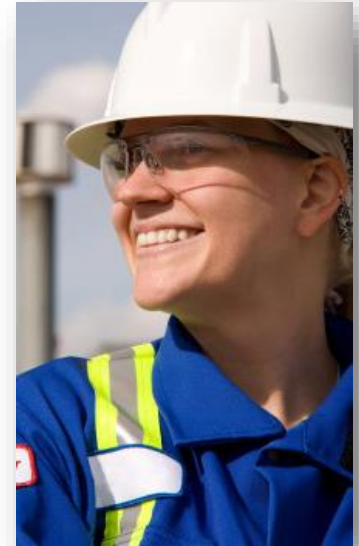


CIRCULAR ECONOMY IN NORWAY

Gunnar Grini, Chief of branch, the Federation of Norwegian Industries

The Federation of Norwegian Industries

- **Facts and figures:**
 - 2,600 member companies with approx. 126,000 employees.
 - Yearly turnover of approx. 600 NOK billion.
 - Export of goods for approx. 300 NOK billion.
- **Sectors within the Federation of Norwegian Industries:**
 - Oil and gas contractors, onshore petroleum activities, aluminium, biotechnology, cement, chemical industries, electro and energy equipment, furniture, glass and ceramics, machine and hardware industry, maritime industry, aquaculture and aquaculture suppliers, graphic arts and communication, metals, mining, paints and coatings, pharmaceuticals, plastics, recycling, textiles, hotels, other services, etc.

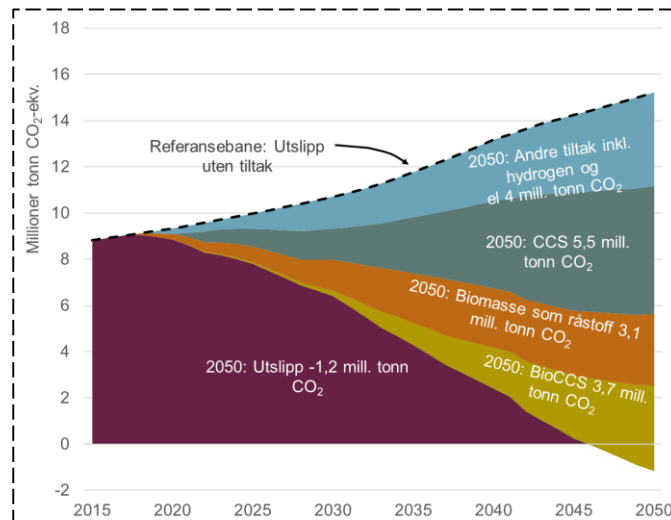


The role of the Federation of Norwegian Industries

- **Contact with political authorities and public administrations**
- **Several boards and committees with representation from member companies.**
- **Assistance to members, in all kinds of cases, including questions on waste, by-products/end of waste, chemicals, pollution control, energy, climate, etc.**
- **Development of position paper, reports, suggestions for political measures, etc.**
- **Active in Brussels - Member of approx. 20 EU industry organisations.**
- **Nordic co-operation groups established for most industry branches.**

**R&D is (of course) carried out by the companies, not by the Federation.
However- we can assist to facilitate, support and contribute to R&D projects.**

