



***DynaWind & WinWinD***

***En pålitlig vindturbin  
baserad på avancerad  
Multibrid®-teknologi***

# 1 MW vindkraftverk

<i>Effekt</i>	1 MW
<i>Rotor diameter</i>	56, 60, 64 m
<i>Tornhöjd</i>	56, 66, 70 m
<i>Startvind</i>	3 m/s
<i>Stoppvind</i>	20-25 m/s
<i>Märkvind</i>	12 m/s



# 3 MW vindkraftverk

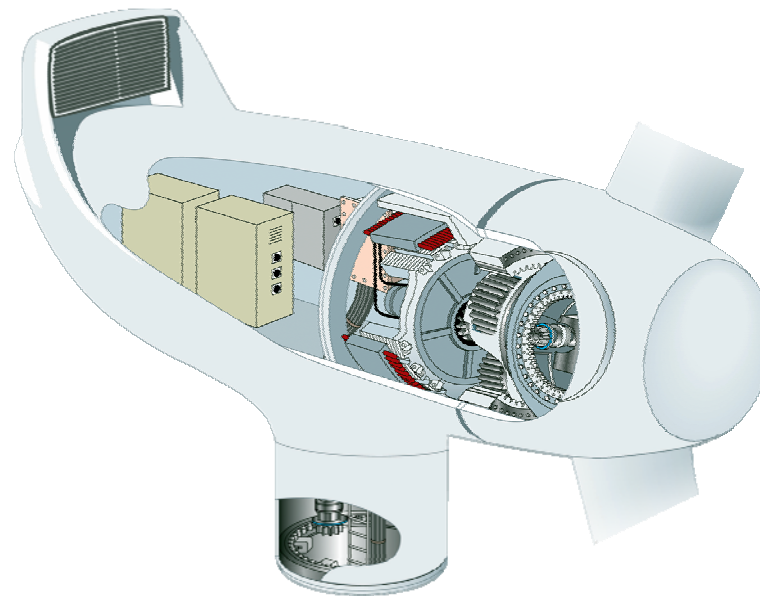
<i>Effekt</i>	<i>3 MW</i>
<i>Rotor diameter</i>	<i>90, 100 m</i>
<i>Navhöjd</i>	<i>80-100 m</i>
<i>Startvind</i>	<i>3 m/s</i>
<i>Stoppvind</i>	<i>20-25 m/s</i>
<i>Märkvind</i>	<i>12 m/s</i>



# WWD use same World Class Know-How



HRE



***Our world class partners take care of component design and manufacturing. Together with Partners we make deliveries and after sales.***



