PROJECT of RENEWABLE ENERGIES SYSTEMS
at DUMONT d’URVILLE and CONCORDIA

Concordia

1110 km

Stations with French activity

Dumont d’Urville

2700 km

SOUTHERN OCEAN
Nb of buildings: 55
Built surface: 5000 m²
Heated surface: 3000 m²
Mean produced electrical power: 90 kw
Fuel needs: 370 m³
Water yearly produced: 1500 m³
Wind Speed Frequency Distribution - Dumont d'Urville

based on 1962-1995 Wind Statistics - 3 hourly 10 minute averages @10m
Concordia (IPEV- PNRA)

- Nb of buildings: 10
- Built surface: 2500 m²
- Heated surface: 2200 m²
- Mean produced electrical power: 80 kw
- Fuel needs: 250 m³
alternative energies

Wind Speed Frequency Distribution at Dome C
(Standard Wind Speed at 10m height, 15°C and 1013hPa over 11 years: 1985-1995)
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Applications

Dumont d’Urville

- Good and strong winds
- Snow
- Frost

Wind turbines
looks better than
solar arrays

As Ipev has not the capacity,
funds and skills to install and
maintain on a long term, a 200
kw machine

We are searching on the
market a mid power (20-30
kw) vertical axis machine

Concordia

- Nearly no wind
- Nearly no snow
- Frost but disappear with light

Solar array is at first preferable
Research of machine made for low winds
Or research of a balloon machine
Overview of vertical axis wind turbine makers

- 10-30 kw machine not in production
  - Vertica / Quebec Canada
  - Fairwind / Belgium
  - Applewind / France

- 10-30 kw machine in production
  - Gual / France
  - Aquilo / Ontario Canada
  - Ropatec / Italy
Dumont d’Urville wind potential energy

Ropatec 20 kw vertical axis wind turbine

Type: Ropatec MegaStar
Power: 20 kw @ 12m/s
Weight: 3500 Kg (without mast)
Cost (with winterisation): 75 000 Euro
Dumont d’Urville wind potential energy

Exemples of balloon wind turbines (Maggen)
Concordia photovoltaïc project

1 – Determination of a suitable module

10 Photowatt PW 1650 = 1750 W – 240 V

10 Auversun AV 230 = 2300 W - 300 V
Concordia photovoltaïc project

2 – Best field results with AUVERSUN module

Puissances des modules photovoltaïques Auversun AV230

Station Concordia - 15 Mars 2010

30% benefit given by the good optical characteristics of the site
Concordia photovoltaïc project

3 – Physical installation at Dome C

Number of modules: 168 (14 masts of 12)
Theoretical power 1st step: 38 640 W
Practical power 1st step: 55 000 W
Disposition: 270° Sun tracking
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Concordia photovoltaïc project

6 – Equipment budget

Overall budget

Solar modules (170 @ 1.7 €/Watt) : 66 500 €

Electrical wiring (-50° quality) : 45 000 €

Buried feet's supports : 19 500 €

Aerial supports : 65 000 €

Shelter : 70 000 €

Electrotechnical equipment : 102 000 €

Battery set : 27 000 €

Total equipment : 395 000 €

Present needs : 788 000 Kwh
Annual production : 83 000 Kwh (10.5 %)
Fuel saving : 24 m3
Concordia photovoltaïc project

7 – Conclusions

Present needs : 788 000 Kwh
Annual production : 83 000 Kwh (10.5 %)
Fuel saving : 24 m3
Budget savings : 70 000 € / Year

In the situation of Concordia

The additional interests of this installation are to :

- Cut the traditional summer peak
- With the help of the batteries, reinforce the electrical shading during the year