Review Ecodesign / Energy labelling Cooking appliances

2nd Technical Working Group – interactive webinar

04th & 5th May 2021

European Commission

Agenda

Time	Topic
10:00 – 10:10	Introduction & Welcoming
10:10 – 11:00	Hobs: main results and policy options
11:00 – 11:15	Cooking fume extractors: scope
11:15 – 11.45	Cooking fume extractors: improvement options, current situation and policy option 1
11:45 – 12:15	Cooking fume extractors: policy option 2
12.15 – 12.45	Cooking fume extractors: policy option 3
12.45 – 12.55	Cooking fume extractors: scenarios comparison
12.55 – 13.00	Wrap-up and next steps

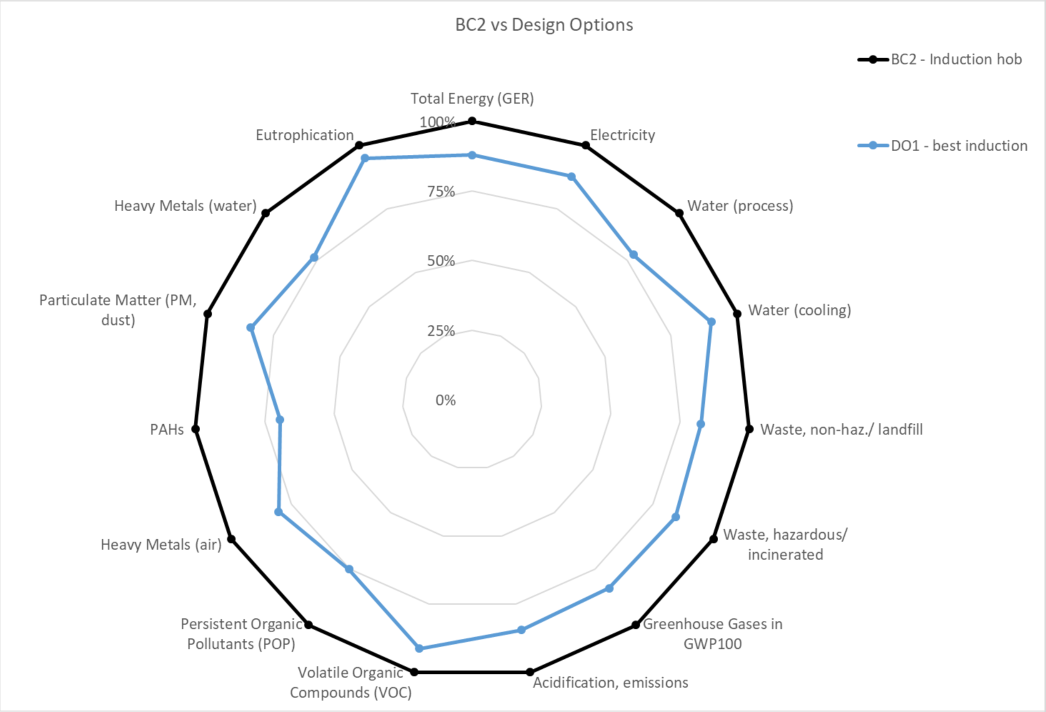
Hobs

Scope

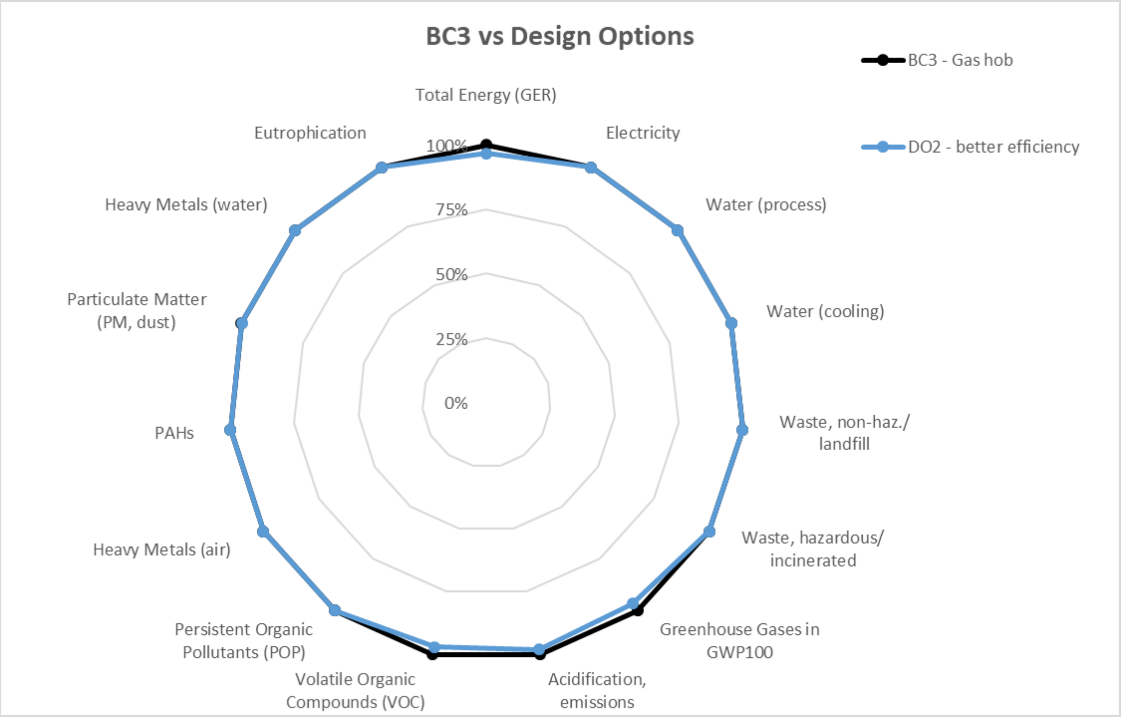
- Inclusion of small (auxiliary) burners with a nominal heat input under 1.16 kW → not covered by the current standard, but a the test procedure is ongoing
- Inclusion of hobs using 3rd family gases → recommended to be included in the scope.

Base cases and improvement options

- 3 base cases: radiant, induction and gas
- Improvement potential for induction and gas

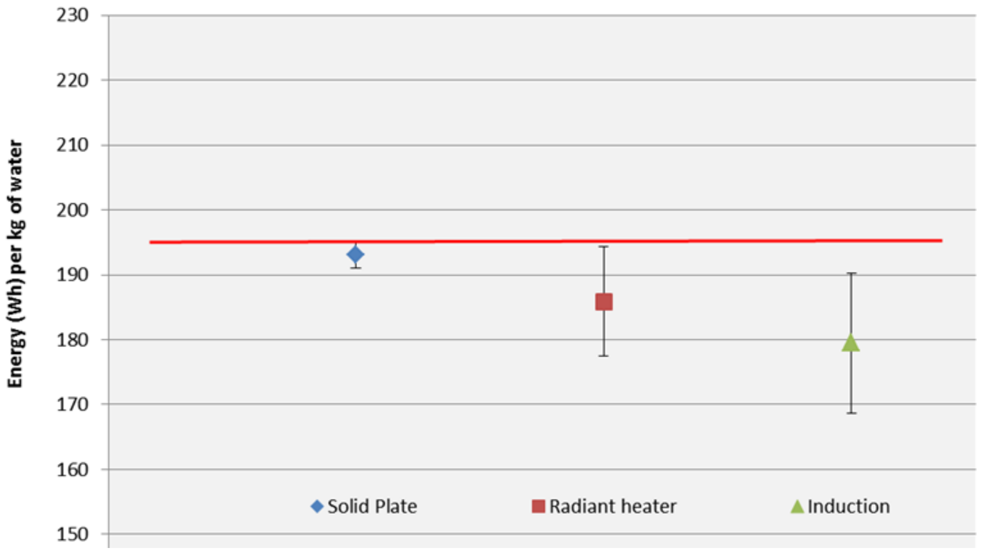


Induction



Gas

Feasibility of energy labelling for hobs



- Small difference in the energy consumption of the three electric technologies
- Difficult to set distinct energy classes.
- Energy labelling is not recommended for hobs

Current Ecodesign minimum requirements

	Electric hob (Energy consumption in Wh/kg)	**Gas-fired hob (energy efficiency in %)**
February 2015	< 210	> 53
February 2017	< 200	> 54
February 2019	< 195	> 55

