

Elektrische aspecten van kleine en middelgrote windturbines

25 maart 2010

Air Breeze



Energy Ball



Hannevind





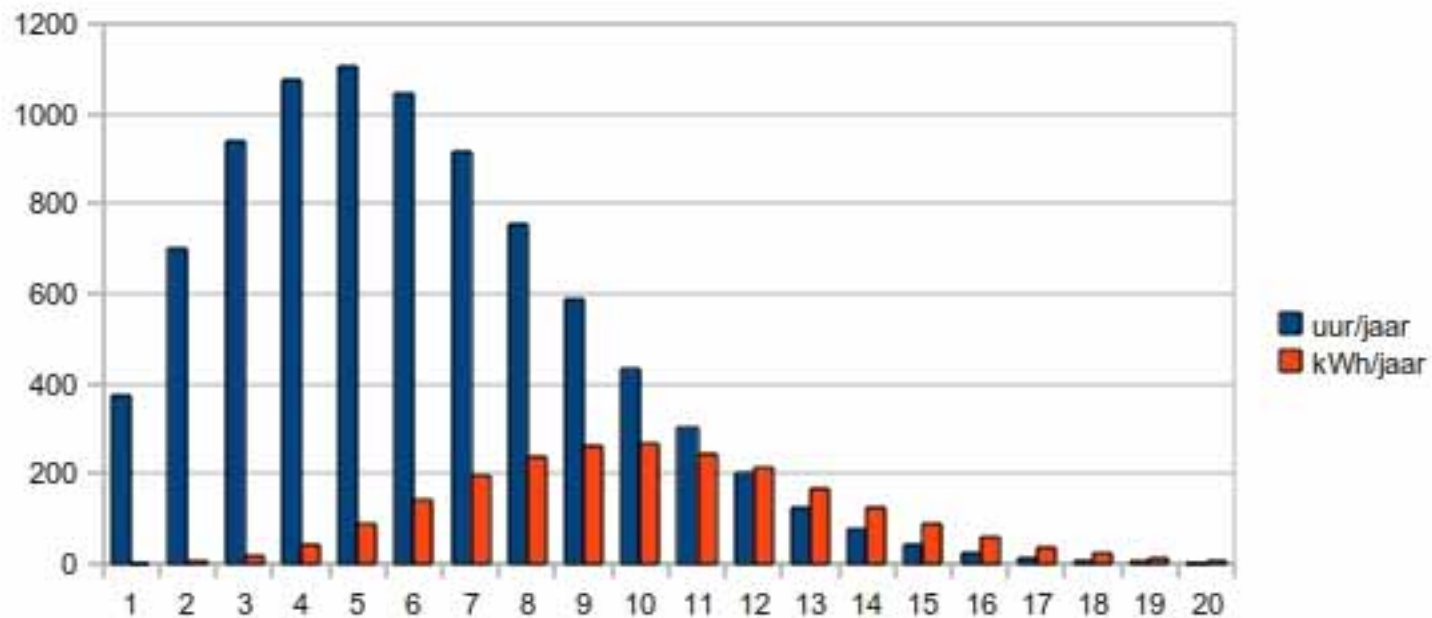
Energieproductie:

$$\frac{1}{2} \rho C_p A v^3$$

- ρ • Air density
- C_p • coefficient of power
- A • Swept Area
- v • Wind speed

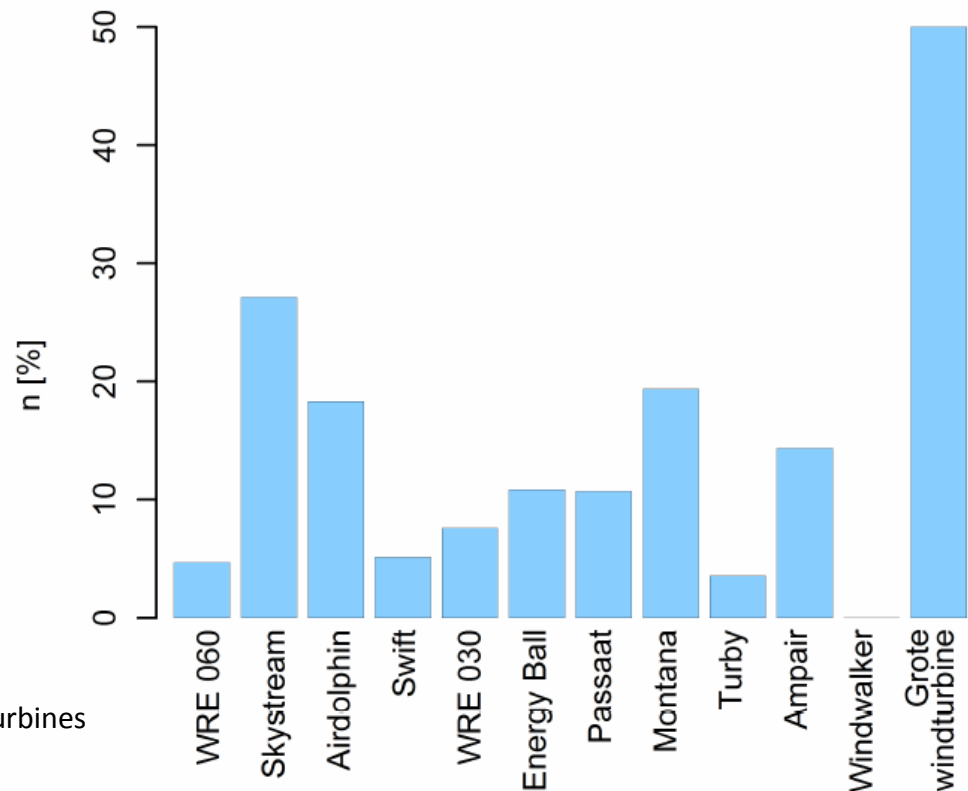
V

- Wind speed
- Average wind speed
- Raleigh distribution

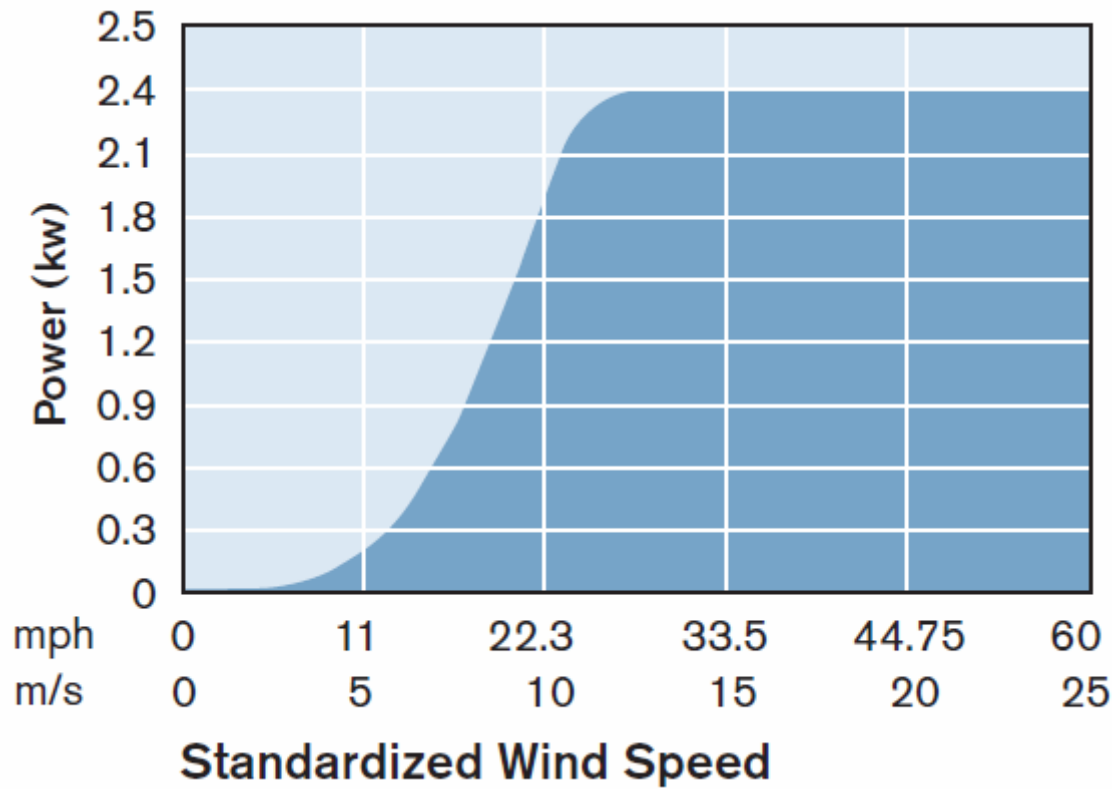


