

# Background study for review of Fan Regulation 327/2011 1st stakeholder meeting

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Brussels, 1 October 2014

# Draft agenda

meeting will be recorded

## **9:30 Start meeting**

9:45 Introduction to study objectives

## **10:00 - 13:00 1<sup>st</sup> presentation / discussion (Chapter 1-7)**

- scope, including 'cascading'
- exemptions, exclusions
  - incl. **replacement** fans
- dual use / jet fans
- market surveillance

13:00 - 14:00 Lunch

## **14:00 - 17:00 2<sup>nd</sup> presentation / discussion (Chapter 8-11, + 1.1.2)**

- Annex I Ecodesign requirements (slopes, targets)
- Annex II Measurement & calculation (especially 'not final assembly')
- verification
- box + roof fans

## **17:00-17:30 Wrap up / conclusions / other points**

# Background 327/2011

- Recital 14:
  - consider setting technology independent requirements, potential of use of VSD, reduce exemptions, consider fans below 125 W
- Article 7:
  - review of Regulation no later than 4 years (6 months to CF meeting, 30 March 2015)
  - assess feasibility of reducing number of fan types
  - can scope of exemptions be reduced, including allowances for dual use fans
- plus other relevant issues / topics
  - jet fans, replacement fans, etc.

# Study objectives

- Tasks:
  - reduction of fan types possible?
  - reduction of exemptions possible?
  - assess adequacy of allowance for dual use fans
  - requirements for jet fans? (plus impacts)
  - assess adequacy of market surveillance
  - other information relevant for review (impact 327/2011?)
- website, email list

# Time path

Activity	Month														
month	0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	...	+18
indicative month	Apr '14	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan '15	Feb	Mar	Apr	...	Oct
Reporting				1 <sup>st</sup> IR				disc. docs		2 <sup>nd</sup> IR					FR
Other activities		kick-off web site				1 <sup>st</sup> SH mee ting			2 <sup>nd</sup> SH mee ting			CF mee ting?	technical assistance		

IR = Interim report (1+2): 1st report sent 1-8-2014, available on [www.fanreview.eu](http://www.fanreview.eu) from 4-9-2014

FR = Final Report

SH = Stakeholder meeting (1+2)

CF = Consultation Forum meeting (indicative)

# 1.1 Subject matter and scope

- most SH agree with scope and categories
  - no need to further segregate by market segments / application areas e.g. catalogue fans, bespoke fans, specialty applications
- minimum 125 W ?
  - fans <125 W not in Ecodesign Work Plan
- maximum 500 kW ?
  - alignment with LVD and/or 640/2009

## 1.1.1. Fans incorporated into products

- most SH prefer ‘no change’
  - both direct fan sales and fans ‘incorporated into products’ to be covered (even playing field)
- but many also want no ‘cascading’ of regulations (double regulations), but
  - no cascading means that fans sold directly to end user are regulated and ‘incorporated fans’ (present in many regulated HVAC applications) are unregulated (uneven playing field)

## 1.2.1 Exclusions – cooling for e-motor

- fans (impellers) that cool electric motors excluded from scope if motor < 3 kW
  - most SH: exclusion should remain
  - cascading with ED 640/2009 and its revision
  - **boundaries?** limit to motors < 3 kW, or apply to all cooling fans for motors, or...?



## 1.2.2 Exclusions – fans in small clothes driers

- fans < 3 kW in (clothes) driers
  - most SH state they should be covered
  - cascading with ED 932/2012 (hh tumble driers)
  - requirements to consider lint, humidity levels, temperatures?

## 1.2.3 Exclusions – kitchen hoods fans

- fans < 280 W in kitchen range hoods
  - most SH state they should be covered
  - cascading with EL 65/2014 & ED 66/2014 (kitchen appliances)
  - need to consider grease, humidity levels, temperatures?

## 1.3.1/.2/.3 Exemptions – extreme operating conditions

- most SH agree with exclusion of ATEX (3<sup>rd</sup> party certification), and
- emergency use only (3<sup>rd</sup> party certification), and
- extreme temperatures
  - better align with IEC 60034-30-1 (& -2): change motor ambient temp. from 65° to 60° (also Regulation 6/2014), max. altitude 4000 m needed?
  - does high temp. equipment need to be 3<sup>rd</sup> party certified?

