Extended Producer Responsibility

- a tool for the circular economy

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NORSIRK

Who is Norsirk AS

- A proven take-back system on Weee, Batteries and Packaging
- Founded in 1999 (Weee)
- Owned by trade and interest organisations; the Consumer Electronics Trade Foundation (Elektronikkbransjen) , Norwegian Electrical Supplier Association– NEL , ICT Norway (Ikt Norge) and Abelia
- A nonprofit company
- Nonstop shop for producer responsibility systems

What is EPR?

- A policy approach under which producers are given a significant responsibility – financial and/or physical – for the treatment or disposal of post-consumer products.
- Assigning such responsibility could in principle provide incentives to
  - prevent wastes at the source,
  - promote product design for the environment
  - support the achievement of public recycling and materials management goals.
- Within the OECD the trend is towards the extension of EPR to new products, product groups and waste streams.

What is EPR ?

It is about the manufacturer that makes the product – he knows how to recycle the products, - and the manufacturer wants the product back.

Apples recycling robot, Liam
https://youtu.be/AYshVbcEmUc

The legislation is part of an important premise of circular economy. It make it possible for the consumer to return to the same place as he is shopping. It will not be easier - it is closing the loop!

How do Norsirk conduct the producer responsibility for their customers ?

The recycling network

R & D activities

- Norsirk are and will be a pioneer in producer responsibility systems in Europe.
  - Started the **Weee Forum** Brussels in 2002 together with 4 other European countries. Its a forum for non profit EPR systems, focusing on best practices in EPR system and recycling of E waste. Weee forum is at moment 34 scheems in Europe and Australia.
  - Started We**ee Europe AG** in Munich (2014) together with 8 other countries. A comercial company that builds systems to report put on market volumes for major international companies.

- Through our environmental award, we collaborate with several universities, industry actors, produsers, suppliers and government agencies
- We integrate results to our operator's manufacturing processes.
- We are also early starters of reuse of elecronic and electronic components

New materials flow in to the circular ekonomi

- Get new materials away from shredder floating into the circular economy
- One example
  - How to get **NEODYMIUM (Nd)** from WEEE stream
- It starts when Stena received Norsirks (Elretur's) environmental award for the recycling of Neodymium magnets from WEEE.
- The Neodymium appears as part of high performance magnets.
- Typical products where we find Neodymium
  - Hard disks (optical)
  - Brushless electric motors
  - Generators (wind turbines)
  - Speakers

Influencing factors on recycling Neodymium

- Highly variable price picture
- No market for recycled Nd, - when we start the project
- No working recycling process for Nd
- Neodymium is a ”crispy” / brittle materiale and oxidates very quickly
- «An absolute nightmare to refine»

What have we done so far in this Nd-project

- Assessment / testing of two processes
  - Mechanical treatment
  - Melt process

- 50,000 hard drives become 27 tons after manual pre-processing
  - 10 tonnes were mechanically treated
  - 17 tonnes were melted in Stena's aluminum smelter in Älmhult.

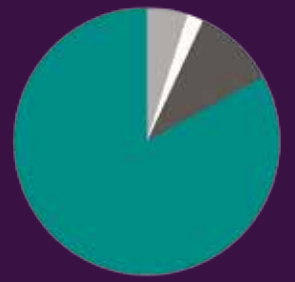
Melting process to recycle Nd

- Melting in rotary ovens gives low yield of Neodymium
- Temperature and mechanical decomposition
- New ovens will be installed and the testing will be continued
- Downgraded material - must be worked out for better qualities

Mechanical recycling process

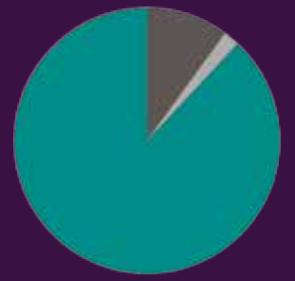
- Robot sorts hard disks and places them in a scissor
- The scissor clip the harddisk so that the magnet becomes available
- The nickel coating is removed from the magnet
- Hydrogen gas breaks out Nd out of the magnet structure
- Iron, Aluminum, Nickel and Nd as pure fractions
- Neodymium fraction can be reused directly in polymer or sinter processes to new Nd magnets.

Recovery rates 2016



EE

- 2 % Reuse
- 83 % Raw material recycling
- 10 % Energy recovering el recycling
- 5 % Landfill



Battery

- 0 % Reuse
- 88 % Raw material recycling
- 10 % Energy recovering el recycling
- 2 % Landfill

Packaging

- 0 % Reuse
- 96 % Raw material recycling
- 4 % Energy recovering el recycling
- 0 % Landfill