

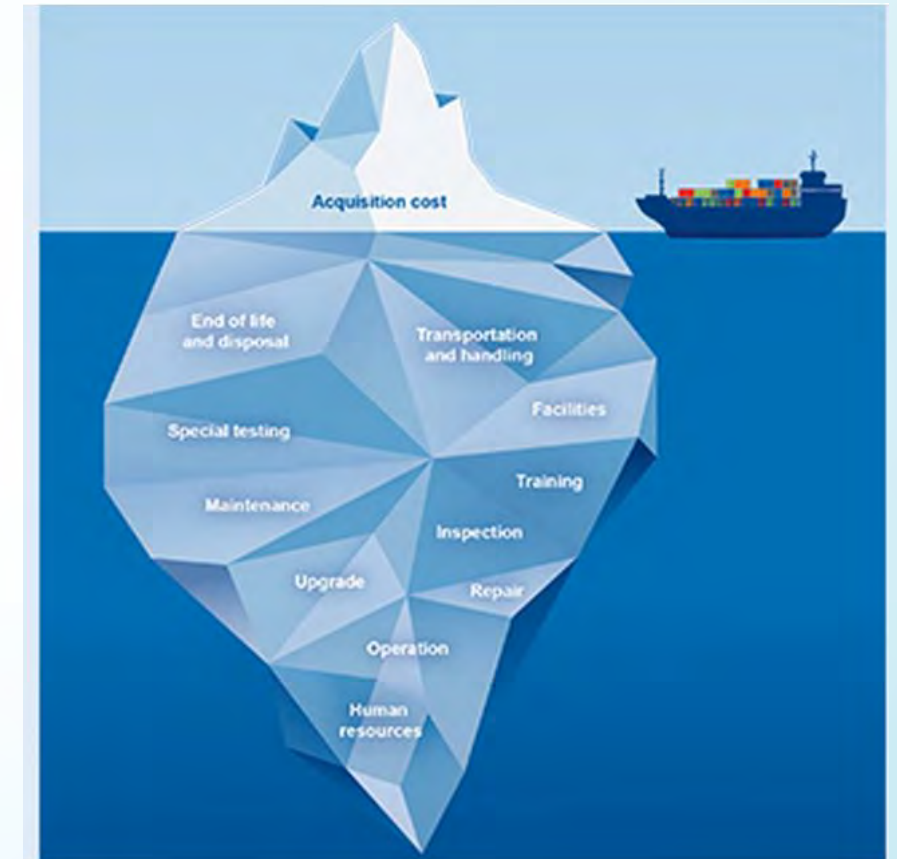
# Efficiency and benefits of direct driven fans



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# Known facts about HVAC

- Air-conditioning / Process Cooling in a building is a major power consumer (~50%) , which includes chillers, airside equipment (**AHU**) and water circulating pumps.
- **Life Cycle Cost** is more **IMPORTANT** compared to the Capital / First Cost.

