

# The role of slags and other by-products within circular economy in the steel industry

- EAF and SMS slags in Italy
- Alfredo Schweiger - Federacciai

5.-6.  
MARCH  
2025

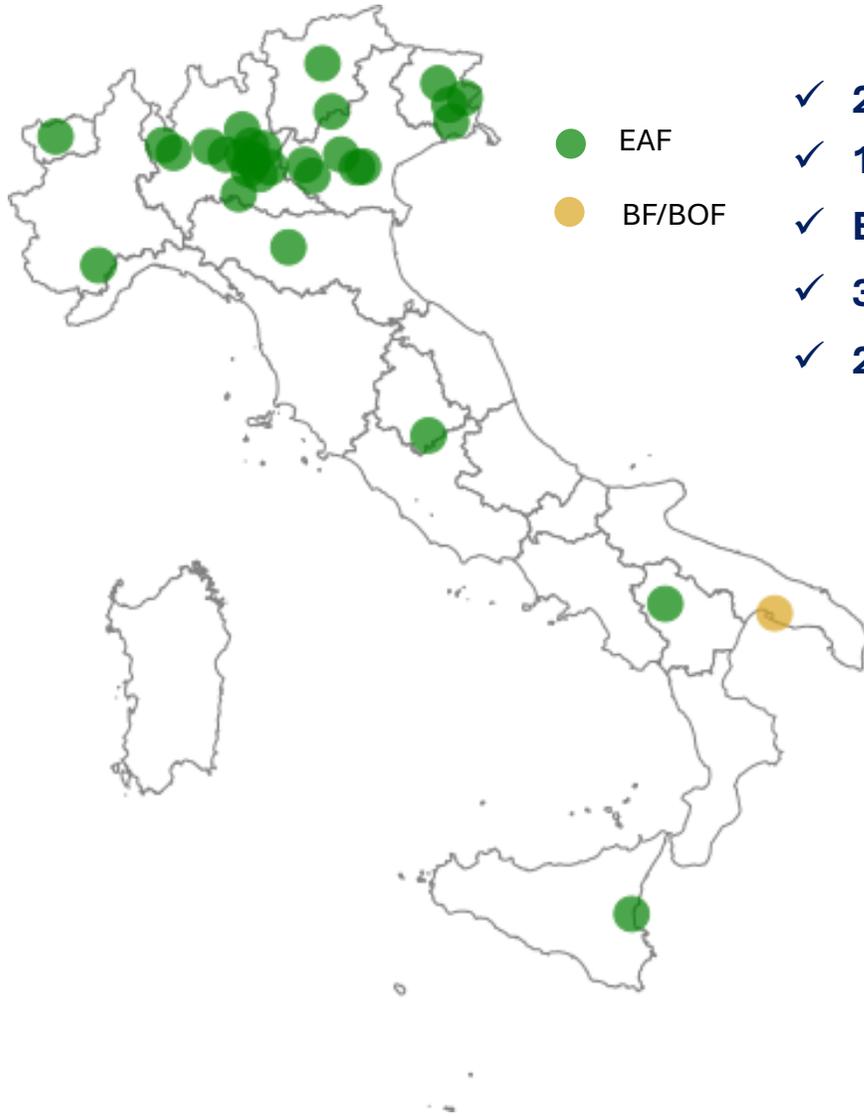
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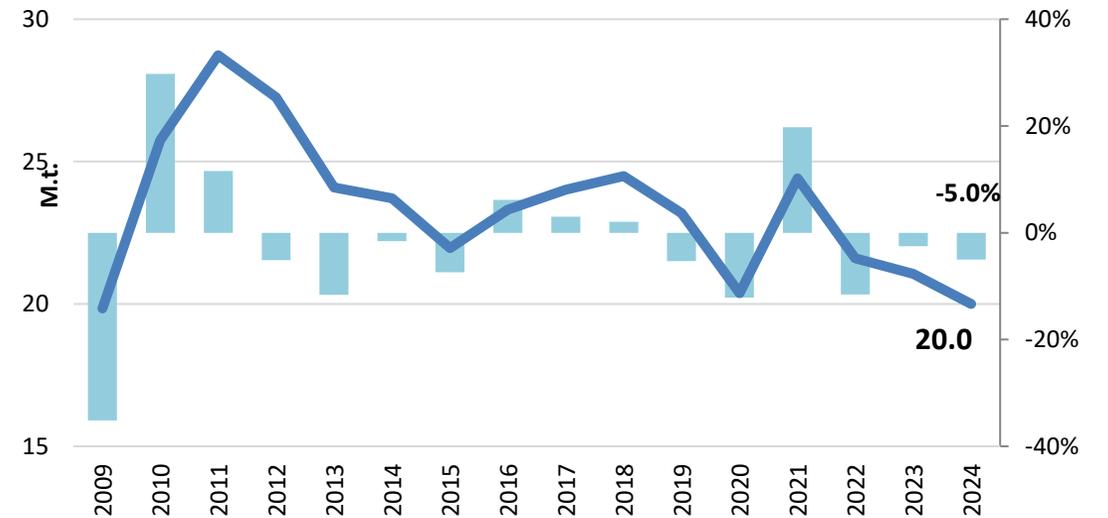
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# Steel production in Italy