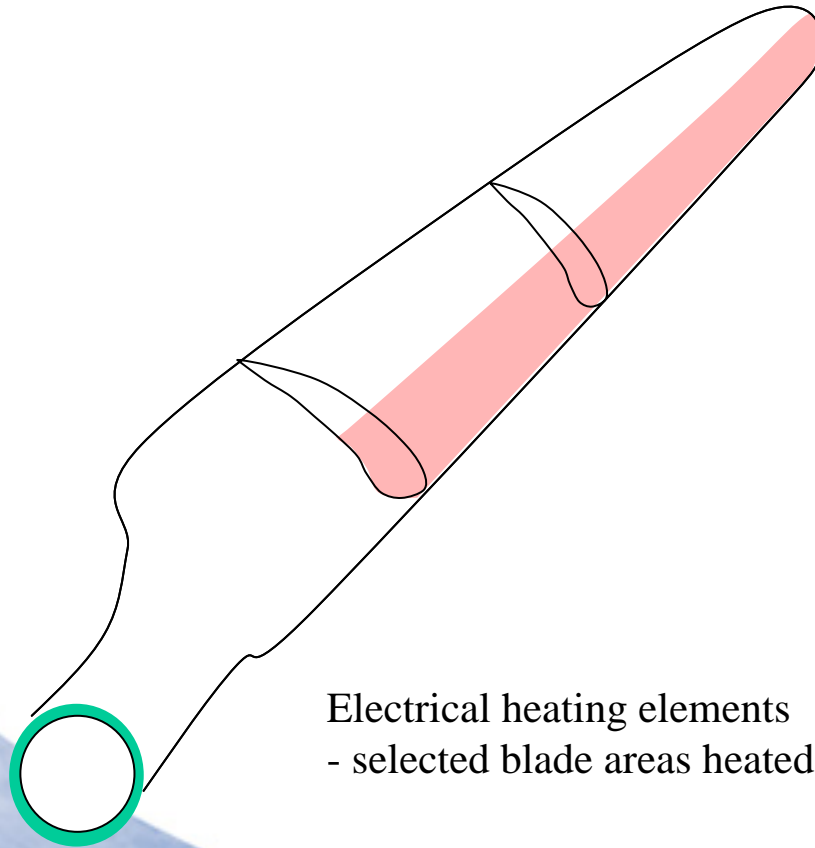
# *Blades ice prevention*

- 1. Heating foils applied on the blades**
- 2. Electricity supply, slip rings, cabling through hollow shaft**
- 3. Sensors and control**
- 4. Other items**

# 1. Heating foils

- Carbon fabric. Decision positive or negative application ( in mould or glued on blade)
- Heating power distribution chord wise and span wise.
- Connections and cabling, lead through to the blade inner region.
- Identification and solution for possible erosion problems
- Identification and solution for lightning protection

# 1. Heating foils principle



Electrical heating elements  
- selected blade areas heated

## ***2. Electricity supply***

- **Voltage control system or autotransformer with taps on the non-rotating side. Used voltage 690V.**
- **Voltage control elements.**
- **Additional slip rings, detail design and specification**
- **Cabling through hollow shaft , cable selection, special cable cooling measures necessary(?)**



## 3. *Sensors and control*

- **Needed sensors:**
  - Two ice sensors on each blade**
  - Stationary ice sensor on the nacelle top**
  - Humidity stationary on park**
  - Snow or rain indicator (by visibility)**
- **Signals which are anyhow existing and are used for ice prevention control**
  - Blade root strain in leadlag and flap direction**
  - Wind speed of fully heated anemometer**
  - Machine torque and power**

## 4. Other items

- **Meteorological statements regarding icing and lightning in Swedish Lapland for the coming sites (possible additional winter measurements for winter 2008/2009?)**
- **It shall be investigated if blades can be in black colour to collect solar radiation in spring.**
- **It shall be investigated if Teflon foil is useful to ease ice removal**

# ***Nacelle heating (to secure start)***

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- **Lubrication / hydraulic oils are pre heated**
- **Cooling water circulation also pre heated**
- **Nacelle interior heating**
- **Electric cabinets heating**

