



# European Nickel production in the context of batteries

Project BATMAN  
Norwegian opportunities within  
Lithium-ion batteries

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Oslo  
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# Antitrust reminder

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- **Nickel Institute does not present forecasts or comments on supply/demand, nickel markets or prices**
- We are committed to full compliance with the competition or antitrust laws in all jurisdictions where our members are active
- NI Guidelines (NI website) provide an overview of areas of legal risk
- All participants in NI activities share responsibility for adherence to the Guidelines
- If any doubt exists about the appropriateness of specific discussions or activities, legal advice should be obtained before they are undertaken



**NI is committed to antitrust compliance**



## 1. Nickel

2. EU Production

3. First & end use

4. Availability

5. Recycling

# Nickel Institute member companies



NORNICKEL

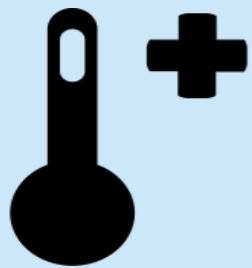


Vale Canada Limited  
PT Vale Indonesia Tbk  
Vale Japan Limited

Nickel Institute is representing leading global producers of nickel and nickel compounds

# Nickel: physical / chemical properties

**01**  
High melting  
point



**02**  
Alloys readily



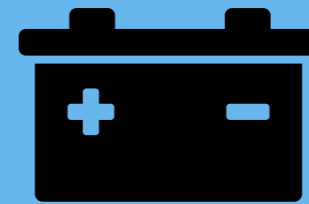
**03**  
Can be  
deposited on  
surfaces



**04**  
Magnetic at  
room  
temperature



**05**  
Electro-  
chemical  
properties



**06**  
Resistant  
against  
corrosion and  
strong acids

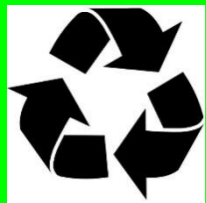


Nickel with outstanding physical / chemical properties with a major role  
what concerns energy efficiency