C_p = Afhankelijk van de rotatiesnelheid en de windsnelheid

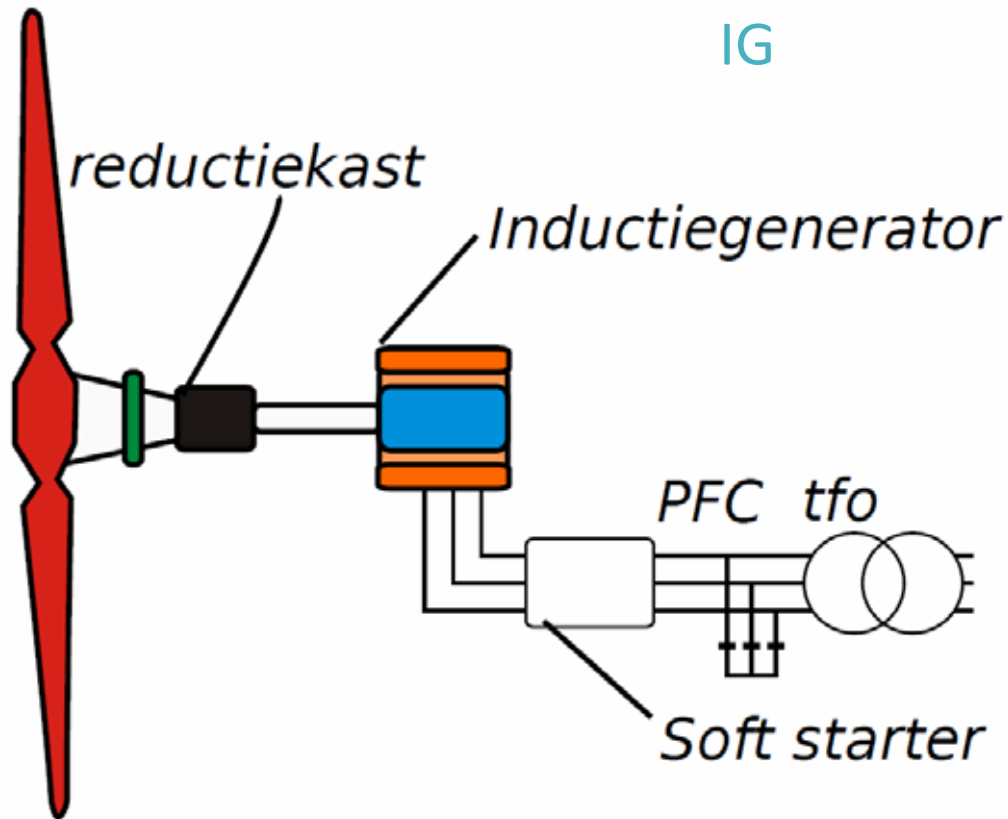
Betz-limiet: Theoretisch maximum 59,3%



Bron: [IngreeniousR01_2009] Ingreenious, 1ste Evaluatie meetresultaten testveld kleine windturbines Zeeland, Rapport 0904000.R01, May. 2009