# ***Project Kemi, Finland***

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***5+5 pcs of WWD-3***

***90 m hub height***

***Total capacity 15+15 MW***

***100 m rotor***

***Annual production 85 GWh***





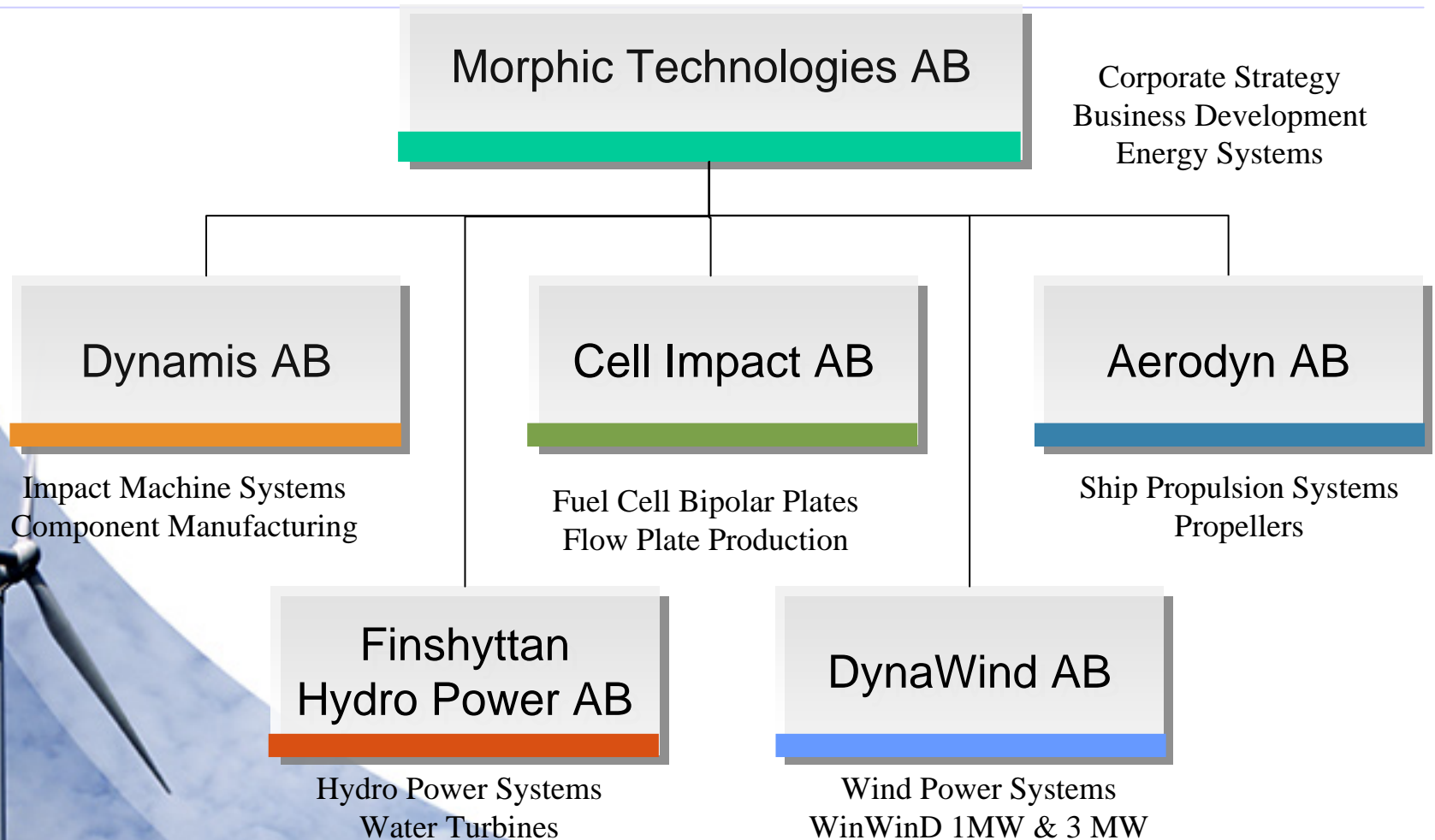
Energiteknik som ger tillväxt

# Morphic expanderar inom

- Vindkraft
- Vattenkraft
- Bränsleceller



# Industrikoncernen Morphic





Business area

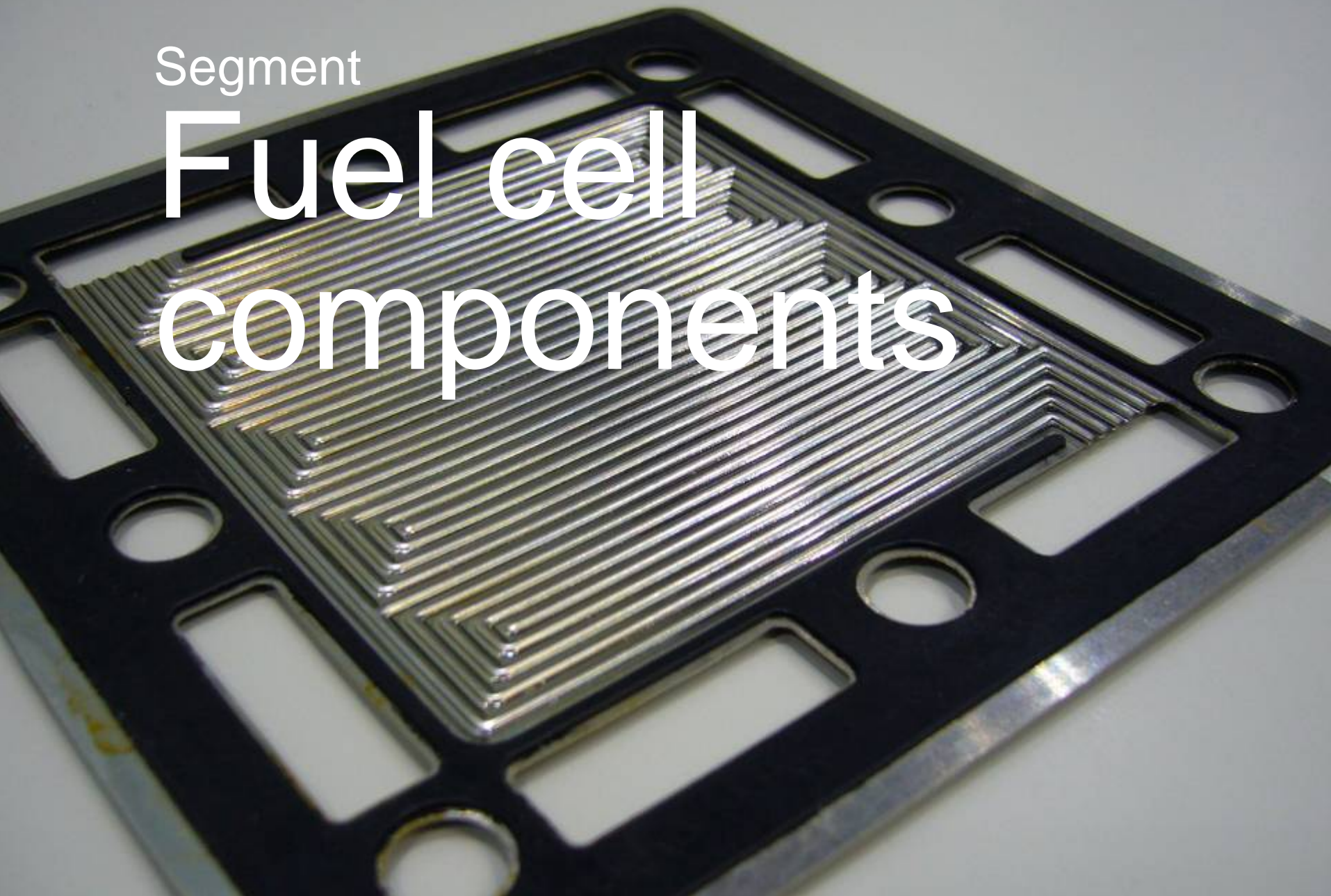
# Fuel Cells

Fuel cells as the "motor" in vehicles, houses, portable electronics



