

Hydrogen at Akzo Nobel – Stockvik

Presentation at Green Highway Sundsvall – Östersund –Trondheim workshop at
Hotel Knaust 2013-11-26

Peter Gustavsson, Sr Process Specialist Chlorate Technology



Akzo Nobel – our parent company

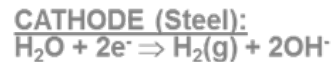
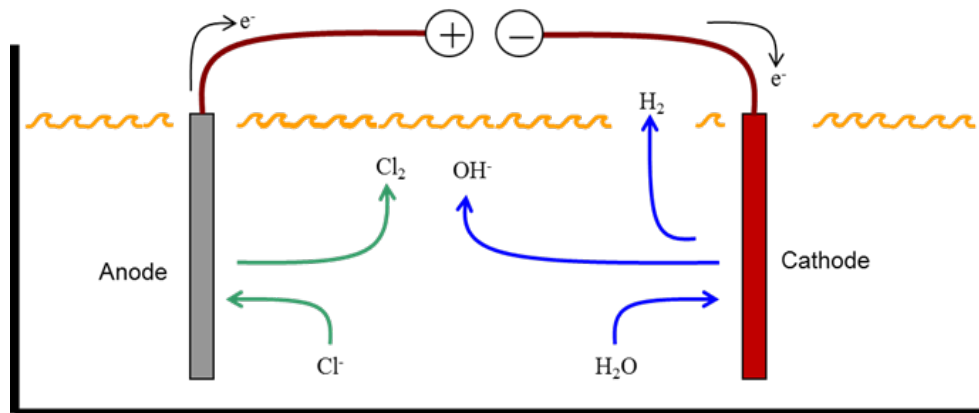


Akzo Nobel our parent company

- **The world's largest paint and coatings company and a major producer of specialty chemicals**
- **Committed to excellence and delivering Tomorrow's Answers Today**
- **Global Fortune 500 company**
- **Consistently ranked as one of the leaders in the area of sustainability**
- **.....**

This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.

Pulp & Performance Chemicals



Reactions



Overall reaction



Hydrogen is produced in sodium chlorate manufacturing

- PPC is the biggest producer of sodium chlorate in the world, with a capacity over 1 000 000 ton per year. That corresponds to 650 000 000 nm³/y.

This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.

Pulp and Performance Chemicals



- The world wide total production capacity for sodium chlorate is approximately 3 000 000 ton/ year.
- PPC is the biggest producer of sodium chlorate in the world, with a capacity over 1 000 000 ton per year.
- PPC has 13 production units in operation Europe, South America and North America.
- Sodium chlorate is a powerful oxidant. It is primarily used for production of chlorine dioxide that is used for environmental friendly bleaching of pulp, ECF method.

- **Chlorate drying, direct burning**
- **Steam production, fuel replacement**
- **Hydrogen peroxide, Hydrogenation**
- **Compressed hydrogen**
- **Liquefied hydrogen**

This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.

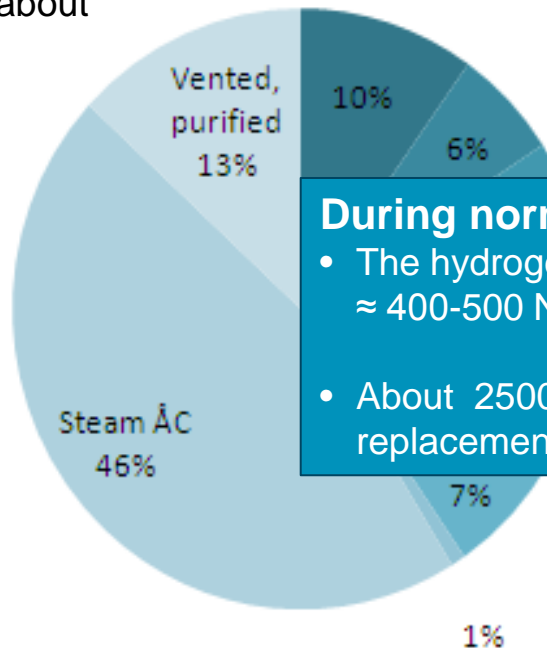
Stockvik site – Hydrogen related parts



- Stockvik is a multisite with several different units from Akzo Nobel and other companies.