## 1.3.4. Exemptions – LVD scope

- fans beyond LVD (>1000 VAC or >1500 VDC)?
  - SH agree
  - motor regulation under study, scope possibly extended, IEC 60034-30-1 for broader range (→ 1 MW), useful?
  - battery operated remains excluded? (FAN FAQ)

## 1.3.5. Exemptions – gas properties

- definitions needed for toxic/corrosive/abrasive
  - flammable, corrosive and toxic according CLP Regulation 1272/2008?
  - abrasive: as in FAN FAQ or ...?
  - combine with definition of clean air? (EVIA suggestion)

definition for 'clean air' (EVIA)	Dry air		Humid air (>70%)	
	Max . dimension of suspended particles [mm]	Max concentration of particles [g/m <sup>3</sup> ]	Max . dimension of suspended particles [mm]	Max concentration of particles [g/m <sup>3</sup> ]
	<1	<0.2	<0.05	<0.05

## 1.3.6. Exemptions – replacement fans

- after 1-1-2015 no replacement fan can be supplied for fans sold before 1-1-2013
  - SH expect problems related to integration into existing applications (size, motor drivers, building automation, etc.) and
  - related to availability of spare parts
- what 'grace period' for revised regulation?
  - Note: motors 640/2009 and pumps 547/2012 have no 'grace period'; Circulators & EPS allow 5 years
- need for proper definition (to avoid confusion about replacement, refurbishment, repair, etc.)

### 3.2.2. Exemption from tier 1 (must comply after 1-1-2015)

- fans in large laundry and washer-driers > 3 kW
  - indoor AC fans
  - ICT fans
- 
- most SH agree with lifting exemption, some see technical issues for drier fans (similar small driers)
  - cascading appears to be the biggest issue

### 3.4. Exemptions from specific requirements (info only)

- fans > 8000 rpm (vacuum cleaners etc.)
  - information requirements still justified?
- fans with ratio > 1.11
  - most likely beyond 25 kJ/kg = outside scope
  - what about narrow blade BC ?
- fans for non-gaseous substances
  - air streams with solids, particles, fibres, etc.



## 3.5. Dual use fans

- most SH state allowance should remain
- combination of Tier II plus reduced allowance from 10% to 5% is problematic
- loophole effect not significant → 3<sup>rd</sup> party tested
- reversibility relevant?
  - (no data received)

## 3.6. Jet fans

- definition as in ISO 13349, section 3.5.3 ?
- method for efficiency → ISO 13350 (include silencers?)
- identify targets (efficiency grades N)
  - differentiate tube-axial and non- tube-axial?
  - dual-use / reversibility (large air gap ?)
  - stationary only?
  - need data on efficiency range and cost impacts !!

## 4. Market surveillance

- responsibility of Member States
- possibility of an accreditation scheme for manufacturer's labs (besides Notified Bodies)?

# Lunch break

- reconvene at 14:00 hr

# Draft agenda

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  - incl. replacement fans
- dual use / jet fans
- market surveillance