Segment

# Fuel cell components



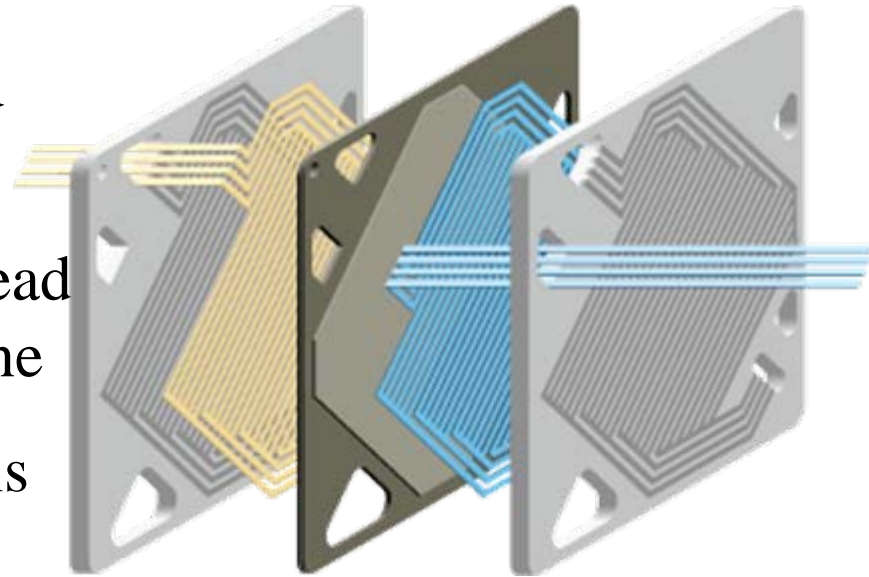


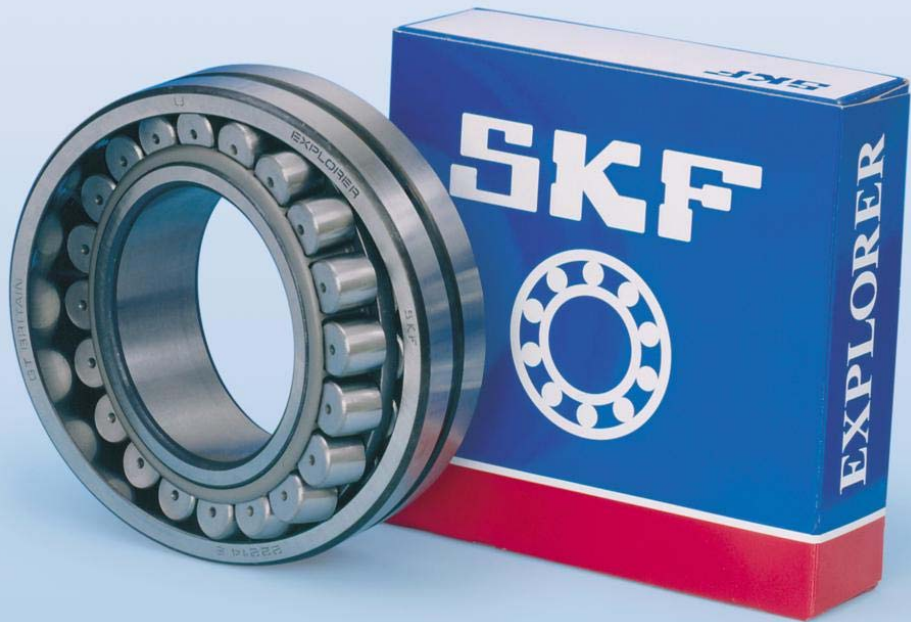


**FCX**  
CONCEPT

# Flow plates the crucial factor

- A fuel cell consists of patterned plates and a membrane
- The function of the plate is to lead the gas over the entire membrane
- The function of the membrane is to break down the gas and separate electrons and protons
- The cells are stacked on top of each other. About 800 A4-sized cells are required to power car