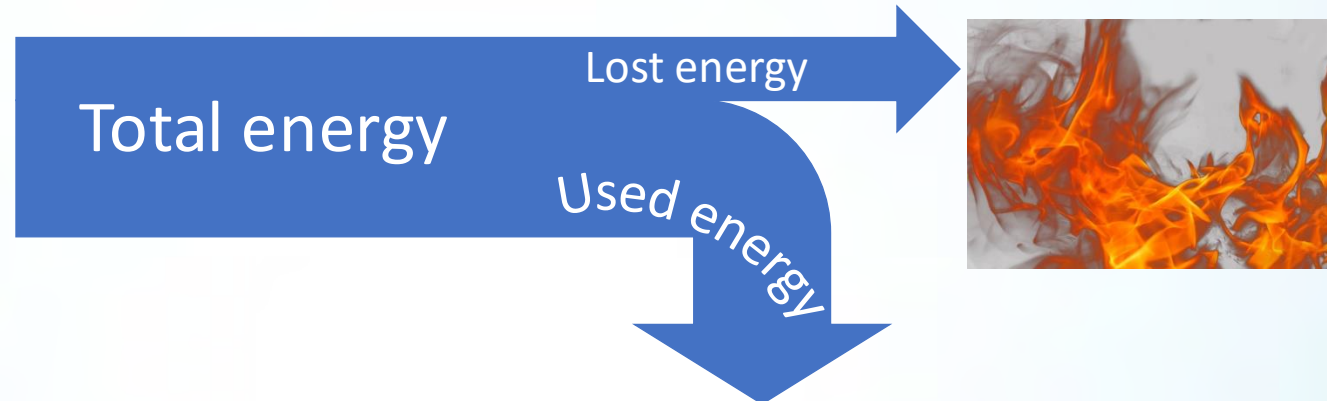


# Efficiency



$P_{\text{input}}$

$$(\text{Efficiency}) \eta = \frac{P_{\text{output}}}{P_{\text{input}}}$$



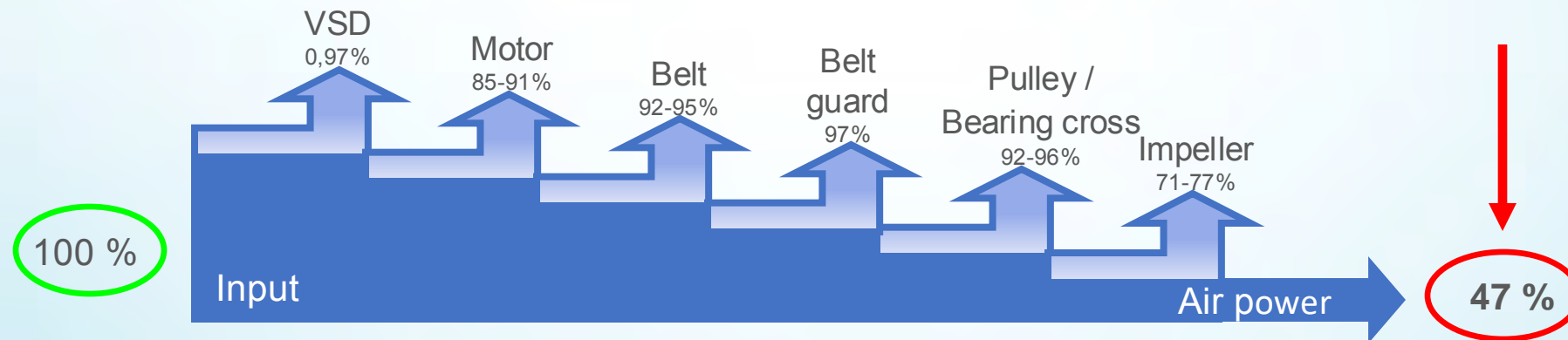
$P_{\text{output}}$

Applies to  
every  
component  
in a system

# Real Efficiency of a DIDW fan (Static Pressure)



$$\eta_{\text{vsd}} * \eta_{\text{mot}} * \eta_{\text{belt}} * \eta_{\text{beltguard}} * \eta_{\text{pulley}} * \eta_{\text{fan}} = \eta_{\text{sys}}$$

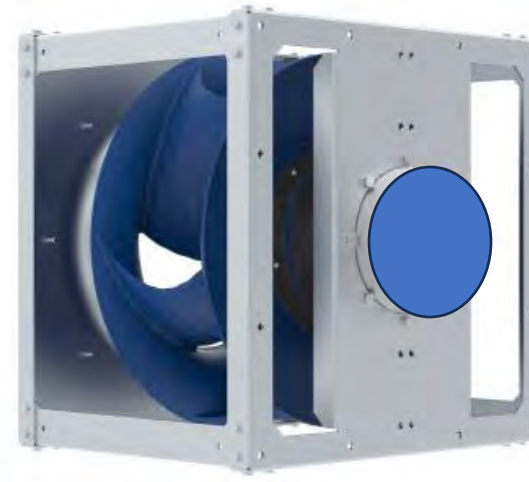




# Efficiency of Direct Driven Fans (Static Pressure)

- Less Number of Components
- No Belt = No loss of efficiency and No dust
- No Maintenance
- Compact design = Saves Space

EC Fan with IE5 Motor



Plug Fan with IE3 Motor

$$\eta_{\text{fan}} * \eta_{\text{mot}} * \eta_{\text{vsd}} = \eta_{\text{sys}} (> 65\%)$$

