharing

3. Low transport-need environment (Floridosdorf, Vienna)

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What are the main Hot Spots?

- Study: Environmental Impacts of Products
  - For EU's Integrated Product Policy
  - With Leiden University (NL), Danish Technogical University, and VITO (Belgium)
  - Must identify 'hot spot' products, given the total EU-25 final consumption
- Some basic features:
  - January 2004-January 2005, 150.000 Euro
  - Track 1: Review existing (national) studies
  - Track 2: Use an existing Input-Output model and adapt that to the EU

Hot Spots in the EU: Track 1

- Review a variety of national studies
  - RIVM, Dutch Namea
  - 2.-0 LCA consultants: Danish Environmental IOA study
  - ETC/WMF: European resource analysis via IOA
  - Bio Intelligence/O2: Bottom-up extrapolation of LCAs, EU
  - VITO: Bottom-up extrapolation of LCAs, Belgium
  - Toolsust/University of Groningen: hybrid method for 4 cities in the EU, focused on Energy
- Results
  - Consistent priority of Mobility, Housing/Energy, Food (70% of life cycle energy)
  - However, maximum breakdown into 50 final consumption categories
  - Not yet suitable to identify sectors for IPP

Hot Spots in Europe: Track 2

- Use an existing E-IOA from the US to 'model' Europe (CEDA 3.0 at CML)
  - Advantage: 500x500 matrix, high resolution
  - Som 280 final consumption items
  - Only feasible approach to get an EU-like IOA with this resolution on short term
  - 'Forced' to emulate EU via
    - RAS method (adjusting to EU final consumption and known sector turnover data)
    - Total emission data
    - Variety of other adjustments (energy, fertilizer use)

Some Results from the E-IOA Work

	AD	GWP	POCP	AC	EU	Aggr.	Expend	Expend
CP01 Food and non-alcoholic beverage	12%	17%	15%	22%	29%	18%	18%	6,17E+11
CP02 Alcoholic beverages, tobacco and	2%	2%	2%	2%	2%	2%	3%	1,13E+11
CP03 Clothing and footwear	6%	7%	7%	7%	8%	7%	7%	2,51E+11
CP04 Housing, water, electricity, gas a	11%	9%	9%	9%	9%	9%	10%	3,50E+11
CP05 Furnishings, household equipme	15%	14%	13%	15%	12%	13%	11%	3,86E+11
CP06 Health	3%	3%	3%	3%	2%	3%	4%	1,28E+11
CP07 Transport	29%	28%	25%	17%	16%	25%	16%	5,36E+11
CP08 Communications	1%	2%	2%	2%	1%	2%	3%	1,02E+11
CP09 Recreation and culture	8%	7%	8%	8%	8%	9%	9%	3,14E+11
CP10 Education	1%	1%	1%	1%	1%	1%	1%	3,48E+10
CP11 Restaurants and hotels	4%	4%	5%	5%	6%	5%	7%	2,42E+11
CP12 Miscellaneous goods and servic	9%	7%	9%	8%	7%	8%	9%	3,05E+11
	100%	100%	100%	100%	100%	100%	100%	3,38E+12

