

Corporate Perspective, Norsk Hydro Magnesium
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INTRODUCTION

With each passing day, cooperating world organizations find it necessary to promote a changing strategy in order to meet the global greenhouse challenge. It was recently announced in the thirty year energy forecast from the International Energy Agency that overall energy consumption may increase by more than 60%, with a continuing strong dependence on hydrocarbons. In this scenario, industry must be prepared to present a much stronger business case for energy utilization and to provide greater environmental awareness and consequences to consumers (1).

Norsk Hydro ASA is a world leader in environmental responsibility and has over 400 production operations globally in more than 70 countries. Norsk Hydro has the primary environmental goal of creating efficient management of natural resources, as well as reducing waste and emissions, while taking great care to insure that its operations are as kind to humans as they are to the environment. Norsk Hydro's environmental principles, established in 1993, include specific attention to the impact of both production operations and products (2).

CURRENT ACTIVITIES

Norsk Hydro ASA is a charter member of the World Business Council for Sustainable Development (WBCSD) and is an active partner in the World Bank's Prototype Carbon Fund, the Sustainable Mobility Project, the Greenhouse Gas Protocol, the CO2 Capture Project, and several other partnerships. The company also holds membership in the European Climate Change Programme 6, Working Group 5 on Fluorinated Gases. Hydro is actively engaged in the global debate on sustainability, corporate social responsibility and maximizing the positive impact of production operations and products on communities and the natural environment.

Greenhouse gas emissions in 2001 for Hydro's major sectors were in the ratio 69% Agri, 17% Light Metals and 14% Energy, with total emissions being approximately 25 million tons of CO2 equivalent. Multiple ongoing approaches are used to reduce emissions, with sample projects being the development of new technology to reduce the formation of nitrous oxide during the production of nitric acid and the recent development of advanced pre-bake technology for aluminium production. Hydro's eco-efficiency index, a tool developed by the WBCSD to merge essential portions of both ecological and economic progress, has shown remarkable improvement over the past three years and now stands at about 0.3 tons of CO2 equivalent per ton of product.

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HYDRO MAGNESIUM OPERATIONS

Norsk Hydro is the third largest light metals manufacturer globally and the world's largest magnesium producer. Currently Norsk Hydro Magnesium achieves magnesium melt protection through the use of an SF₆-dry air mixture at the Becancour, Quebec, Canada primary production plant and the Porsgrunn, Norway remelting facility. An SO₂-dry air mixture is used for melt protection at the Bottrop, Germany remelting facility, the Xi'an, China remelting facility and the Porsgrunn, Norway research foundry.

Environmental commitment is a way of life at all of the Hydro Magnesium production facilities, with Figure 1 showing the trend in amount of protection gas used at the Becancour plant during the decade of the 1990's. This impressive record of continuous reduction resulted in the receipt of the prestigious EcoGESte Award from the government of Quebec. This award is made periodically to organizations that voluntarily commit to reduce their emission of greenhouse gases, and Norsk Hydro Canada Inc. was the first company ever to receive the award for a decade of achievement. A change in ingot product format in 2000 changed the SF₆ usage to 0.7 kg/MT, a value that has remained constant through 2002. The plant now generates <15% of the emissions given off in 1990 and also continues to maintain its ISO 14001 certification.

The Hydro Magnesium Norway production facility entered operations in 1951 and has operated continuously since that time, currently as a remelting facility. After concerted efforts through the early 1990's, the consumption of SF₆ dropped below 0.6 kg/MT in 1995 and has remained at least that low since that time. The consumption in 2001 was 0.55 kg SF₆/MT of Mg melted. Figure 2 shows the evolution of Norsk Hydro Magnesium's systematic greenhouse gas reduction efforts during the period that brought emissions to the current low levels.

Hydro Magnesium facilities in Bottrop, Germany and Xi'an, China both utilize an SO₂-dry air mixture for melt protection. Both plants meet Norsk Hydro and regional Health, Environment and Safety standards and strive to have their suppliers do so as well. Additionally, the social responsibility component of Norsk Hydro policy requires that the Xi'an plant does not employ personnel from the migrant work force.

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RECENT TRIALS AND FUTURE PLANS

In an ongoing effort to further reduce or eliminate greenhouse gas emissions from magnesium melting operations, Hydro Magnesium Technical Service has assisted die casting companies in trials with SO₂ based systems. The Becancour plant also conducted an extensive SO₂-dry air trial in 2001, with very satisfactory results. For example, the mixing, distribution and protection properties were all excellent, the ingot surface and quality were also excellent, and the emissions were very low and amenable to capture.

Additionally, the Hydro Research Foundry in Porsgrunn, Norway recently served as the test site for the International Magnesium Association sponsored project dedicated to the replacement of SF₆ gas in magnesium melting operations.

The plan for Hydro Magnesium is to eliminate SF₆ from all of its production plants before the end of 2005. Presently SO₂ is considered an acceptable alternative, although the accompanying enhanced safety risks and a non-ideal working environment are certainly disadvantages to this choice. In order to seek a potentially better solution, a fluoroketone (Novec 612) gas trial is planned for Becancour in early 2003. When that trial and potentially others are completed, Hydro Magnesium will be prepared to implement the best available technology in its operations.

REFERENCES

1. K. Oren, World Business Council for Sustainable Development, November 2002
2. Corporate website, www.hydro.com/environmental/global

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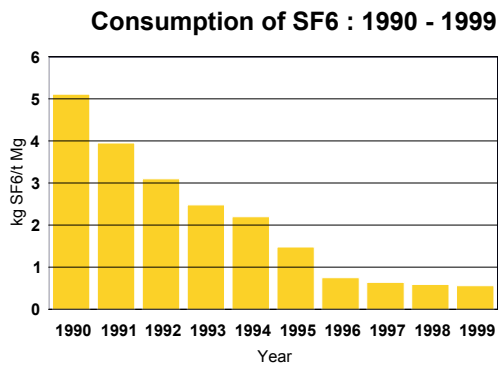


Figure 1: Reduction of SF6 consumption at Becancour, Quebec, Canada plant

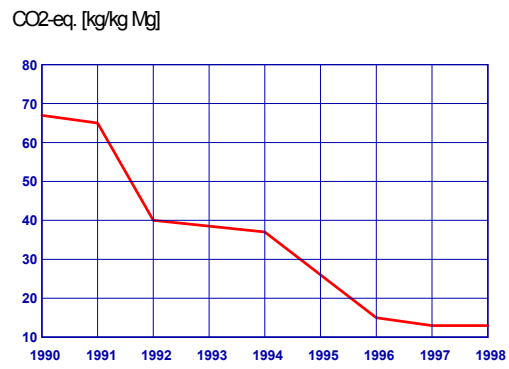


Figure 2: Norsk Hydro Magnesium Systematic Reduction of Greenhouse Gases