**Photron**

4000 fps

Manual 2532

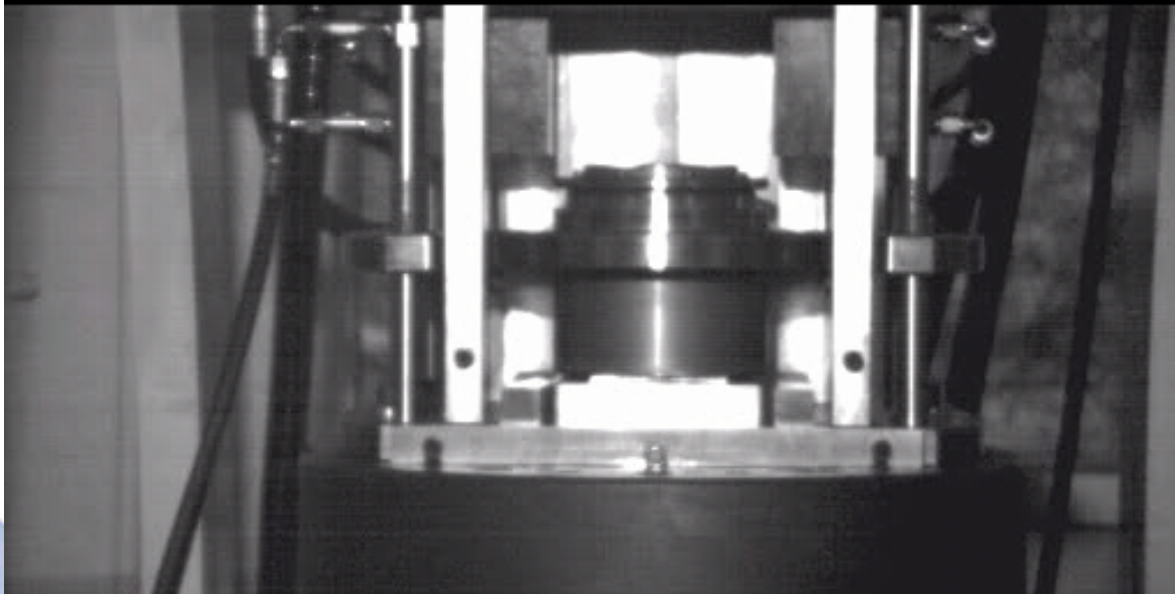
FASTCAM-Ultima512 ...

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frame : -1413

512 x 256

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# Unique production facility

- Specially adapted for production of flow plates for fuel cells
- Strong international interest
- Several test series in production
- Volume order received
- First line completed in 2006
- One further line nearing completion
- Investment cost Sek 15-20 million/unit