Technology	**Benchmark**
Electric	169.3 Wh/kg
Gas	63.5%

Proposals for Ecodesign minimum requirements

Background

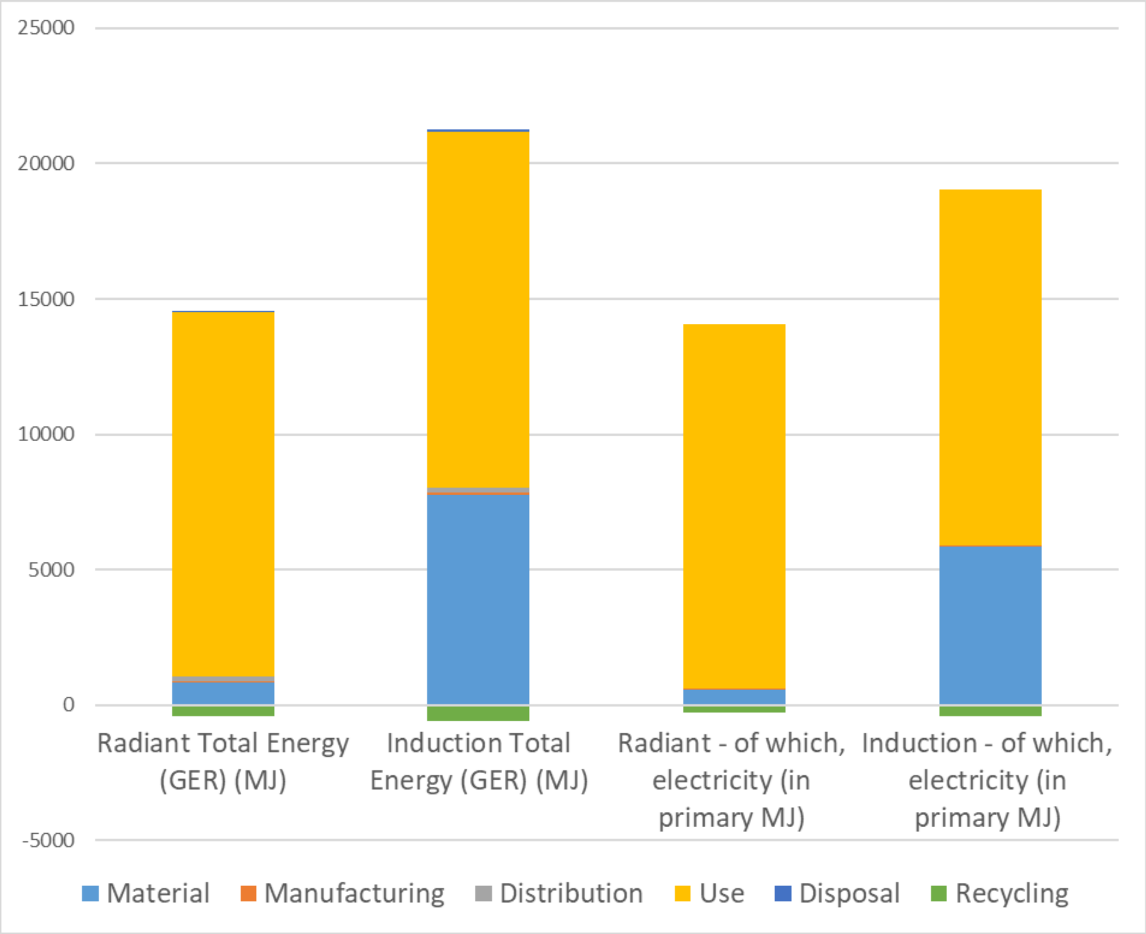
- The market analysis shows that induction technology is steadily replacing radiant technology in the EU households
- Stricter common requirements could equal to banning radiant hobs, since no further improvement seems feasible.
- Setting different thresholds for radiant and induction hobs would deviate from the current technology-neutral approach
- Common requirements for electric and gas hobs → not recommended at this moment, since the test methods available for electric and gas hobs are completely different and not comparable

Policy options

Option 1: common minimum requirement for electric hobs		
	Electric hob (Energy consumption in Wh/kg)	**Gas-fired hob (energy efficiency in %)**
February 2021	< 190	> 56
February 2023	< 180	> 57
February 2025	< 175	> 58

Option 2: different minimum requirements for radiant and induction hobs			
	Radiant hob (Energy consumption in Wh/kg)	**Induction hob (Energy consumption in Wh/kg)**	**Gas-fired hob (energy efficiency in %)**
		< 185	> 56
February 2023	< 190	< 180	> 57
February 2025	< 185	< 175	> 58

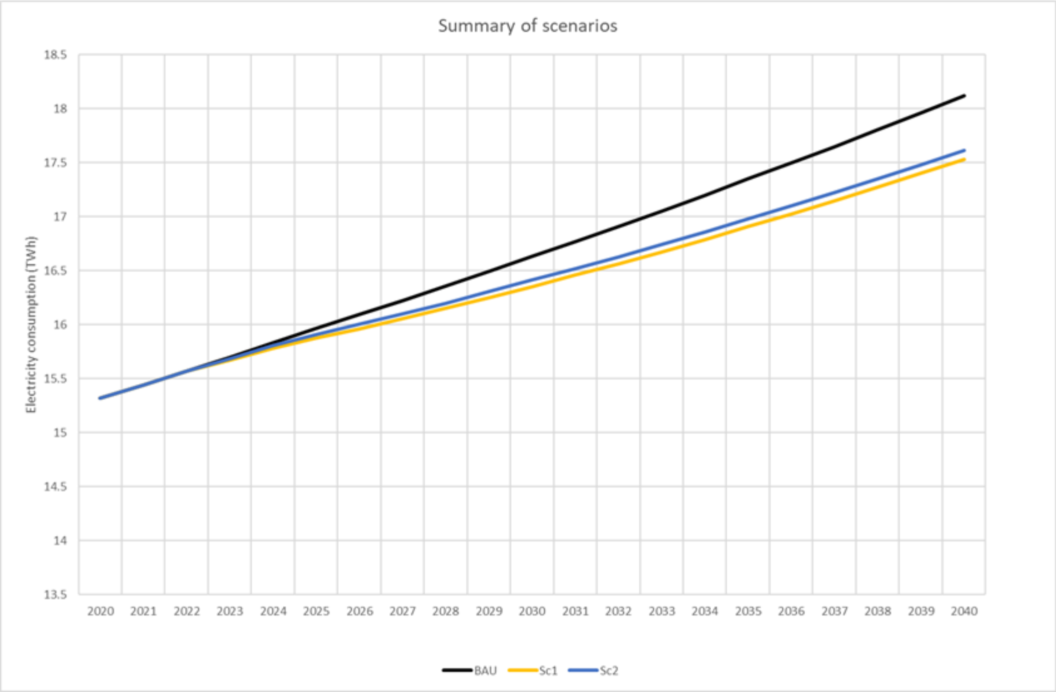
Induction – Radiant comparison in life cycle energy

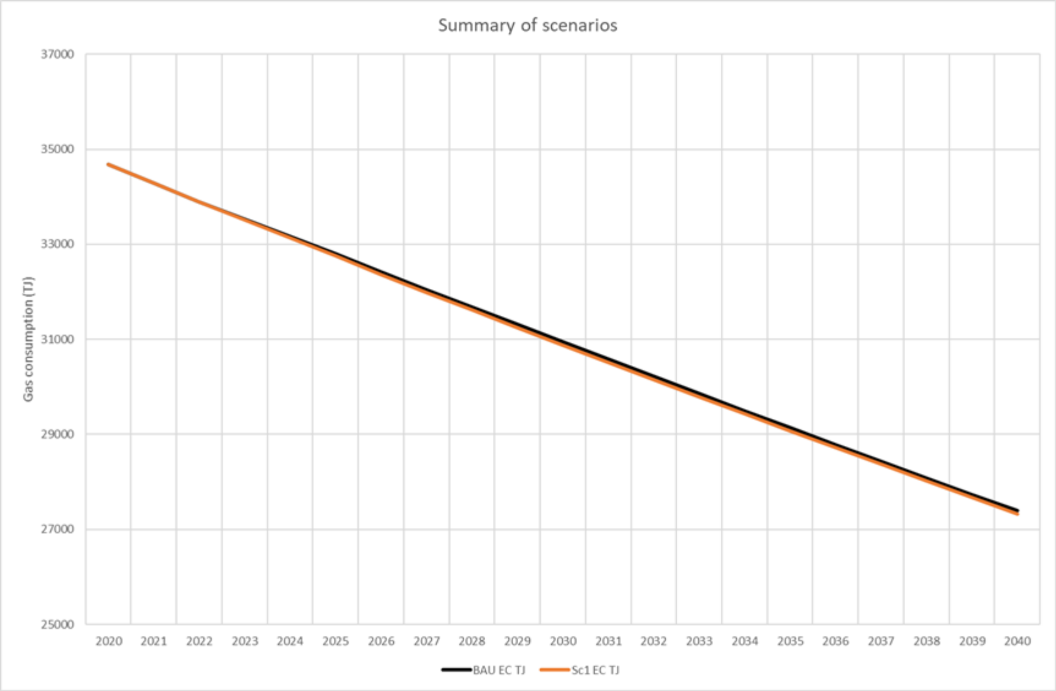


- Induction → more electronics → more energy due to materials
- Different base cases in Task 5 and 6
- Comments from stakeholders → a common minimum requirement requires a life cycle energy analysis in scenarios

Scenarios comparison

Scenario	Technology impact	Energy cumulative impact (TWh electricity / TJ natural gas)	GHG cumulative impact (MtCO2)	LCC cumulative impact (billion EUR)
Sc1: electric hobs: same ecodesign requirements for induction and radiant hobs	Radiant hobs would not fulfil 2023 threshold.	-5.7	-1.0	-0.9
Sc2: electric hobs: different ecodesign requirements for induction and radiant hobs	Radiant hobs would remain in the market, and eventually be replaced by induction hobs by market evolution	-4.7	-0.8	-0.7
Sc1: gas hobs: ecodesign requirements	Gas hobs would be driven to reach their improvement potential, though it is very marginal	-1092	-0.1	-0.03





Cooking fume extractors

Scope

Inclusion of only recirculation cooking fume extractors

- Key element of these extractors → odour filters, which may or not be sold together with the cooking fume extractors → a standard odour filter?
- Declaration of the odour reduction efficiency based on MEK test method
- MEK test method → only for odour reduction efficiency of recirculation extractor → starting point to develop ecodesing measures for recirculation cooking fume extractors.
- Proposal of threshold of 75% for odour reduction efficiency for both recirculation and ducted cooking fume extractors → too strict?