Our ambition: Zero CO₂-emissions by 2050

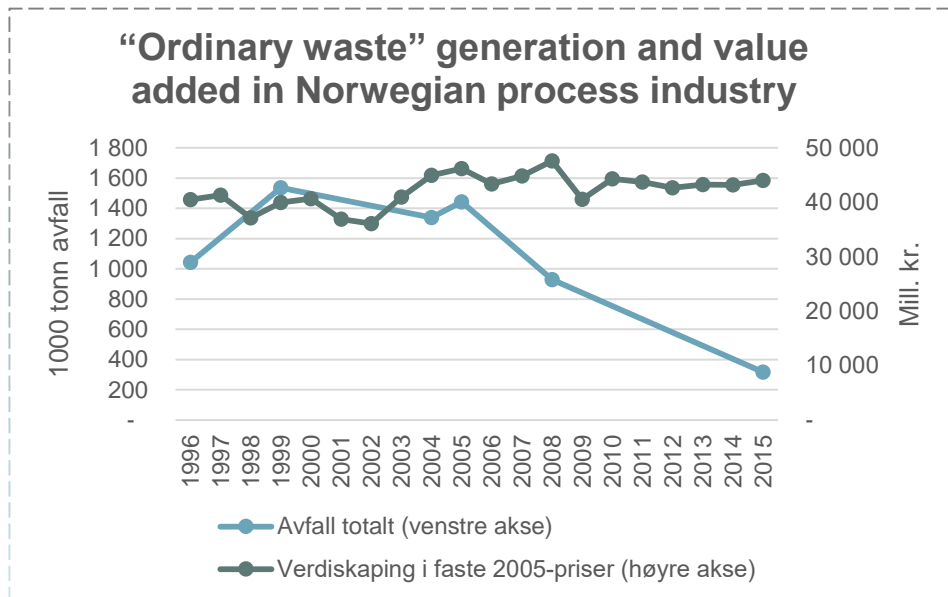


Roadmaps for the Norwegian industry

- Norwegian industry are world-leaders within several climate and environmental areas and is looking to further strengthen this position.
- Necessary framework conditions include:
 - Predictability and stability
 - Tripartite cooperation
 - Green public procurement
 - Industrial know-how and competence
 - Development and use of new technology (and financial support from Enova, Innovation Norway, Norwegian Research council, Gassnova, GiEK)
 - Competitive tax system
 - Access to renewable energy at competitive terms

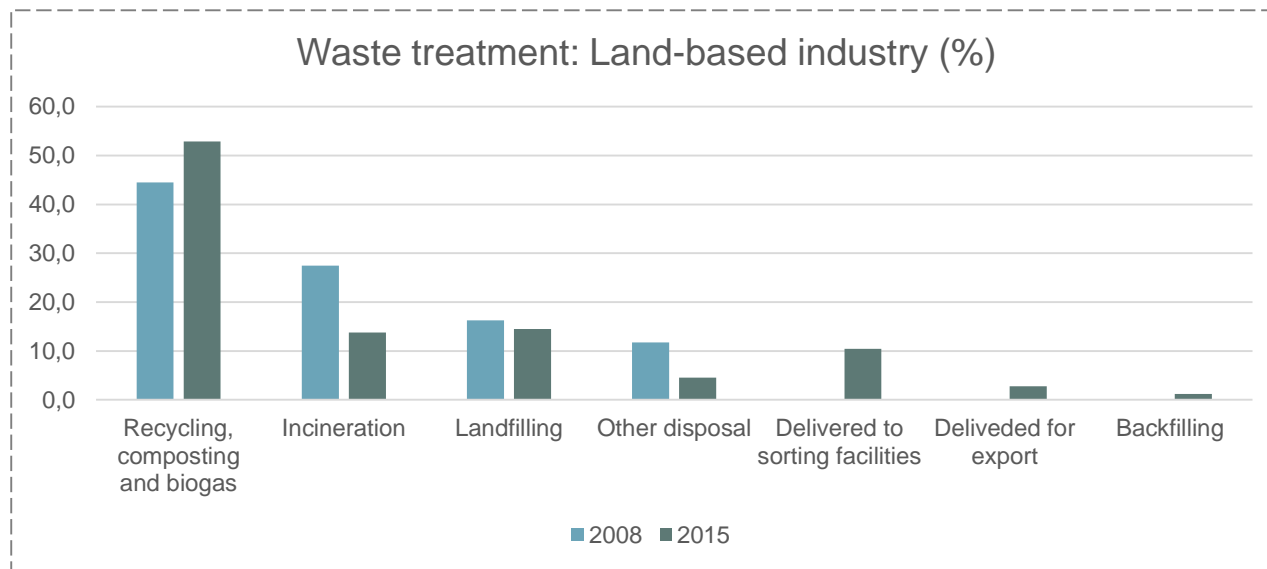


Waste reduction in Norwegian process industry



- **Waste reduction is normally contributing to economic growth.**
- **The results have come as result of long-term circular economy R&D.**
- **Note: From 2008: differentiation between waste and by-products.**