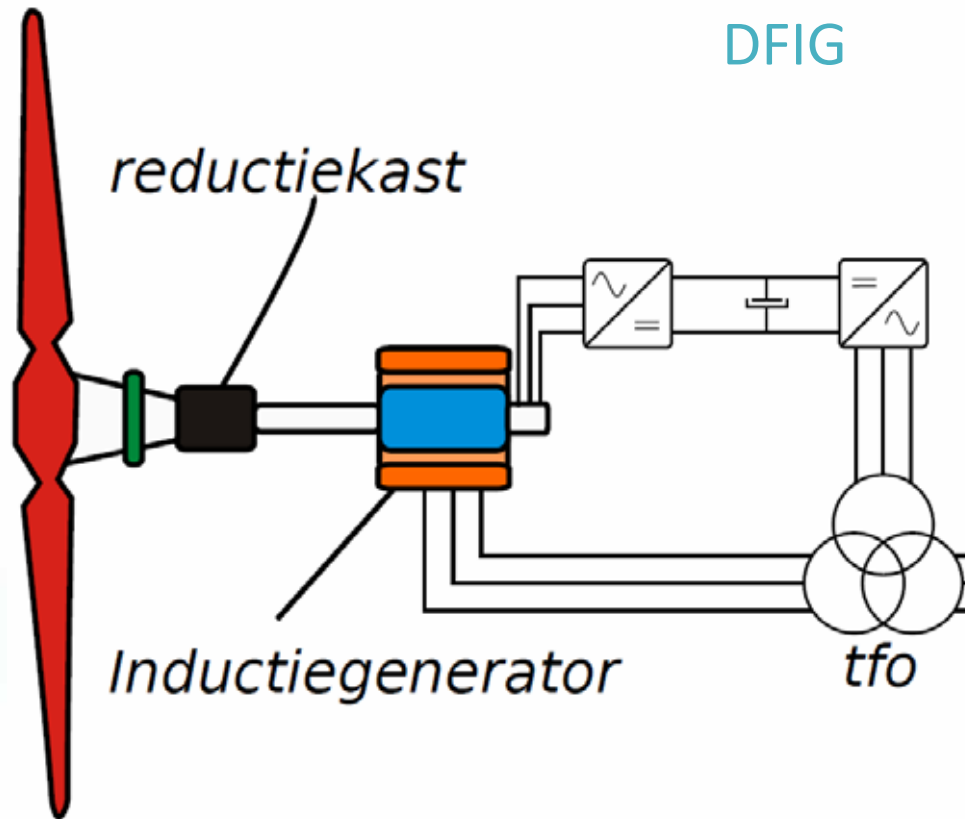


power curve
 x
 frequentieverdeling
 windsnelheden
 =
 AEP

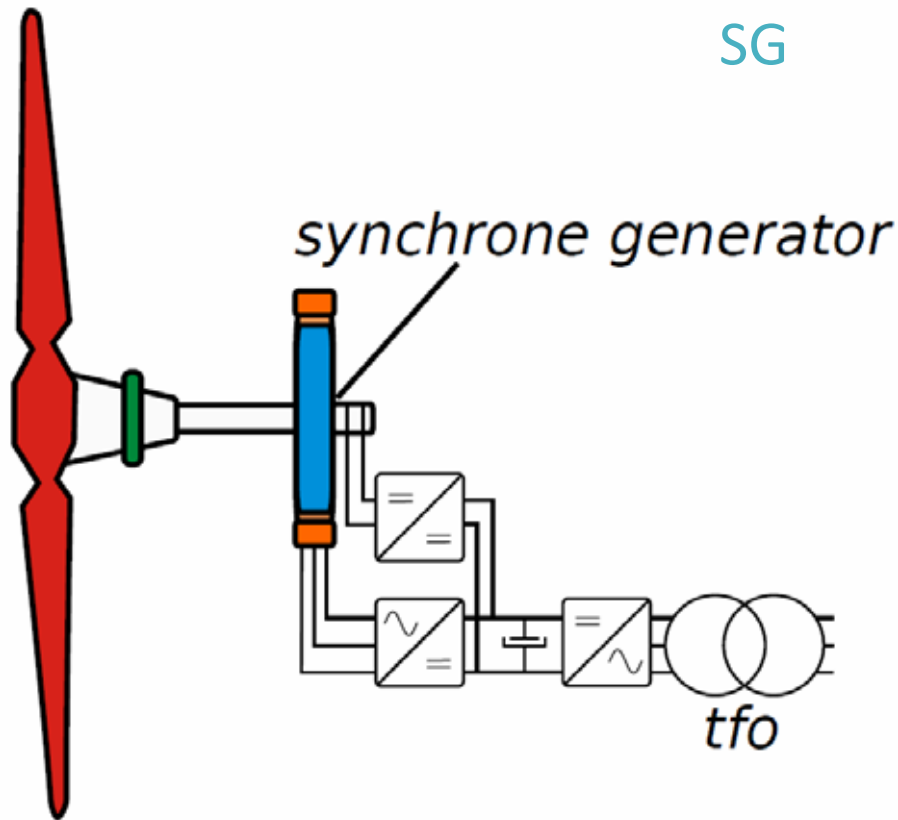


IG

- robuust
- goedkoop