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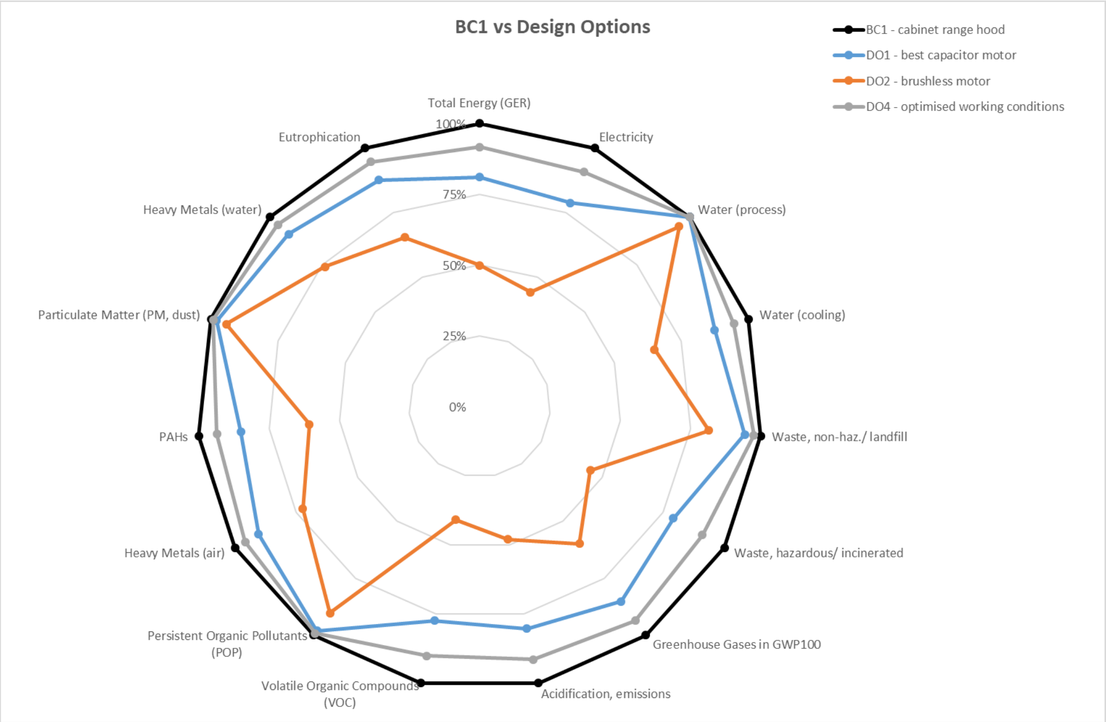
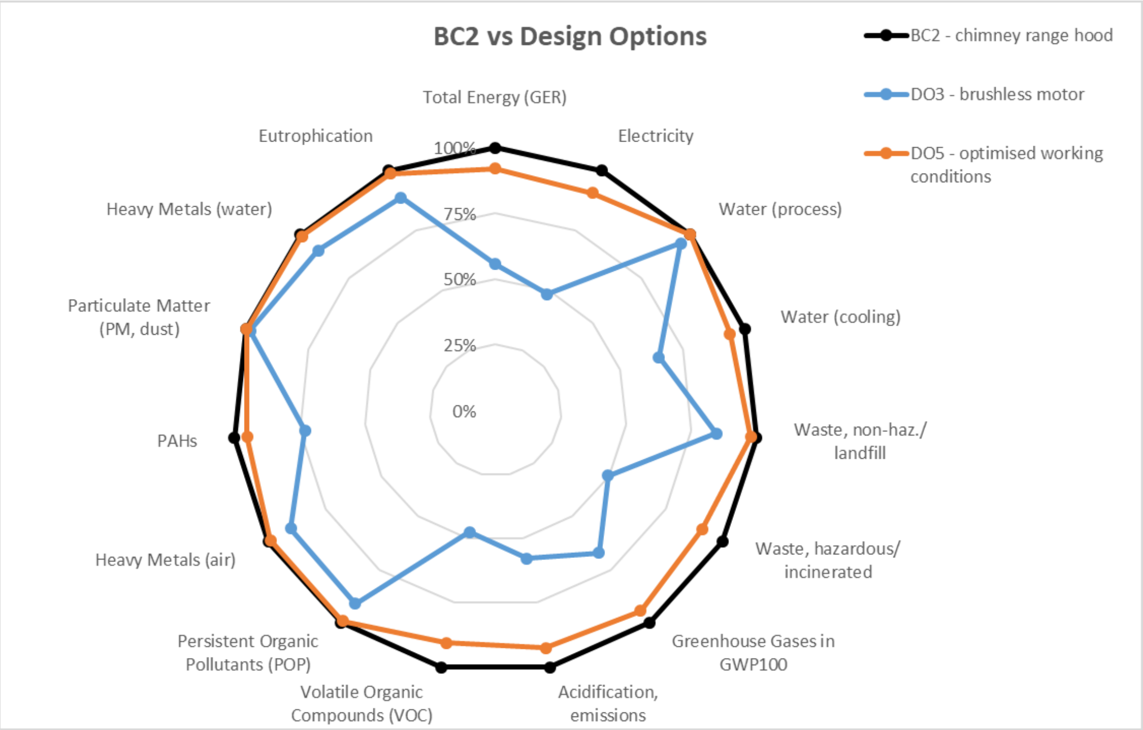
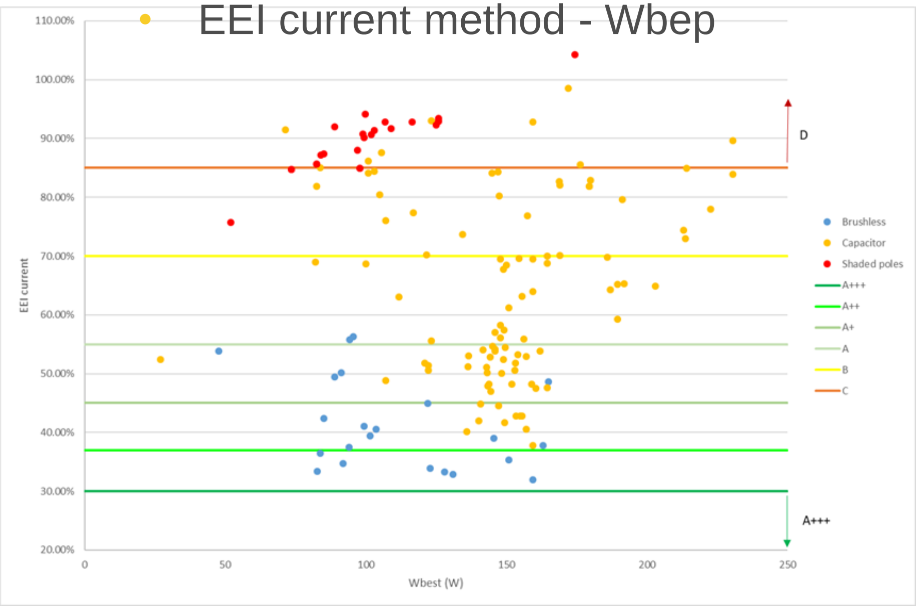
Base cases and improvement options

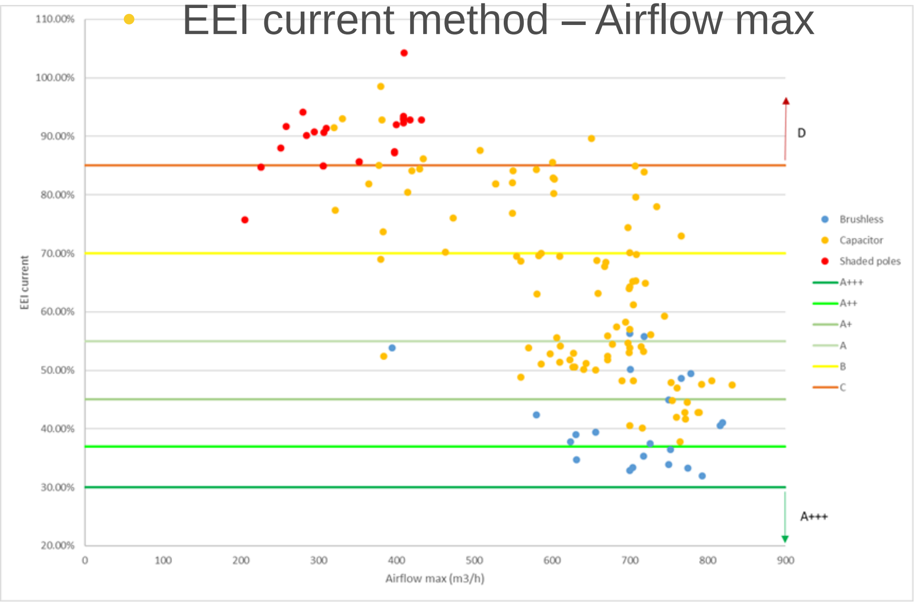
- Two base cases: cabinet CFE and chimney CFE
- Improvement options → optimised working conditions, improved motors and brushless motors





Current situation measured at BEP





- Analysis of APPLiA database 143 models
- Brushless and capacitor motors → best energy classes
- Shade poles → worst energy classes
- Highest maximum airflows → best energy classes

