Ecodesign Preparatory Studies

ENER Lot 22: Domestic and commercial ovens *(electric, gas, microwave), including when incorporated in cookers*

ENER Lot 23: Domestic and commercial hobs and grills, *including when incorporated in cookers.*

1st Stakeholder Meeting on commercial appliances
Paris – November 5th 2010

A study being conducted for DG ENER by BIO Intelligence Service and Cobham-ERA Technology Ltd

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Industrial Ecology - Nutritional Health

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Agenda of the meeting

10:00 – 10:30	**Welcome, "Tour de table", Introduction to the Ecodesign Directive, schedule update**
10:30 – 11:20	**Lot 22 – Tasks 1 to 3: Main conclusions on commercial ovens**
11:20 – 11:30	**COFFEE BREAK**
11:30 – 12:30	**Lot 22 – Tasks 4 and 5: Main conclusions on commercial ovens**
12:30 – 13:00	**Lot 22 – Next steps: Tasks 6, 7 and 8**
13:00 – 14:00	**LUNCH BREAK**
14:00 – 14:50	**Lot 23 – Tasks 1 to 3: Main conclusions on commercial hobs and grills**
14:50 – 15:30	**Lot 23 – Tasks 4 and 5: Main conclusions on commercial hobs and grills**
15:30 – 16:00	**Lot 23 – Next steps: Tasks 6, 7 and 8**
16:00 – 16h30	**Lot 22 & 23 : General discussion and conclusions**

ENER Lots 22/23 team

BIO Intelligence Service:

- (Shailendra Mudgal)
- Benoît Tinetti
- Eric Hoa
- Guillaume Audard

Cobham:

- Chris Robertson
- Paul Goodman

European Commission project officer:

- Villö Lelkes

ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 1 - Products Definition

1.1. Product Definition

In this study, the following definitions are used :
- **hob** : appliance or part of an appliance which incorporates one or several distinguishable cooking zones, where pans can be placed on for heating.
- **grill** : appliance or part of an appliance in which food is cooked by radiant or contact heat.

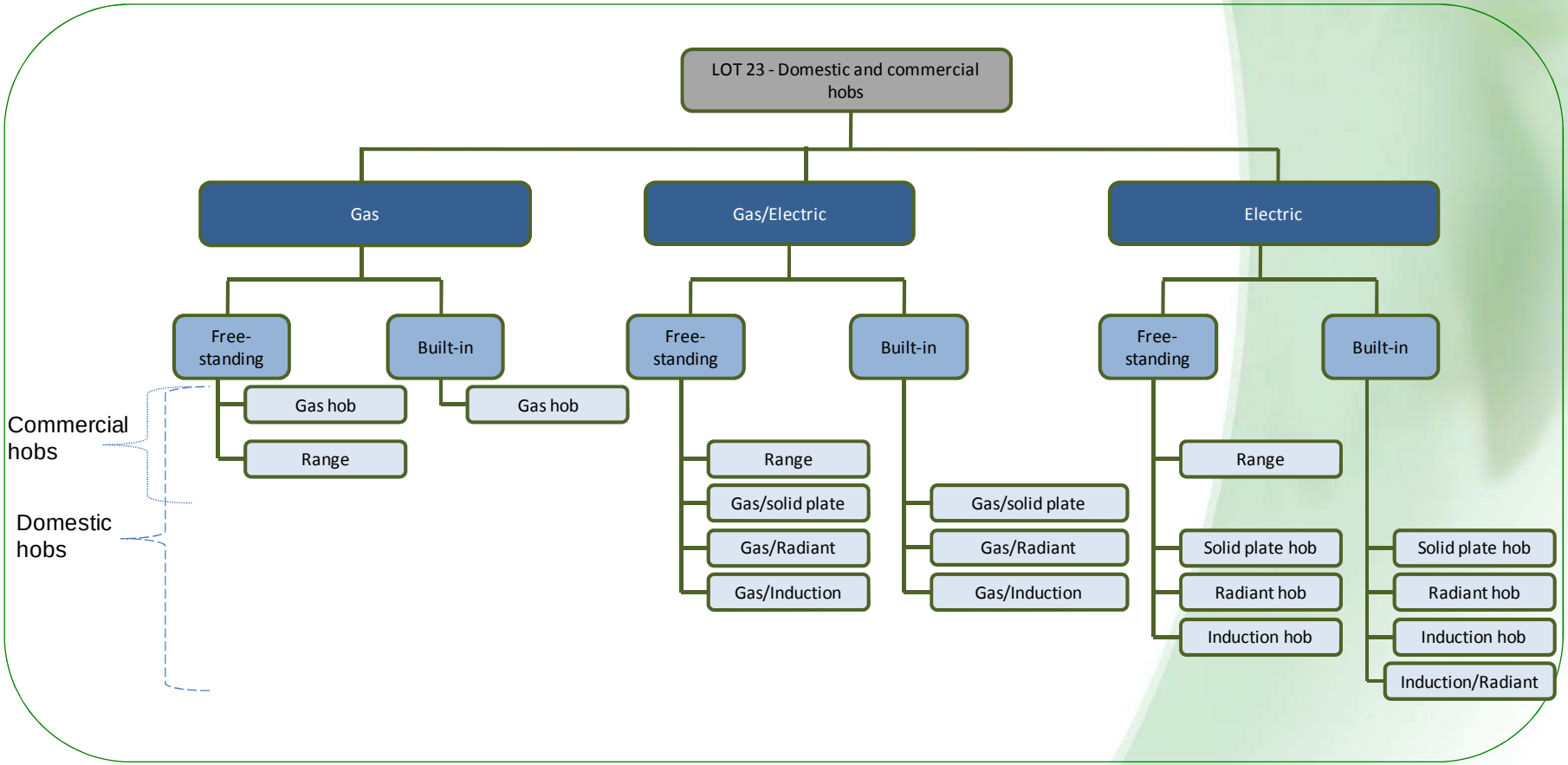
- Main criteria to be considered within the scope of the study:
  - ✓Energy Source
  - ✓Heating Mechanisms and Technologies
  - ✓Appliance Configuration

1.1. Product Definition

- Prodcom does not classify commercial hobs and grills explicitly in a specific NACE category.

Prodcom code	Prodcom category
28.93	**Manufacture of machinery for food, beverage and tobacco processing**
28.93.15.80	Non-domestic equipment for cooking or heating food (excluding non-electric tunnel ovens, non-electric bakery ovens, non-electric percolators)

1.1. Product Definition – Our Classification



1.1. Product Definition

Built-in Hobs :

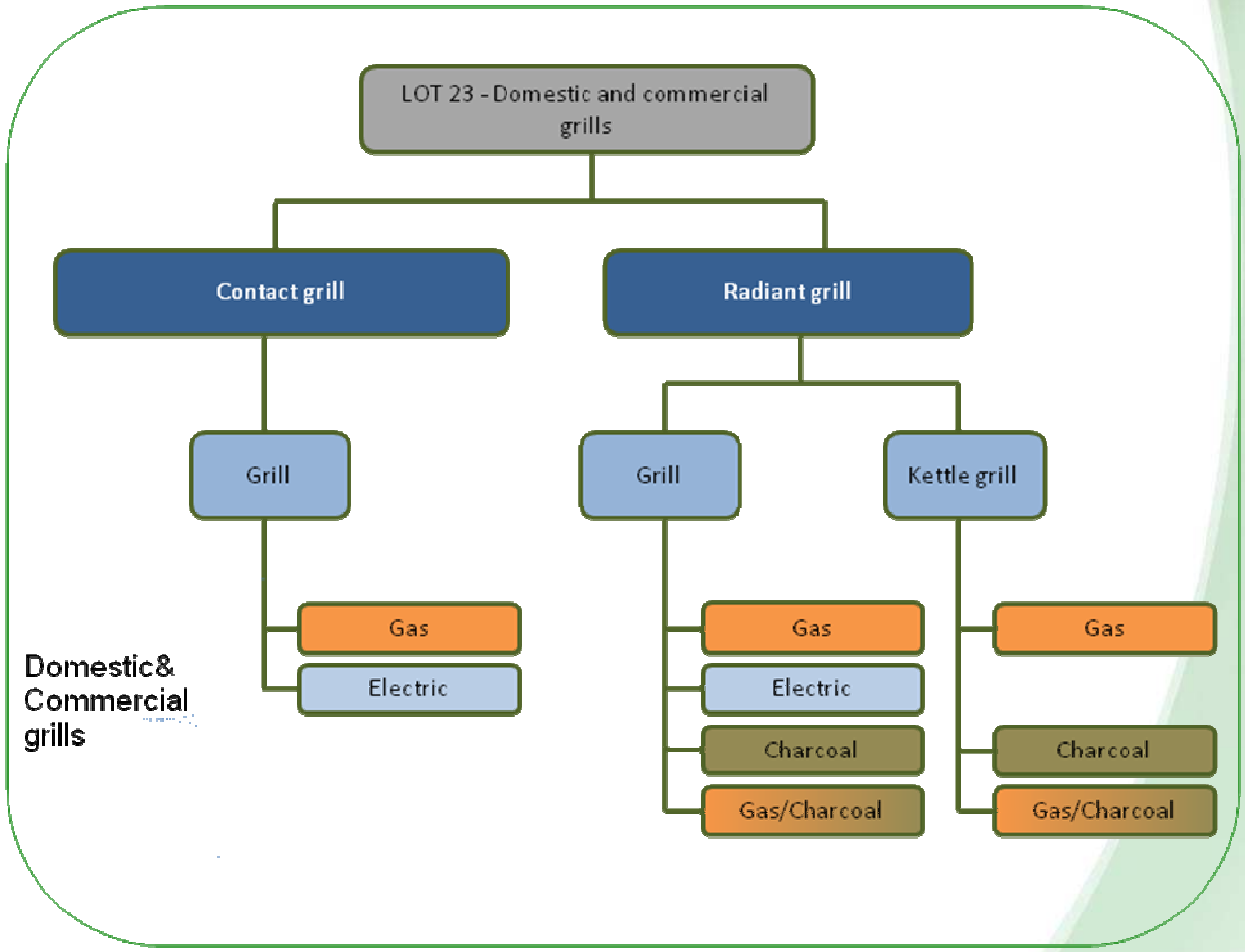
Gas

Free-standing Hobs :