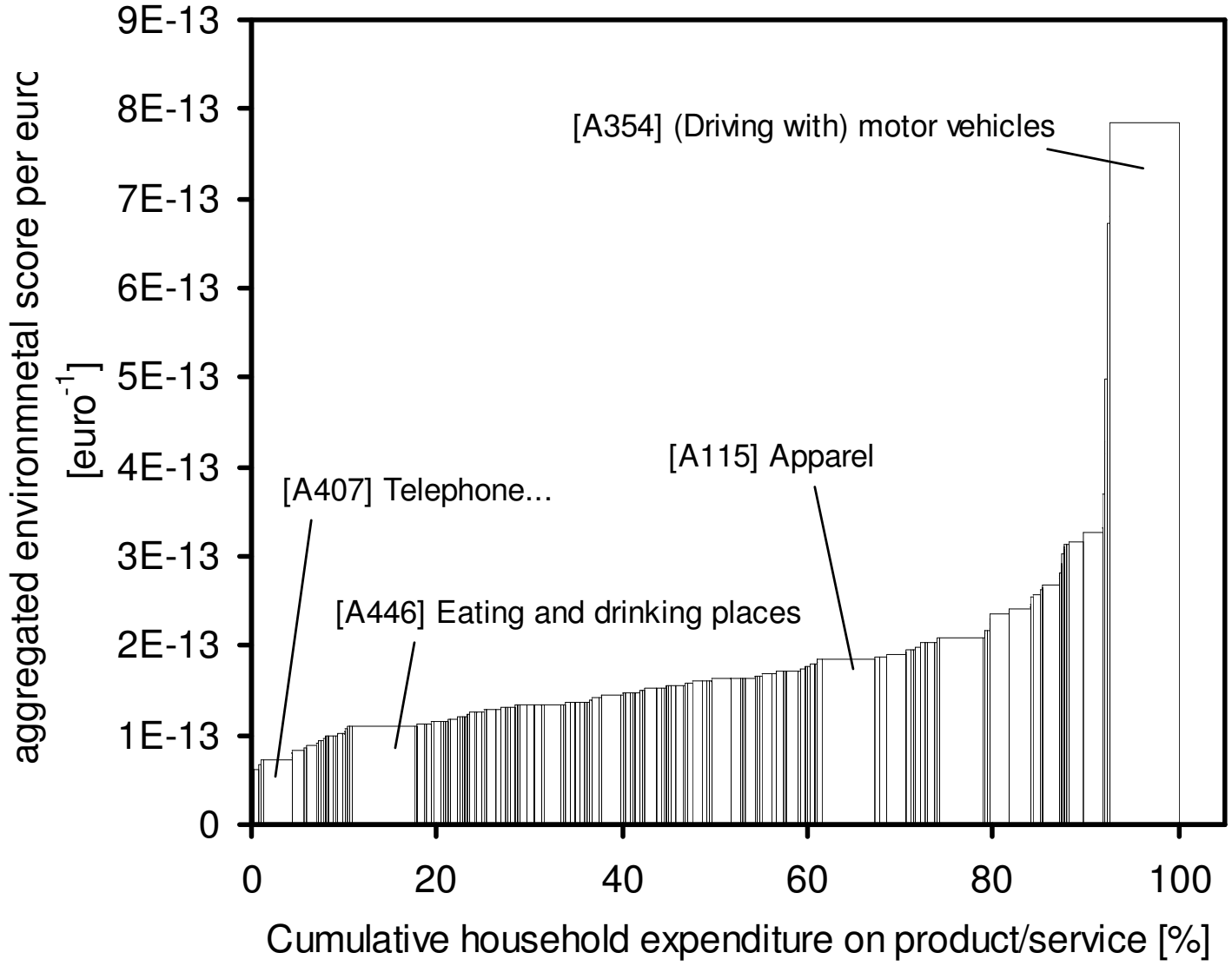
- Dominant are:
  - Food (CP01, 02 and 11) with some 20-25% for GWP
  - Housing (CP04 and 05) with some 25 % for GWP
  - Mobility (CP 07) with some 25-30% for GWP

All this work has been done by CML (Huppes, Suh and others)

Impact per Euro (change factor 5 only)

Top 15 (Impact per Euro spent)	GWP, normalised
[A233] Output of Minerals, ground or treated	1.28E-12
[A228] Output of Lime	1.25E-12
[A110] Output of Nonwoven fabrics	1.21E-12
[A231] Output of Abrasive products	7.29E-13
[A410] Output of Electric services (utilities)	7.08E-13
[A337] Output of (use of) Electric lamp bulbs and tubes	6.82E-13
[A237] Output of Blast furnaces and steel mills	6.71E-13
[A30] Output of Chemical and fertilizer minerals	6.58E-13
[A354] Output of (Driving with) motor vehicles and passenger car bodies	6.32E-13
[A257] Output of (Household heating with) heating equipment, except electric and warm a furnaces	5.81E-13
[A331] Output of (use of) Household cooking equipment	5.68E-13
[A245] Output of Primary aluminum	5.53E-13
[A332] Output of (use of) Household refrigerators and freezers	5.48E-13
[A238] Output of Electrometallurgical products, except steel	5.33E-13
[A333] Output of (Washing with) household laundry equipment	5.30E-13
[A335] Output of (use of) Household vacuum cleaners	5.29E-13
Bottom10	
[A260] Output of Fabricated plate work (boiler shops)	1.22E-13
[A441] Output of Research, development, and testing services, except noncommercial	1.19E-13
[A406] Output of Arrangement of passenger transportation	1.16E-13
[A455] Output of Racing, including track operation	1.16E-13
[A75] Output of Bread, cake, and related products	1.14E-13
[A234] Output of Mineral wool	1.13E-13
[A261] Output of Sheet metal work	1.13E-13
[A262] Output of Architectural and ornamental metal work	1.12E-13
[A99] Output of Cigars	9.73E-14
[A466] Output of Private libraries, vocational schools, and educational services, n.e.c.	7.60E-14

Impacts per Euro and total



Conclusion: even a very radical change of consumption patterns yields Factor 2-3 at best (apart from car driving)

