African Utility Week

CSIR Energy Autonomous Campus Programme

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our future through science

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www.african-utility-week.com

CSIR PRETORIA CAMPUS OVERVIEW

- ✓ 150 ha
- ✓ 52 Buildings
- ✓ 30 GWh/yr electricity consumption
- ✓ 3 MW Base Load
- ✓ 6-7 MW Peak Load

PROGRAMME OVERVIEW

- Recognizing the importance of long-term strategic vision with respect to campus energy
- South Africa's endowment with world-class solar and wind resources combined
- Strong cost decreases for solar and wind technologies
- Demonstrate how a primarily renewables-based energy system can be designed and operated
- Integrating energy generating and consuming systems

KEY REQUIREMENTS

- **Distributed Generation**
  - ✓Multiple generation sources (Eskom, solar, wind, biogas)
  - ✓Energy Efficiency
  - ✓Energy Storage (batteries, hydrogen)
- **Reliability**
  - ✓Provide a robust infrastructure
- **System Intelligence**
  - ✓Monitoring and control
  - ✓Integrated energy supply and demand control
  - ✓Demand Response

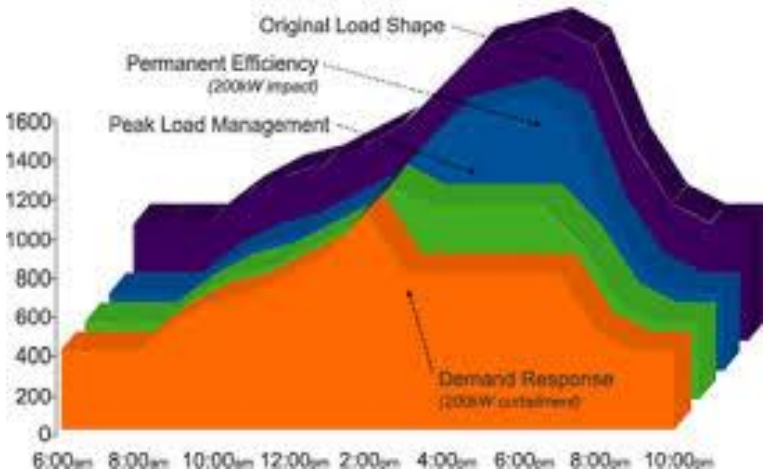
Potential CSIR's energy supply mix

Solar PV: rooftops, ground-mounted plants
Total of 8 MWp → 13 GWh/yr

Wind: 3-4 MW-class wind turbines
Total of 3 MW → 7 GWh/yr

Biogas: Municipal solid waste and/or organic waste from surrounding supermarkets & restaurants
4-5 MW @ 800-1,000 hrs/yr
→ 4 GWh/yr

CSIR's energy saving potential



Current consumption: 30 GWh/yr

20% reduction through energy efficiency to 24 GWh/yr)