- ✓ **2° EU country** in terms of steel production, consumption and employment
- ✓ **1° EU country** for EAF steel production and recycling of ferrous scrap
- ✓ **EAF share > 85%**
- ✓ **34 EAF production sites**, located mainly in northern Italy
- ✓ **20 Millions tons** of steel produced in 2024

### Italian steel production



# EAF and LF slags figures

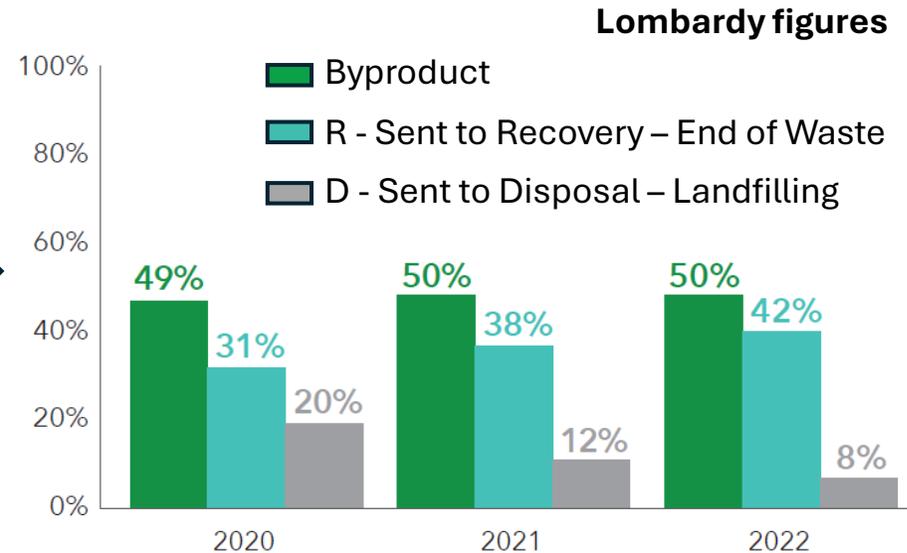


**EAF SLAG (black slag)**



**Italy total (2023 est). 2.400.000 t**

**Lombardy Region 1.331.000 t**

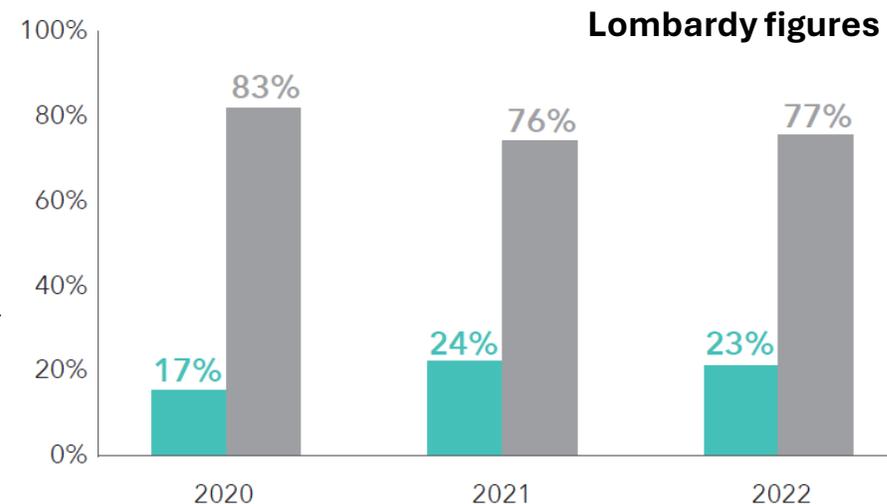


**LF SLAG (white slag)**



**Italy total (2023 est.) 730.000 t**

**Lombardy Region 415.000 t**



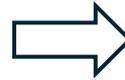
# Identified obstacles for full slag valorisation

**Lack of clarity on conformity tests and thresholds values required for compliance (composition, leaching test, ecotoxicity test, ecc)**



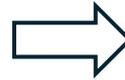
**Approval of guidelines for each specific use to give legal certainty to all operators → Not all test and limit values are appropriate for all kind of slag uses and applications**

**Mistrust, lack of confidence, reluctance by some potential users**



**Importance of communication and dissemination of good experiences and best practices**

**Low or uncertain return from investment in innovative processing/treatment**



**Development of “circular” incentives at EU level  
Simplification in access to EU and national funds**

**Not enough demand side incentives to encourage utilisation**



**Introduction of binding minimum content of non virgin material (artificial aggregates, byproduct, EoW) in public procurement for building, infrastructures, road construction and maintenance, ecc.**