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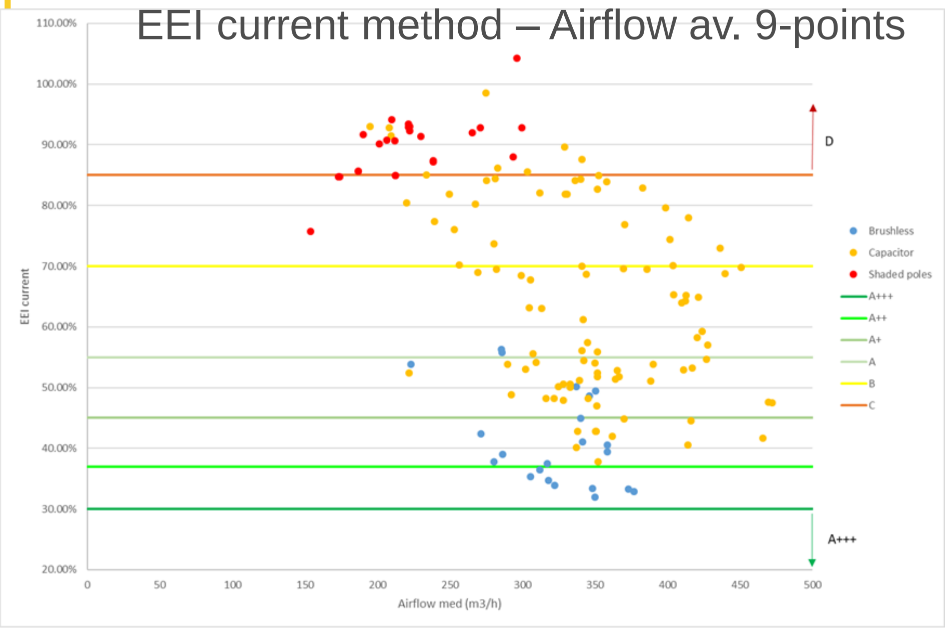
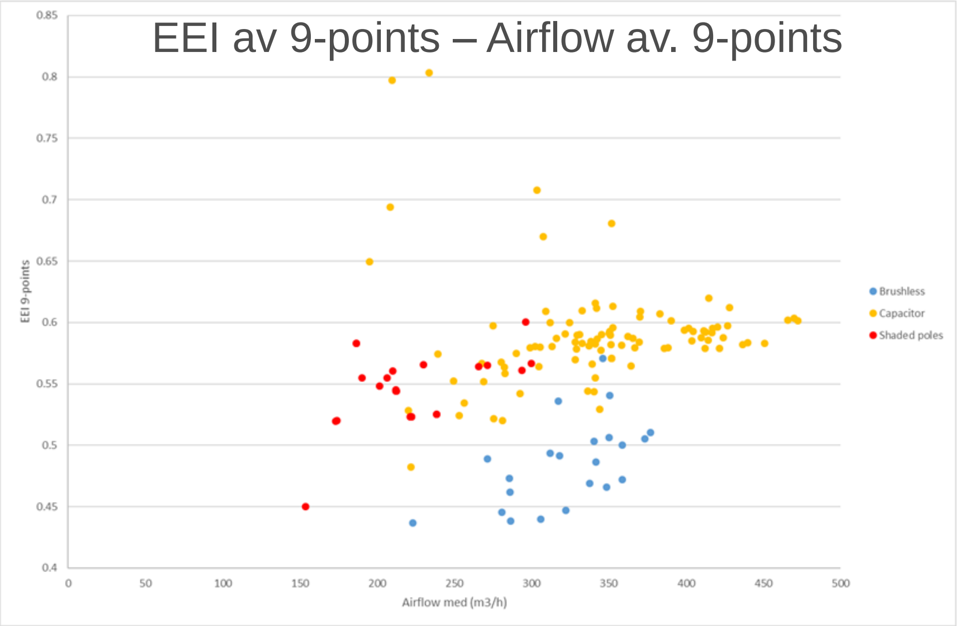
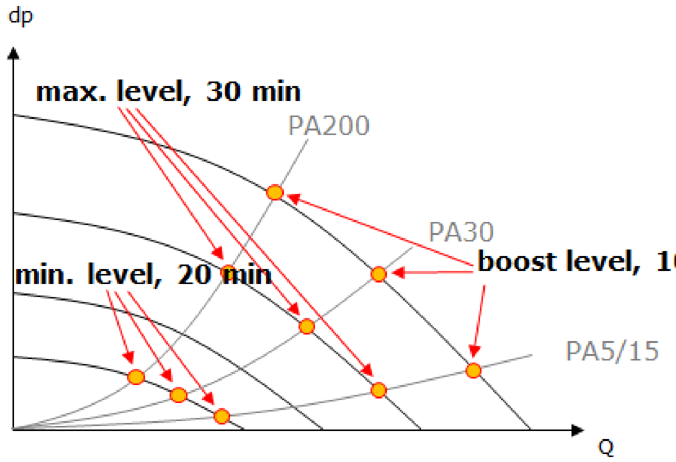
Current situation measured at 9-points





- The use of the 9-points average changes the distribution of points with airflow
- Usually, best motors also have a large range of min – max. airflows → no real correlation with max. airflows
- If EEI is calculated as 9-points average, the correlation almost completely disappears



Options for the revision of EEI

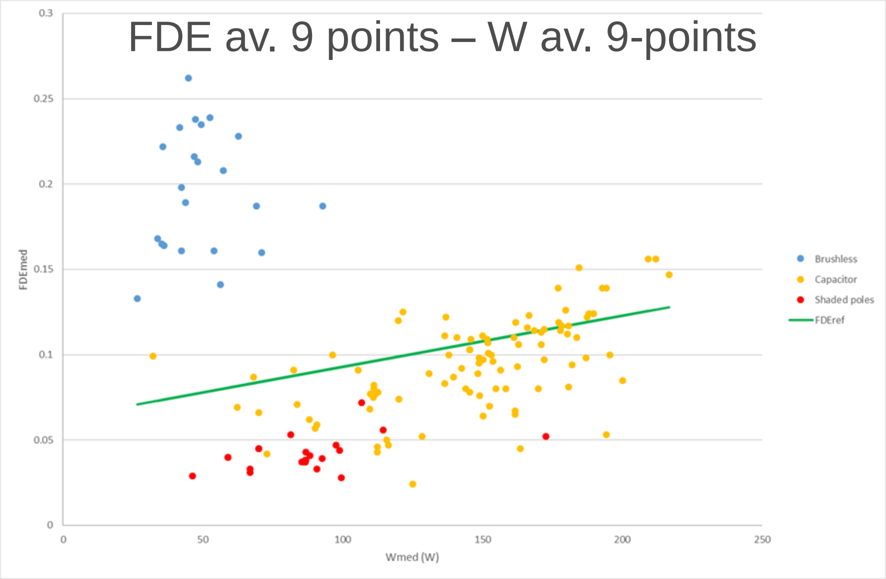
Proposal	Advantages	Disadvantages/obstacles
Integrating odour reduction efficiency	• Identify best products in terms of function, i.e. those that consume less energy to provide the same function • Take into account the product as a whole, i.e. considering the design, shape, etc. that may have an impact in the product performance • Cover recirculation modes	• The test method currently available is only valid for recirculation modes
Indirect energy consumption in heating and cooling	• Extend the boundaries of the system to include the indirect impact of excessive airflow.	• It dilutes the impact of the direct energy consumption, which may discourage the technology improvement.

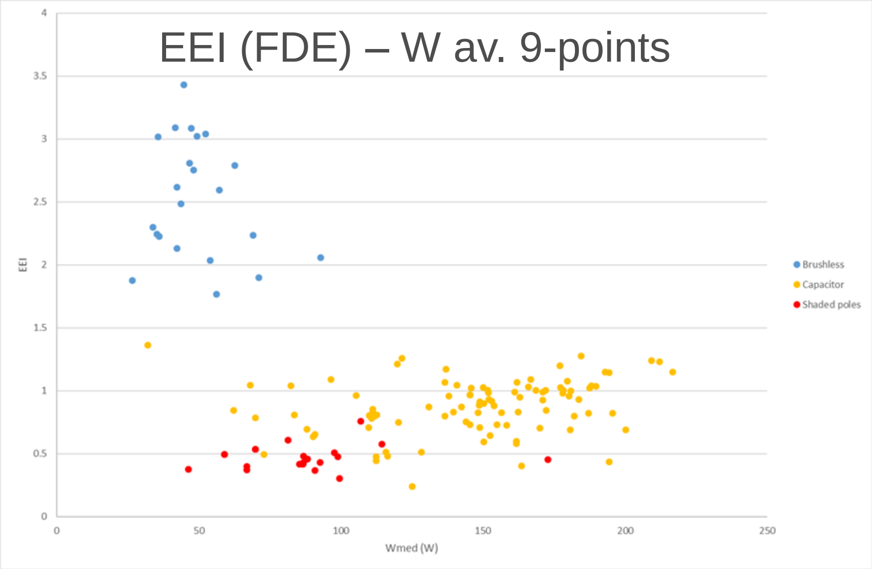
Proposal	Advantages	Disadvantages
EEI based in FDE	• The current method only takes into the FDE as a time factor. This proposal provides a figure of real energy efficiency, as ratio between power delivered and power consumed. • The ratio airflow/power would help smooth the apparent benefits of large airflow extractors	• The odour reduction efficiency is not considered. • It is probable that motors that are more powerful perform better FDE. A reference FDE is require to compensate this effect.

Proposal	Advantages	Disadvantages
EEI based on SAEC as function of airflow	• The AEC is confronted to the airflow provided by cooking fume extractor, which is a parameter related to functionality • EEI distinguishes the three motor technologies.	• The odour reduction efficiency is not considered. • It is probable that motors that are more powerful perform better EEI, because their FDE are higher.

