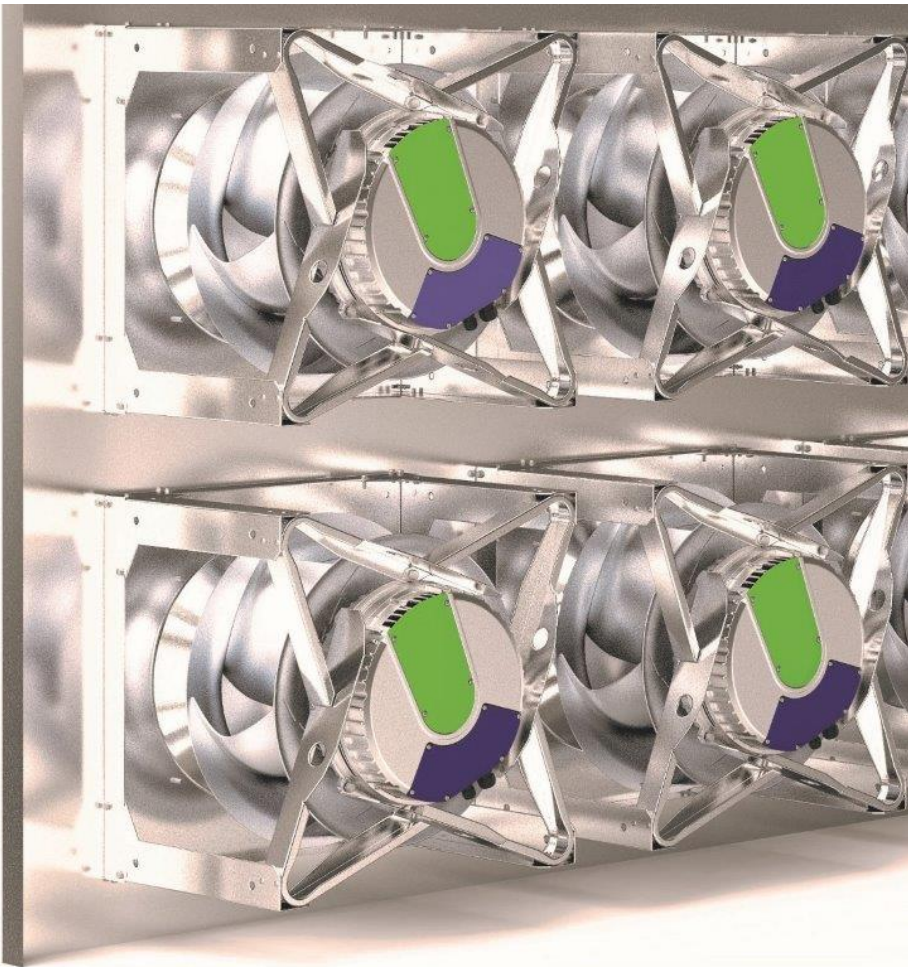


Retrofit of fans in AHU to save energy



AMCA European Fan Symposium 2024



Johan Roos

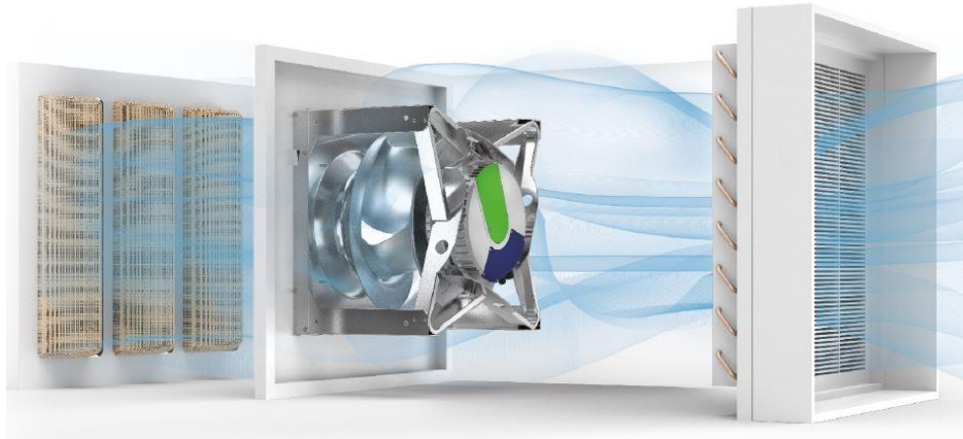
Sales Manager Retrofit Energy Saving
Nicotra Gebhardt AB, Sweden



AMCA European Fan Symposium 2024

What if ...