# Nickel: how it contributes to sustainability

01

100%  
recyclable



02

Low  
maintenance



03

Energy  
storage



04

Increased  
lifetime



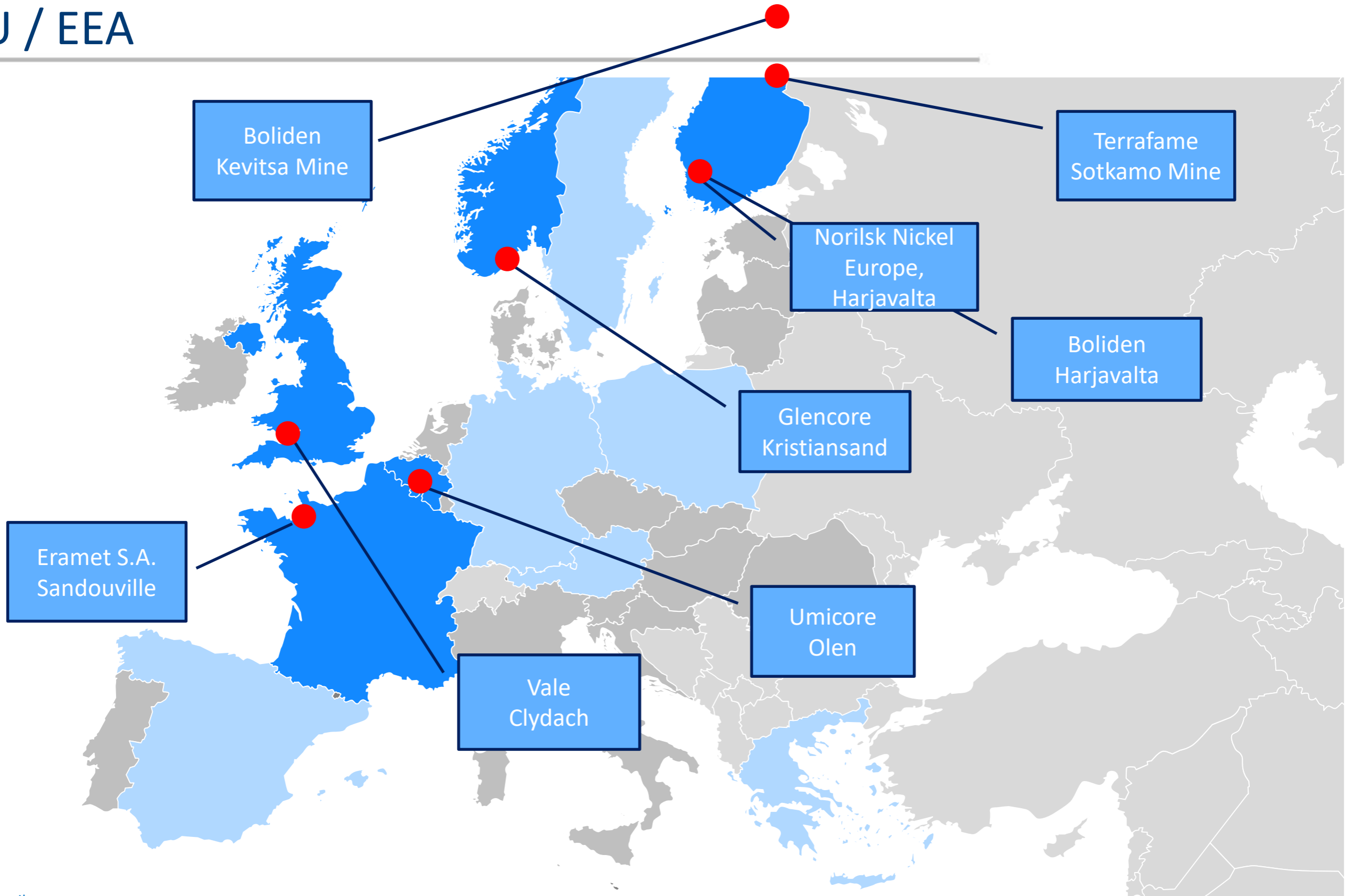