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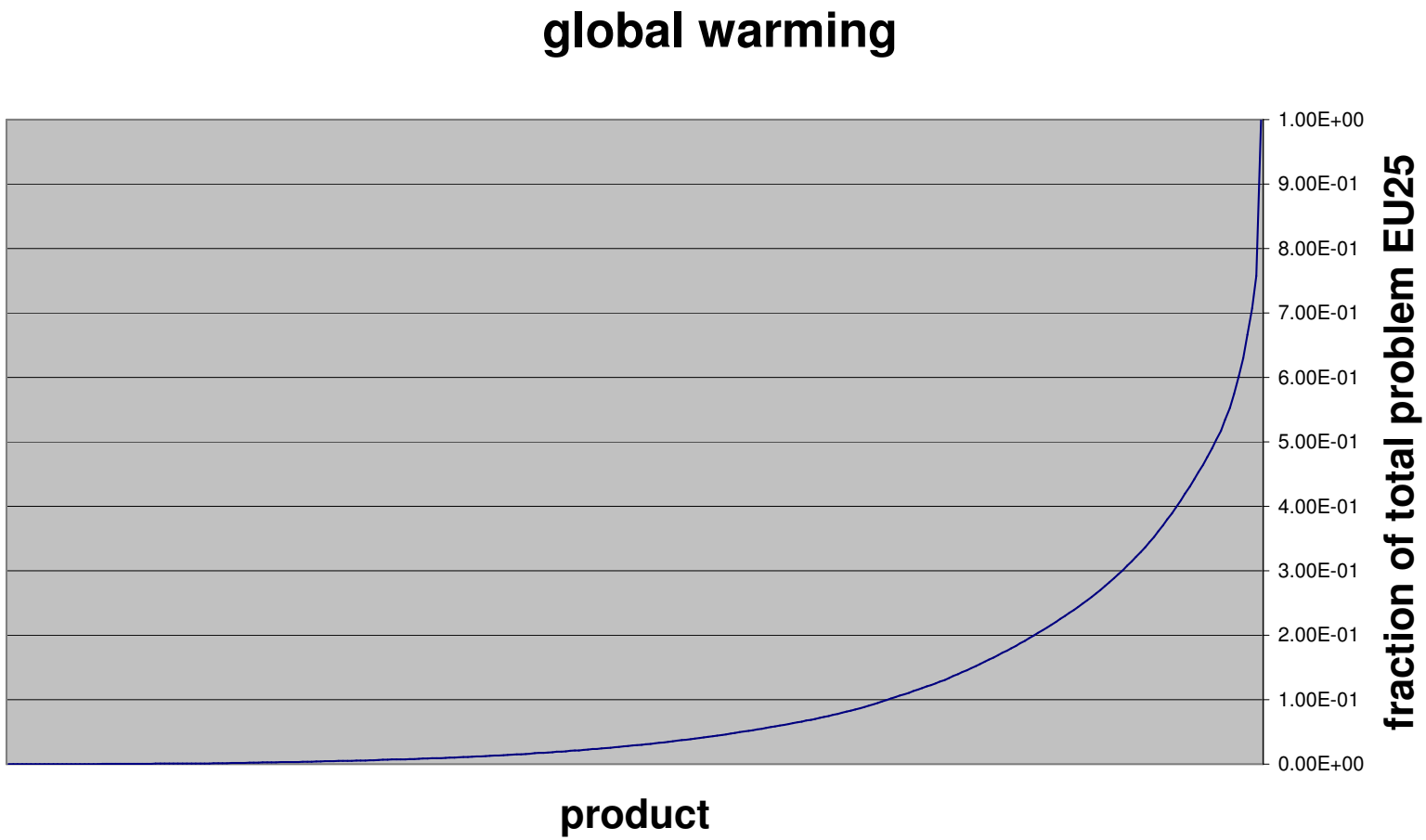
Impact total: Services are in as well!

Top 25-30 (Total Impact)	GWP, Norm.	Fraction exp.
[A354] Output of (Driving with) motor vehicles and passenger car bodies	0.2420	0.1134
[A115] Output of Apparel made from purchased materials	0.0501	0.0525
[A31] Output of New residential 1 unit structures, nonfarm	0.0409	0.0441
[A446] Output of Eating and drinking places	0.0367	0.0613
[A257] Output of (Household heating with) heating equipment, except electric and warm a furnaces	0.0281	0.0144
[A419] Output of Insurance carriers	0.0272	0.0352
[A52] Output of Meat packing plants	0.0217	0.0199
[A333] Output of (Washing with) household laundry equipment	0.0181	0.0101
[A33] Output of New additions & alterations, nonfarm, construction	0.0176	0.0219
[A54] Output of Poultry slaughtering and processing	0.0137	0.0154
[A332] Output of (use of) Household refrigerators and freezers	0.0136	0.0074
[A340] Output of (use of) Household audio and video equipment	0.0129	0.0090
[A448] Output of Automotive repair shops and services	0.0120	0.0154
[A393] Output of Brooms and brushes	0.0119	0.0121
[A407] Output of Telephone, telgraph communications, and communications services n.e.c.	0.0112	0.0267
[A12] Output of Vegetables	0.0111	0.0117
[A187] Output of Drugs	0.0108	0.0113
[A336] Output of (use of) Household appliances, n.e.c.	0.0108	0.0123
[A59] Output of Fluid milk	0.0103	0.0108
[A337] Output of (use of) Electric lamp bulbs and tubes	0.0097	0.0042
[A10] Output of Fruits	0.0092	0.0069
[A457] Output of Other amusement and recreation services	0.0092	0.0161
[A431] Output of Beauty and barber shops	0.0091	0.0105
[A206] Output of Shoes, except rubber	0.0089	0.0102
[A86] Output of Bottled and canned soft drinks	0.0083	0.0085
[A56] Output of Natural, processed, and imitation cheese	0.0080	0.0083
[A458] Output of Doctors and dentists	0.0075	0.0149
[A42] Output of Maintenance and repair of farm and nonfarm residential structures	0.0073	0.0105