Gas/Electric Range

Electric

1.1. Product Definition – Our Classification



1.1. Product Definition

Free-standing Grills:

Gas

Electric

1.2. Test Standards

- For the performance of commercial hobs and grills, no specific European standard exists.
- Other standards

Standard	Type	Grill/hob
EN 203-2-1:2005	Safety/Performance	Gas (commercial)

1.3. Existing Legislation

At EU level: No specific legislation for commercial hobs and grills.

Scope	Legislation
Environmental Legislation	
Entire Product	Waste Electrical and Electronic Equipment Directive 2002/96/EC
	Restriction of the use of certain Hazardous Substances in electric and electronic equipment Directive 2002/95/EC
	The REACH regulation, 1907/2006 (superseding the Marketing and Use Directive regarding substance restrictions)
Legislations related to Safety	
Entire product	General Product Safety Directive 2001/95/EC
	Low Voltage Directive 2006/95/EC
	Materials and articles intended to come into contact with foodstuffs – Regulation 2004/1935/EC
	Appliances burning gaseous fuels Directive 90/396/EEC

ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 1 Conclusions

- The panel of products is identified and defined
- No EN test standards for commercial hobs and grills
- No existing legislation, but some voluntary initiatives

ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 2 - Economic and Market Analysis

The estimation of the stock of commercial appliances presented in slides 16 to 20 is based on the number of foodservice outlets in the EU-27 provided by Eurostat.

Another approach based on the production data of the main manufacturers is under discussion.

Task 2.1 – Market Trends

Stock Estimation

	Number Of outlets	Hobs (cooking zones)	
		Cap./ outlet	Total capacity
Restaurants	413,481	4.5	1,860,666
QSR (Quick Service)	187,946	0	0
Pubs	263,125	1.1	289,437
Hotels	281,919	4.5	1,268,636
Leisure	131,562	4	526,249
TOTAL commercial restaurants	1,278,033		3,944,989
Staff Catering	150,357	2	300,714
Health Care	169,151	2	338,303
Education	244,330	2	488,660
Services	37,589	2	75,178
TOTAL institutional restaurants	601,428		1,202,855
TOTAL	**1,879,461**		**5,147,844**

Stock Estimation

Stock for Commercial hobs at EU level in 2005

Number of cooking zones	Distribution	Total capacity	Hobs' stock
6	15%	1,286,960	214,493
4	50%	2,859,912	714,978
2	35%	1,000,969	500,485
TOTAL		**5,147,844**	**1,429,956**

Stock Estimation

	Number Of outlets	Grills	
		Nb. /outlet	Stock
Restaurants	413,481	0.3	124,044
QSR (Quick Service)	187,946	1	187,946
Pubs	263,125	0	0
Hotels	281,919	0.3	84,576
Leisure	131,562	0	0
TOTAL commercial restaurants	1,278,033		396,566
Staff Catering	150,357	1	150,357
Health Care	169,151	1	169,151
Education	244,330	1	244,330
Services	37,589	1	37,589
TOTAL institutional restaurants	601,428		601,428
TOTAL	**1,879,461**		**997,994**

Stock Estimation

Distribution between electric and gas commercial appliances installed in the EU in 2005

Appliances	Total Stock	Stock Electric		Stock Gas	
Hobs	1,429,956	35%	500,485	65%	929,471
Grills	997,994	65%	648,696	35%	349,298

Commercial hobs and grills at EU level - Stock Forecasts

Appliance	Stock 2005	Stock 2010	Stock 2015	Stock 2020	Annual growth rate
Electric hobs	500,485	543,160	589,474	639,737	1.65%
Gas hobs	929,471	996,382	1,068,109	1,145,000	1.40%
Electric grills	648,696	705,742	767,805	835,325	1.70%
Gas grills	349,298	368,937	389,679	411,588	1.10%

- No sales data are available. Further estimations will be based on the stock values and the product lifetime.
- Sales values < 200,000 units/year

Average Price Range

Type of hob/grill	Commercial appliances		
	Low range (€)	High range (€)	Average price (€)
Solid plates	-		-
Radiant hob	-		2,900
Induction hob	-		-
Gas hob	800	4,000	2,950
Range cooker	1,500	12,000	
Electric grill	1,500	5,000	3,100
Gas grill	1,500	5,000	3,200
Charcoal grill	500	5,000	

Running Costs

	Rates
Electricity rate	15.54 € / 100 kWh
Natural gas rate	14.81 € / GJ
Discount rate	4 %

ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 2 Conclusion

- Data for the commercial sector is sparse and difficult to obtain.
- Need for validation to be used in further tasks.
- The number of units sold in the market seems to be lower than the threshold (200,000 units / year) established by the Ecodesign Directive, however the intensity of use studied in Task 3 can demonstrate the relevance to include the products under the study.

ENER Lot 23: Domestic and commercial hobs and grills,
including when incorporated in cookers.

Task 3 – Consumer Behaviour Analysis

- No figure on the consumption of energy due to the commercial use of hobs and grills at EU level

- Member state level:
  - ✓ UK Catering industry:
    21.6 TWh per year (not only cooking)
  - ✓ France: Cooking in commercial sector
    13.6 TWh

Type of commercial appliance	Annual Energy Consumption
Gas hobs	Less than 0.04 PJ (11.1 GWh)
Induction hobs	Less than 0.03 PJ (8.33 GWh)
Radiant hobs	Less than 0.04 PJ (11.1 GWh)
Solid plates hobs	Less than 0.01 PJ (2.78 GWh)
Big hobs electricity operated	Less than 0.03 PJ (8.33 GWh)
Electric contact grills	Less than 0.01 PJ (2.78 GWh)
Electric radiant grills	Less than 0.008 PJ (2.22 GWh)

Source HKI

- Different use patterns for commercial appliances compared to the domestic ones.
- The appliances are used much more intensively, to cook larger portions of food, and thus consume much more energy over their lifetime.

Type of commercial appliance	Power-on time of the heating	Time of using per year (h)	Average lifetime (years)
Gas hobs	50%	1,500	20
Induction hobs	30%	1,500	15
Radiant hobs	50%	1,500	15
Solid plates hobs	50%	1,500	15
Big hobs electricity operated	50%	1,800	15
Electric contact grills	30%	1,500	15
Electric radiant grills	80%	1,500	8

Task 3 – End-of-life behaviour

- Commercial appliances have a high residual value due to the high proportion of stainless steel.
- The largest proportion of material goes back into the professional recycling process by specialized companies and don’t take the typical recycling process like in the domestic sector.

Task 3 – Possible barriers to Ecodesign

- Higher capital costs
- Absence of economies of scale
- Isolated initiatives without government support
- Lack of information
- Lack of operator training

ENER Lot 23: Domestic and commercial hobs and grills,
including when incorporated in cookers.

Task 3 – Conclusions

- Commercial catering as a huge consumer of energy vs. very little empirical data
- Potential shift of the energy consumption from the domestic sector to the commercial one due to an apparent increase of eating-out habits at EU level.