05

Higher  
efficiency



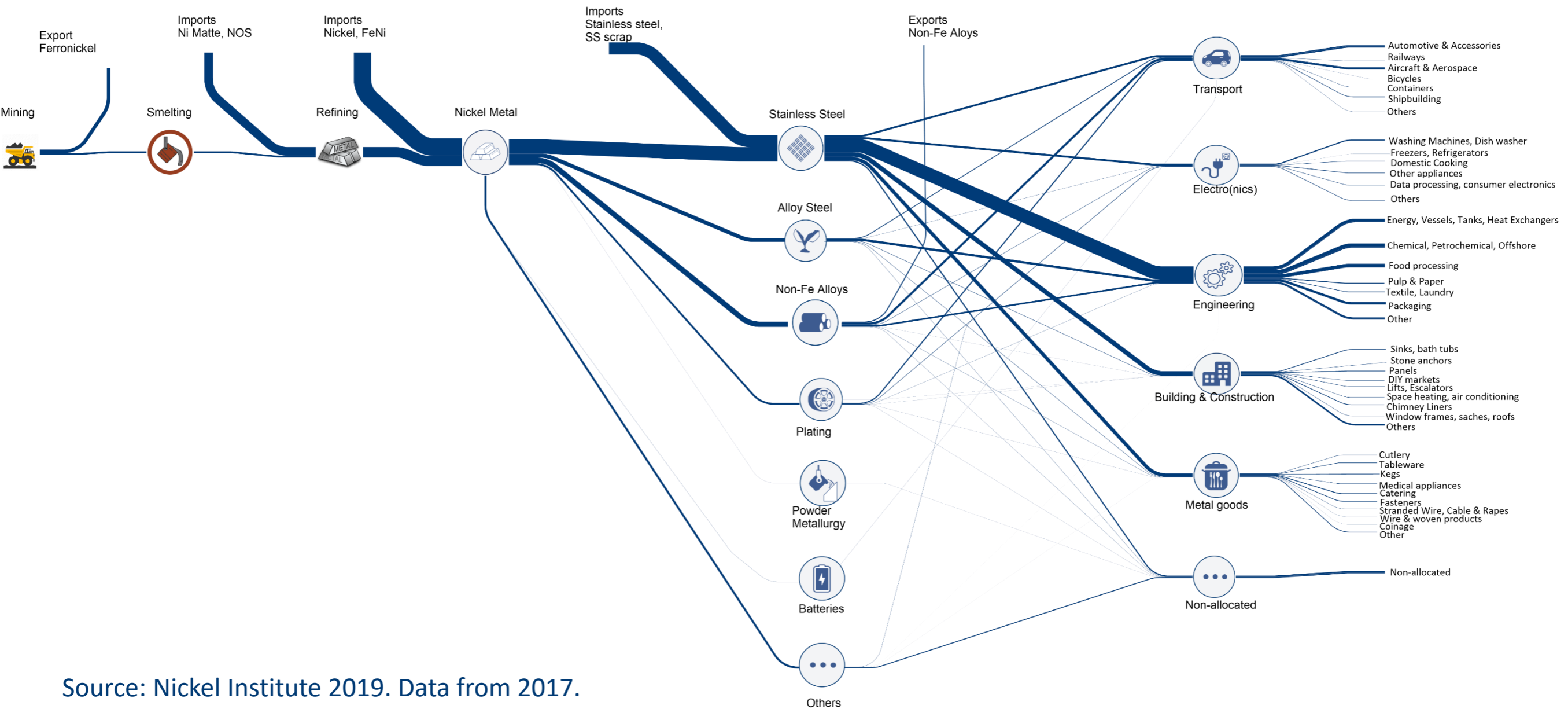
Nickel contributes to sustainability during use and at the end of life through recycling