Recycling of “ordinary waste”: Land-based industry



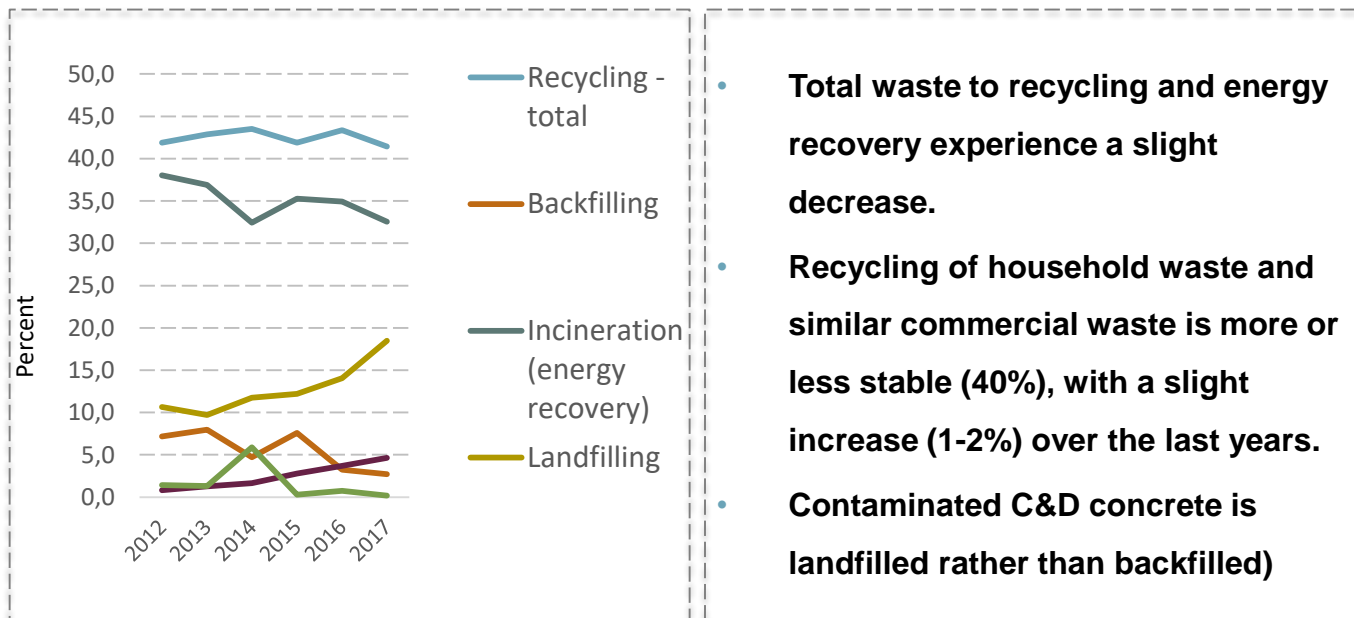
More waste is recycled (even after by-products are taken out of the statistics)

Hazardous waste in the Norwegian Industry



- **New classifications of chemicals (CLP) means that more waste is also classified as hazardous.**
- **Used of nest available techniques (BAT) means that emissions are increasingly captured in waste/sludge instead of being released to water/air.**

Recycling of “ordinary waste” (total)



Measures for increased recycling

- **Requirements for separate collection of recyclable waste**
 - Requirements for separate collection of plastics and food waste are proposed by the Norwegian Environmental Agency. Similar requirements for other fractions are necessary.
- **Increased demand for recycled materials (Green public procurement, etc.)**
- **Standardisation**
 - International quality standards for secondary materials (plastics)
 - Documentation of circular product properties: recyclability, reusability, etc.
- **Simplification and harmonisation of EU regulations**
 - Transboundary movements of waste
 - Interface of product, chemical and waste regulation
 - Definitions of waste, recycling, by-products, end of waste, etc.
- **Equal playing field - enabling fair competition**

New publication: Circular economy in the Norwegian process industry

- Norwegian process industry have been frontrunners within the circular economy.
- Our new study are been forwarded to our Ministry of Climate and Environment as input to a new circular economy strategy
- Necessary measures to strengthen the position of Norwegian industry include:
 - Harmonisation and simplification of EU-regulations (by-products, end of waste, etc.).
 - Increased demand for resource efficient and environmentally friendly products/materials.
 - Cooperation in industrial parks and clusters.



Examples from Norwegian industry

- **Borregaard – one of the worlds most advanced bio-refineries.**
- **NCE Eide – industrial cluster which targets zero waste to landfill.**
- **Norsk Hydro – the worlds most energy efficient production of aluminium.**
- **Mo Industripark – use of surplus energy and by-products to new raw materials.**
- **Celsa Armeringsstål – use of hydro power, steel scrap and advanced pollution control.**
- **Glava/Rockwool – use of recycled materials in the production of new insulation materials.**
- **Jotun – active participation in developing Product Environmental Footprint Category Rules.**
- **Norcem – hazardous waste substitutes the use of coal in the production of cement.**
- **Etc.**



R&D in a circular economy

- **Circular product design**
- **Development of low-emission products**
- **Industrial use of by-products**
- **Industrial symbiosis.**
- **New technologies for recycling**
- **Cost efficient solutions for recycling of critical raw materials and rare earth metals.**



Several new industrial research projects within circular economy has been recently established (BATMAN, PRICE, ALPAKKA, etc.)

Necessary support instruments

- **More efforts in industry-oriented research**
 - **Higher share in the form of grants and extended grant periods (research -> piloting -> commercialisation)**
 - **Financial support to “first of a kind” investments, that reflects socio-economic additional costs and corporate risk**
 - **Financial support to the development and commercialisation of processes/products with limited environmental footprints.**
 - **Support to company-internal pilots (for instance pilots aiming at improving the use of waste/by-products as raw materials).**
-
- **Increased use of hydrogen as reductant and energy carrier.**
 - **Sufficient access to sustainable biomass (biogas, etc.)**

