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## FUEL-CELL TECHNOLOGY FOR POLAR SCIENCE ?

### IPEV INTENDS TO SET UP A 'CLEAN' STATION IN NY-ALESUND, SVALBARD IN 2007

**Date : January 1<sup>st</sup>, 2005.**

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The French Polar Institute (IPEV) is a support agency for french scientific researches in polar areas. In the North, its activities are focused in Ny-Alesund, international scientific village situated on the west coast of Svalbard (79°N), where the French arctic stations are located (Base Jean Corbel and Station Charles Rabot), they act as a part of the French-German platform (AWIPEV platform). See also our web site : <http://www.ipev.fr/awipev>.

#### Scientific Context :

- The international scientific community invested in climate and its short-term changes, large-scale topical theme for the planet's future, met at IPEV on May 2002, so as to confirm the scientific interest of Corbel base in the realization of atmospheric chemistry research programmes on an easy access "clean" site (report available on request). The stakes are of great importance, because this "clean" base in Arctic by 80° North (that is to say in the middle of the Arctic climatic complex) will be close to an easy logistic servicing and accommodation. The knowledge of chemical processes in the snow and on glaciers is rather limited due to, at least, polluting logistics used for field experiments.

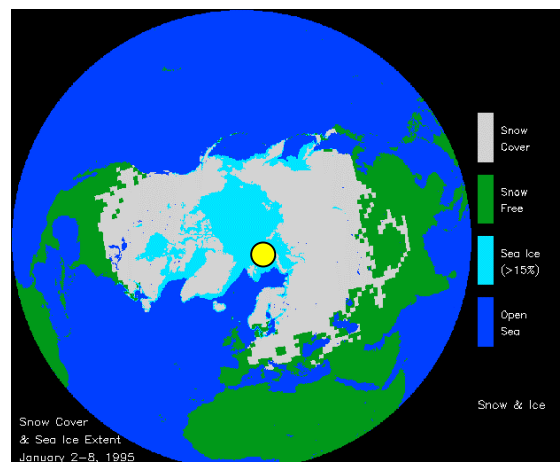
#### IPEV wishes to answer to :

- The international scientific community in setting up new tools for atmospheric researches in Svalbard area, using fuel cells as a "clean power".
- On the same time, the new regulations in Svalbard, reducing the human impact on the Environment in Svalbard.

This drives in concrete terms in setting up 3 projects, all linked with new technologies power supply.