# Nickel producers EU / EEA



Sources:  
<sup>1</sup> [www.nornik.ru](http://www.nornik.ru)  
<sup>2</sup> Glencore presentation New Caledonia Nickel Conference 2013  
<sup>3</sup> <http://shingo.org/recognition/profiles/Profile%20Sheet%20-%20CNR%20Jan%202014%20-%20Vale%20Refinery.pdf>  
<sup>4</sup> [www.eramet.com](http://www.eramet.com)

# The EU Nickel value chain

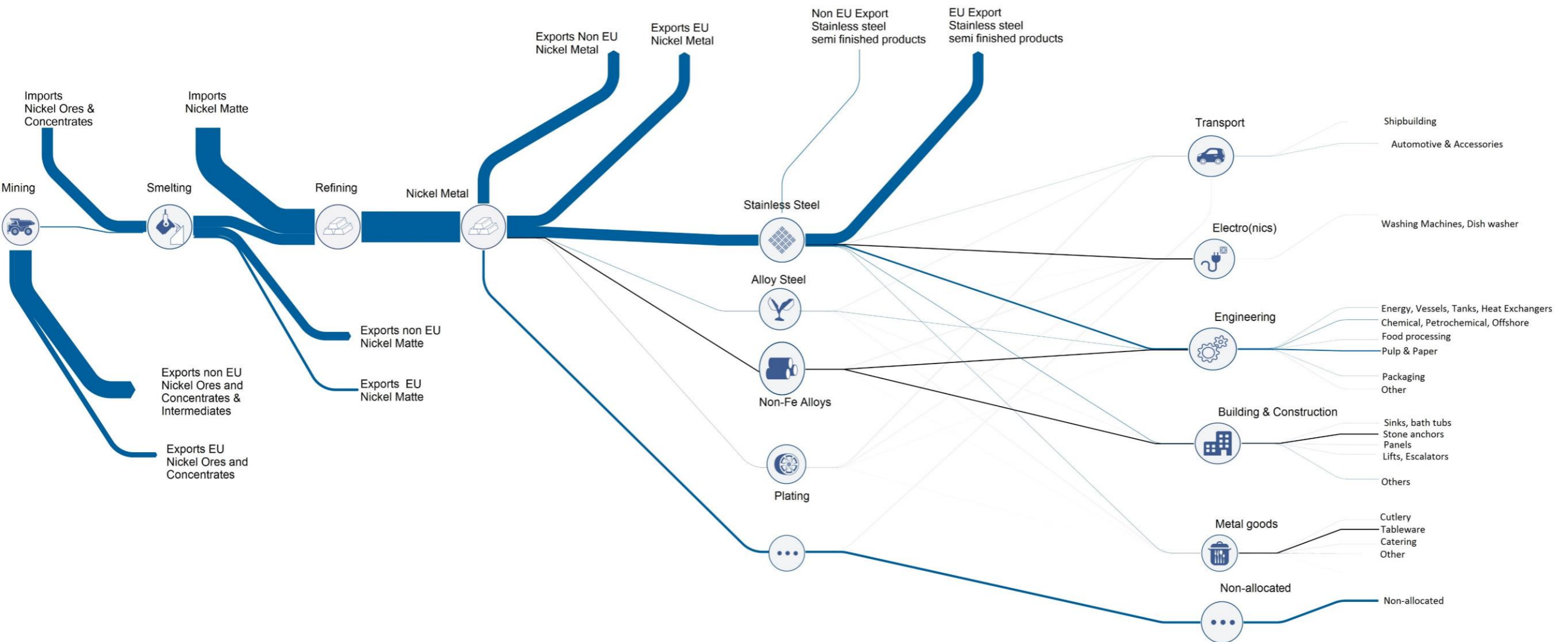


Source: Nickel Institute 2019. Data from 2017.

Major imports of nickel intermediates into EU to satisfy demand and to compensate lacking mine production



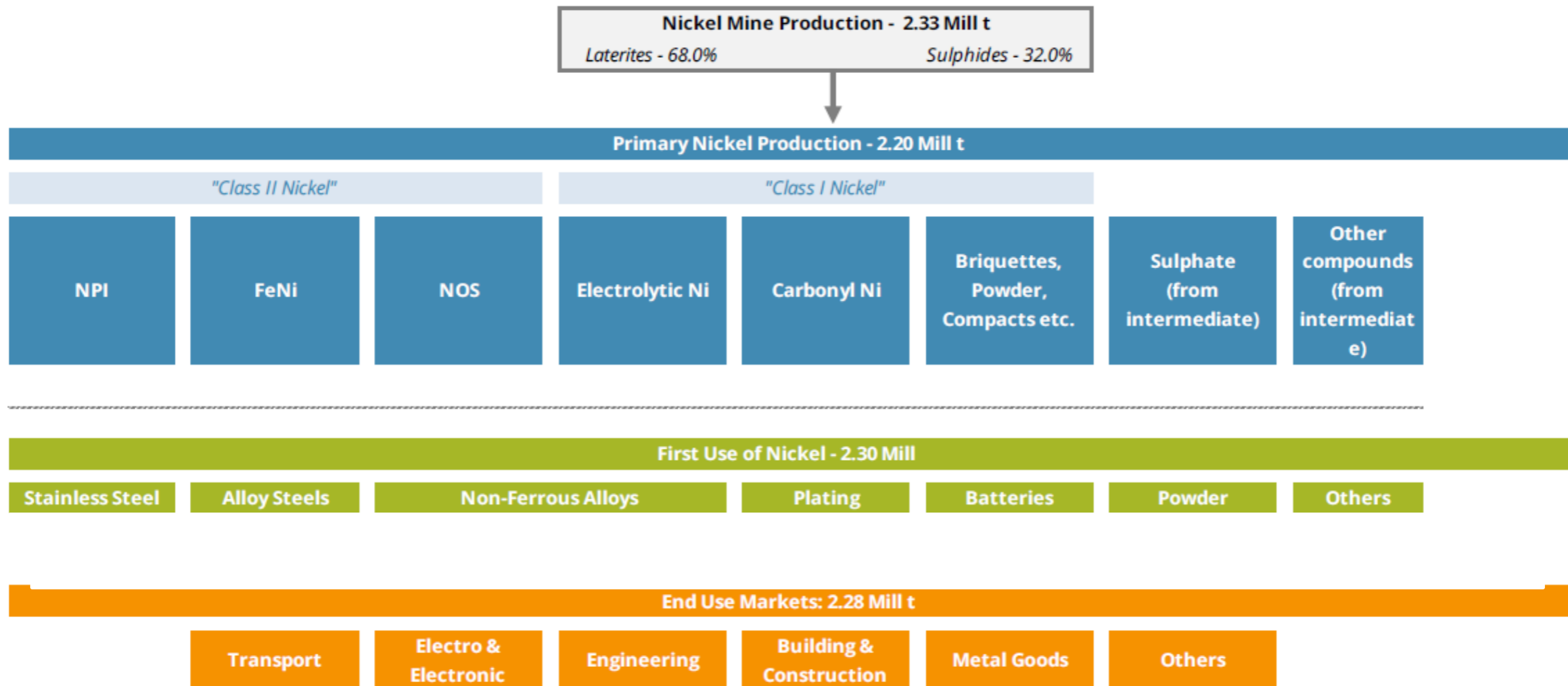
# Country level: The Finnish Nickel value chain