Segment

# Energy technology

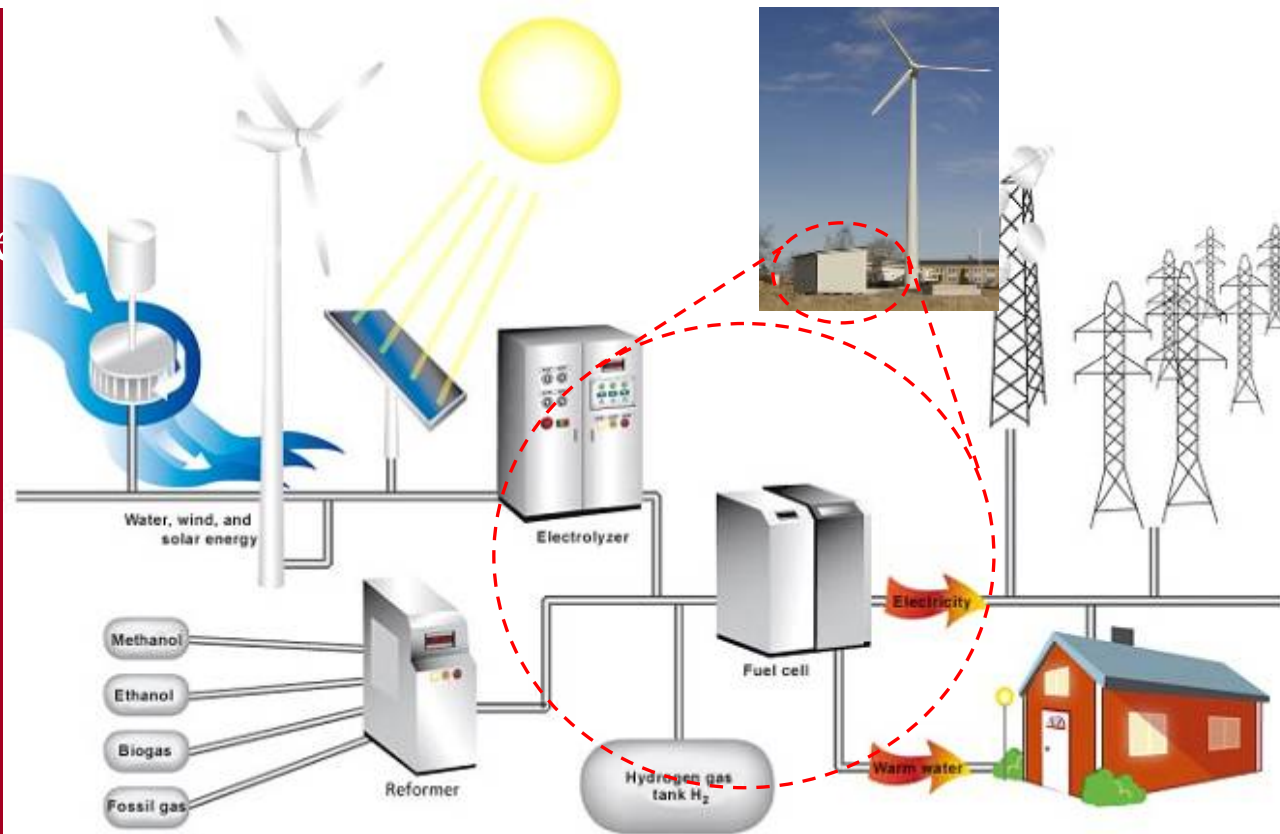


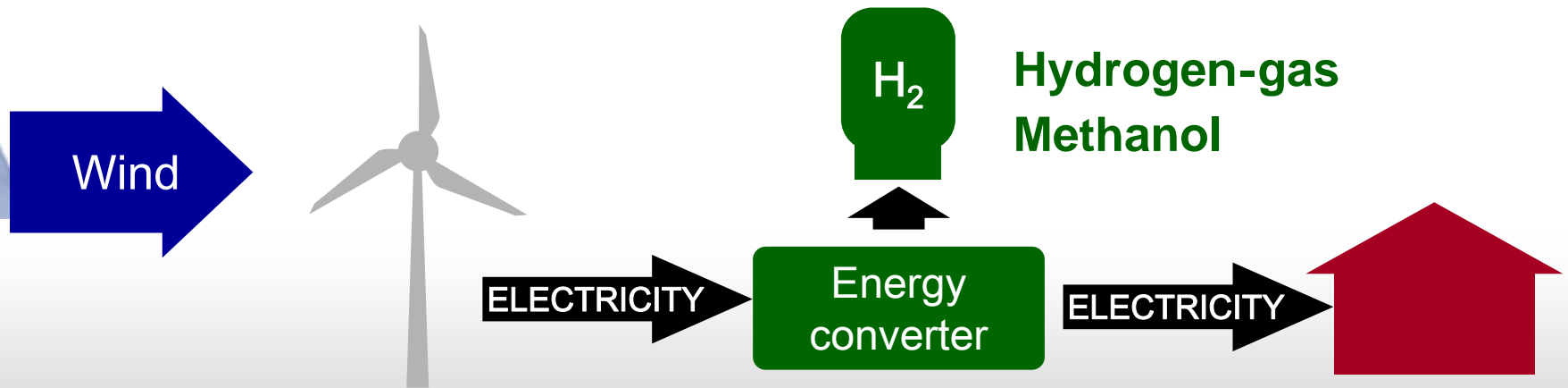


# Converting, storing and using energy

## Multiple energy sources

- Hydroelectric power
- Wind power
- Solar energy
- Biogas
- Fossil gas





- **Uses more of the wind**
