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# Best Practice for Energy Management – Guidance and Recommendations

# Best Practice for Energy Management – Guidance and Recommendations


## *Summary*

1. This paper highlights the importance of ensuring that energy management is considered on Antarctic stations, in the field and on ships. COMNAP has a group focussed on energy management that continually looks at ways of recording and reducing the use of energy to produce power for activities in Antarctica. The best practice for use of energy has been developed into a set of guiding principles generally adopted by National Operators within their area of influence. These guiding principles are presented for comment and endorsement by the CEP.


## *Background*

2. Energy is essential to enable activities to be delivered and supported in Antarctica. It is needed to provide power, operate engines, heaters and other equipment including:

- Electrical generators on stations and in the field.
- Heaters, water and waste systems, and other plant in buildings.
- Aircraft, ships, boats and land based vehicles.

3. The primary means of supplying energy to Antarctica is through fossil based hydrocarbon fuels. Fuel is normally purchased commercially and subject to the variability of world market prices. The fuel is then transported to Antarctica by ship; the burning of fuel is necessary to propel the ship. Reducing the use of fuel saves operating costs, lowers the potential impact of a fuel spill should one occur, and reduces pollutants from engine exhausts. Reducing fuel use also lowers the emission of $CO_2$ and gasses that contribute to the greenhouse effect.

4. Understanding how and where energy is used is necessary before decisions can be made on how to make reductions. National Operators monitor and record fuel consumption on Antarctic stations to assist with the decision process. Measuring and reviewing electricity demand, utilities and fuel use are all key to understanding where energy is actually used in Antarctica.

5. The interpretation of energy use data enables technical solutions to be developed to reduce energy consumption. Major changes are also achieved through education programmes to convince personnel to undertake and sustain an energy saving approach. At some sites, changing the attitude of personnel has provided greater savings than technical solutions and is less expensive to implement.

6. Technical solutions to reducing energy have been achieved through:

- Replacing buildings and structures that have high-energy demand with new facilities incorporating enhanced levels of insulation. Ensuring that architectural and engineering designs incorporate passive features to eliminate heat loss.
- Introducing heating and lighting systems that are optimised as low energy systems. Incorporating energy management controllers to tightly match supply to actual demand.
- Installing electricity supply generators that match site demand and have heat recovery systems.
- Providing renewable energy systems where technically feasible including wind generators and solar panels. Wave power is under active investigation.
- Operating field camps with renewable energy systems rather than providing fuel based generators.

7. Operational solutions that have been developed to reduce energy include:

- Ensuring that ship and aircraft operations are optimised. Most ships operating in Antarctica use many times the volume of the fuel that is consumed on Antarctic stations. An example of

optimising ship operations is planning passage through sea ice for the least obstructed route. Fuel burn is significantly reduced.

- Close liaison with other operators to share facilities and maximise their use. The Dromlan air link enables efficient use of air operations for many Antarctic operators.

## *Use of Fuel*

8. The technology to generate renewable power in Antarctica is not always mature and can be very expensive to deploy. By providing an offset against the cost of delivering fuel to Antarctica however, a viable business case can often be developed. Using renewable energy systems reduces the emission of greenhouse gasses and the volume of fuel that has to be shipped to Antarctica. Although a reduction in fuel use can be achieved, it is likely that there will be a need for fossil fuels in the Antarctic for the foreseeable future.

9. COMNAP and the CEP have over the years developed procedures and provided guidance on the cleanup of oil spills, waste elimination and remediation of sites. By reducing the use of fossil fuels, the effect of fuel spills and emission of products from burnt fuel is also reduced. Energy saving and energy management are a one component of the process to reduce environmental impact in Antarctica.

## *Best Practice for Energy Management*

10. The energy management guiding principles developed by the COMNAP energy management group are generally adopted by National Operators within their area of influence. There is a significant recognition amongst operators that energy saving is essential to reduce environmental impact and the cost of purchasing fuel. The guiding principles are:

- Measure and clearly identify where energy and power is being used.
- Introduce an education programme to recognise the need for energy saving and encourage personnel to implement and maintain energy saving measures.
- Replace inefficient buildings or install enhanced insulation to ensure that heat loss is reduced.
- Replace power and lighting systems with energy efficient equipment and controllers that ensure that equipment is only using power when there is an operational need.
- Install energy efficient generator systems and make use of heat recovery systems where feasible.
- Investigate and where feasible install renewable energy systems to reduce the dependence on fossil based fuel.
- Reduce where possible operational activities. Particular attention to be paid to the routing of ships and the operation of engines to ensure lower fuel burn.

## *Recommendations*

11.The Committee on Environmental Protection is invited to consider the following recommendations:

(1) That the CEP recognises and endorses the energy management guiding principles developed by the COMNAP energy management group and generally adopted by National Operators within their area of influence.

(2) That the CEP adopts these guiding principles for use by all in Antarctica.