- we could make 100 TWh of energy within EU available
- we could provide a sustainable solution for upgrading AHU's



Retrofit of fans in AHU to save energy



- **14%** of all electric energy produced within EU is going to drive fans
 - = $0,14 \times 2641 \text{ TWh} = 370 \text{ TWh}$ per year (2022)
 - Approx. 50% of these have **low efficiency**
- Possible savings with retrofit is approx. 50% of power consumption
 - Possible saves $0,5 \times 0,5 \times 370 \text{ TWh} = \mathbf{92 \text{ TWh}}$ per year



Retrofit of fans in AHU to save energy

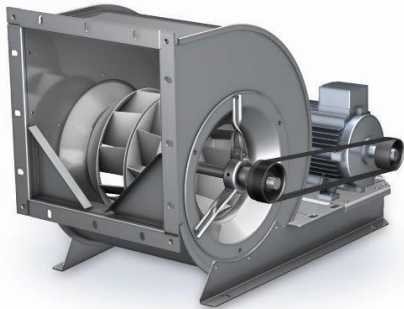
• How much is 92 TWh?

- Equal to the total electricity production of Belgium (96 TWh)
- Equal to the need for all electrical cars within EU year 2030.
- Close to the need for all electrical trucks within EU year 2040



Retrofit of fans in AHU to save energy

- Fans running 24/7 => 8760 h/year running hours
every kW => 8760 kWh per year in used energy
- Saving on maintenance when replacing beltdriven fans with direct driven
- Return of investment, pay-off time, approx. 5 years



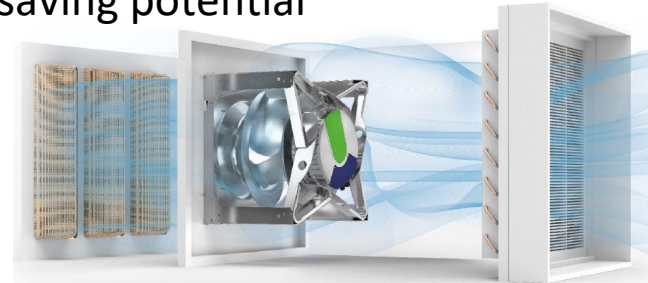
Retrofit of fans in AHU to save energy

Speed controlled direct driven PM/EC fans gives huge energy saving possibilities

Based on the affinity laws for fans (relationship between variables);

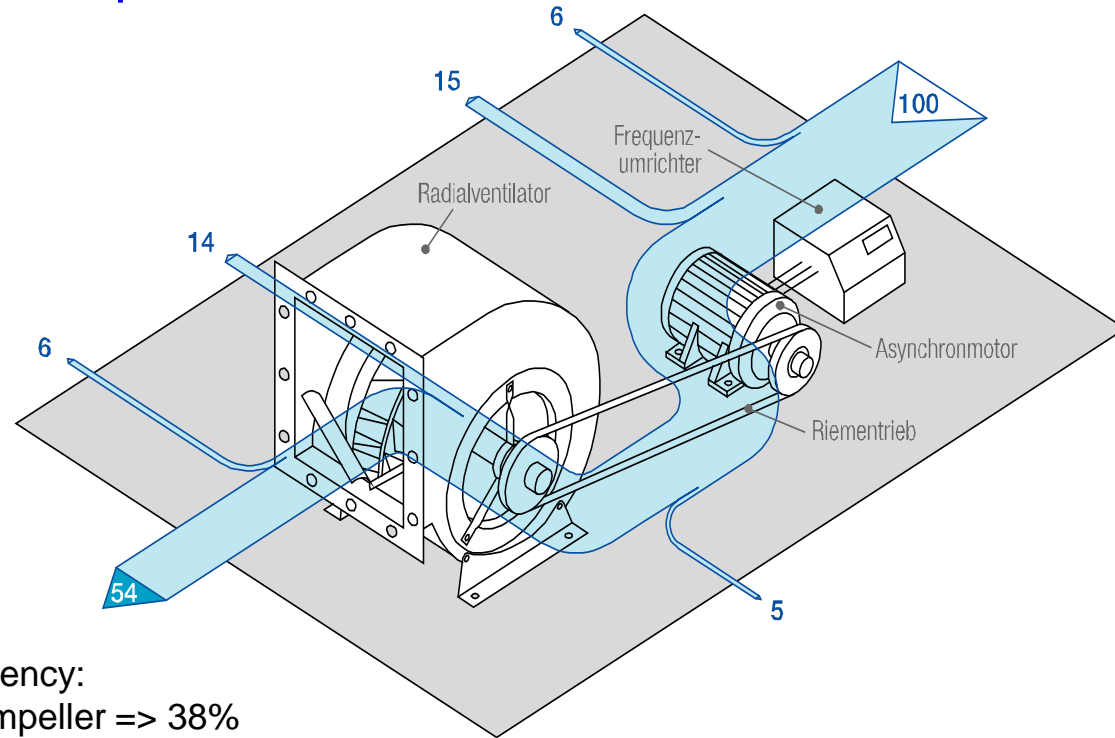
- 80% of the speed => 80% of the airflow => 50% of the energy
- 50% of the speed => 50% of the airflow => 13% of the energy

⇒ Control of fans via air quality sensors gives a huge saving potential and a better indoor climate!