  - Weak and strong winds
  - Varying winds
- **Stores excess energy**

#### Areas of use

- Households
- Regions with no electricity
- Telecom base stations
- Wind power parks

# Segment

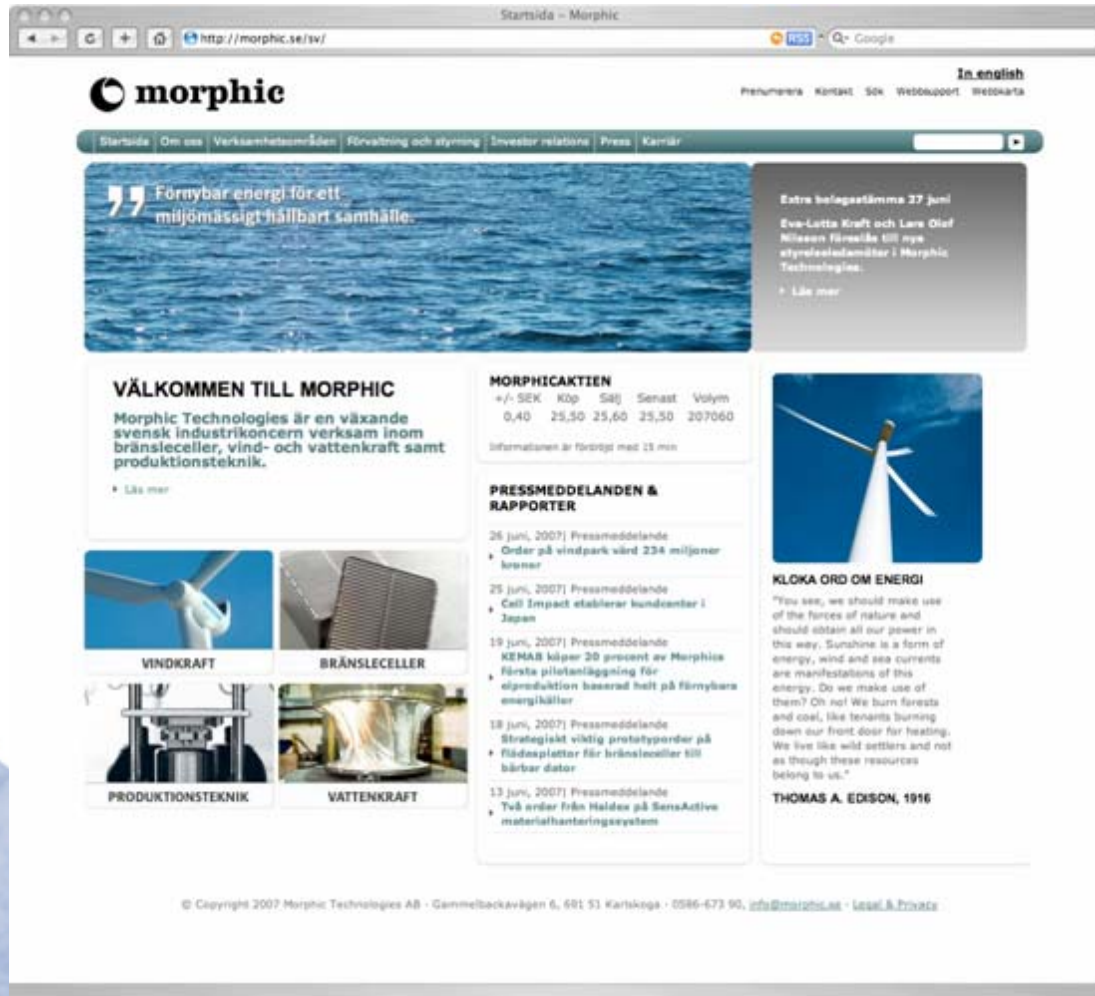
## Contract production in Swedish hydroelectric industry