Cumulative total impact, GWP



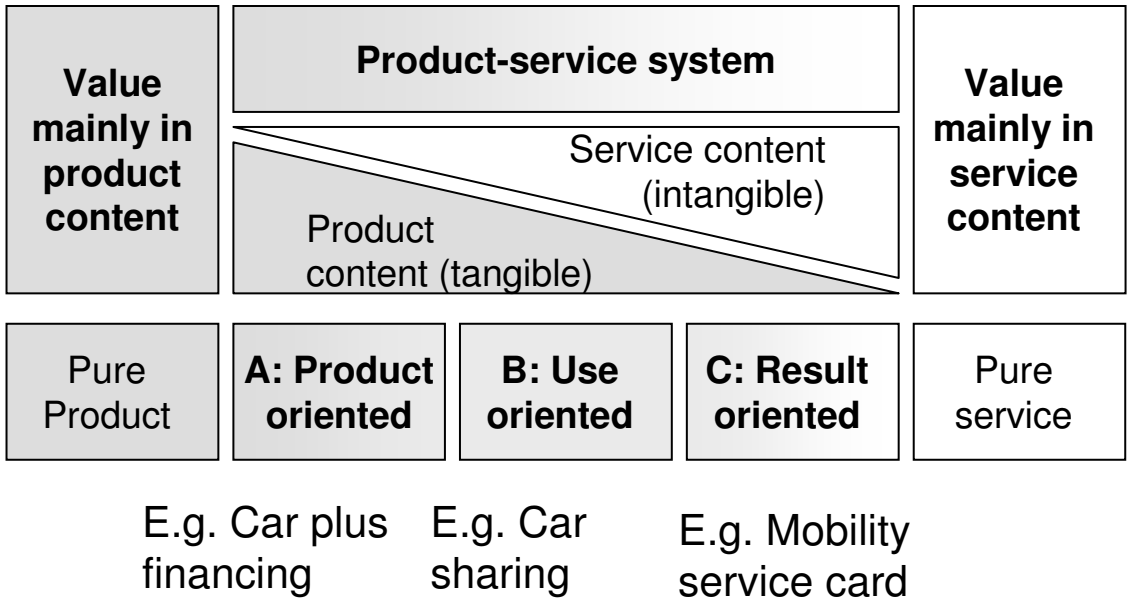
Conclusion: 20% of the (255) product categories cause 80% of the impact

Hot Spots - Conclusions

- Robust hot spots are
  - Mobility
  - Housing
  - Food
- Shifts to services will NOT give Factor 10
  - Impact per Euro differs only a Factor 5 between the highest (No 10) and lowest (No 270) scoring consumption item
  - Services are in the top 20 (barbers, medical services, restaurants)

Improvement options: Results from SusProNet

- SusProNet: Some basics
  - 2002-2004
  - 1.5 Million Euro
  - 6 Main institutes, 30 Industry members
- SusProNet is about Product-Services



Product services: good for business, good for SCP ?

- Good for business:
  - Business and consumers concentrate on ‘core competences’; need more integrated solutions
  - Many products become commodities -> diversification is the only strategy to escape price competition
- Good for SCP ??
  - Smart: By starting with satisfaction, you have more degrees of freedom to design sustainable delivery systems
  - Stupid: *‘Services are weightless’* or *‘If business focuses on PSS the sustainable paradise will follow’*

Eco efficiency strategies’		Sufficiency strategies’		
Production processes	<- Products	<- PSS	<- End user needs	<- End user well-being

Improvement options: Results from SusProNet

- SusProNet has completed a database with 200-250 PSS cases
- Attributes included:
  - PSS type (product, use, result oriented)
  - Environmental gains
  - Economic performance
  - Social performance
  - Drivers and barriers
  - Type of market: niche, main
  - How it started: product supplier, service supplier, new startup
- Large variety of cross-analyses possible (not all ready yet)