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Dr Paul Goodman,
Reliability and Failure Analysis Group

5 November 2010

COBHAM

ERA TECHNOLOGY
ANTENNA AND
ELECTRONIC
SYSTEMS

ERA TECHNOLOGY
ENGINEERING
CONSULTANCY
SERVICES

VECTOR FIELDS
SOFTWARE

LIGHTNING
TESTING AND
CONSULTANCY

DG ENER Lots 23 Eco-design preparatory study
Task 4 - Commercial Hobs and Grills
Technical analysis of existing products

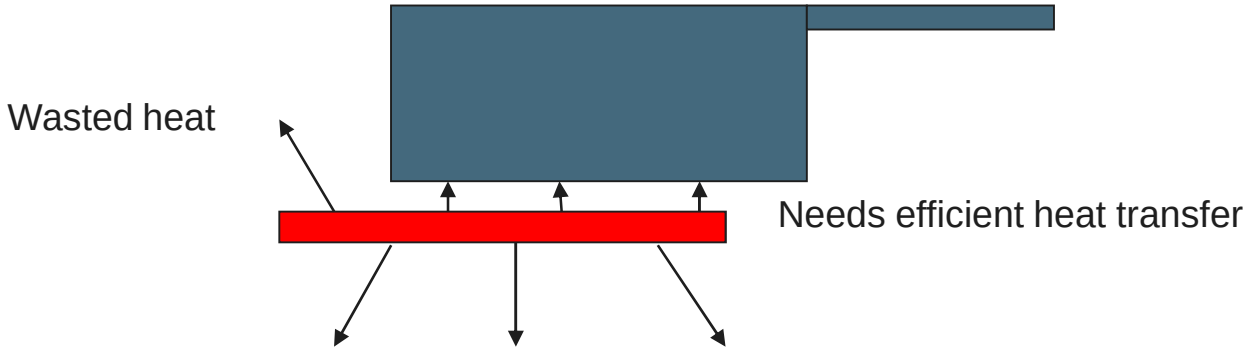
conducted on behalf of the European Commission, DG ENER,
by Cobham Technical Services and Bio Intelligence Service

Technologies

- Hobs
  - Gas burners
  - Electric hotplates
    - Solid plate
    - Radiant
    - Induction
- Grills
  - Radiant and Contact
  - Gas and electric

Commercial hobs

- Efficiency in use depends on pan size, materials, etc
  - Simmer control accuracy important where used



Thermal insulation needed for safety
and may benefit solid plate hotplates.
Less important for induction and gas

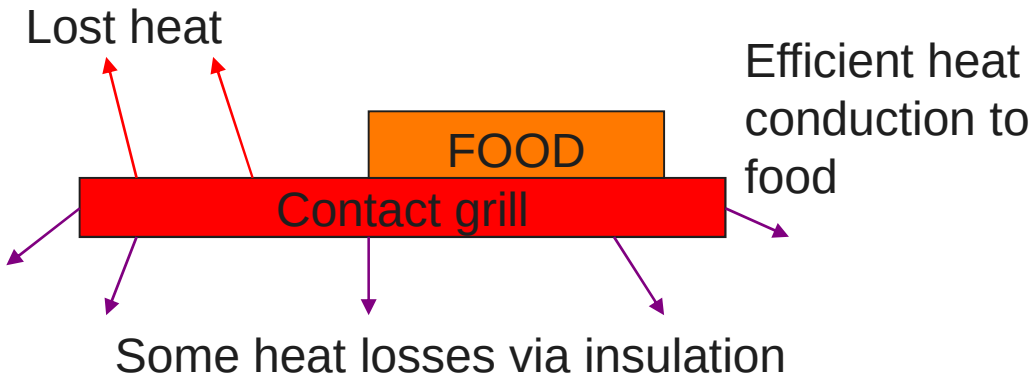
Commercial hobs

- Often used on full power continuously (also grills)
  - Wastes energy when not cooking
  - Wastes energy when simmering needed (pans moved to edge of hotplate or covered gas burner)
  - Pan sensors available but uncommon
- These issues are not applicable to induction hobs
- Some EU commercial hobs have pilot lights (not EU domestic, banned in USA & Canada)
- EN 203-2-1 standard: uncovered hob minimum energy efficiency = 50%
  - One report* claims >60% is achievable and automatic standby devices should be included in standard

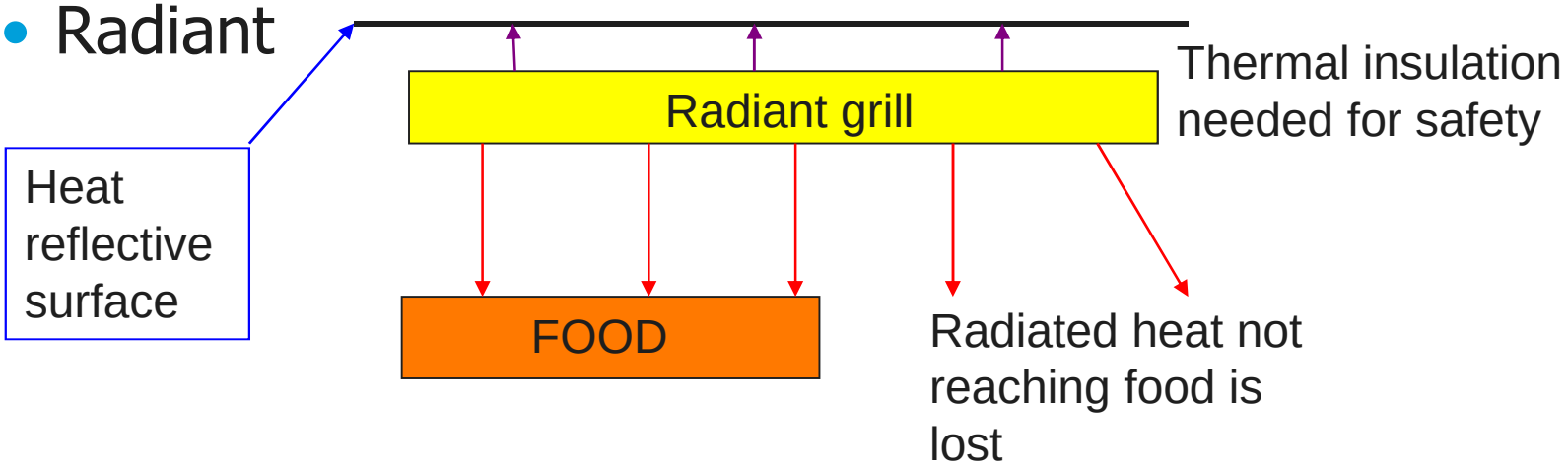
* V. Cocker, Aga Foodservices Group, 2007

Grills

- Contact



- Radiant



Grill performance

- No EU standard measurement methods
- US Energy Star for commercial griddles (contact grills) and commercial broilers (radiant grills) shows large variation in energy performance of grills on US market
- Japan Top Runner program tests Japanese grills and also finds large performance variation (best = ~50% better than worst, 2004 report – gas consumer grills only)
- Potential energy loss design features include:
  - Use of pilot lights (gas)
  - Unused grill area (unable to switch off unused areas)
    - Special low emissivity coatings for contact grills
  - Limited power control – e.g. on/off only or few settings
  - Thermal insulation (mainly contact grills)

Standards

- EU energy measurement standards needed for all types of commercial hob and grill
  - Should be based on commercial cooking procedures
  - Give credit for energy saving design features, e.g.
    - Pot sensors
    - Grill zone control

EU Energy consumption

- Not known.
- Need to know stock levels
  - BIO's estimates:

Appliances	Total Stock	Stock Electric		Stock Gas	
Hobs	1,429,956	35%	500,485	65%	929,471
Grills	997,994	65%	648,696	35%	349,298

- Average annual energy consumption
  - Will be much more than domestic:
    - hobs = 1 – 2 MWh/y, grills 0.4 MWh/y?
  - Hobs ~**3 TWh/y**, grills ~ **0.4 TWh/y** – but could be much more!

Conclusions
- Commercial hobs and grills

- Designs are very varied and different to consumer hobs and grills
- Sold in smaller numbers than domestic, used for much longer periods and many have higher power ratings
  - Energy consumption not yet determined but will be significant
- No EU energy consumption data available
  - Test results from USA & Japan indicate that significant variation in performance exists
  - So improvement potential may be significant

Thank you

Questions

ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 5 - Assessment of Base-cases

Objectives

- Assessment of average EU products, the so called “base cases”
  - ✓ A base case is “a conscious abstraction of reality”
- The description of the Base Cases is the synthesis of the results of Tasks 1 to 4
- Most of the environmental and life cycle cost analysis are built on these Base Cases throughout the rest of the study and it serves as the point-of-reference for Task 6 (technical analysis of BAT), Task 7 (improvement potential), and Task 8 (policy analyses)

EcoReport tool

	material
	Bulk Plastics
1	LDPE
2	HDPE
3	LLDPE
4	PP
5	PS
6	EPS
7	HI-PS
8	PVC
9	SAN
10	ABS
	TecPlastics (incl. Fillers, reinforcement, additives)
11	PA 6
12	PC
13	PMMA
14	Epoxy
15	Rigid PUR
16	Flex PUR
17	Talcum filler
18	E-glass fibre
19	Aramid fibre

	Ferro metals
21	St sheet galv.
22	St tube/profile
23	Cast iron
24	Ferrite
25	Stainless 18/8 coil
	Non ferro metals
26	Al sheet/extrusion
27	Al diecast
28	Cu winding wire
29	Cu wire
30	Cu tube/sheet
31	CuZn38 cast
32	ZnAl4 cast
33	MgZn5 cast
	Coating / plating (per g coating)
38	pre-coating coil
39	powder coating
40	Cu/Ni/Cr plating
41	Au/Pt/Pd

	Electronics
42	LCD per m2 scrn
43	CRT per m2 scrn
44	big caps & coils
45	slots / ext. ports
46	large IC
47	small IC
48	SMD/ LED's avg.
49	PWB 1/2 lay 3.75kg/m2
50	PWB 6 lay 4.5 kg/m2
51	PWB 6 lay 2 kg/m2
52	Solder SnAg4Cu0.5
	Miscellaneous
54	Glass for lamps
55	Bitumen
56	Cardboard
57	Office paper
58	Concrete