Load management : Flatten residual load, peak shaving, incl.EVs

Potential energy storage technologies

Hydrogen : For long-term storage of excess electricity

Batteries: For short-term peak shaving

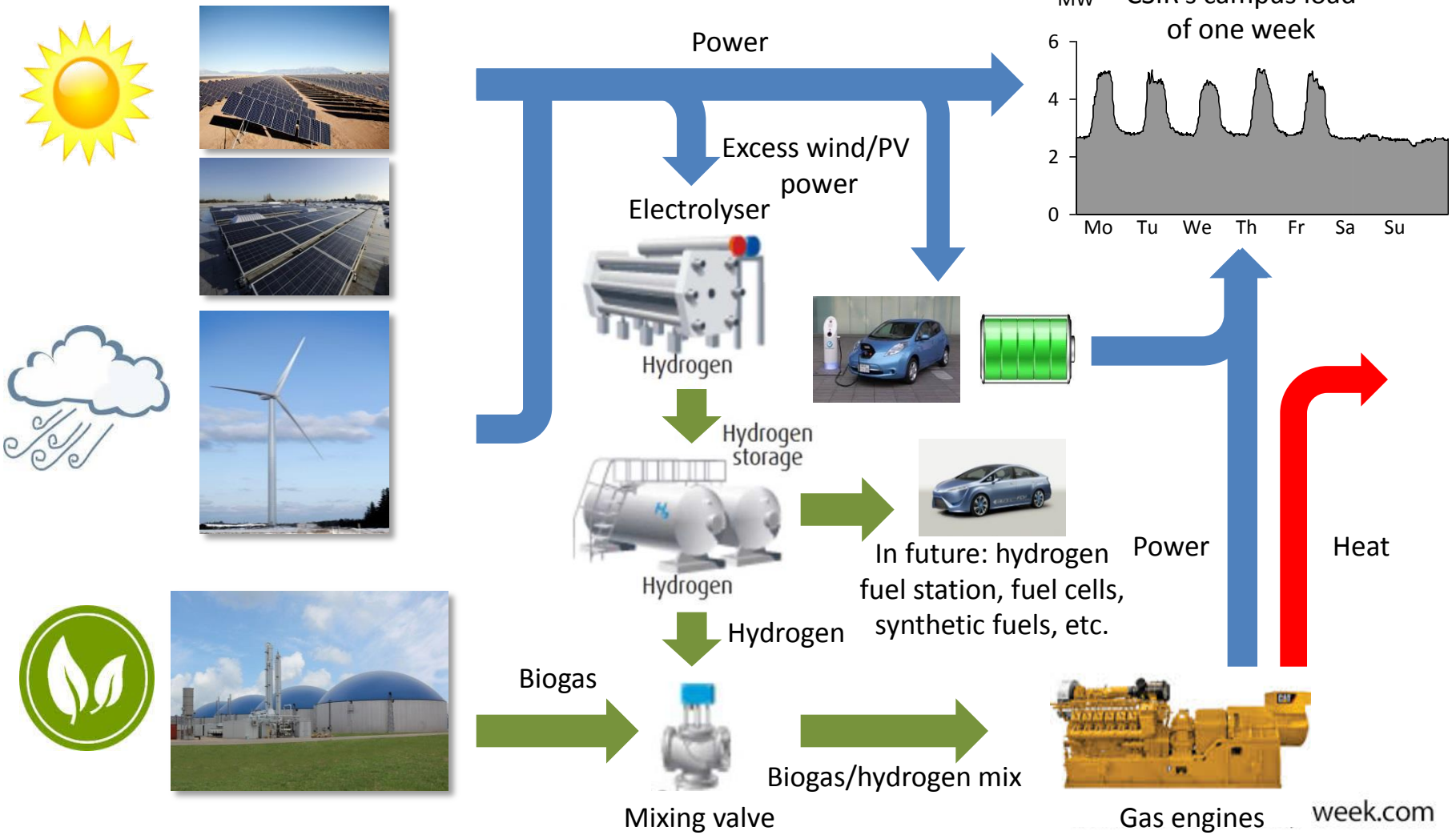
Heat storage: For flattening of heat/cold demand

Allow to extend generation capabilities

Integrated intelligent energy system

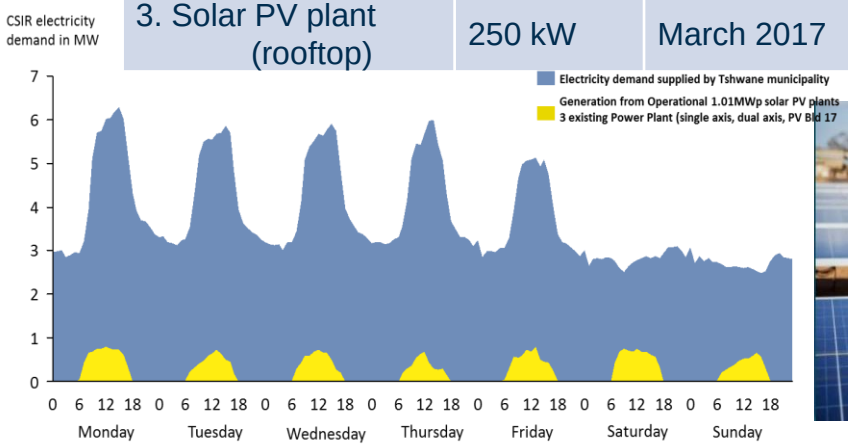
- Establishment of a control and visualization centre
- Deployment of Advanced Metering Infrastructure (AMI)
  - ✓ Enable the integration of the various technologies (EVs, Storage, etc)
  - ✓ Enable two-way communication for demand response, system monitoring

Vision: Real-world research platform for a future integrated energy system



Highlights: Operational solar PV plants

Project	Size	Commissioned	Investment	
1. Solar PV plant (1-axis)	558 kW	August 2015	R10.75 m	
2. Solar PV plant (2-axes)	200 kW	November 2016	R7.0 m	
3. Solar PV plant (rooftop)	250 kW	March 2017	R4.5 m	



Re a leboha

Ha Khensa

Enkosi

Siyathokoza

Thank you!

Re a leboga

Ro livhuha

Dankie

Siyabonga