- gearbox
- mechanische belasting
- constant speed
- geluid
- PFC



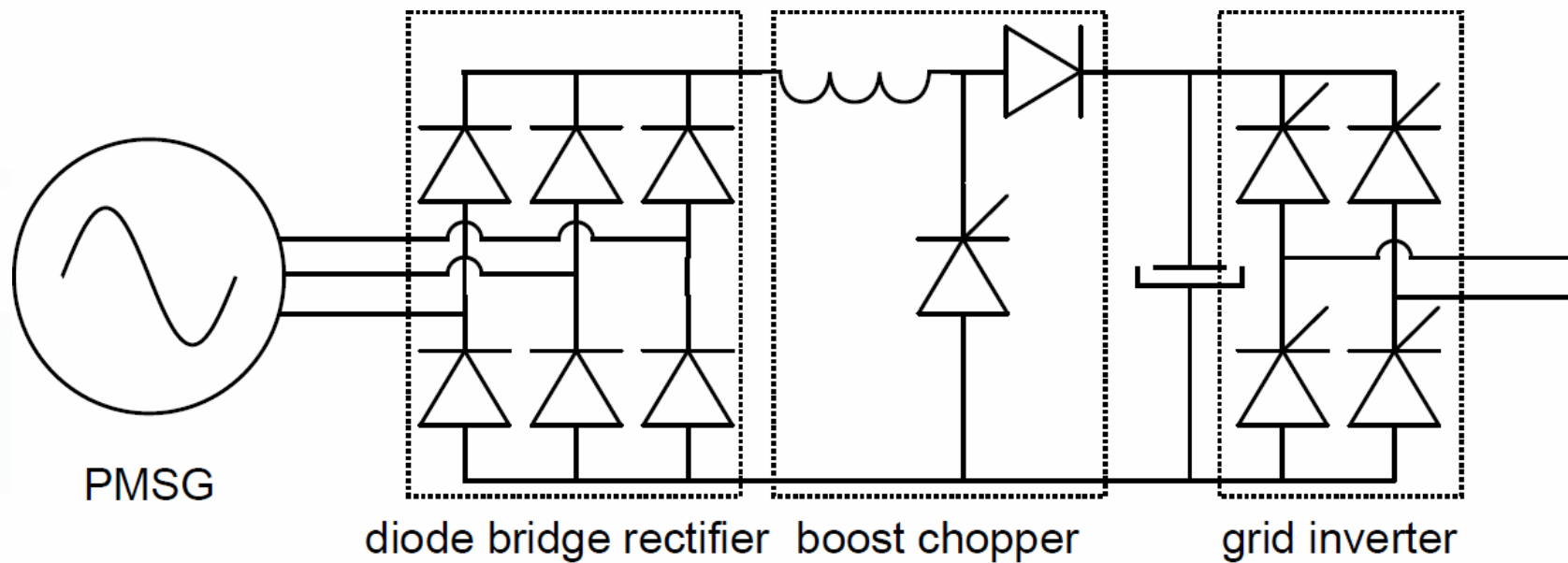
- variable speed
- duur
- sleepingen
- gearbox
- small PE converter