Task 5 - Methodology (2/2)

	Life Cycle phases →		P
	Resources Use and Emissions		M
	Materials	**unit**	
1	Bulk Plastics	g	
2	TecPlastics	g	
3	Ferro	g	

	Life Cycle phases →		PRODUCTION			DISTRI-	USE	END-OF-LIFE*			TOTAL
	Resources Use and Emissions		Material	Manuf.	Total	BUTION		Disposal	Recycl.	Total	
	Total weight	g									
	Other Resources & Waste										
8	Total Energy (GER)	MJ									
9	of which, electricity (in primary MJ)	MJ									
10	Water (process)	ltr									
11	Water (cooling)	ltr									
12	Waste, non-haz./ landfill	g									
13	Waste, hazardous/ incinerated	g									
	Emissions (Air)										
14	Greenhouse Gases in GWP100	kg CO_2 eq.									
15	Ozone Depletion, emissions	g R-11 eq.									
16	Acidification, emissions	g SO_2 eq.									
17	Volatile Organic Compounds (VOC)	g									
18	Persistent Organic Pollutants (POP)	ng i-Teq									
19	Heavy Metals	mg Ni eq.									
	PAHs	mg Ni eq.									
20	Particulate Matter (PM, dust)	g									
	Emissions (Water)										
21	Heavy Metals	mg Hg/20									
22	Eutrophication	g PO4									
23	Persistent Organic Pollutants (POP)	mg									

ECO-DESIGN OF ENERGY-USING PRODUCTS

EuP EcoReport: RESULTS
Assessment of Environmental Impact

Nr	Product name						Date		Author		
	Life Cycle phases →		PRODUCTION			DISTRI-	USE	END-OF-LIFE*			TOTAL
	Resources Use and Emissions		Material	Manuf.	Total	BUTION		Disposal	Recycl.	Total	
	Materials	**unit**									
1	Bulk Plastics	g			0			0	0	0	0
2	TecPlastics	g			0			0	0	0	0
3	Ferro	g			0			0	0	0	0
4	Non-ferro	g			0			0	0	0	0
5	Coating	g			0			0	0	0	0
6	Electronics	g			0			0	0	0	0
7	Misc.	g			0			0	0	0	0
	Total weight	g			0			0	0	0	0
									see note!		
	Other Resources & Waste							debit	credit		
8	Total Energy (GER)	MJ	0	0	0	0	0	0	0	0	0
9	of which, electricity (in primary MJ)	MJ	0	0	0	0	0	0	0	0	0
10	Water (process)	ltr	0	0	0	0	0	0	0	0	0
11	Water (cooling)	ltr	0	0	0	0	0	0	0	0	0
12	Waste, non-haz./ landfill	g	0	0	0	0	0	0	0	0	0
13	Waste, hazardous/ incinerated	g	0	0	0	0	0	0	0	0	0
	Emissions (Air)										
14	Greenhouse Gases in GWP100	kg CO_2 eq.	0	0	0	0	0	0	0	0	0
15	Ozone Depletion, emissions	g R-11 eq.	negligible								
16	Acidification, emissions	g SO_2 eq.	0	0	0	0	0	0	0	0	0
17	Volatile Organic Compounds (VOC)	g	0	0	0	0	0	0	0	0	0
18	Persistent Organic Pollutants (POP)	ng i-Teq	0	0	0	0	0	0	0	0	0
19	Heavy Metals	mg Ni eq.	0	0	0	0	0	0	0	0	0
	PAHs	mg Ni eq.	0	0	0	0	0	0	0	0	0
20	Particulate Matter (PM, dust)	g	0	0	0	0	0	0	0	0	0
	Emissions (Water)										
21	Heavy Metals	mg Hg/20	0	0	0	0	0	0	0	0	0
22	Eutrophication	g PO4	0	0	0	0	0	0	0	0	0
23	Persistent Organic Pollutants (POP)	mg	negligible								

*=Note: Recycling credits only relate to recycling of plastics and electronics (excl. LCD/CRT). Recycling credits for metals and other fractions are already taken into account in the production phase.

The definition of commercial base-cases is not yet finalised.

The inputs presented in slides 46 to 52 are to be considered as an example to show the information needed for the environmental assessment in Task 5.

Any comment on the following figures will be highly appreciated.

Base-cases for the Lot 23 study:

Base-Case	Configuration	Technology Type	Number of cooking zones / Surface (cm^2)	Total maximum power (kW)	Lifetime (years)
BC3 - Commercial electric hob	Free-standing	Electric resistance	4 / 3600cm^2	16	8
BC4 - Commercial gas hob	Free-standing	Inox plate-open burners	1 / 520cm^2	12	8
BC5 - Commercial electric grill	Free-standing	Electric resistance	1 / 560cm^2	11	8
BC6 - Commercial gas grill	Free-standing	Ceramic tiles-open burners	1 / 420cm^2	18	8

Task 5 – Inputs (1/6)

Base-Case	Weight	1 Bulk Plastics	2 Tech. Plastics	3 Ferro	4 Non-ferro	5 Coating	6 Electronics	7 Misc.	Total
Base-Case 3: Commercial electric hob	in g	5,400	1,160	72,200	1,200	0	0	120	80,080
	in %	6.7	1.4	90.2	1.5	0	0	0.1	100
Base-Case 4: Commercial gas hob	in g	10,400	1,160	103,500	3,600	0	0	320	118,980
	in %	8.7	1.0	87.0	3.0	0	0	0.3	100
Base-Case 5: Commercial electric grill	in g	10,100	1,160	88,100	4,900	0	0	230	104,490
	in %	9.7	1.1	84.3	4.7	0	0	0.2	100
Base-Case 6: Commercial gas grill	in g	7,900	1,160	85,700	3,800	0	0	6,230	104,790
	in %	7.5	1.1	81.8	3.6	0	0	5.9	100

Task 5 – Inputs (2/6)

Base-Case	Volume of packaged product (in m^3)
BC3 - Commercial electric hob	1.1
BC4 - Commercial gas hob	1.1
BC5 - Commercial electric grill	1.1
BC6 - Commercial gas grill	1.1

Task 5 – Inputs (3/6)

Base-Cases	Consumption per cycle (kWh)	Number of cycle per year	Number of kilometres over the product life
BC3 - Commercial electric hob	1.2	5000	600
BC4 - Commercial gas hob	0.95	5000	720
BC5 - Commercial electric grill	1.1	4800	600
BC6 - Commercial gas grill	0.95	4800	690

Task 5 – Inputs (4/6)

Base-Case	Percentage of the total weight going to landfill	Plastics		
		Re-use, close-loop recycling	Material recycling	Thermal recycling
BC3 - Commercial electric hob	15%	15%	83%	2%
BC4 - Commercial gas hob	15%	15%	83%	2%
BC5 - Commercial electric grill	10%	15%	83%	2%
BC6 - Commercial gas grill	10%	15%	83%	2%

Task 5 – Inputs (5/6)

Base-Case	Product Lifetime (in years)	Sales (units/yr) (=stock/lifetime)	Stock (units)	Product price (in €)	Maintenance costs (in €)
BC3 - Commercial electric hob	8	62,500	500,000	2900	980
BC4 - Commercial gas hob	8	115,000	930,000	2950	1100
BC5 - Commercial electric grill	8	80,000	650,000	3100	920
BC6 - Commercial gas grill	8	45,000	350,000	3200	1130