Proposal	Advantages	Disadvantages
Update of existing EEI based on SAEC as function of power	• Energy labels principles are unchanged, and are improved by 9-points average • EEI distinguishes the three motor technologies.	• The odour reduction efficiency is not considered. • Airflow is not considered either, i.e., the work or function delivered by power unit is not considered

EEI based on fluid dynamic efficiency (FDE)





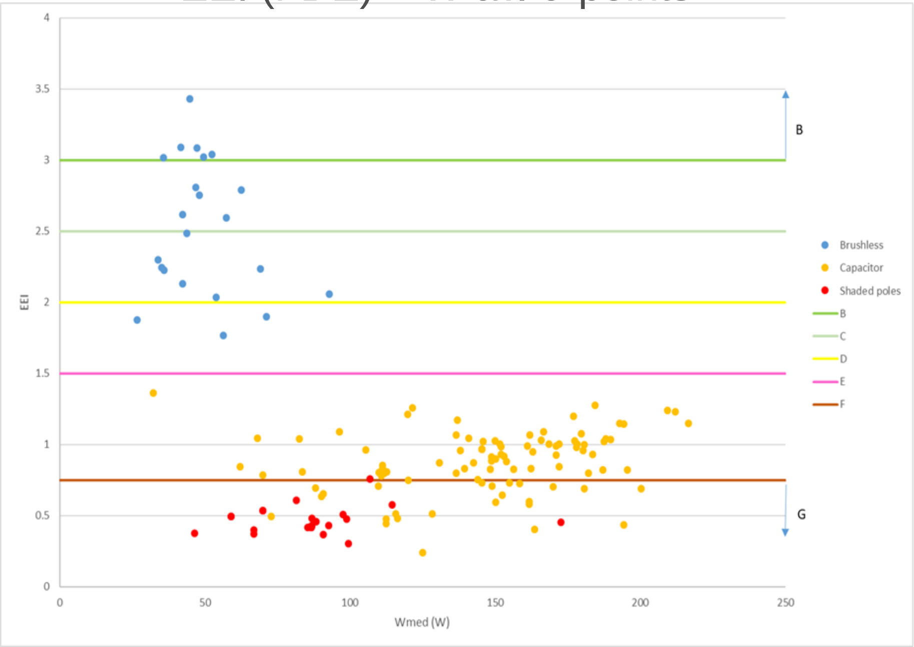
$$EEI = \frac{FDE}{FDE_{ref}}$$

$$FDE_{ref} = 0.0003 \cdot W_{med} + 0.0629$$

$$W_{med} = \sum_{i=1}^{3} W_i \frac{t_i}{(t_1 + t_2 + t_3)}$$

EEI based on FDE: energy classes

EEI (FDE) – W av. 9-points



- **Option a**: the thresholds of the energy classes are even along all energy classes, i.e. the difference of EEI between energy classes is the same or very similar.

Energy class	**Brushless (total =22)**	**Capacitor (total = 96)**	**Shaded poles (total = 25)**
A (EEI > 350)	0	0	0
B (350 ≥ EEI> 300)	6	0	0
C (300 ≥ EEI> 250)	5	0	0
D (250 ≥ EEI > 200)	8	0	0
E (200 ≥ EEI > 150)	3	0	0
F (150 ≥ EEI > 75)		72	1
G (EEI ≤ 75)		25	23

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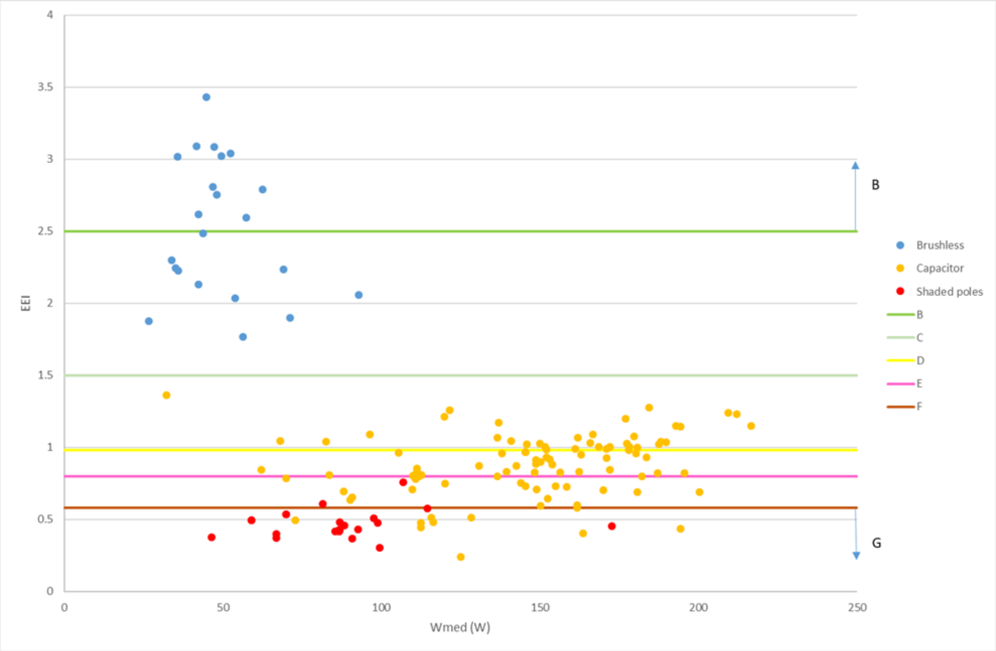
EEI based on FDE: energy classes

EEI (FDE) – W av. 9-points

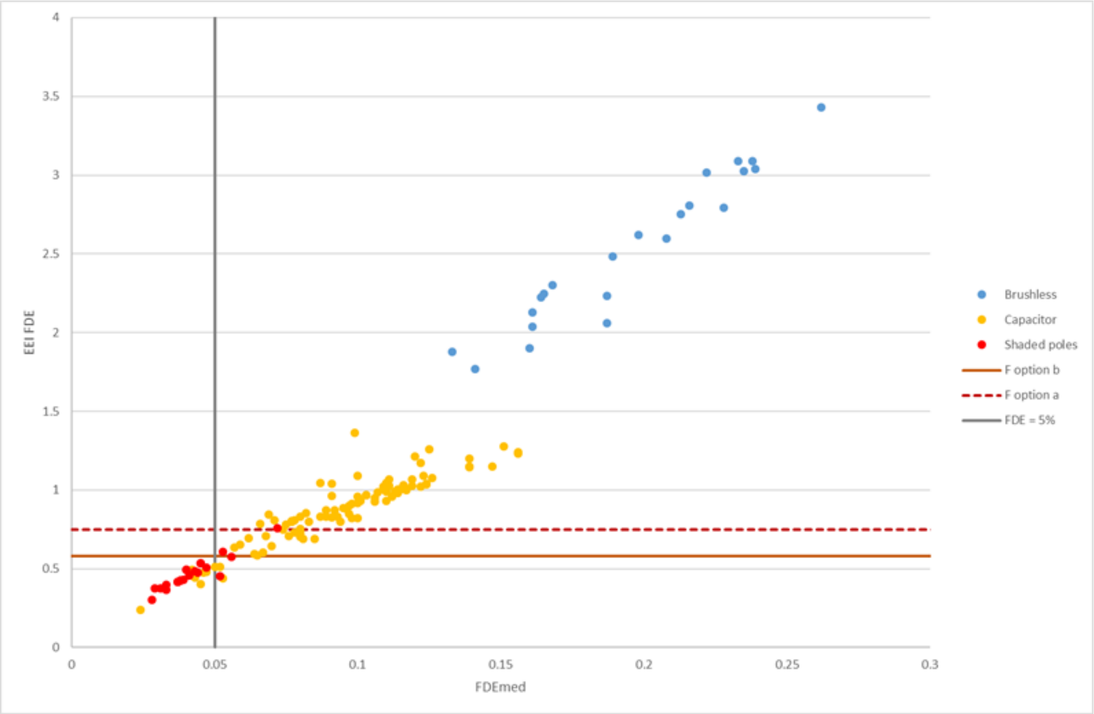


- **Option b**: the thresholds have been determined in a way that the number of models is evenly distributed among the energy classes

Energy class	Brushless (total =22)	Capacitor (total = 96)	Shaded poles (total = 25)
A (EEI > 350)	0	0	0
B (350 ≥ EEI> 250)	11	0	0
C (250 ≥ EEI> 150)	11	0	0
D (150 ≥ EEI > 98	0	33	0
E (98 ≥ EEI > 80)	0	28	2
F (80 ≥ EEI > 58)		23	3
G (EEI ≤ 58)		16	16

Ecodesign requirements

EEI (FDE) – FDE av. 9-points



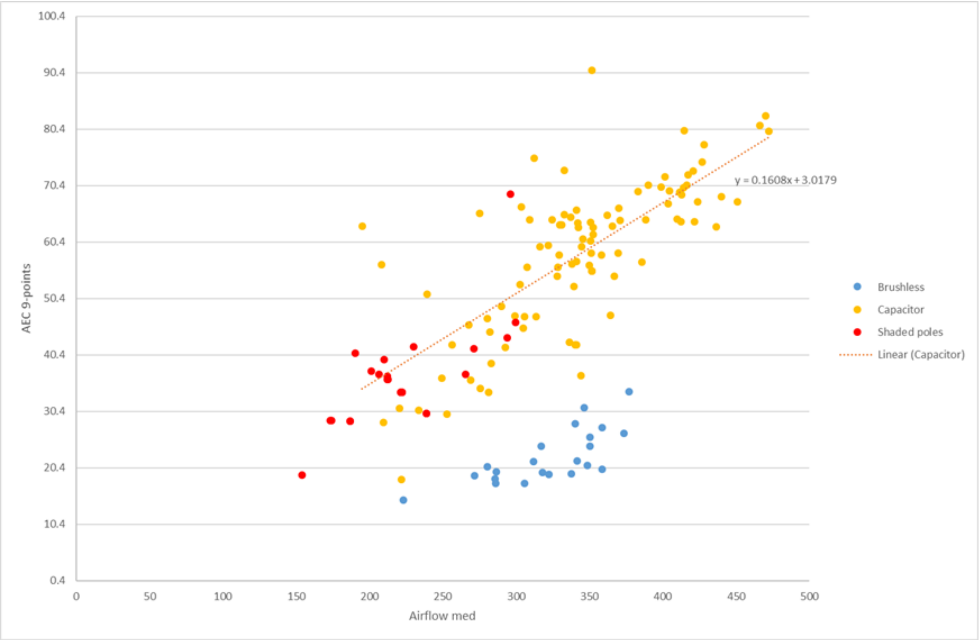
- Minimum F class + FDE=5%

- FDE = 5% affects shaded pole motors.