Source: Nickel Institute 2019. Data from 2017.

**Finnish Nickel value chain shows flows of nickel intermediates and nickel metal are leaving Europe to global markets**

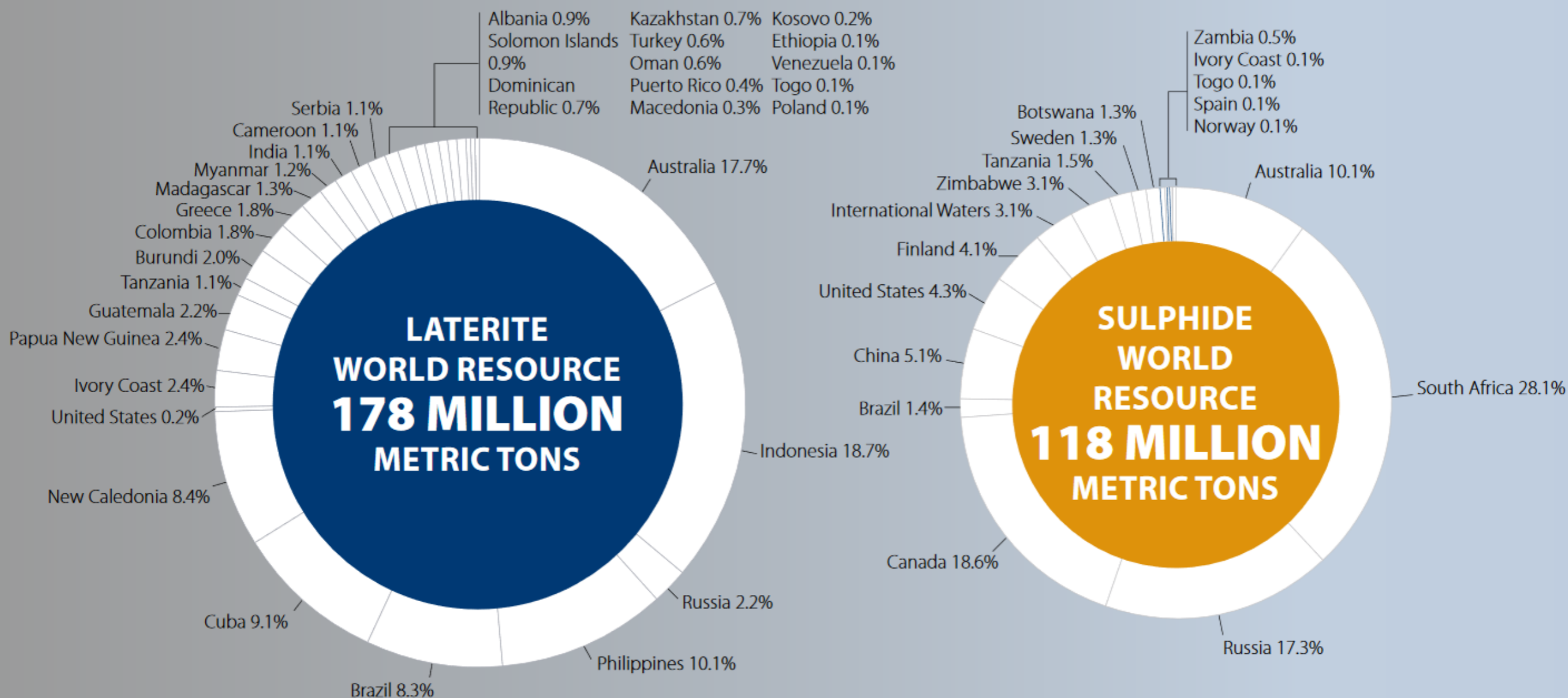
# First use of nickel



Source: Roskill Nickel End Use Report 2019. [www.roskill.com](http://www.roskill.com)