Corbel Station (Spitsberg, 78°54 N, 12°07 E), May 2002



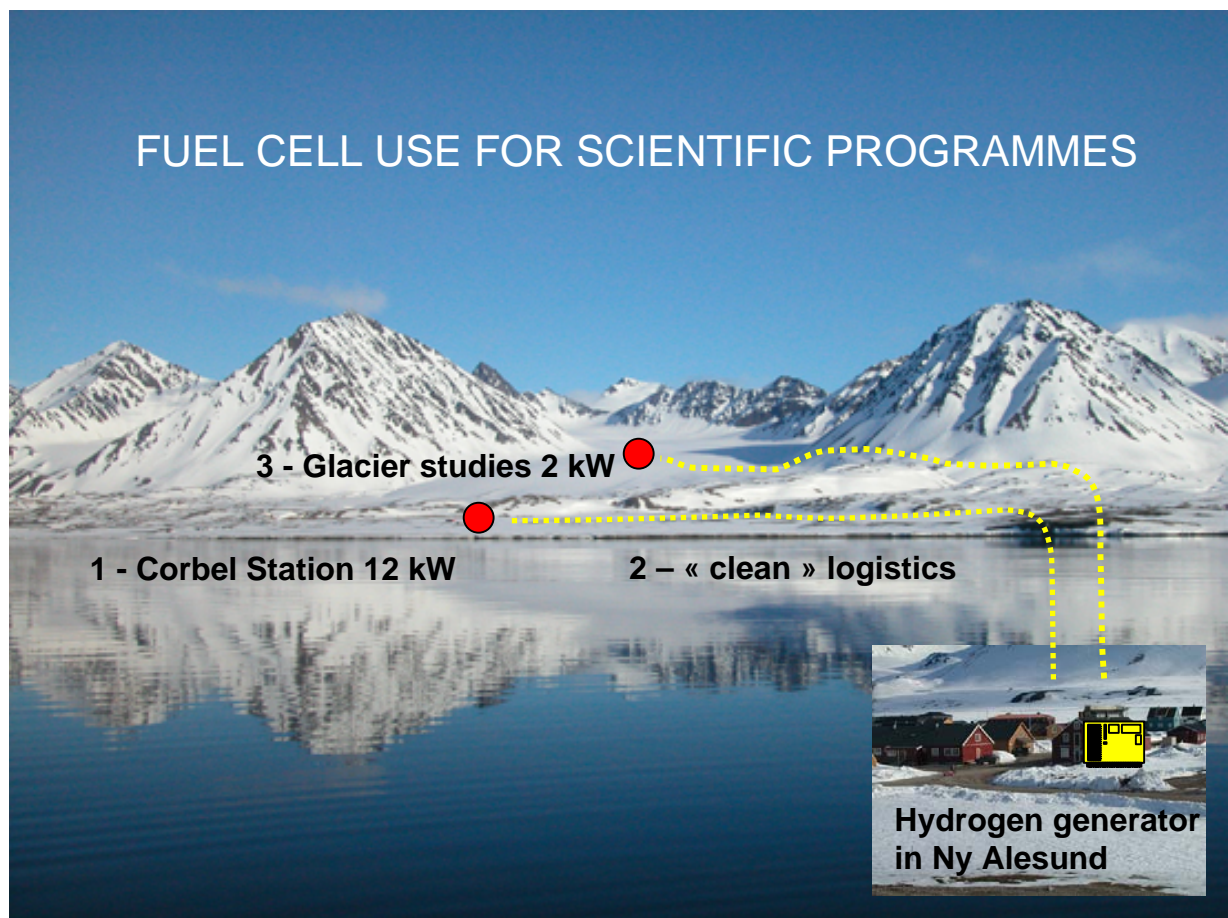
Spitsberg location and snow pack in winter 1995

## FUEL CELL TECHNOLOGY, IN RELATION WITH SCIENCE

● **Project 1 – Corbel Station development as a reference site for atmospheric researches : 12 KW hydrogen fuel cell supply for winter 2006/2007.**

● **Project 2 – Unpolluting logistics in winter and summer. Using snow scooters, and cars in summer all supplied with hydrogen fuel cells systems, to minimize pollution event in Ny-Alesund village.**

● **Project 3 – “transportable hydrogen fuel cell packs”, to be moved on glaciers studies sites so that to provide sufficient energy for snow/ice chemistry experimentation.**



● **Project 1 – Corbel Station development as a reference site for atmospheric researches :**

**12 KW hydrogen fuel cell supply for winter 2006/2007.**

**Technical views ;**

**HYDROGEN**

- **HYDROGEN SOURCE** : Hydrogen generator + compressor located in Ny-Alesund village (5km from Corbel Station).
- **HYDROGEN STORAGE** : Hydrogen cylinders type B50.
- **TRANSPORTATION TO THE SITE CORBEL** : Electric Snowscooter to minimize pollution around the site. Adaptated sledge.

**FUEL CELLS**

- Providing 12 – 15 KW permanently for at least 30 days (average period for scientific experimentation), in winter.
- 2,5 KW per unit (6 pieces are requested) (cf project 2). Peak : 4 KW.
- Installation into insulated room at Corbel Station (-20°C in winter without any heating)