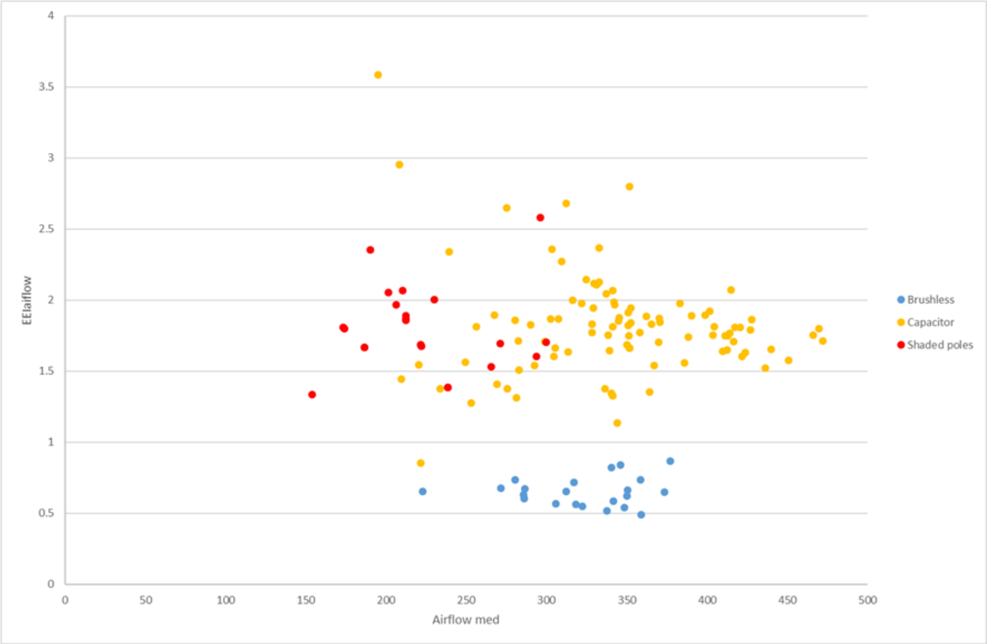
- energy class G based on FDE covers all these cooking fume extractors,

EEI based on SAEC as function of airflow

AEC av. 9 points – Airflow av. 9-points



EEI (Airflow) – Airflow av. 9-points

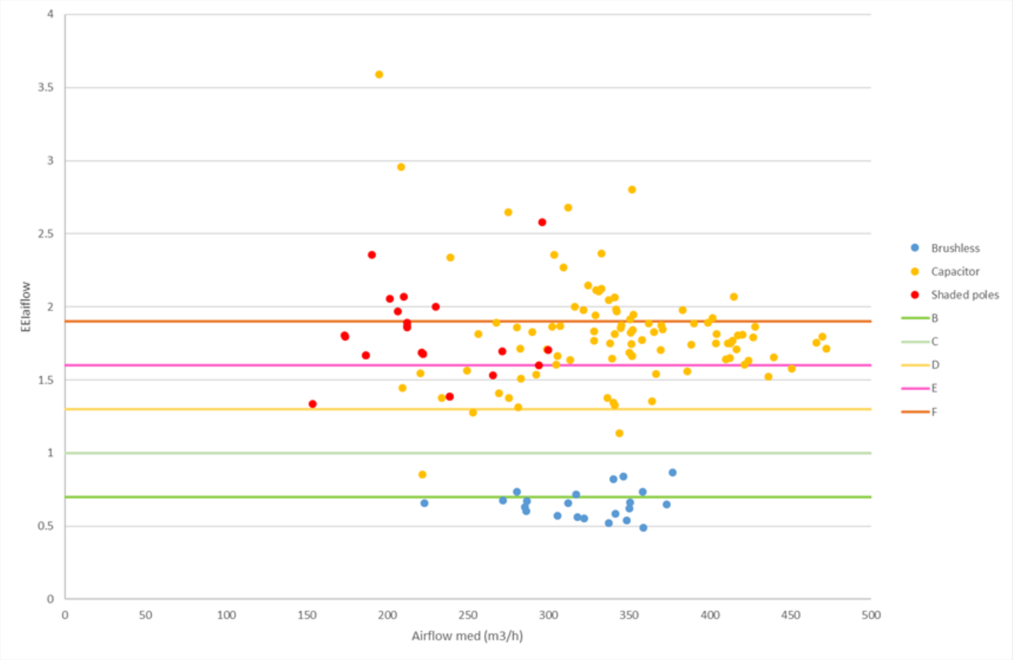


$$SAEC = 0.1608 \times Q_{med} + 3.0179$$

EEI calculated as the ratio AEC/SAEC

EEI based on SAEC(airflow): energy classes

EEI (Airflow) – Airflow av. 9-points

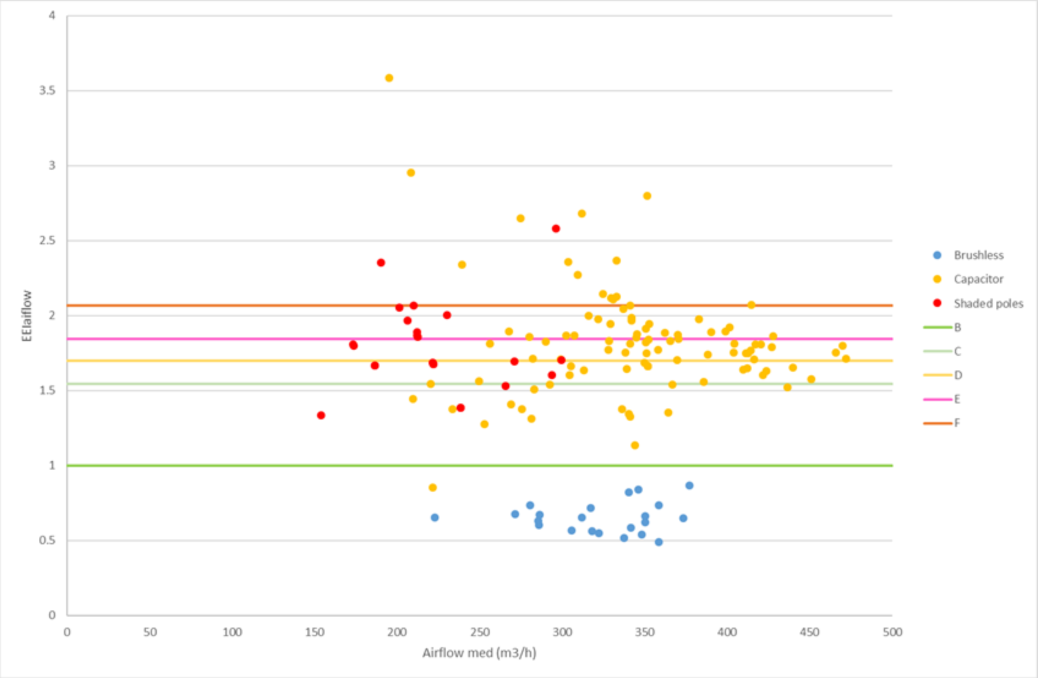


- **Option a**: the thresholds of the energy classes are even along all energy classes, i.e. the difference of EEI between energy classes is the same or very similar.

Energy class	Brushless (total =22)	Capacitor (total = 96)	Shaded poles (total = 25)
A (EEI < 25)	0	0	0
B (25 ≤ EEI < 70)	16	0	1
C (70 ≤ EEI < 100)	6	1	0
D (100 ≤ EEI < 130)	0	2	4
E (130 ≤ EEI < 160)	0	17	14
F (160 ≤ EEI < 190)	0	51	4
G (EEI ≥ 190)	0	25	2

EEI based on SAEC(airflow): energy classes

EEI (Airflow) – Airflow av. 9-points



- **Option b**: the thresholds have been determined in a way that the number of models is evenly distributed among the energy classes

Energy class	Brushless (total =22)	Capacitor (total = 96)	Shaded poles (total = 25)
A (EEI < 25)	0	0	0
B (25 ≤ EEI < 100)	22	0	1
C (100 ≤ EEI < 154)	0	18	2
D (154 ≤ EEI < 170)	0	22	3
E (170 ≤ EEI < 184)	0	29	1
F (184 ≤ EEI < 207)	0	26	4
G (EEI ≥ 207)	0	12	4