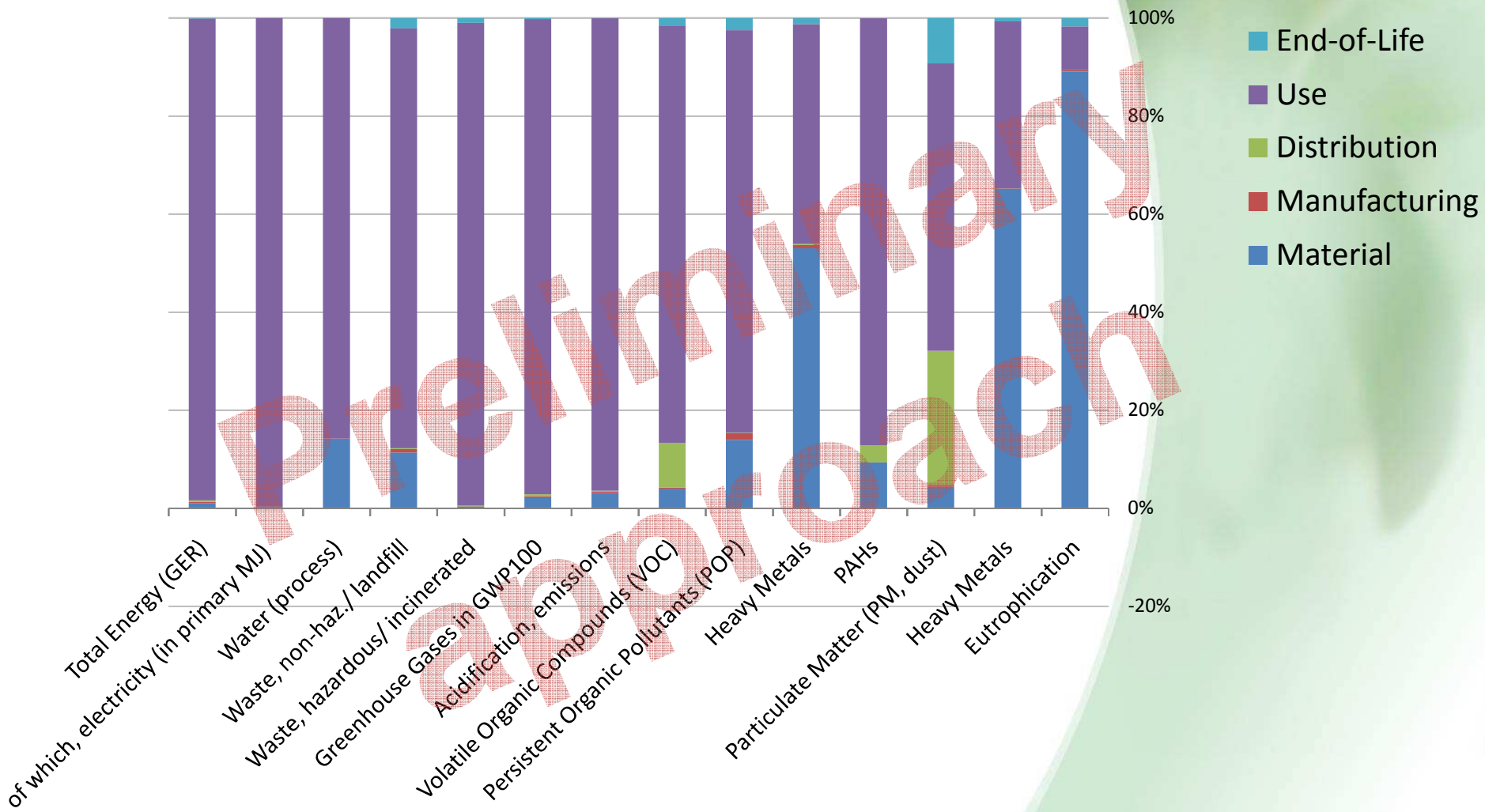
Task 5 – Inputs (6/6)

Base-Case	Electricity rate (€/kWh)	Natural gas rate (€/GJ)
BC3 - Commercial electric hob	0.1554	
BC4 - Commercial gas hob		14.81
BC5 - Commercial electric grill	0.1554	
BC6 - Commercial gas grill		14.81

Base-Case	Overall improvement ratio
BC3 - Commercial electric hob	1
BC4 - Commercial gas hob	1
BC5 - Commercial electric grill	1
BC6 - Commercial gas grill	1

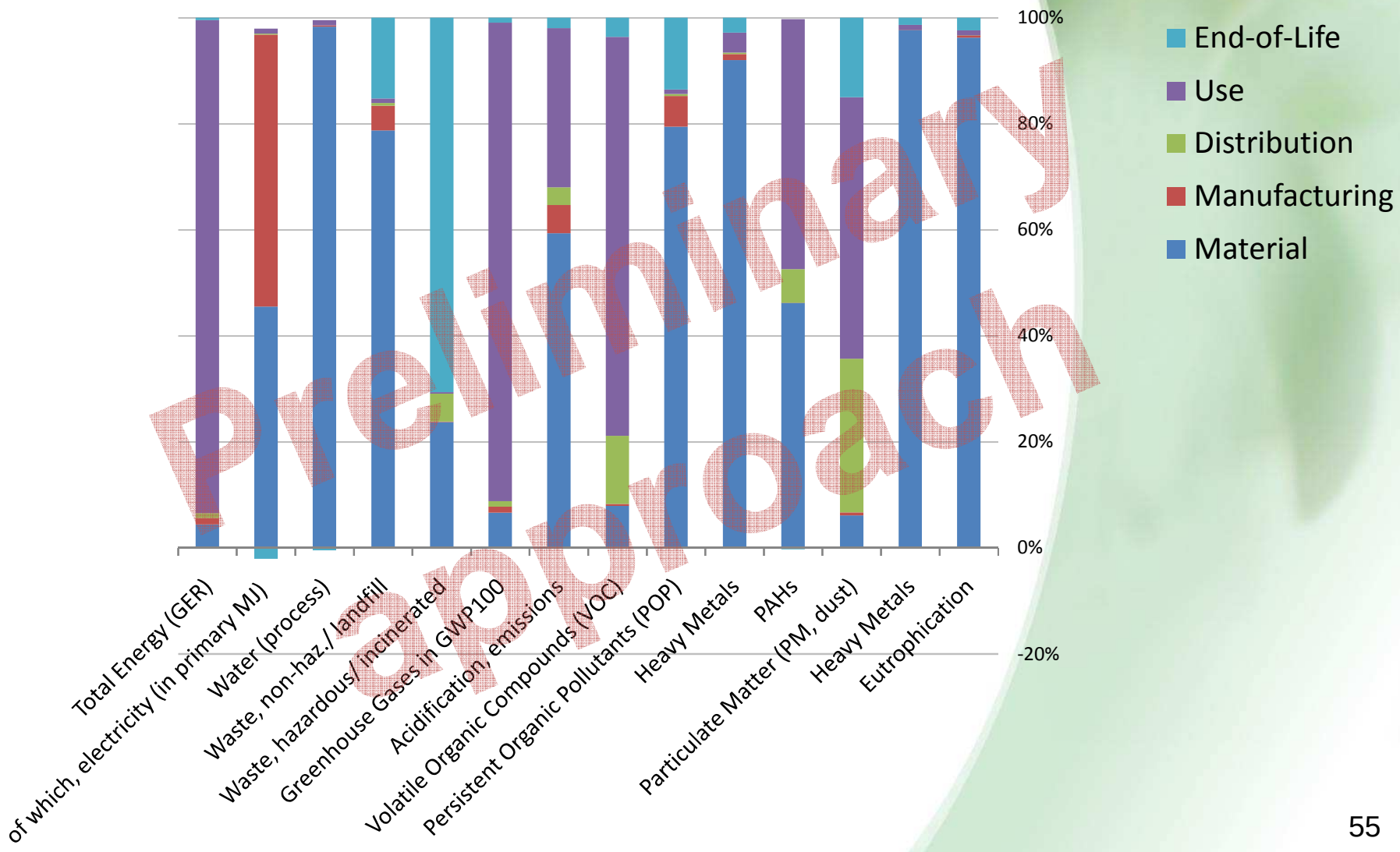
Task 5 - Env. Impact Assessment (1/5)

Base Case 3: Commercial electric hob



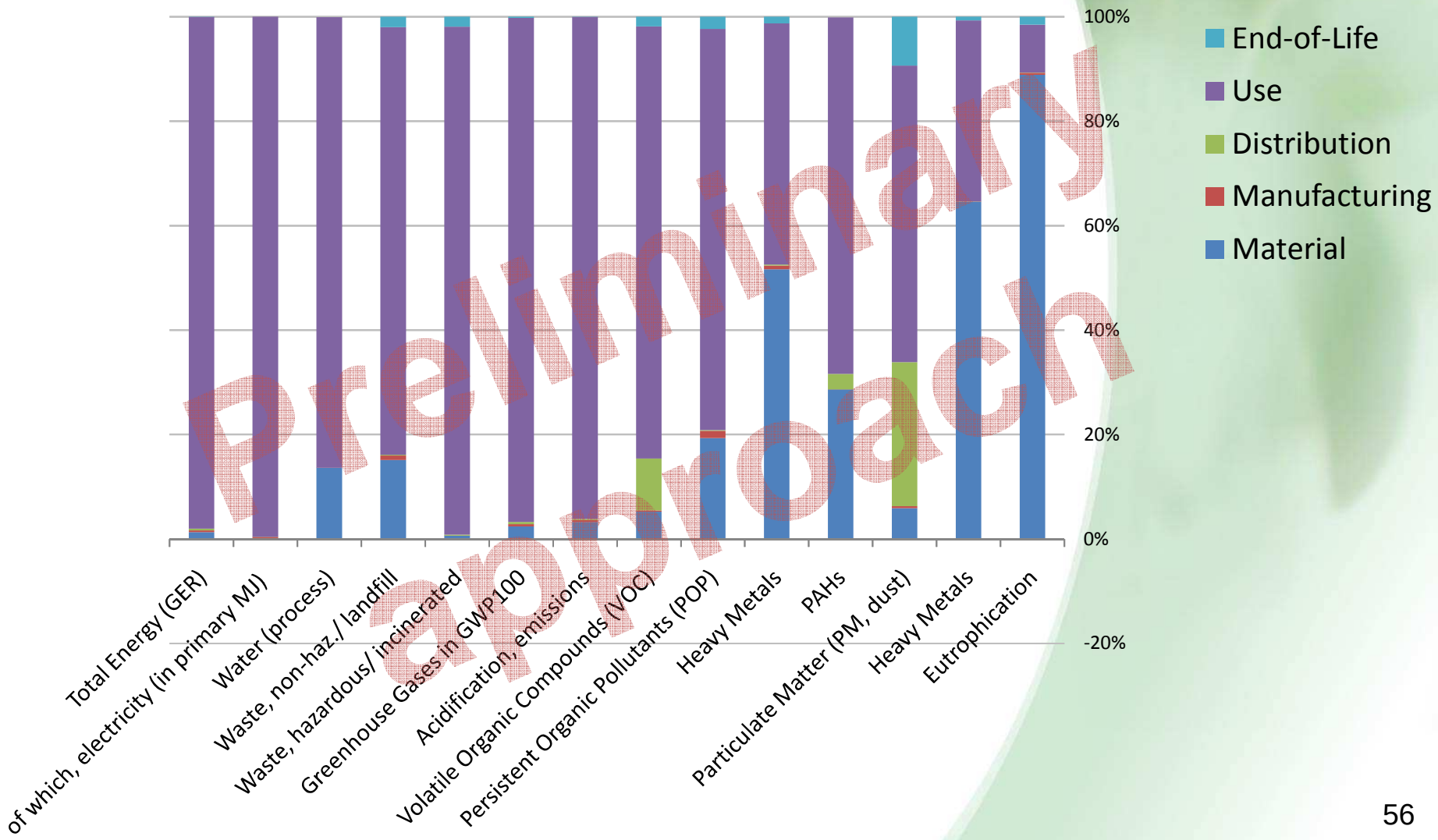
Task 5 - Env. Impact Assessment (2/5)