Some Examples from SusProNet Database: Top 20 Improvement

PSS	Energy	Remark
Call a bike for instant bike rent on demand	F 4-10	Niche
Electronic services provided by a portable solar community centre (Greenstar)	F 4-10	Solar, not PSS is decisive
Leasing of solar-panel-equipped roofs (AMG)	F 4-10	Solar, not PSS is decisive
Videoconferencing service (British Telecom)	F 4-10	No replacement for the real thing
Internet-based training courses to study from any location at any time (Learnways)	F 4-10	No replacement for the real thing
Virtual school trip (Museum of Technology Delft)	F 4-10	No replacement for the real thing
Car-sharing in Switzerland to save costs and use cars more efficiently (Mobility Car	F 2	Niche
Carpet leasing and additional services (Evergreen, Interface Inc.)	F 2	Niche
Central bartering of services (Tauschkreis Niederrhein, Verein „Würdevoll Leben e.V.“)	F 2	Niche
Chain mobility services for time- and cost-saving travelling (Mobility Plan, Texel)	F 2	Not yet existing
Collection and redistribution of tools (G.A.B.)	F 2	Niche
Combined heat and power units for homes and small businesses to save on energy	F 2	Niche but can expand
Development of a two-seater car for urban spaces (Smart-Daimler Chrysler)	F 2	
Electronic data transfer service for the media and print industries (WAM!NET)	F 2	
Energy efficiency advice (Eastern Energy)	F 2	
homecare service (Chores)	F 2	
Instant hiring of bicycles within cities which can be electronically unlocked (CallBike)	F 2	
Jobticket to promote commuting by train (DB Regionalbahn Rheinland)	F 2	
Organic food by subscription (Odin)	F 2	Niche
Pram leasing to offer high quality prams at lower prices (European Nursery Group)	F 2	Niche
Recycling of Cathode Ray Tubes from monitors (Proventia Automation)	F 2	WEE directive asks it
Renting machines, devices and party articles (Boels-Mietshops)	F 2	Niche
Re-use of CO2-waste for energy production (OKEP)	F 2	
Upgrading old washing machines with a micro controller	F 2	
Virtual answering machine improving people's accessibility (T-Net-Box, Deutsche	F 2	
Virtual hospital for cost- and time-efficient provision of health care (Atuline Oy)	F 2	

- Confirms EIPRO conclusion: Mainstream Factor X improvement is diffiult !

Overall lessons from the SusProNet case research

PSS type	Advantages	Disadvantages
1: Product oriented services	Easy to implement Close to core business	Incremental environmental benefits (20%)
2: Use oriented services	Medium (Factor 2) Changes consumer behaviour Very successful in B2B context.	Low intangible added value => consumer acceptance difficult, because of ownership conflict etc.
3: Result oriented service	Radical (Factor x potential)	Risks/ Liabilities How to measure result? Customer loses power over means