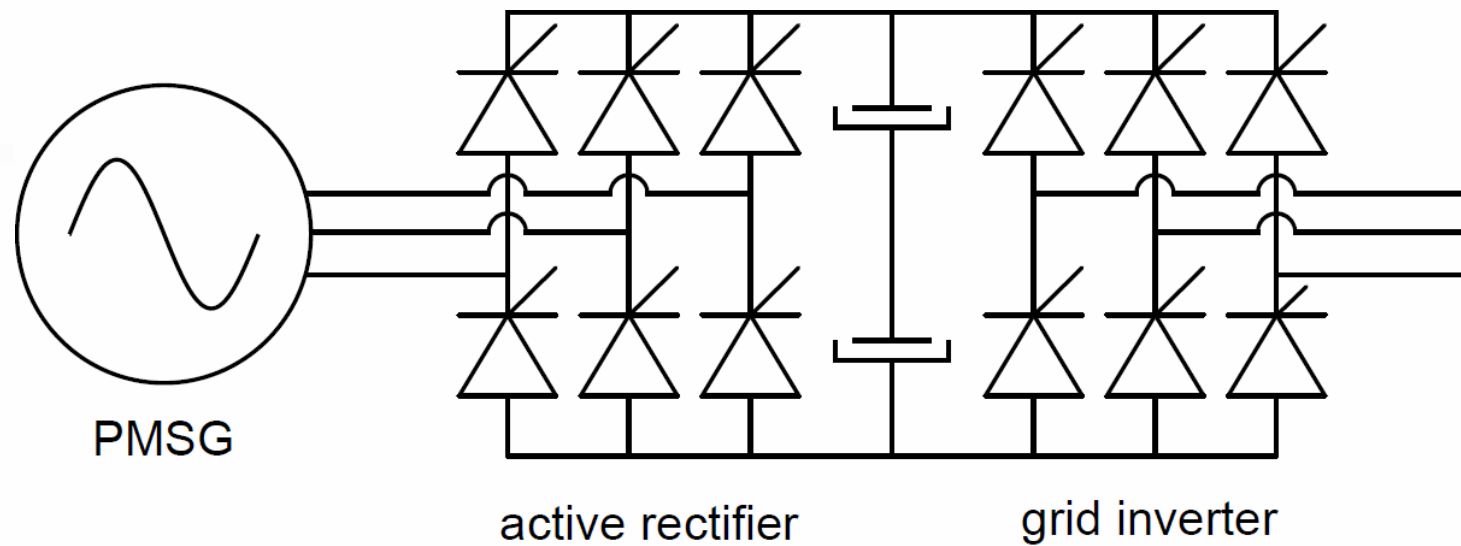
SG

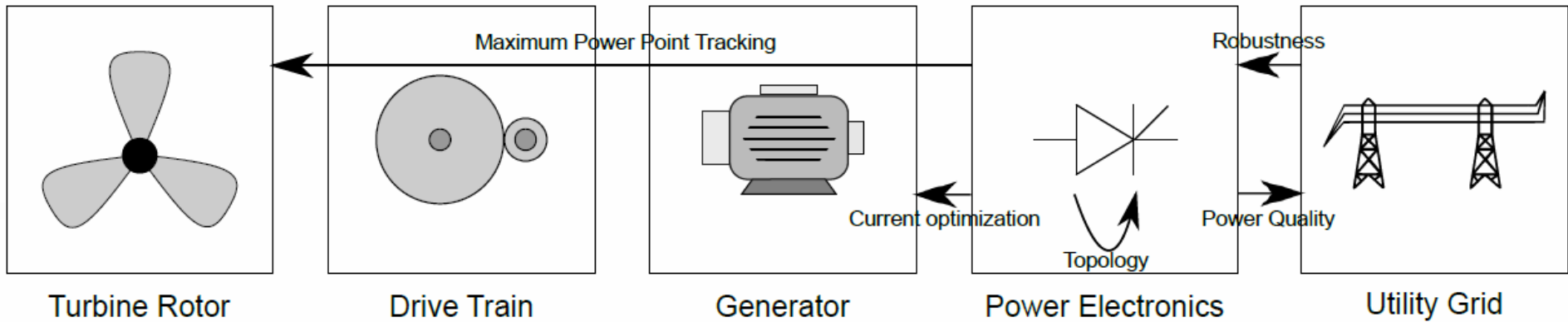
- variable speed
- permanent magnets
- direct drive
- duur
- zware generator
- full converter

Standaard Oplossing



Back-to-Back convertor





- West-Vlaams wetenschapspark



- Cleantech business park
- Incubator high-tech starters
- R&D omgeving
- CO₂-neutraal terrein
- Greenbridge wetenschapspark ~ UGent
- Greenbridge incubator ~ Greenbridge nv



- Energiekennisplatform
 - Gevestigd in Greenbridge incubator
 - Duurzame en hernieuwbare energie
 - Kennispartner – onderzoek
 - Netwerkpartner – actoren
- Activiteiten
 - Energiesector interlinken
 - Wetenschapsplatform uitbouwen
 - Onderzoeksprojecten faciliteren
 - Seminars, B2B, etc. Organiseren
- Hefboom voor Greenbridge wetenschapspark



Projecten

- Onderzoeksprojecten
 - Vlaams – nationaal
 - Europees – internationaal
- Demonstratieprojecten
 - MVO-technologieën
 - CO2-neutraal terrein
 - Events
- Educatieve projecten
 - jongeren en wetenschap
 - demo en edu site ontwikkeling