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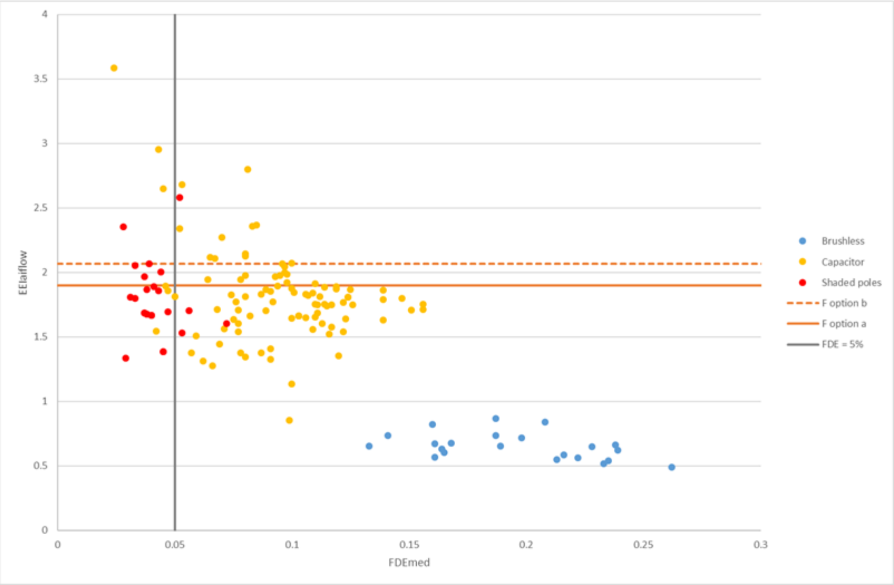
Ecodesign requirements

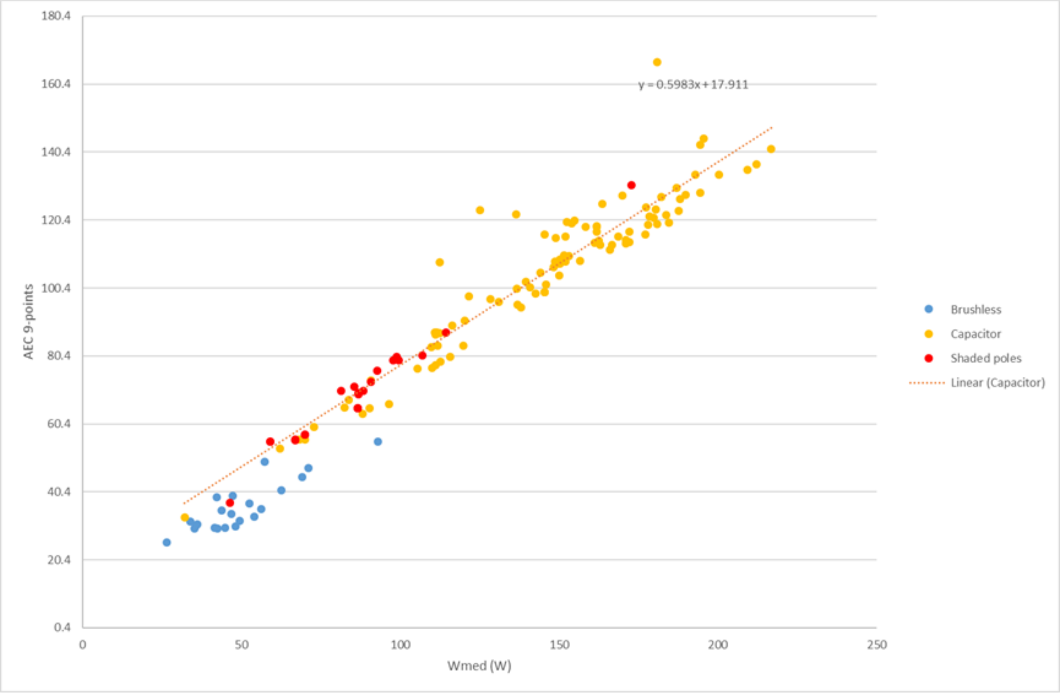
EEI (Airflow) – FDE av. 9-points



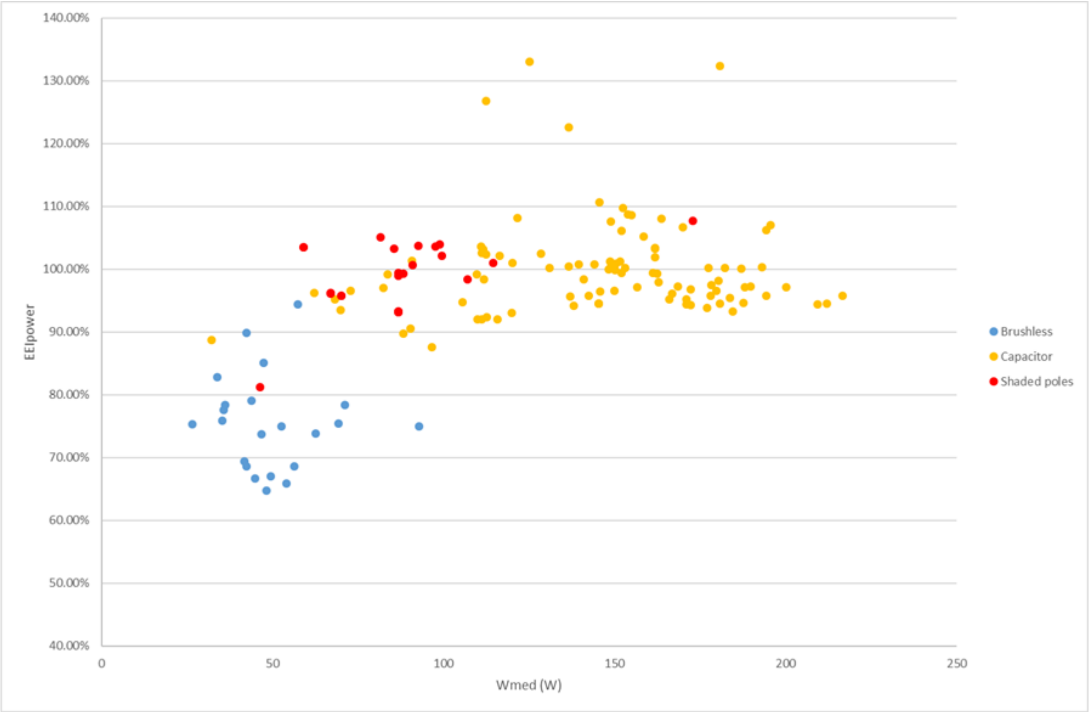
- Minimum F class + FDE=5%
- Energy class G based on airflow covers shaded and some capacitor motors
- Min FDE is additional to the minimum energy class required.