The old fan design

System components and their losses



System efficiency:

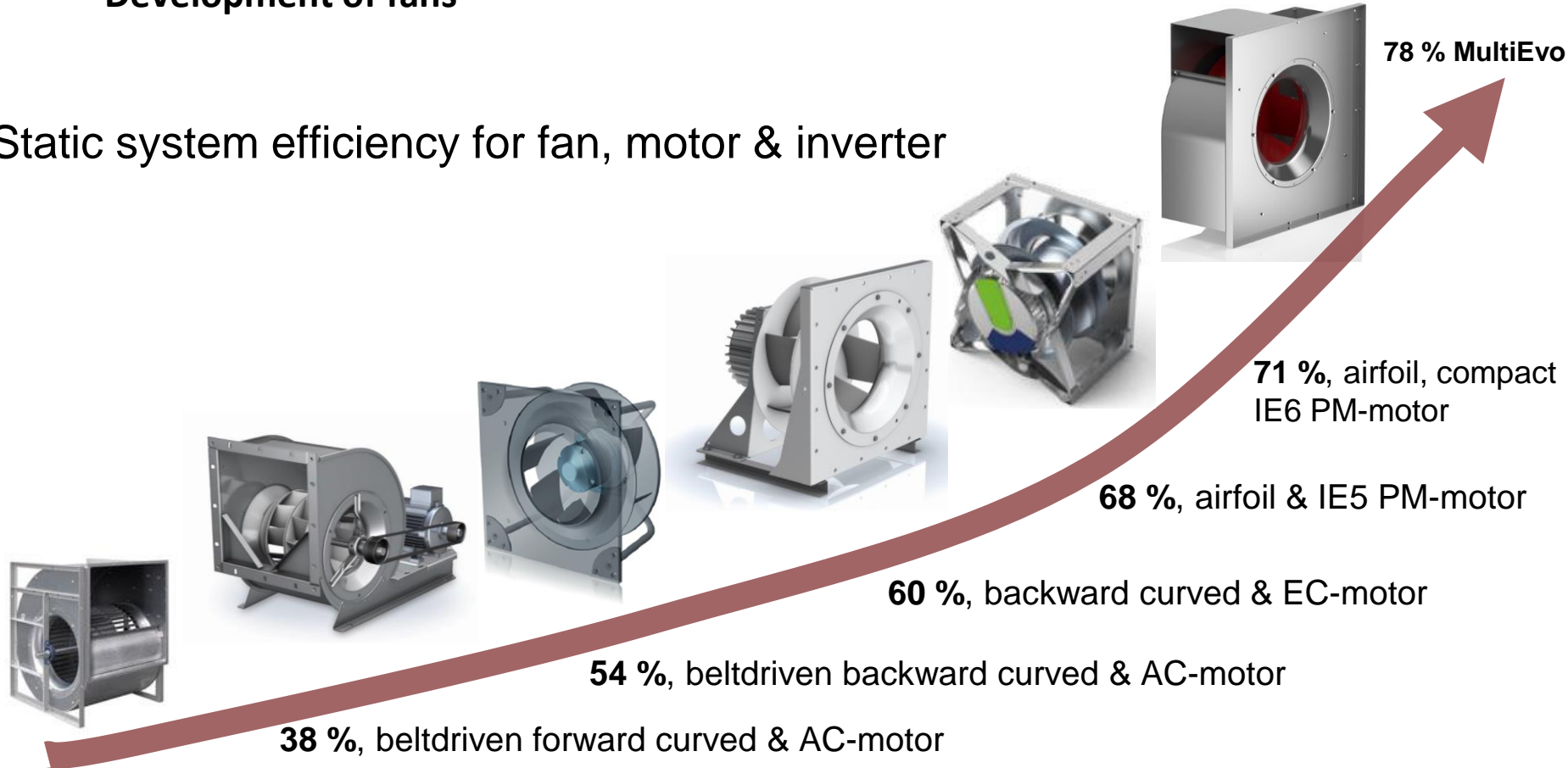
Beltdrive F-impeller => 38%

Beltdrive B-impeller => 54%

Directdriven fans => ?

Development of fans

Static system efficiency for fan, motor & inverter



Example of buildings suitable to retrofit fans in

- Automotive Industry
- Industrial Buildings
- Pharmaceutical Industry
- Shopping Malls
- Hospitals
- Sport Centers
- Airports
- Food Industry
- Universities
- Hotels
- Logistics Industry
- Office Buildings
- Schools



A few examples



Arlanda Airport

- 2016-2020
- 276 Fans replaced
- 1.5 GWh saved per year
- Terminal buildings
- Hotel
- Garage



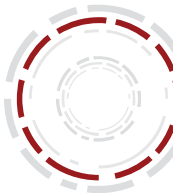
Västerås stad

- 2009-2015
- 600 fans replaced
- 2.5 GWh saved per year
- Schools
- Kindergarten
- Theater
- Office
- Sport facilities



Hospital in Sweden

- 2018
- 29 new fans installed
- 0.45 GWh saved per year



Retrofit of fans are providing:

- Huge energy saving potential
- A sustainable alternative to replacing entire HVAC systems at a fraction of the cost.
- Applicable in all cases
- Short pay-off time
- Makes electric energy available for the transition to a more sustainable world
- A tool for the transformation to Zero emissions

CO₂



Energy
saving





Thank you!

Do you have any questions?

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