# Guidelines (Lombardy Region)

D.g.r. 13 settembre 2021 - n. XI/5224  
Approvazione linee guida per la gestione delle scorie nere di  
acciaieria a forno elettrico

**2021**

Regione Lombardia

Osservatorio per l'Economia Circolare e  
la Transizione Energetica



Tavolo scorie di fusione  
Scoria nera da forno elettrico  
EAF-C

**Two guidelines have been published:**  
**in 2021: EAF Slag (black slag)**  
**In 2024: LF Slag (white slag)**

**As a result of a work coordinated by Regional  
Competent Authority with the active  
involvement of:**

- steel producers,
- potential users of slag,
- local authorities,
- environmental control authorities,
- academic institutions

D.g.r. 16 settembre 2024 - n. XII/3041  
Approvazione Linee guida per la gestione delle scorie bianche  
da metallurgia secondaria

**2024**

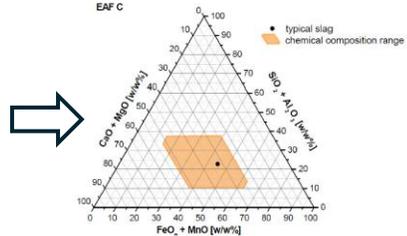
Regione Lombardia

Osservatorio per il Clima, l'Economia Circolare e la  
Transizione Ecologica



Tavolo scorie di fusione  
Linee guida per la gestione delle scorie  
bianche da metallurgia secondaria

# Guidelines key principles

- Clear criteria to switch **from 'managing a waste' to 'managing a resource'**, which can be used for **specific identified uses** to replace natural resources, according to the principles of the circular economy and industrial symbiosis.
- A useful reference both for steel producers who choose to manage their residues as **"by-products"** (demonstrating compliance with condition of **art 5 of WFD** as transposed in national legislation) and for competent authorities in case an authorisation is required for the recovery operation of a **«waste that ceased to be waste»** (**Art. 6 of WFD** as transposed in national legislation)
- Chemical-physical characteristics linked to the **REACH Registration** (concept of «sameness») 
- **Product requirements guaranteed by compliance with EN technical standards** for different uses and CE marking where required (i.e. construction aggregates)
- **The environmental requirements are dictated by the specific uses and applications** (bound, unbound, semibound, others) and consequently decoupled as far as possible from legislation generally applicable to waste
- Lombardy Guidelines are covering so far a number of well identified uses of EAF slag and only the use in clinker production for LF Slag. But guidelines are meant to be a dynamic instrument to be revised periodically **to include new and innovative applications** ( which are listed in the text for future update).

# Guidelines demonstration of byproduct status

- ✓ **Certainty about slag utilization**  
(Art 5,1-a of WFD)



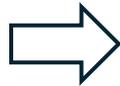
- **Commercial or contractual relationships between the manufacturer of the slags and the users or any intermediaries.**
- **Technical documentation, indicating the types of uses for which the slag will be destined.**

- ✓ **Direct use without any further processing other than normal industrial practice** (Art 5,1-b of WFD)



**All treatments on the steel slag that are falling within the classification of normal industrial practices are clearly identified in the guidelines (reference to I&S BAT) using flowcharts.**

- ✓ **Fulfillment of all relevant product, environmental and health protection requirements for the specific use and no overall adverse environmental or human health impacts** (Art 5,1-d of WFD)



- **REACH registration (sameness concept)**
- **Link to relevant EN standard for the specific uses**
- **Link to conformity test (composition, leaching test, and other requirements) with relevant thresholds for the different identified uses**

# Green Public Procurement – Road construction and maintenance

Minimum Environmental Criteria for the awarding of the service of planning and execution of **construction, maintenance and adaptation works of road infrastructures** (CAM Strade). Adopted by Italian Ministerial Decree 5 August 2024, 'published in the Official Gazette no. 197 of 23-8-2024 and in force since 21 December 2024.

The new road construction projects shall use construction products with **a minimum content of recovered or recycled material or by-products**, referred to the weight of the finished product according to **binding minimum percentages**



## Examples

### *Corpo stradale*

Bonifica del piano di posa del rilevato	≥ 70%
Corpo del rilevato	≥ 70%
Sottofondo	≥ 70%

### *Strati di fondazione o base in pavimentazioni flessibili e semirigide*

Fondazione in misto granulare non legato	≥ 50%
Fondazione in misto granulare legato (con legante idraulico o legante idrocarburico)	≥ 50%
Misto cementato	≥ 50%

### *Strati in conglomerato bituminoso per pavimentazioni flessibili e semirigide*

Conglomerati con bitumi normali	
Base o Base/binder	≥ 35%
Collegamento o Binder	≥ 30%
Usure chiuse	≥ 15%

***THANK YOU  
FOR YOUR ATTENTION***

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