- Renovation, modernization and upgrading of hydroelectric power stations
  - Market with few players
  - Major investments going ahead
  - Approx. 1,900 hydroelectric power stations in Sweden
  - 20 projects completed since 2001
  - Vattenfall
  - E. ON
  - GE Energy





# www.morphic.se



Startsida - Morphic

http://morphic.se/sv

In english

Prenumerera Kontakt Sök Webbshoppt Meddelanden

Startsida Om oss Verksamhetsområden Förvaltning och styrning Investör relationer Press Karriär

**Förnybar energi för ett miljömässigt hållbart samhälle.**

Extra bolagsstämma 27 juni  
Eva-Lotta Kraft och Lars Olof Nilsson föreslår till nya styrelseledamöter i Morphic Technologies.  
Läs mer

**VÄLKOMMEN TILL MORPHIC**  
Morphic Technologies är en växande svensk industrikoncern verksam inom bränsleceller, vind- och vattenkraft samt produktionsteknik.  
Läs mer

**MORPHICAKTIEN**  
+/- SEK Köp Sålj Senast Volym  
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Informationen är föråldrad med 13 min

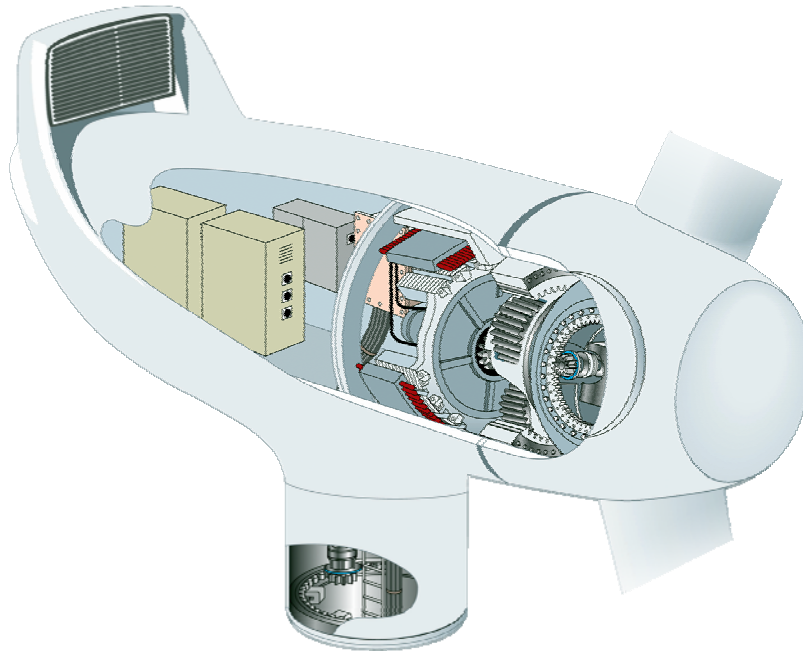
**PRESSMEDDELANDEN & RAPPORTER**

- 26 juni, 2007 Pressmeddelande  
• Order på vindpark värd 234 miljoner kronor
- 25 juni, 2007 Pressmeddelande  
• Cell Impact etablerar kundcenter i Japan
- 19 juni, 2007 Pressmeddelande  
• KEMAS köper 20 procent av Morphics första pilotanläggning för ölproduktion baserad helt på förnybara energikällor
- 18 juni, 2007 Pressmeddelande  
• Strategiskt viktigt prototyporder på flädesplattor för bränsleceller till bärbar dator
- 13 juni, 2007 Pressmeddelande  
• Två order från Haldex på SensActive materialhanteringsystem

**KLOKA ORD OM ENERGI**  
"You see, we should make use of the forces of nature and should obtain all our power in this way. Sunshine is a form of energy, wind and sea currents are manifestations of this energy. Do we make use of them? Oh no! We burn forests and coal, like tenants burning down our front door for heating. We live like wild settlers and not as though these resources belong to us."  
**THOMAS A. EDISON, 1916**

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# *DynaWind – integrerar bästa know-how*



EUROS

*aerodyn*

ABB

metso

FAG



**DynaWind och WinWinD arbetar som integratörer, vi tar hand om design, montage, leverans och underhåll.**

**Vi samarbetar med välkända partners, som ta hand om komponent design och tillverkning.**

**WinWinD**