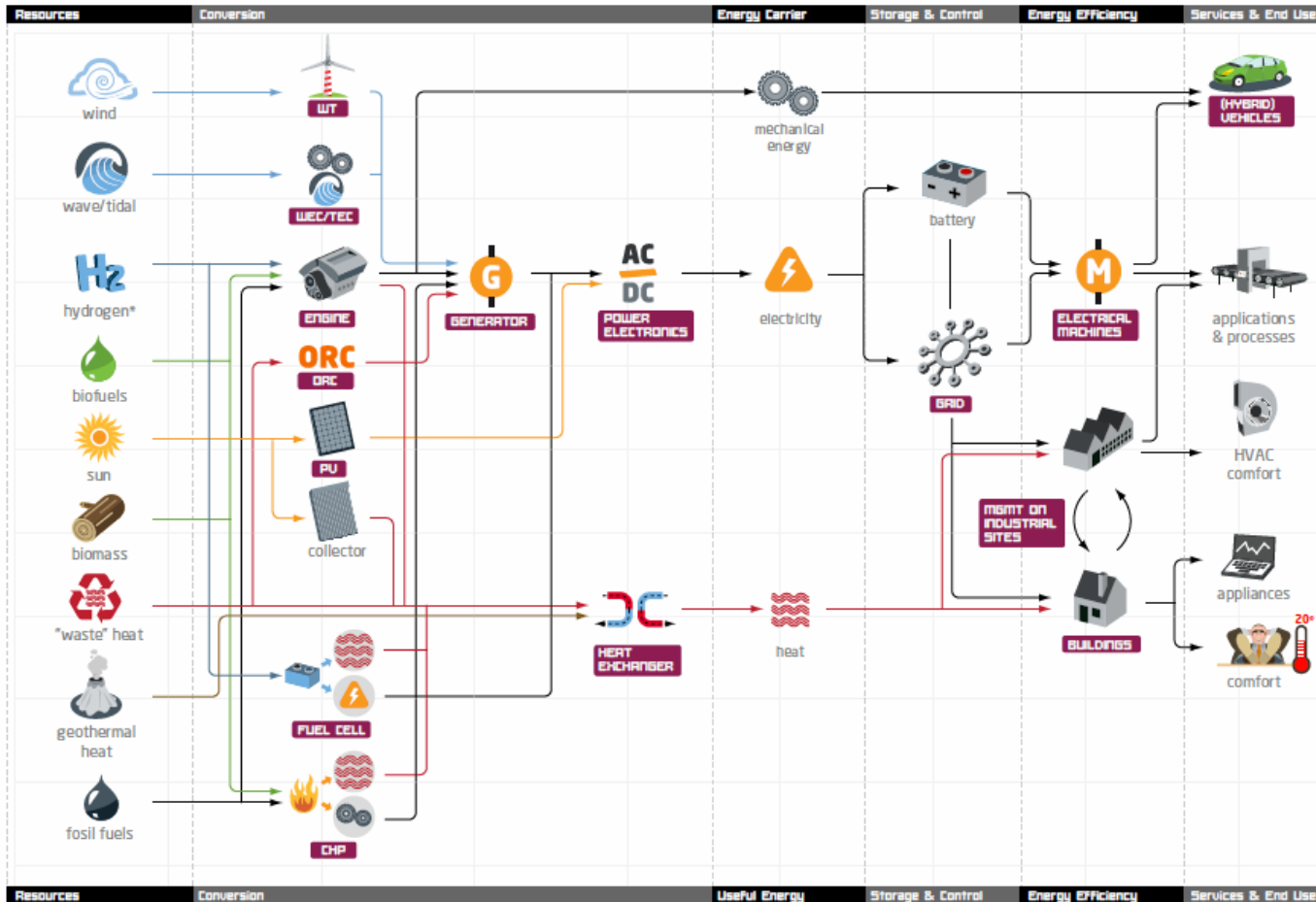
- Energieportaaalsite
 - ledenvereniging & -voordelen
 - toegang tot high traffic portaaalsite
 - upfront cleantech informatie
 - zichtbaarheid van & voor bedrijven, technologieën, ...
 - netwerking evenementen
- Activiteiten
 - PowerDays
 - PowerFair
 - PowerEvents
- Linked in Power

WWW.POWER-LINK.BE



- The Energy Box (TEB)
 - ‘working tomorrow’
 - demonstrator nieuwe energietechnologieën
 - combinatie, demonstratie, monitoring, commercialise
 - onderzoek - ontwikkeling – ondernemen
- Doelgroep
 - KMO’s, start-ups, spin-offs, R&D centra, valorisatieplatformen, ...
 - innovatieve en combinatieve energie-concepten of producten







Small Wind Turbine Field Laboratory



The diagram shows a small wind turbine with various research areas indicated by arrows:

- technology demonstration (pointing to the nacelle)
- generator and inverter efficiency (pointing to the generator area)
- generator design (pointing to the generator area)
- inverter optimisation (pointing to the inverter area)
- energy yield and power curve (pointing to the mast)
- blade and mast fatigue (pointing to the mast)
- noise propagation (pointing to the blades)
- noise sources (pointing to the blades)

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