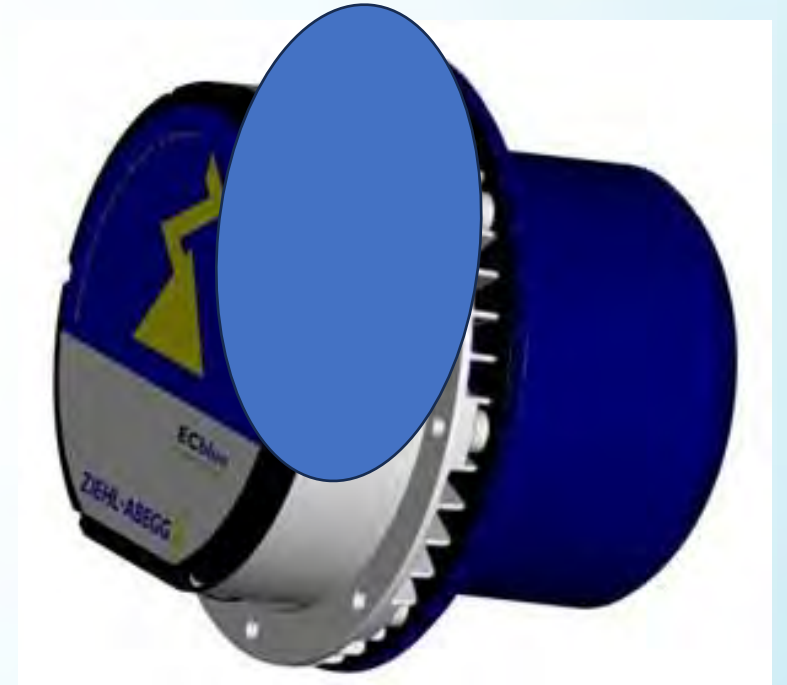
# EC Technology

**EC** motor = **Electronically Commutated** motor

What is an EC motor?

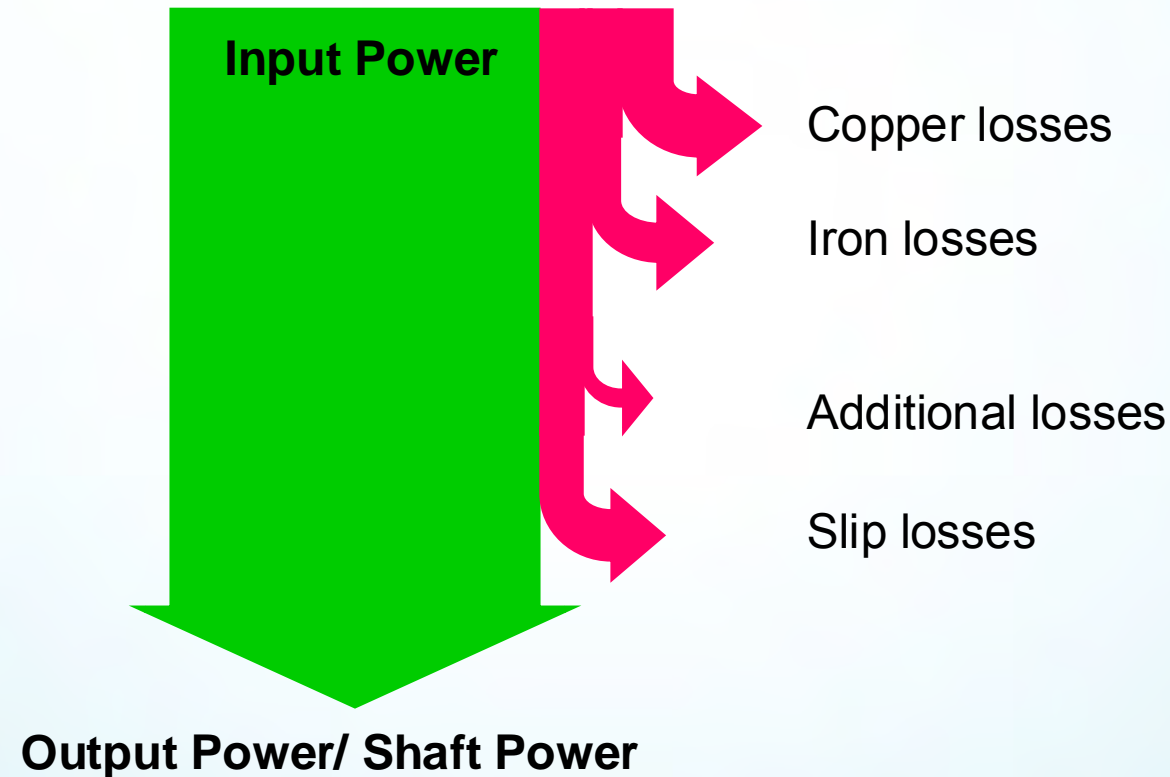
EC motors are

- brushless DC motors, electronically commutated
- permanent magnet motors
- synchronous motors
- speed controlled by an EC controller