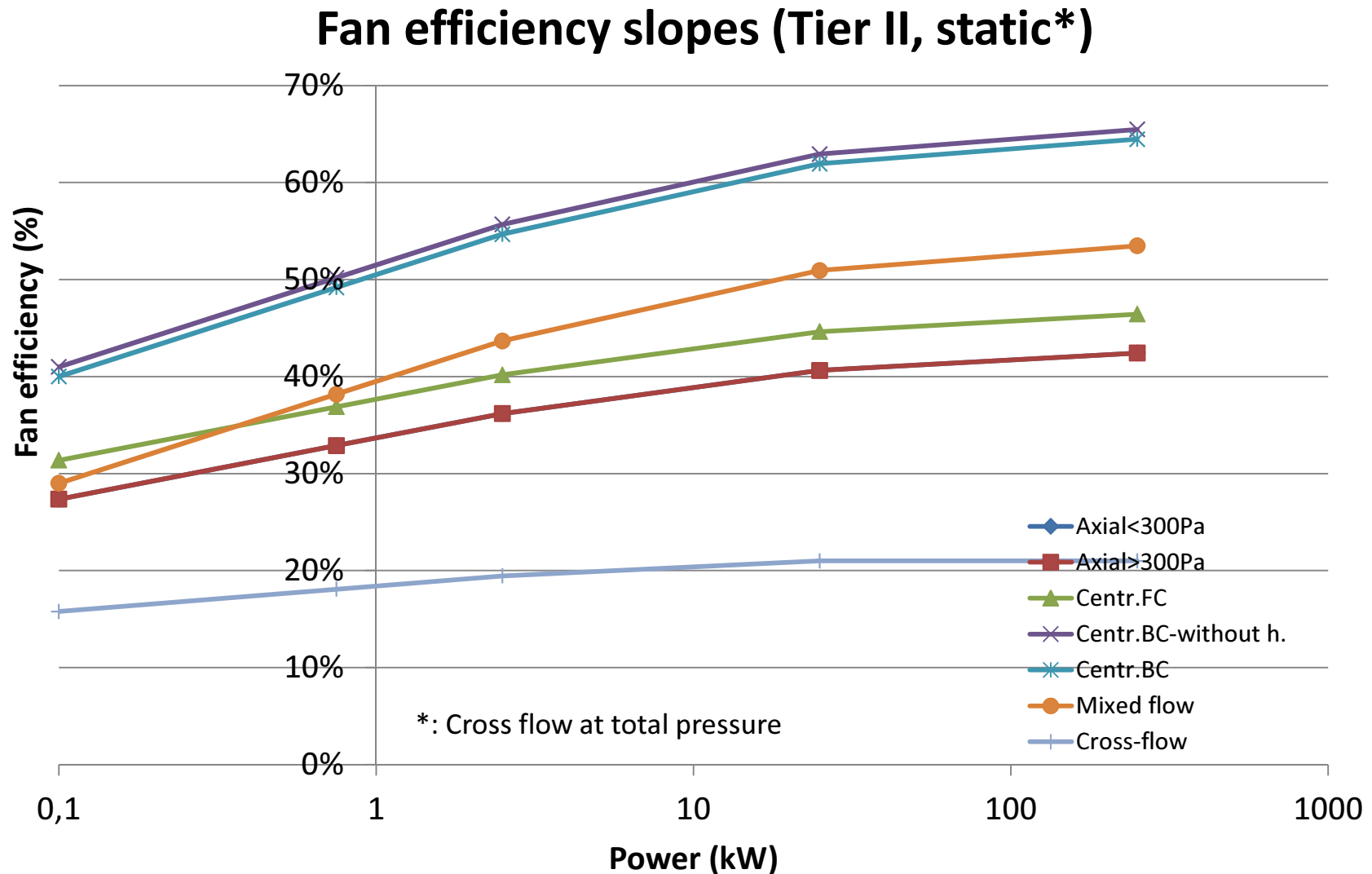
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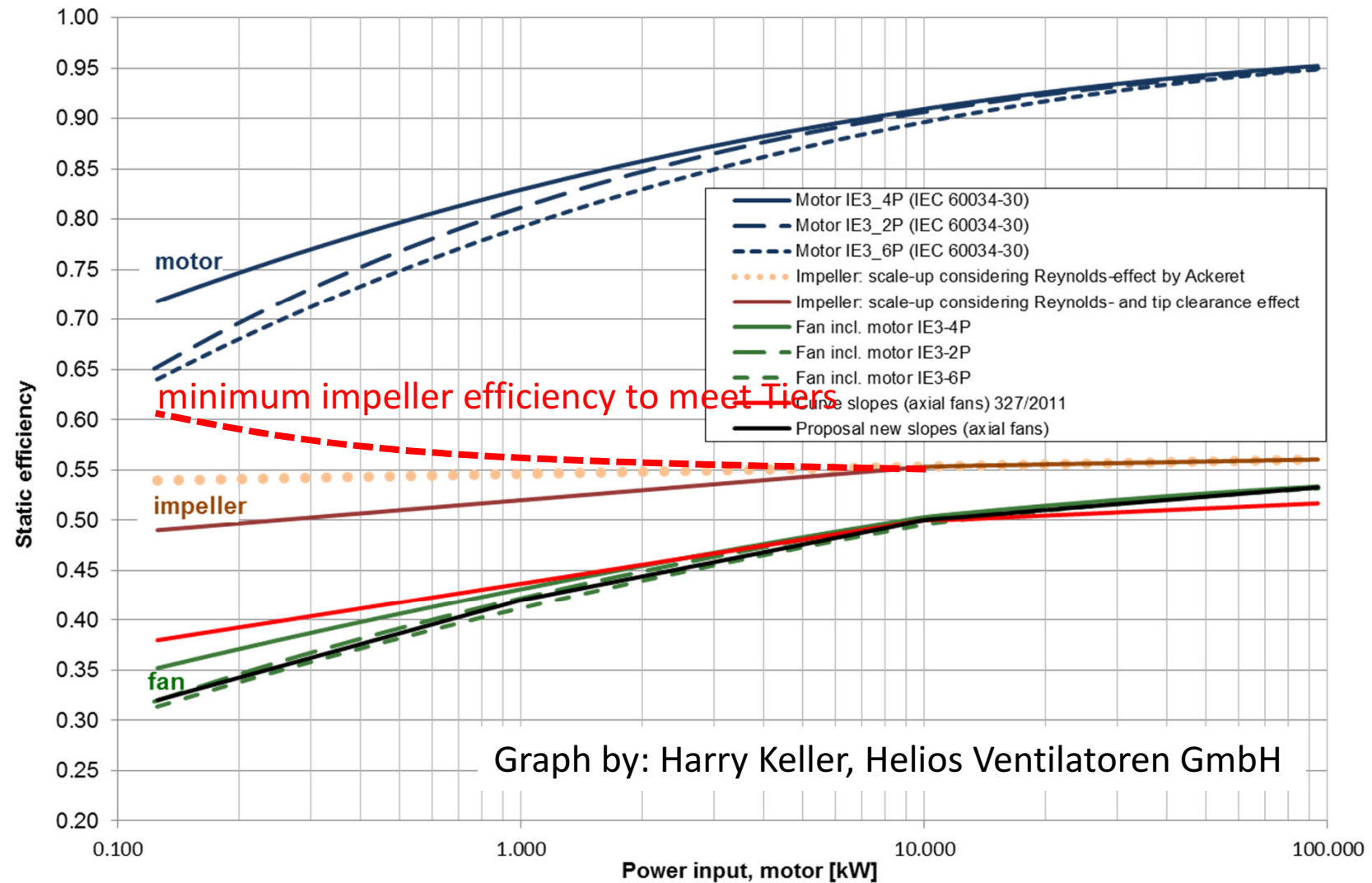
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## 8.2. Ecodesign requirements (1/4)