Base Case 4: Commercial gas hob



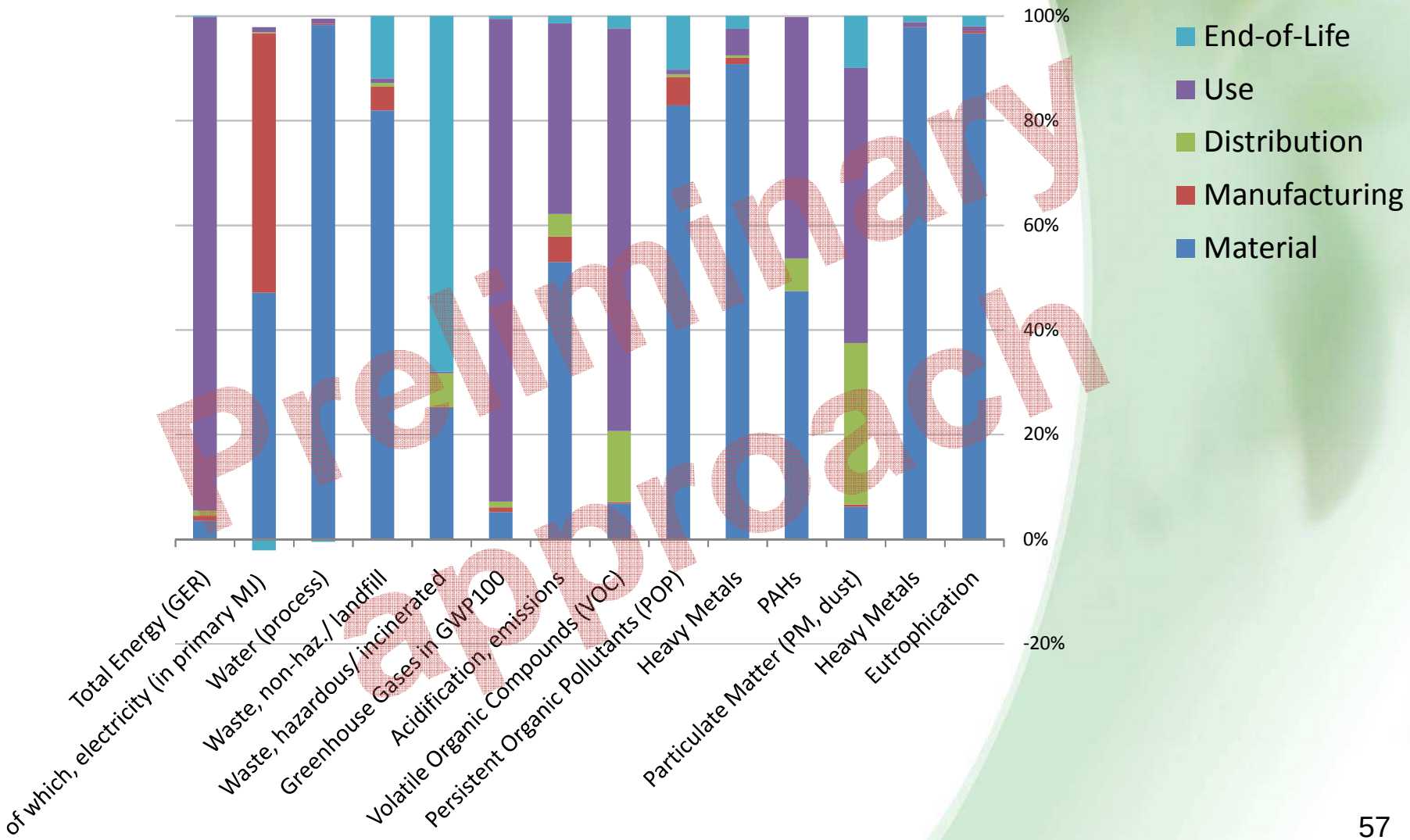
Task 5 - Env. Impact Assessment (3/5)

Base Case 5: Commercial electric grill



Task 5 - Env. Impact Assessment (4/5)

Base Case 6: Commercial gas grill



Task 5 - Env. Impact Assessment (5/5)

Comparison of the main impacts :

	Total energy consumption (MJ)	Waste (non-hazardous, landfill) (g)	GHG emissions (kg CO_2 eq)	Heavy Metal emissions to air (mg Ni eq)
BC3 - Commercial electric hob	514, 300	683,400	22,800	20,200
BC4 - Commercial gas hob	158 ,600	142,600	9,100	13,300
BC5 - Commercial electric grill	454 ,200	629,200	20,200	17 ,400
BC6 - Commercial gas grill	150,200	106,600	8,500	9, 000

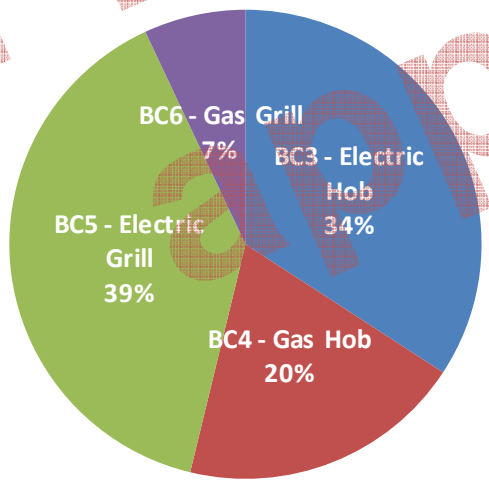
Life cycle cost results:

	BC3 - Commercial electric hob		BC4 - Commercial gas hob		BC5 - Commercial electric grill		BC6 - Commercial gas grill	
Product price (€)	2,900	*29%*	2,950	*52%*	3,100	*33%*	3,200	*55%*
Installation cost (€)	60	*0.6%*	60	*1%*	60	*0.6%*	60	*1%*
Energy cost (€)	6,278	*62.4%*	1,702	*30%*	5,524	*58.4%*	1,634	*28%*
Maintenance and repair costs (€)	825	*8%*	934	*17%*	774	*8%*	951	*16%*
Life Cycle Cost (€)	**10,062**	*100%*	**5,646**	*100%*	**9,459**	*100%*	**5,845**	*100%*

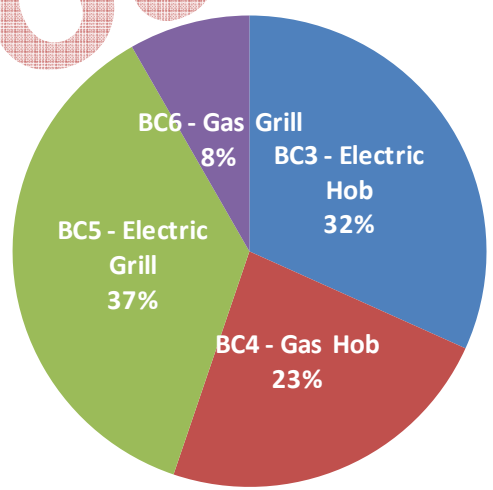
Task 5 – Impacts at EU level

	Total energy consumption (PJ)	Waste (non-hazardous, landfill) (kt)	GHG emissions (Mt CO_2 eq)	Heavy Metal emissions to air (ton Ni eq)
BC3 - Commercial electric hob	32	43	1.4	1.3
BC4 - Commercial gas hob	18	17	1.1	1.5
BC5 - Commercial electric grill	37	51	1.6	1.4
BC6 - Commercial gas grill	7	5	0.4	0.4

Total Energy (GER)