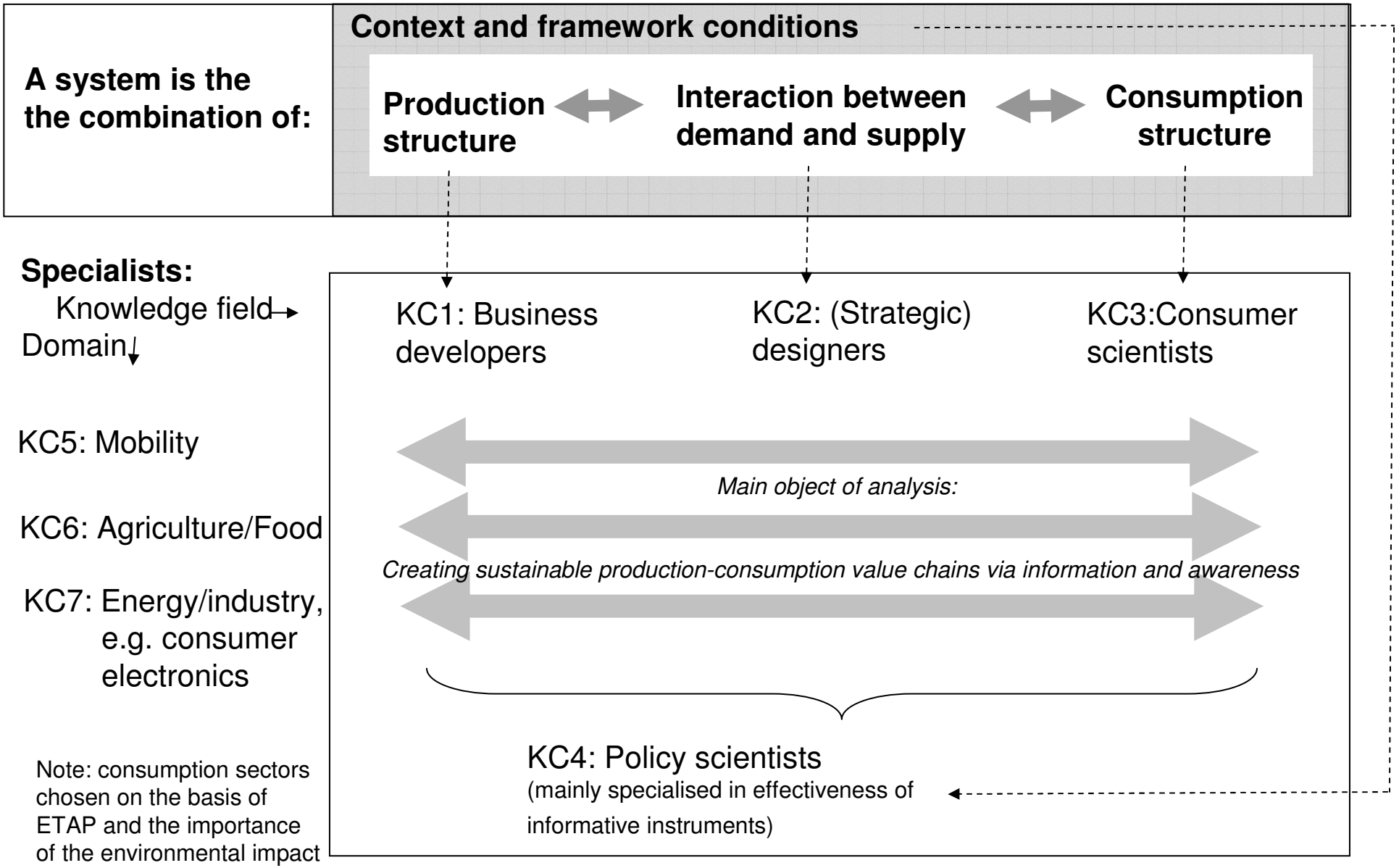
Other results

- SusProNet book: Greenleaf, Sept. 2005
- Edited Cluster Book
- Courses
- Spin off project on SCP: SCORE!

Sustainable Consumption Research Exchanges (SCORE !)

- Philosophy
  - For implementing SCP you need knowledge from
    - –Business
    - –Design
    - –Consumer behaviour
    - –Innovation at system level
  - You should focus at the 3 priorities mobility, food, housing
  - You should develop ideas and a testing/learning plan for them (SCORE cannot do research)
- Some basics
  - Co-ordination action
  - 8 core institutes, 20 members
  - 2005-2007
  - 1 Million Euro

Knowledge communities to be involved



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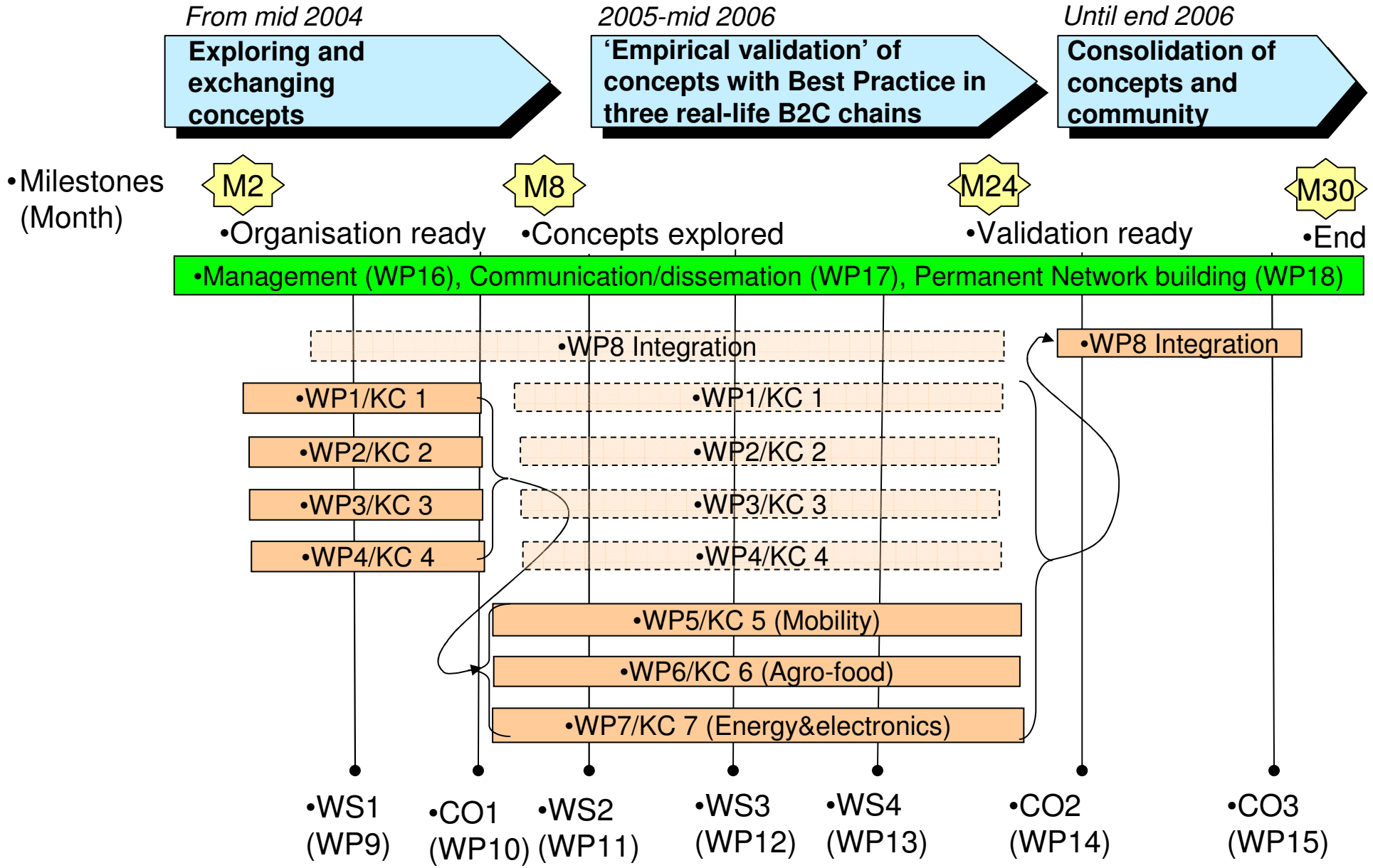
Structure of Activities