Update of the existing EEI based on power

AEC av. 9 points – W av. 9-points



EEI (W) – W av. 9-points

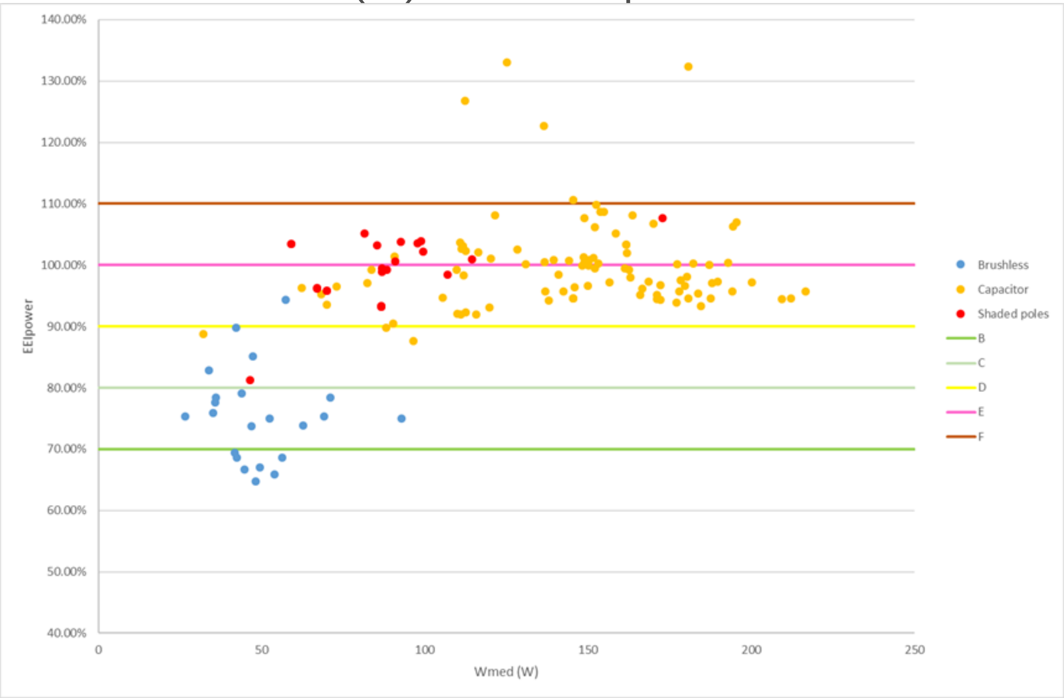


$$SAEC = 0.5983 \times W_{med} + 17.911$$

EEI calculated as the ratio AEC/SAEC

Update of EEI based on power: energy classes

EEI (W) – W av. 9-points

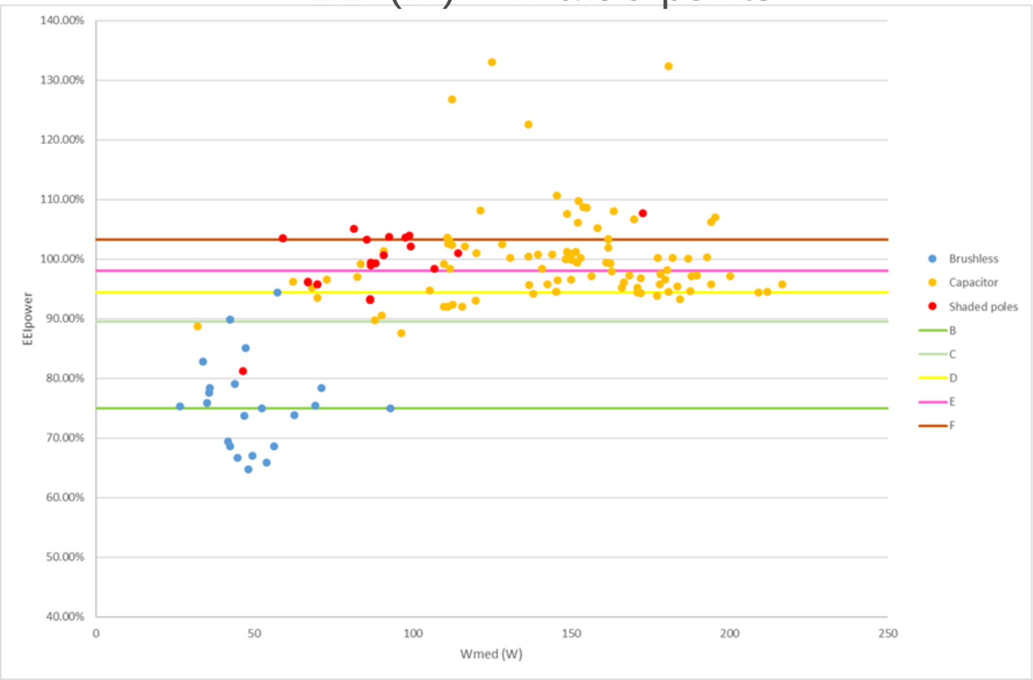


- **Option a**: the thresholds of the energy classes are even along all energy classes, i.e. the difference of EEI between energy classes is the same or very similar.

Energy class	Brushless (total =22)	Capacitor (total = 96)	Shaded poles (total = 25)
A (EEI < 60)	0	0	0
B (60 ≤ EEI < 70)	7	0	0
C (70 ≤ EEI < 80)	11	0	0
D (80 ≤ EEI < 90)	3	3	1
E (90 ≤ EEI < 100)	1	54	12
F (100 ≤ EEI < 110)	0	35	11
G (EEI ≥ 110)	0	5	0

Update of EEI based on power: energy classes

EEI (W) – W av. 9-points

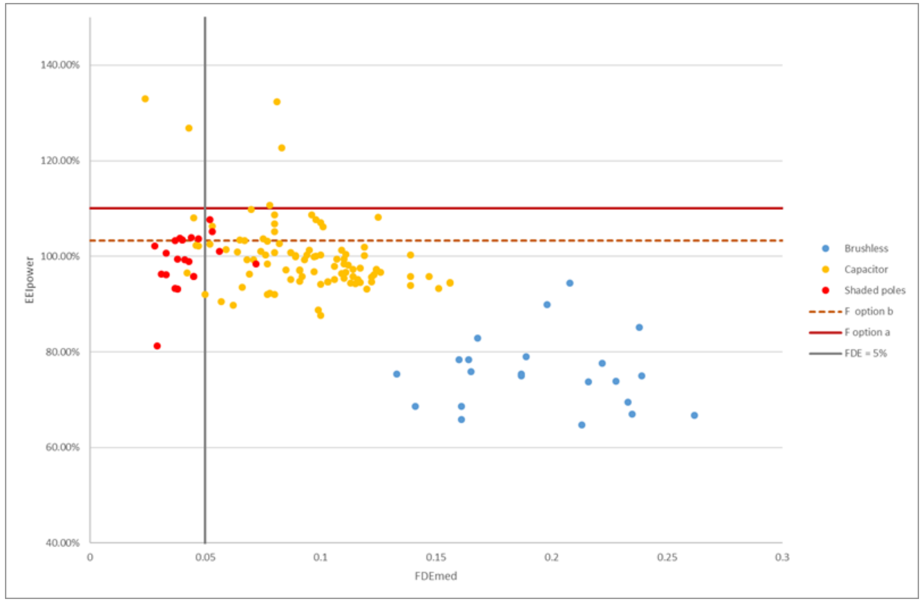


- **Option b**: the thresholds have been determined in a way that the number of models is evenly distributed among the energy classes

Energy class	**Brushless (total =22)**	**Capacitor (total = 96)**	**Shaded poles (total = 25)**
A (EEI < 60)	0	0	0
B (60 ≤ EEI < 75)	9	0	0
C (75 ≤ EEI < 90)	12	1	1
D (90 ≤ EEI < 95)	1	18	1
E (95 ≤ EEI < 98)	0	32	3
F (98 ≤ EEI < 103)	0	32	7
G (EEI ≥ 103)	0	19	7

Ecodesign requirements

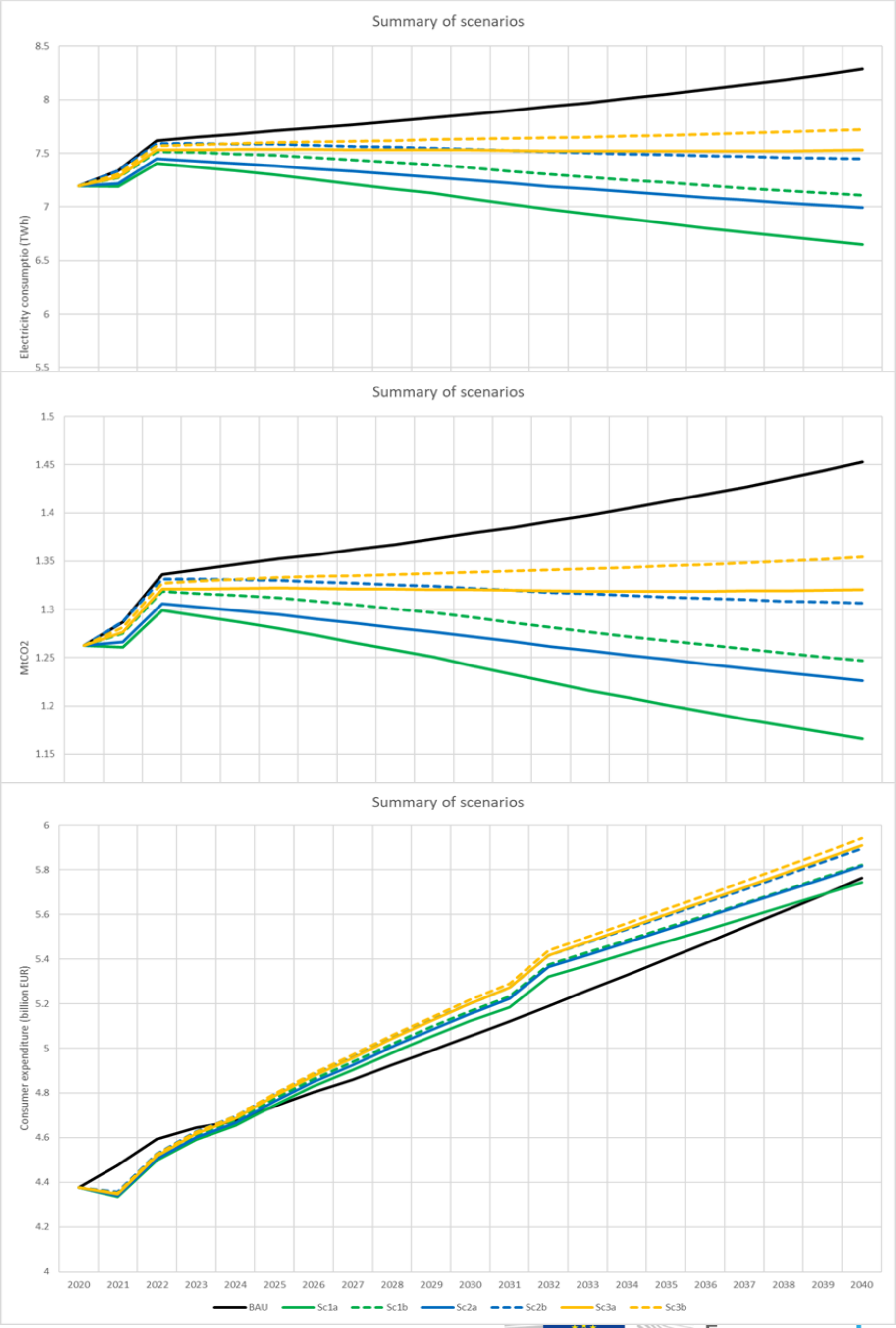
EEI (W) – FDE av. 9-points



- Minimum F class + FDE=5%
- Energy class G based on W covers capacitor and shaded poles motors
- Min FDE is additional to the minimum energy class required.

Scenarios comparison

Scenario	Energy cumulative impact (TWh electricity)	GHG cumulative impact (MtCO2)	LCC cumulative impact (billion EUR)
Sc1a: new EEI and energy classes based on FDE	-17.0	-3.0	0.5
Sc1b:	-11.3	-2.0	1.5
Sc2a: new EEI and energy classes based on airflow	-13.3	-2.3	1.3
Sc2b:	-7.5	-1.3	2.2
Sc3a: : update of existing EEI and energy classes based on power	-7.5	-1.3	2.2
Sc3b	-5.3	-0.9	2.6



Next steps

- Minutes of the TWG meeting
- Period for written comments until 6 June
- Revision of the report based on your feedback
- BATIS HTML not available due technical issues → we will send an email informing you about the recommended format for sending your comments