Stainless steel still the major first use of nickel whereas batteries are at 5% globally

# Availability of Nickel

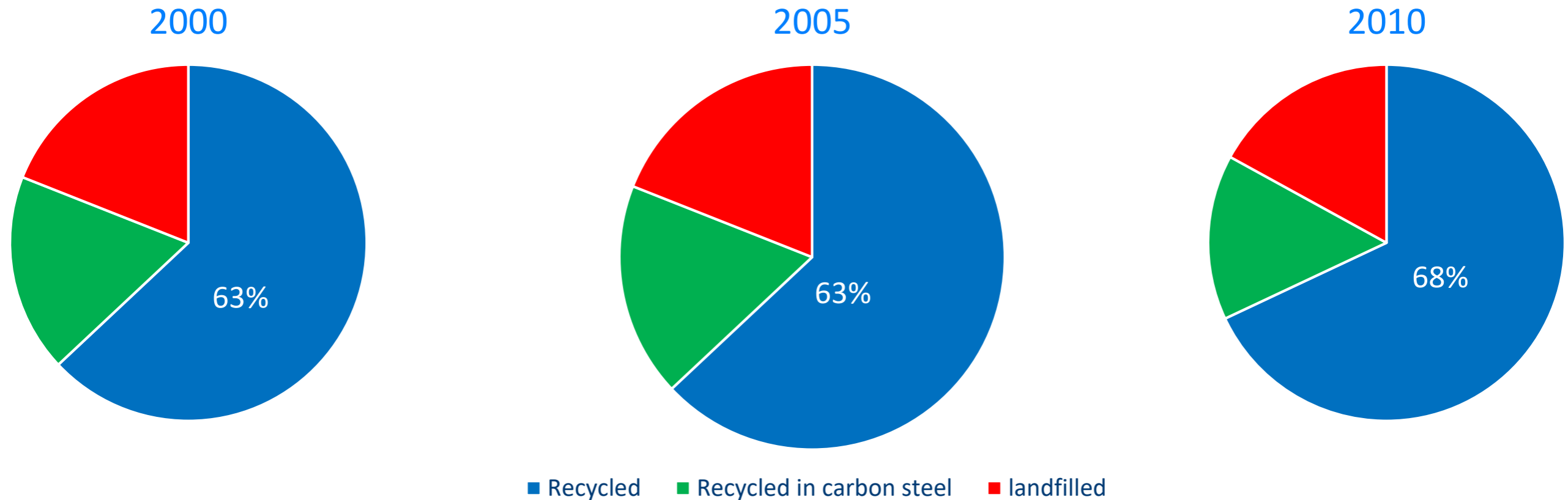


Source: Gavin M. Mudd and Simon M. Jowitt, A Detailed Assessment of Global Nickel Resource Trends and Endowments, 2014 Society of Economic Geologists, Inc. Economic Geology, v. 109, pp. 1813–1814

Source: Life of Nickel. <https://www.nickelinstitute.org/media/1190/thelifeofni.pdf>

Enough nickel to satisfy growing demand in value chains such as batteries

# Nickel Recycling: How efficient?



- Recycling efficiency of nickel from end of life products at 68%
- Landfilling of nickel decreased over past 10 years
- Main recycling in stainless steel mills
- Batteries recycling expected to change recycling system and efficiencies

- Europe has significant nickel production in various countries
- Batteries market is currently less relevant - stainless steel is dominating picture
- A lot of potential to further increase production especially from by-products
- Availability – good reserve and resource situation
- Impacts on other value chains expected to be less relevant than for other raw materials
- A lot of potential through recycling