Greenhouse Gases in GWP100

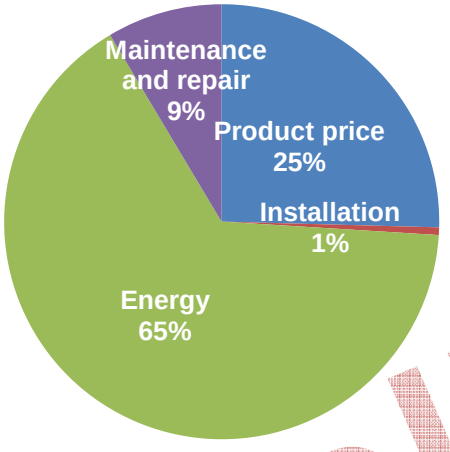


Task 5 – LCC at EU level in 2008

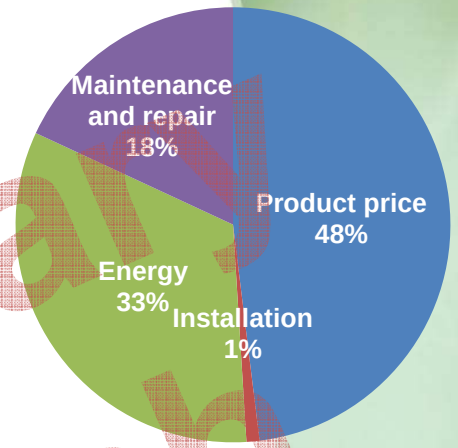
	BC3 - Commercial electric hob	BC4 - Commercial gas hob	BC5 - Commercial electric grill	BC6 - Commercial gas grill
Product price (mln €)	181	343	252	140
Installation cost (mln €)	4	7	5	3
Energy cost (mln €)	466	235	533	85
Maintenance and repair costs (mln €)	61	129	75	49
Life Cycle Cost (mln €)	**712**	**714**	**865**	**277**

Task 5 – LCC at EU level in 2008

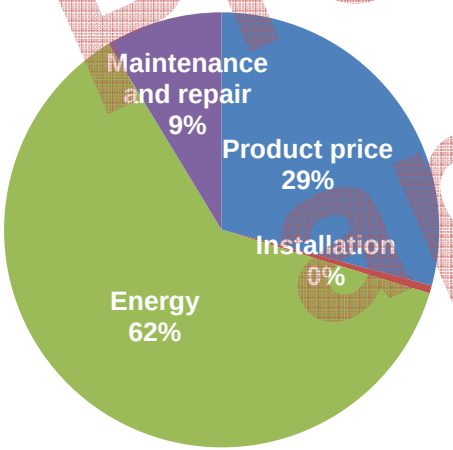
BC3 - Commercial electric hob



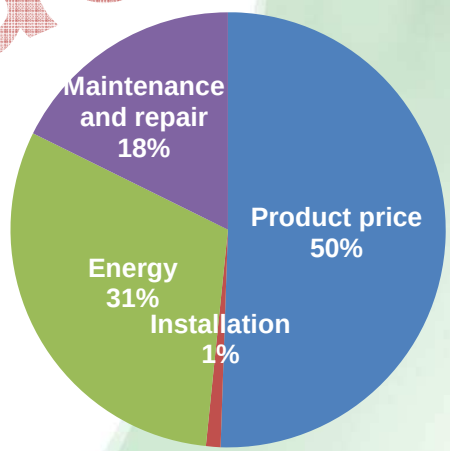
BC4 - Commercial gas hob



BC5 - Commercial electric grill



BC6 - Commercial gas grill



ENER Lot 23: Domestic and commercial hobs and grills

including when incorporated in cookers

Task 5 Conclusions

- The use phase is by far the most impacting stage of the life cycle in terms of energy consumption and greenhouse gases emissions.
- Electricity generation is contributing to an important part of the global environmental impacts of the electric appliances.
- For gas hobs and grills, the quantitative impacts are significantly lower at product level.
- Consistent quantification at EU level required reliable market data.

Agenda of the meeting

10:00 – 10:30	**Welcome, "Tour de table", Introduction to the Ecodesign Directive, schedule update**
10:30 – 11:20	**Lot 22 – Tasks 1 to 3: Main conclusions on commercial ovens**
11:20 – 11:30	**COFFEE BREAK**
11:30 – 12:30	**Lot 22 – Tasks 4 and 5: Main conclusions on commercial ovens**
12:30 – 13:00	**Lot 22 – Next steps: Tasks 6, 7 and 8**
13:00 – 14:00	**LUNCH BREAK**
14:00 – 14:50	**Lot 23 – Tasks 1 to 3: Main conclusions on commercial hobs and grills**
14:50 – 15:30	**Lot 23 – Tasks 4 and 5: Main conclusions on commercial hobs and grills**
15:30 – 16:00	**Lot 23 – Next steps: Tasks 6, 7 and 8**
16:00 – 16h30	**Lot 22 & 23 : General discussion and conclusions**

Dr Paul Goodman,
Reliability and Failure Analysis Group

5 November 2010

COBHAM

ERA TECHNOLOGY
ANTENNA AND
ELECTRONIC
SYSTEMS

ERA TECHNOLOGY
ENGINEERING
CONSULTANCY
SERVICES

VECTOR FIELDS
SOFTWARE

LIGHTNING
TESTING AND
CONSULTANCY

DG ENER Lots 23 Eco-design preparatory study
Task 6 - Commercial Hobs and Grills
BAT & BNAT

conducted on behalf of the European Commission, DG ENER, by Cobham Technical Services and Bio Intelligence Service

Commercial hobs & grills, BAT & BNAT

- BAT
  - Best currently available technology in EU
- BNAT
  - Technology not currently available in EU – could be available within ~10 years
- Hobs – gas, electric (solid plate, radiant & induction)
- Grills – radiant and contact

Sources of information

- Stakeholders – questionnaire is available on website
- Publications
  - Technical papers
  - Patents
  - Technology used by other industries
  - Products available outside EU

Technical issues - hobs

- Minimising heat losses
  - Design (gas)
    - Burner design – double / triple ring separately controllable
    - Covered burners are less efficient than uncovered
    - Pilot lights use more energy than HV spark
  - Design (electric)
    - Improved thermal contact to pot – important for solid plate hotplates only
    - Glass-ceramics with better infrared transmissivity – radiant only
    - Induction hobs – losses from power supply
  - Management of user behaviour - not needed for induction hobs
    - Pot sensors / automatic standby mode
    - Match heat output area to pot size used – burner design / control

Technical issues - grills

- Coatings that prevent radiation losses from unused areas of contact grills
- Heat zones and power level control
- Fast heat up – avoids tendency to leave on continuously
- Food sensors (available for conveyer pizza ovens)
- Thermal insulation behind and to sides of heated area
- Heat reflective surfaces behind radiative grills
  - Difficult to keep clean

Improvement potential

- We need to know:
- Current energy consumption
  - see task 4 estimates, need more accurate data
- Improvement potential
  - No EU data on current average or best products on market
  - US and Japanese data suggests improvement potential may be > 20%
    - Could be much more if pot sensors and other technologies considered

Conclusions

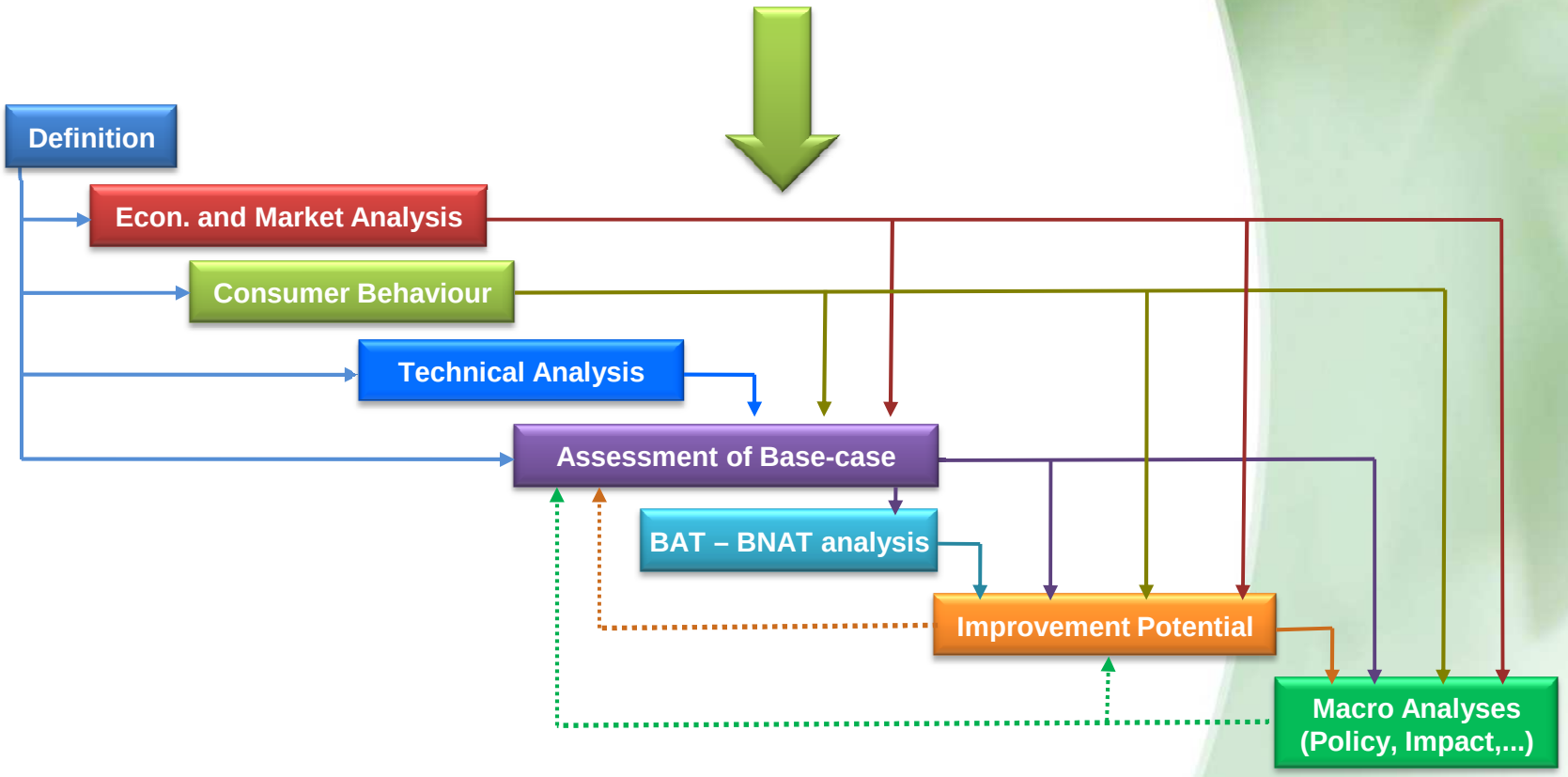
- Wide variety of designs on market – different to domestic products
- No energy consumption data in EU
- Many energy efficient designs and innovations available in EU
  - Also some old technology (solid plate hotplates and pilot lights)
- Evidence from US and Japan that there is a significant potential for an energy consumption decrease
- More data needed from stakeholders

