



*Ferroalloy research for  
sustainable development*



# Introduction to FFF (Ferrolegeringsindustriens ForskningsForening)

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**GLENCORE**  
MANGANESE NORWAY AS

**Elkem**  
A Bluestar Company

**FESIL**

**FINNFJORD**

**WACKER**  
Wacker Chemicals Norway AS  
Irona Metall

**SINTEF**

**NTNU - Trondheim**  
Norwegian University of  
Science and Technology



## FFF-The Norwegian Ferroalloy Producers Research Association

- Formed in 1989
- The members of FFF:
  - Eramet Norway AS**
  - Elkem AS**
  - Glencore Manganese Norway AS**
  - FESIL AS**
  - Wacker Chemicals Norway AS**
  - Finnfjord AS**
  - NTNU/SINTEF**
- Key figures research:
  - R&D budget 2015 – 40 mill NOK (inclusive other industrial partners)
  - Total R&D budget for the period 2000 - 2015, appr. 370 mill NOK
  - 60 PhD candidates at NTNU have been supported by FFF





## FFF - Objectives

- FFF is founded by the Norwegian ferroalloys industry to carry out joint research on ferroalloy processes and products.
- Through this research FFF aims to maintain the Norwegian ferroalloys industry's position at the forefront of developments in the production of ferroalloys and the supply of electrometallurgical technology and equipment.
- It is our aim to pursue environmental improvement in the ferroalloys industry.
- Education of qualified persons to the staffs of the ferroalloys industry is an important part of our work. The research program is also intended to support the education of students to a PhD level.



## FFF Vision 2050

### ■ Ferroalloy research for sustainable development

- The mission for FFF is that by 2050:
  - FFF have developed knowledge that enables its members to produce ferroalloys with correct quality by means of energy-efficient, sustainable and economic methods.
  - FFF have contributed to converting Norway into a zero-emissions society.
  - FFF have contributed to continued or increased metal production in Norway.





# The ferroalloy industry in Norway and the role of FFF

- FFF consists of industrial companies with own in-house research in addition to the research done by FFF.
- Technology development is mainly done by the companies themselves or through cooperation between one company or a group of companies and a research institute.
- The main focus of FFF is **competence development to support technology development** within the member companies.
- FFF is member of the SFI Metal production and FME HighEff.
- FFF have ongoing projects on:
  - NyKoSi – Agglomeration of raw materials
  - Use of natural gas in metallurgical processes
  - Improved energy recovery from furnace off gas
  - Dust emissions