Stockvik site – Hydrogen usage

Total Hydrogen production capacity in Stockvik is about 4000 nm³/hr.

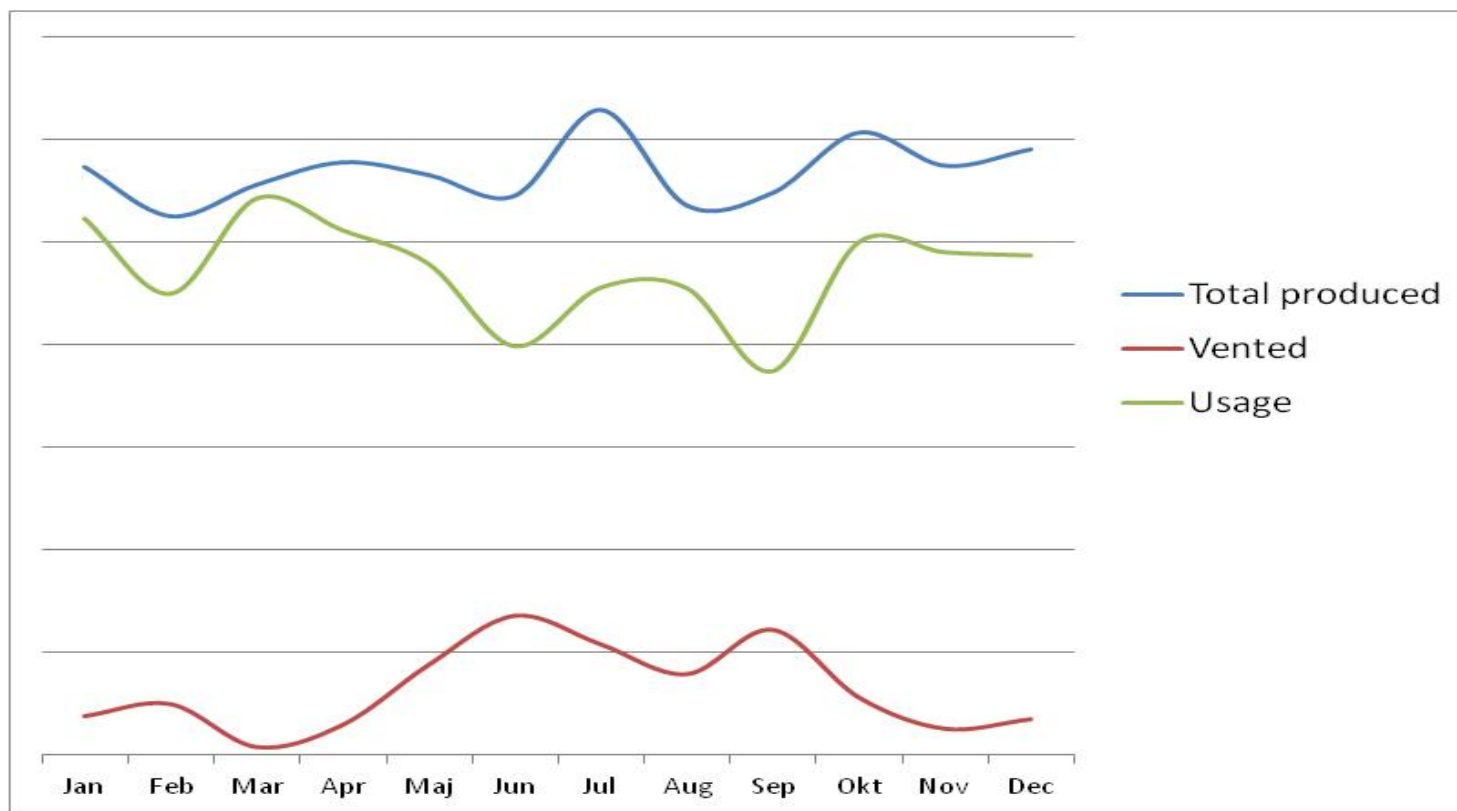


During normal production years:

- The hydrogen vented to atmosphere is about $\approx 400\text{-}500 \text{ Nm}^3/\text{hr}$
- About $2500 \text{ Nm}^3/\text{hr}$ is used as fuel replacement in heat or steam generation.