## 8.2. Ecodesign requirements (2/4)



## 8.2. Ecodesign requirements (3/4)

- SH argue for: more relaxed requirements for smaller fans
  - correct slopes & possibly second slope below 1 kW
- tighter requirements for larger fans
- simplification? already same curve for:
  - axial + FC
  - BC + mixed flow (grades BC w/wo may be same?)
- what about:
  - with high pole (8+) motors? (risk underloading higher speed fans)
  - low pressure axial vs high pressure axial?
  - dual-use fans, including effect of reversibility

$\eta_{\text{target}} = 2,74 \cdot \ln(P) - 6,33 + N$
$\eta_{\text{target}} = 0,78 \cdot \ln(P) - 1,88 + N$
$\eta_{\text{target}} = 4,56 \cdot \ln(P) - 10,5 + N$
$\eta_{\text{target}} = 1,1 \cdot \ln(P) - 2,6 + N$
$\eta_{\text{target}} = 1,14 \cdot \ln(P) - 2,6 + N$
$\eta_{\text{target}} = N$



## 8.2. Ecodesign requirements (4/4)

- to add: jet fans
- remains: static and total pressure as categories

## 8.3. Information requirements

- now 14 points:
  - to correct: (6) year of manufacture on website/brochure?
  - to elaborate/explain: (10) rpm @ BEP – linked to calculation method in performance assessment
  - to reduce: (11) need for specific ratio? etc.
  - marking of use with VSD?

## 9.3. Not final assembly (1/4)

- calculation introduces penalties (matching of components)
- default efficiencies of motors incorrect
- 'not suitable' for all possible fan configurations

## 9. Not final assembly (2/4)

- if “fan” is defined by min. **3 parts** (impeller, stator/nozzle and motor) what about:
  - **bare shaft** (or belt driven): who supplies motor, who is ‘manufacturer’?
  - **impeller & motor** (no stator/nozzle)
  - **impeller & stator** (no motor, partly knocked-down, uncomplete fan)
  - **impeller only**: some SH state that placing on market is when final pairing with motor and stator is made (when supplied to or done by end user?); other SH argue that fan design in final application may be such that standard test conditions do not do justice to actual required performance
  - see also ‘made available’ in Blue Guide 2014
- improve definitions for ‘backward curved’ etc. (says ‘curved’ but covers all backward blade shapes; inclined, aerofoil)