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Focus per Event

Workshop 1	**General platform for exchange of views how to realise sustainable consumption structures between the 33 Participants and Partners, from their own knowledge background.**
Conference 1	**Goals:** **•Launch the network in the EU arena** **•Provide a broad platform for conceptual exchange** **•Provide a broad platform for SC case presentation s**
Workshop 2	**WS2-4 are organised giving consumption domains centre stage. WS2 starts with discussing 5-10 SCP cases per domain from the 4 knowledge perspectives, analysing success- and failure factures, re-design potential, and danger of rebound effects**
Workshop 3	**WS3 abstracts the lessons of WS2 to a higher level, leading to concepts models and case typologies of successful implementation approaches for sustainable consumption in relation to user awareness**
Workshop 4	**WS4 focuses on the implementation tools for successful approaches (e.g. how to organise information management for user awareness)**
Conference 2	**Conference 2 validates the results of the project and forms a first outreach to policy, industry, certification organisations and other bodies relevant for implementation**
Dissemination event	**The dissemination event is meant to disseminate the full lessons of the project to all relevant extermal parties.**

Knowledge generation co-ordinated

What	Projects and knowledge centres
1. Business development	•Various top EU business schools: Arhus, Rotterdam, St. Gallen •POPA-CTDA (FP6)
2. Strategic design	•Various top EU design groups: TU Delft, Polytechnico Milano, Les Ateliers •SusProNet, HiCS, MEPSS, Prosecco, a.o. (FP5
3. Sustainable consumption	•Various top EU sustainable consumer research groups: SIFO, Sheffield Hallam, TU Muenchen •Toolsust (FP5), HomeServices (FP5), EMUDE (FP6) •AIST program on Sustainable Consumption (Japan)
4. Policy & information instruments	•Various top EU (sustainable) innovation groups: RISO, MERIT, ARC, IOW, Lund University •Blueprint network (FP5), Elima (FP5), FLIPP program (Swedish EPA), Dutch Sustainable System Innovation and Transition Program

Key results to be generated

Main header	Result
1. Generating and disseminating best practice	• Describing best practice how to organize user awareness to reach sustainable consumption (3 sectors, 3 levels of change, interplay between 4 knowledge fields)* • Dissemination across EU-25 via workshops, conferences, reports
2. Programming research	• Exchange and (informal) co-ordination of research among participants, with a focus on EU-25 but with links world-wide (over 150 fte research capacity) • Developing input in the form of a structured overview of research needs in FP6/FP7 and UNEP's SCP program
3. Platform for input into policy	•Input of 1) and 2) into the following potentially relevant policy platforms: • EU's IPP and Resource policy: insight in the role of 'soft' informative instruments such as labelling, product declarations, etc. • EU's ETAP: insight in 'willingness to consumer behaviour change' in 3 relevant sectors • EU and UNEP SCP policy platforms
4. Permanent network building	• Building a structural 'Sustainable solution' community covering SCP in collaboration with existing structures in Advisory Board (GIN, Prepare)