Thank you

Questions

Schedule for Lot 23

1st Stakeholder meeting



Task 1 | Task 2 | Task 3 | Task 4 | Task 5 | Task 6 | Task 7 | Task 8

Task 7 – Improvement potential:

- Identify design options, their monetary consequences in terms of Life Cycle Cost for the consumer and their environmental costs and benefits
  - *Life Cycle Costs: indicate whether design solutions might negatively or positively impact the total EU consumer's expenditure over the total product life (purchase, running costs, etc.)*
- Pinpoint the solution with the Least Life Cycle Costs (LLCC) and the Best Available Technology (BAT)

7.1 Options

7.2 Impacts

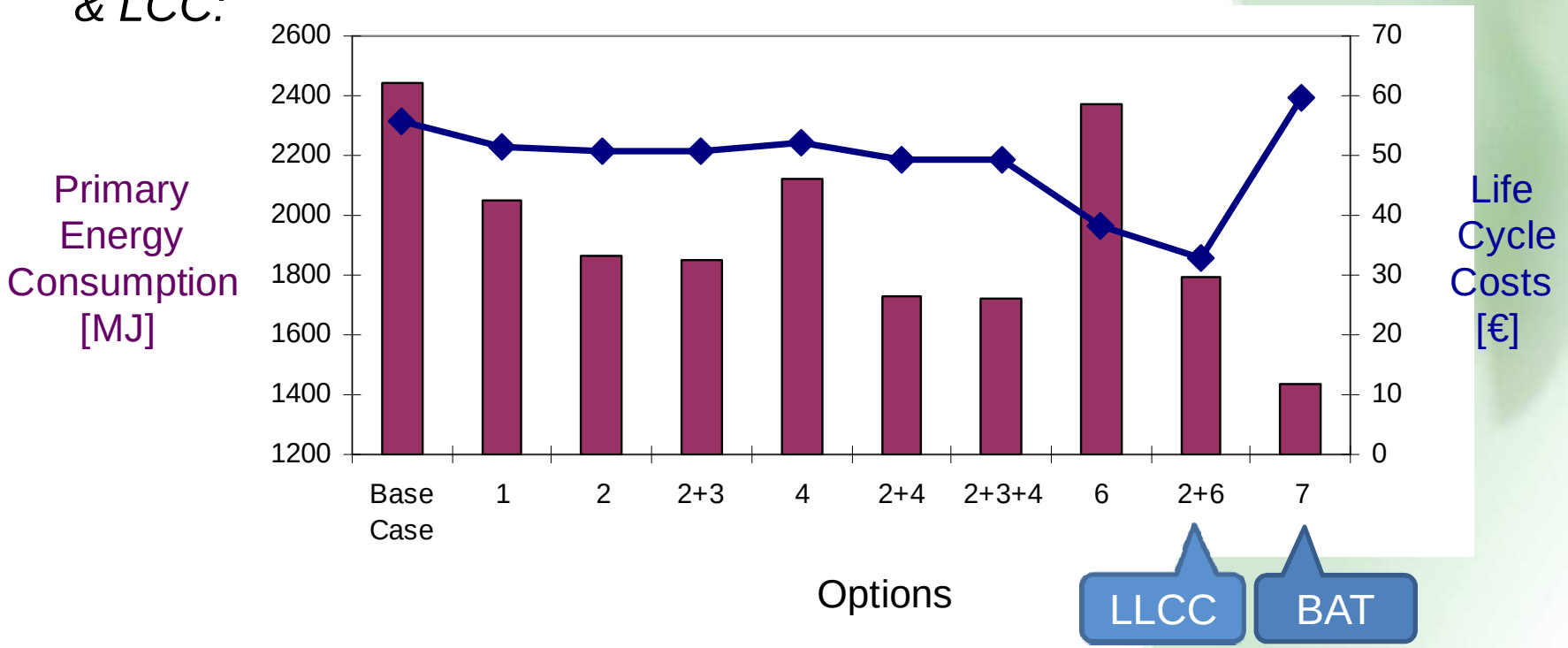
7.3 Costs

7.4 Analysis LLCC and BAT

7.5 Long-term targets (BNAT) and systems analysis

Task 7 – Improvement potential:

Example of options analysis considering a key environmental indicator & LCC:



(1/2)

Task 8 – Scenario, Policy, Impact and Sensitivity analysis:

- Summarise and total the outcomes of all previous tasks
- Look at suitable policy means to achieve the potential e.g. implementing LLCC as a minimum and BAT as a promotional target, using legislative or voluntary agreements, labeling and promotion
- Scenarios 1990 – 2020 quantifying the improvements that can be achieved vs. a Business-as-Usual scenario
- Impacts on consumers and industry
- Robustness of the outcome

8.1 Policy and scenario analysis

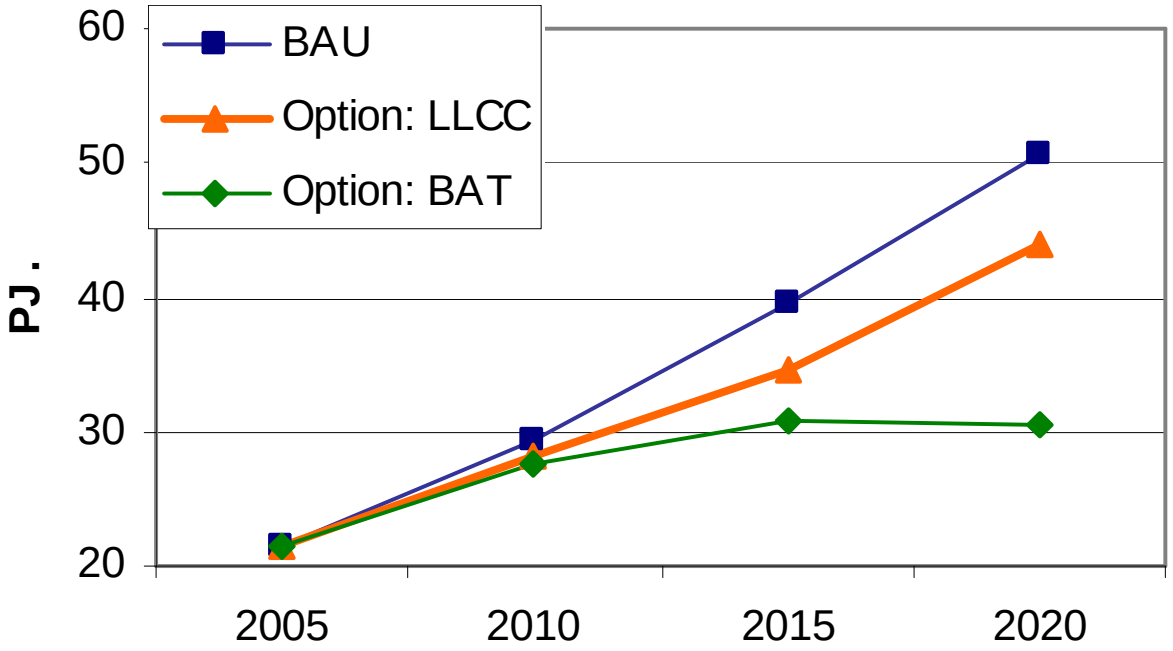
8.2 Impact analysis industry and consumers

8.3 Sensitivity analysis of the main parameters

Task 8 – Scenario, Policy, Impact and Sensitivity analysis:

Example scenarios:

Total energy consumption



- Open Discussion

- Contact :
  - Contact@ecocooking.org