## 9. Not final assembly (3/4)

- incomplete 'fan' (bare shaft, motorized impeller, impeller only?) two options:
  1. differentiate 'incomplete fan' from rest, with separate requirements to 'incomplete fan' (bare shaft, motorized impeller, impeller only) – adds considerable complexity!
  2. fan is defined as impeller + motor + stator: person pairing components resulting in functional fan for end user is 'manufactur' of fan (even if only for own use) and must be able show DoC. Knows missing parts, so asks component supplier for 'component DoC' of configuration, and provides proof that final configuration is equal or better than component DoC configuration

## 9. Not final assembly (4/4)

- what if the final application requires different performance than measured in standard test methods?
  - e.g. fan is intended to operate outside BEP in final application, must component comply with requirements for standard application?
  - also relies on default values for missing components  
Note: IEC 60034-30-1 (line start) and IEC 60034-30-2 (with motor drives) broaden scope of motors covered by IEC rating

## 9. Calculation – speed @ BEP

- which speed for BEP?
  - power at ‘maximum allowable rpm’ may exceed power of supplied motor?
  - how to avoid moving BEP to lower power by use of electronic speed drives

# 10. Verification procedure

- Tolerances reasonable? (for random selected product tested in random lab)
  - no summing of EU and national tolerances
- Issues with very large equipment?
  - can be based on modelling and Fan Laws?



## 1.1.2 Box and roof fans (1/2)

- main benefit is that testing of fans does not require removal from product, but...
  - if also covered by Ventilation products Regulation, what is benefit of inclusion in reviewed 327/2011? (EU should not regulate same aspect twice)
  - if not covered by other Regulation, then non-removal is the only gain
  - can variety of products be properly covered by simple single targets?

## 1.1.2 Box and roof fans (2/2)

- if to be covered, then need to show significance (sales, environmental impacts) and improvement potential – **DATA requested!**
- need to show economic impacts (what if not covered, what if covered)

# Other issues

- as regards impacts of 327/2011, check IA assumptions for:
  - sales / installed base of fans?
  - lifetime of products
  - Best Available Technology / benchmarks (Annex IV)?
  - change in average efficiency of fans
  - costs of improvement of fans?
  - impacts on manufacturers? (SMEs in particular)
- issues related to standards (revision ISO 5801?)

# Other issues - sales

- sales (based on prep.study)

Fan type	sales [mio units]						
	1995	2000	2005	2010	2015	2020	2025
Axial<300Pa	0.9	2.25	2.4	2.62	3	3.39	3.78
Axial>300Pa	0.93	2.51	2.7	2.86	3.01	3.17	3.33
Centr.FC	0.46	0.66	1.12	1.04	1.2	1.36	1.52
Centr.BC/no housing	0.14	0.21	0.33	0.31	0.35	0.39	0.43
Centr.BC	0.14	0.23	0.37	0.34	0.39	0.44	0.49
Cross-flow	0.13	0.23	0.19	0.26	0.3	0.34	0.37
Box	1.53	2.58	2.3	2.91	3.13	3.35	3.57
Roof_all	1.99	3.87	3.4	4.1	4.33	4.55	4.78
<b>TOTAL</b>	<b>6.23</b>	<b>12.54</b>	<b>12.81</b>	<b>14.44</b>	<b>15.72</b>	<b>16.99</b>	<b>18.27</b>

for stock / installed base: lifetime assumed is 15 yrs

# Other issues - benchmarks (Chapter 11.)

- Efficiency range as in Impact Assessment

<b>Fan type</b>	<b>Power [kW]</b>	<b>lowest eff.</b>	<b>average eff.</b>	<b>highest eff.</b>
Axial<300Pa	0.8	20%	31%	40%
Axial>300Pa	1.32	25%	37%	47%
Centr.FC	0.44	20%	32%	42%
Centr.BC-free	3.76	45%	56%	70%
Centr.BC	3.82	45%	54%	67%
Cross-flow	0.42	5%	7%	10%
Box	0.37	15%	23%	45%
Roof_axial inside	0.9	15%	25%	35%
Roof_centr.inside	1.2	35%	44%	60%

# Upcoming / next steps

- Nov 2014: 2<sup>nd</sup> Discussion document
- Dec 2014: 2<sup>nd</sup> SH meeting
- Jan 2015: Final report
- Mar 2015: indicative date CF meeting

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