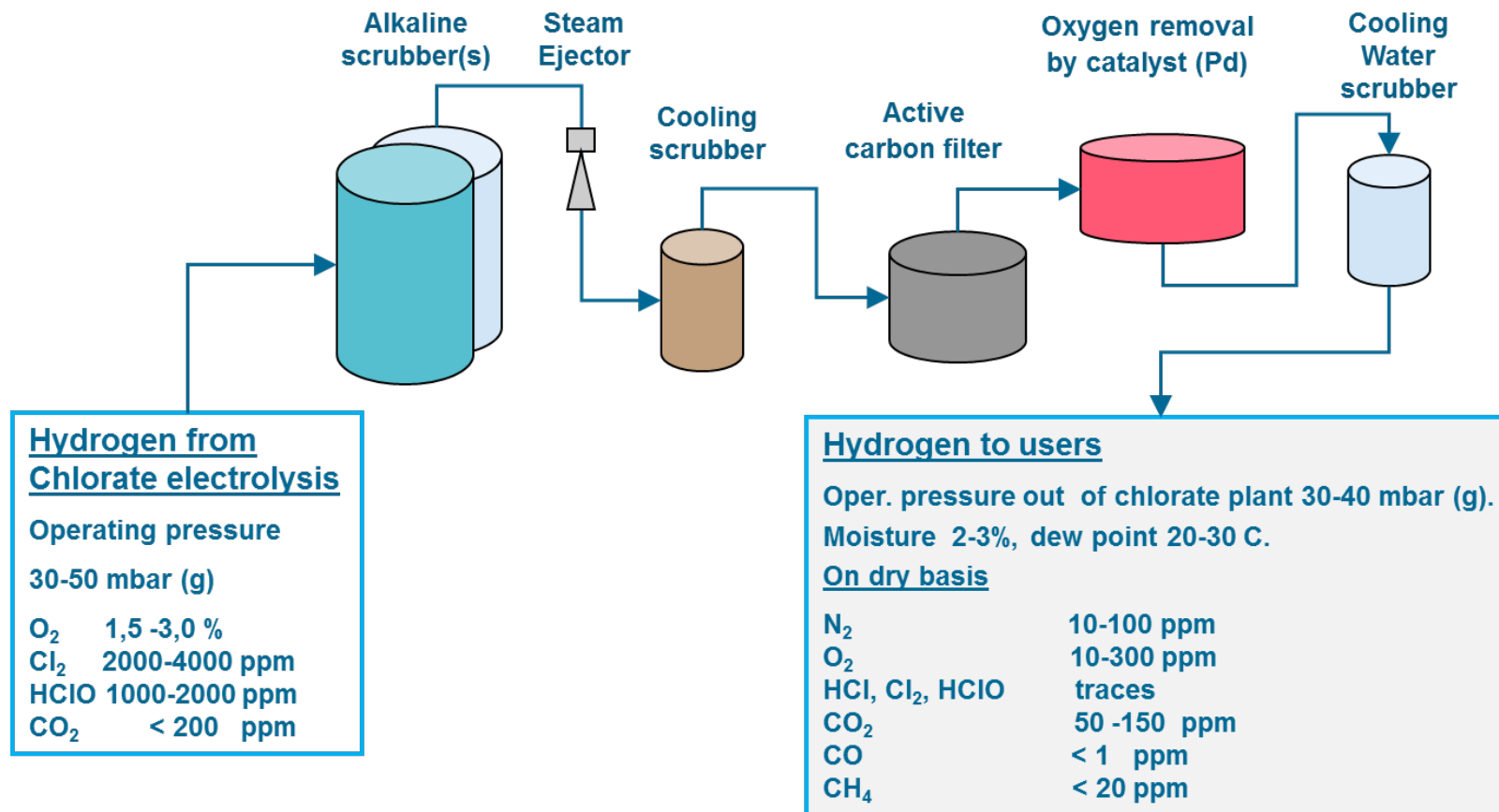
This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.

Hydrogen availability – seasonal



This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.

Hydrogen quality –Technical grade



This presentation is the property of Akzo Nobel . The information is confidential and should not be disclosed, copied or transmitted without written permission . Please refer to www.akzonobel.com/legal-entities for further legal information regarding the sending entity.