*Example sectors:
1. Transport
2. Agro-food
3. Energy&electronics

Levels of change in consumption:
1. Via awareness
2. Via awareness+new solutions
3. Via awareness+new solutions+ framework changes

Knowledge fields:
1. Business development
2. Strategic solution design
3. Consumer behaviour
4. Policy instruments for innovation & information

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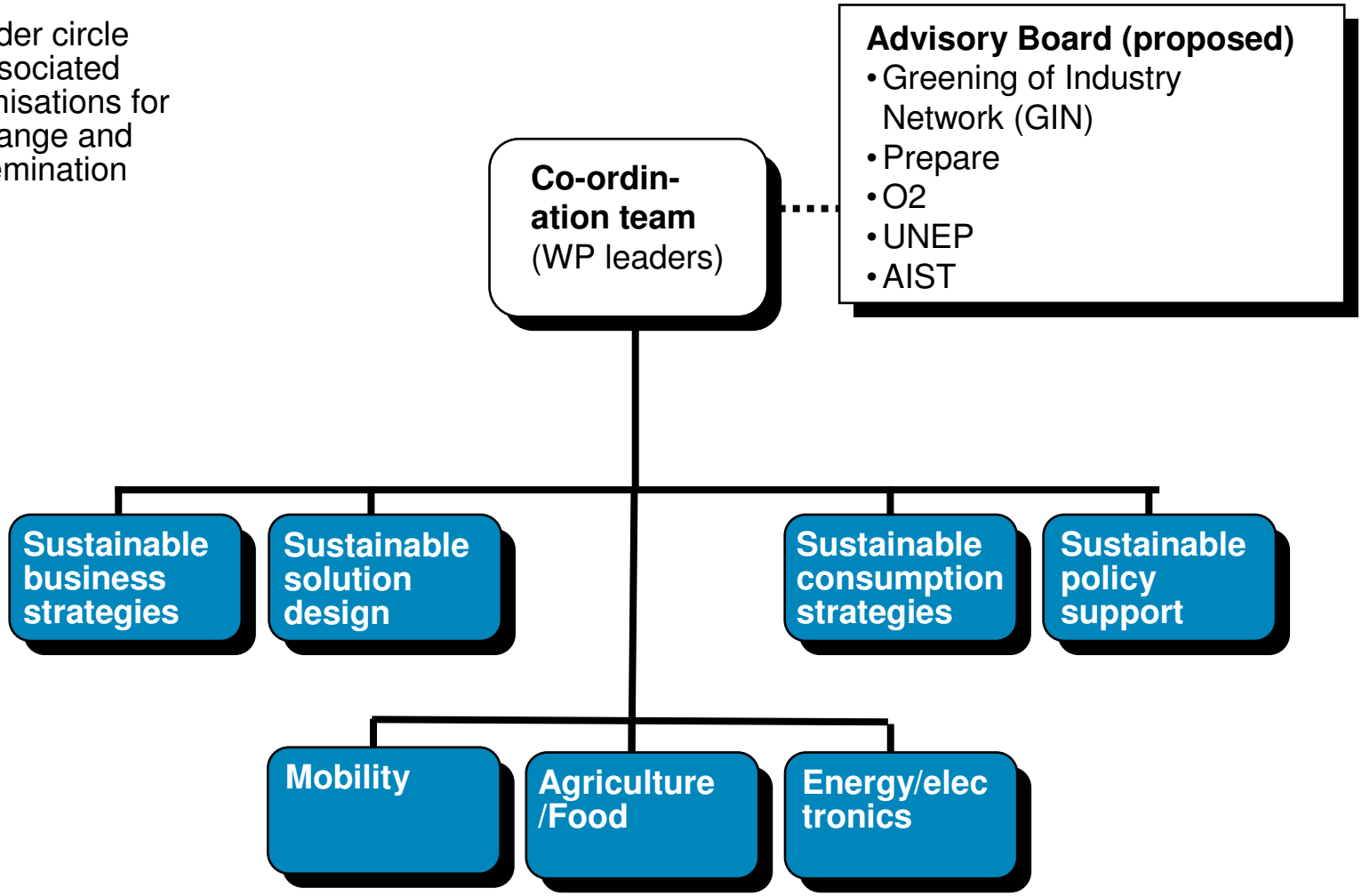
Management structure

Broader circle of associated organisations for exchange and dissemination



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Conclusions

- EIPRO and other projects show robust priorities for sustainable consumption:
  - Housing
  - Food
  - Mobility
  - With 20% of product categories causing 80% of the impact -> IPP can indeed be targeted
- SusProNet showed that product services on their own will NOT provide a Factor 4/10 world
- A more integrated ‘system innovation’ approach is needed, which is at the core of the SCORE project