**Planning ;**

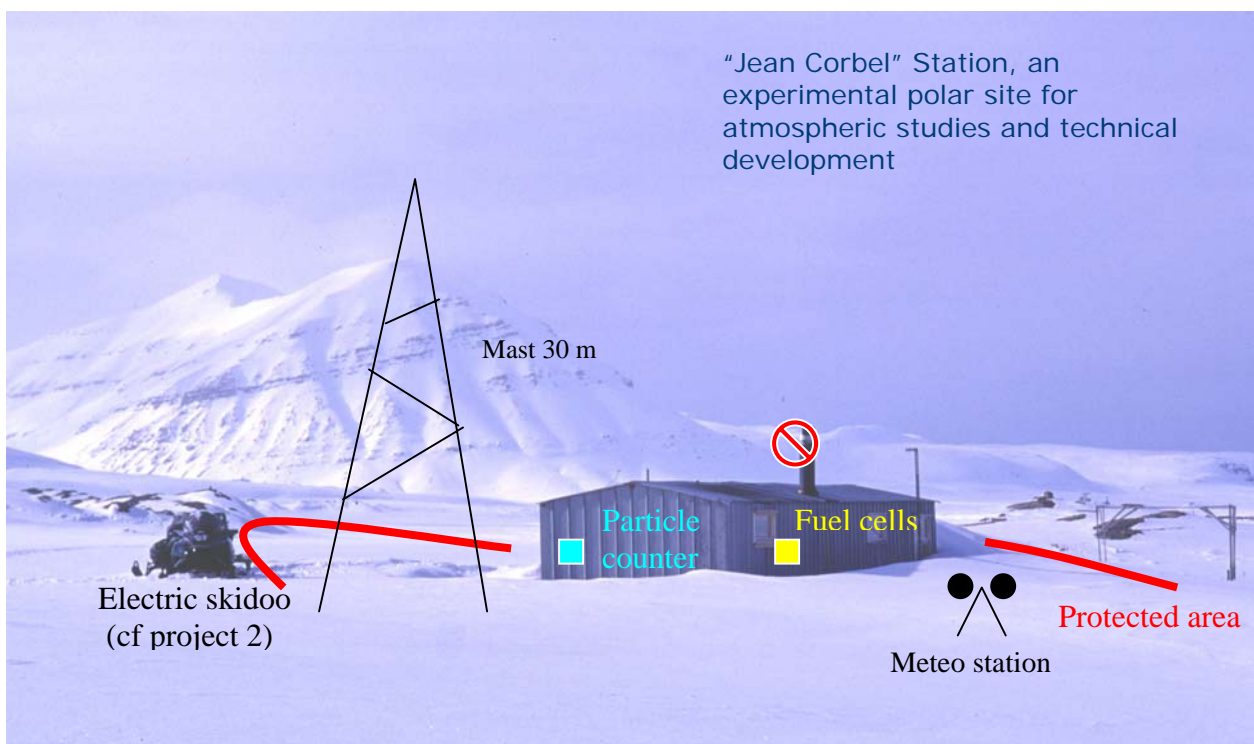
IPEV looks for partnership to buy / provide the hydrogen system and fuel cells.

2005 : budget + preliminary summer tests for adaptations in cold conditions

2006 : Tests in situ situations

2007 : Operation

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**● Project 2 – Unpolluting logistics in winter and summer. Using snowscooters, and cars in summer all supplied with hydrogen fuel cells systems, to minimize pollution in Ny-Alesund village.**

**Technical views :**

HYDROGEN : (see project 1) : Hydrogen generator in Ny Alesund.

FUEL CELL SNOWSCOOTER : 2 prototypes.

Autonomy : 10 Km (Corbel Station to Ny Alesund), and 100 km (access to glaciers).

FUEL CELL CAR : 1 prototype, adapted for large volume transportation (small boat)

Autonomy : 30 km. Access to different places in the village of Ny Alesund.

A prototype joining both systems can be very useful (snowscooter in winter, terrestrial car in summer, using wheels and trawler). Submission to Norwegian authorities.

**Budget / Planning :**

IPEV looks for partnership to buy / provide the prototypes.

2005 : looking for partnership / technical solutions

2006 : installation in winter/summer and tests for adaptations

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International scientific village, Ny Alesund



Because of pollution due to snow scooters, a lot of experimentations are done using skis, a restricted area around Corbel Station is delimited with sticks, to avoid risks of pollution.

● **Project 3 – “transportable hydrogen fuel cell packs”, to be moved on glaciers studies sites so that to provide sufficient energy for snow/ice chemistry experimentation.**

This project is linked with project 1.

**Technical views :**

HYDROGEN : (see project 1) : Hydrogen generator in Ny Alesund.

FUEL CELL STACK : 2 KW units, transportable, and able to be carried by an adapted sledge (see project 1)

**Budget / Planning :**

**Planning : the same as project 1 :**

IPEV looks for partnership to buy / provide the hydrogen system and fuel cells.

2005 : budget + preliminary summer tests for adaptations in cold conditions

2006 : Tests in situ situations

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Surface ice drillings and logistic used



Snow sampling on glacier

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