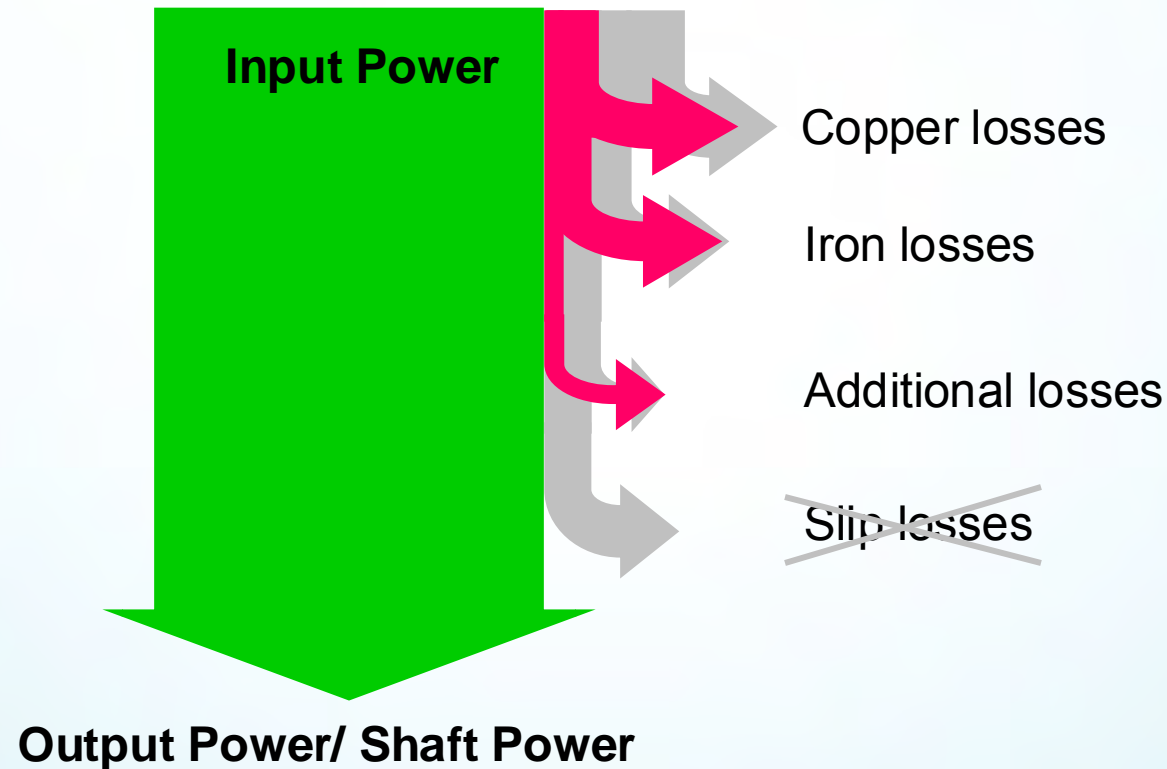
# AC vs. EC Motors / Efficiency

## Power losses of an AC asynchronous Motor



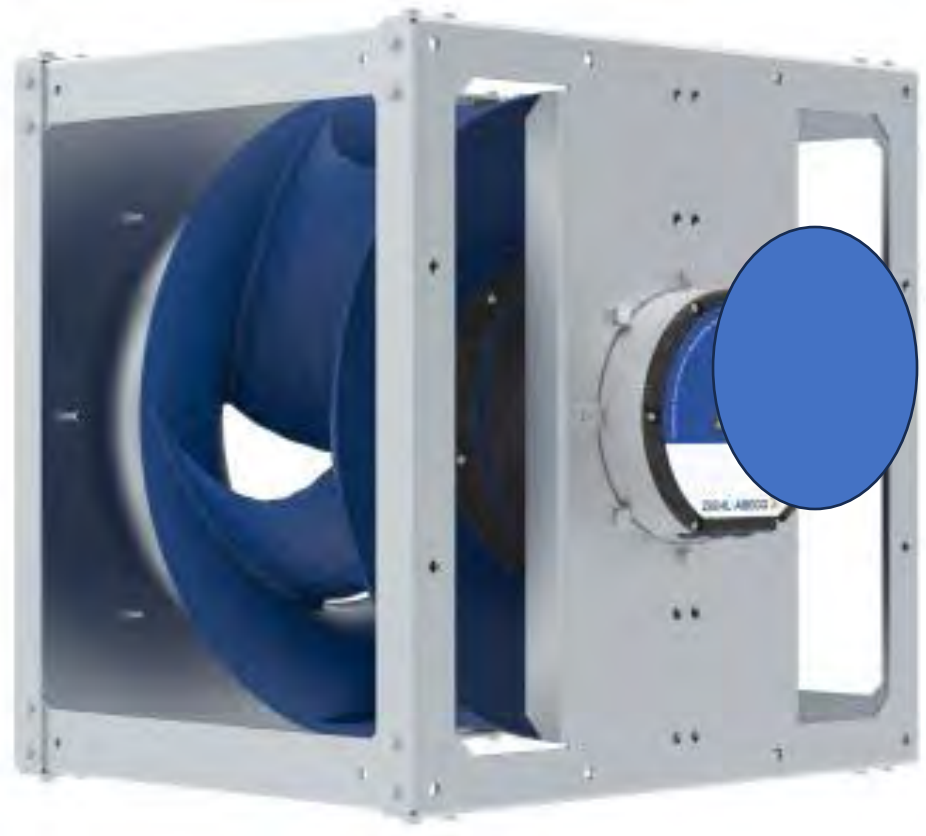
# AC vs. EC Motors / Efficiency

## Power losses of an EC Motor





# EC Fans



**Efficient**

**Simple**

**Flexible**

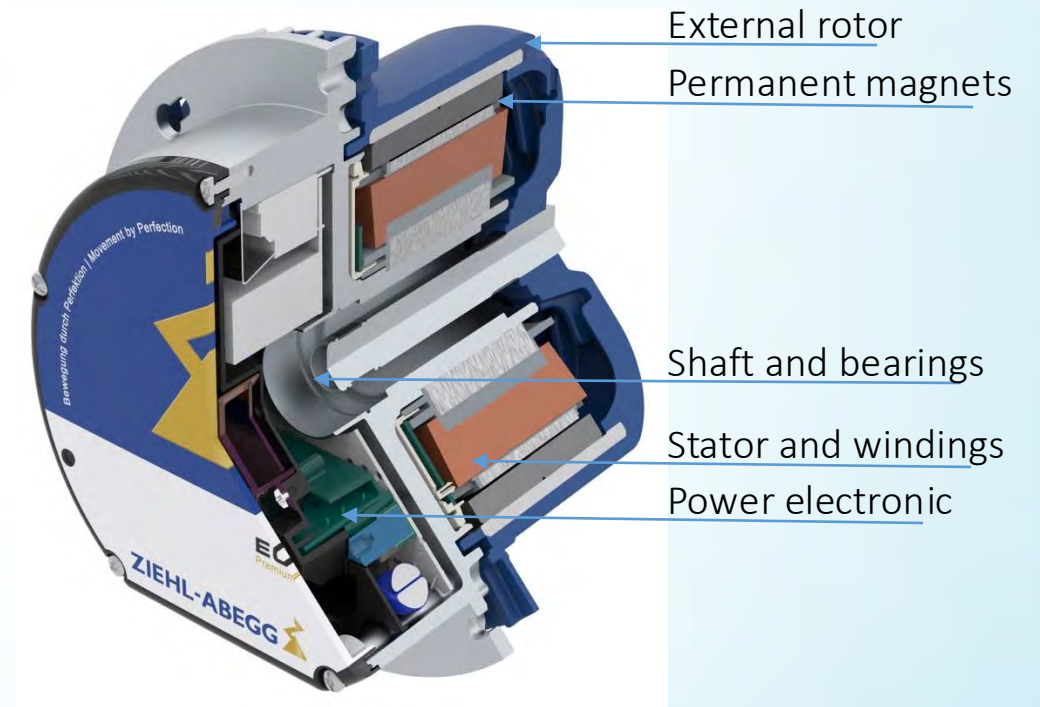
**Reliable**

**Innovative**

# EC Motor Overview

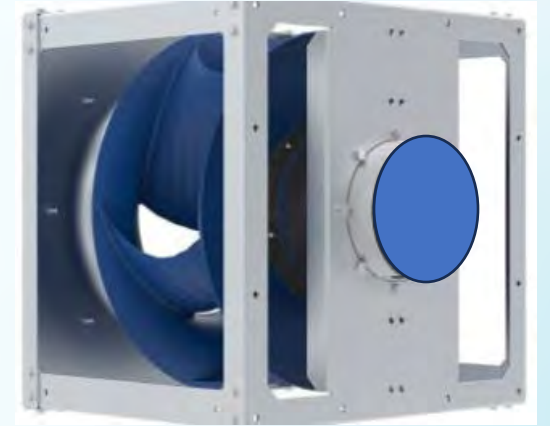
## Highest Efficiency Compact Drive

- IE5 EC motor
- Inbuilt speed controller utilising EC technology: No VFD required
- IP55 rated EC motor



# Key Features of EC Fan

- EC Motor has inbuilt MODBUS RTU for BMS Integration
- Optional BACnet MS/TP for BMS Integration
- Motor has inbuilt Vibration sensor
- 24/7 Indication via LED
- UL, CE, 3<sup>rd</sup> party Certification of EC Fan (AMCA), **Eurovent Certification.**



# Thank You!

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