

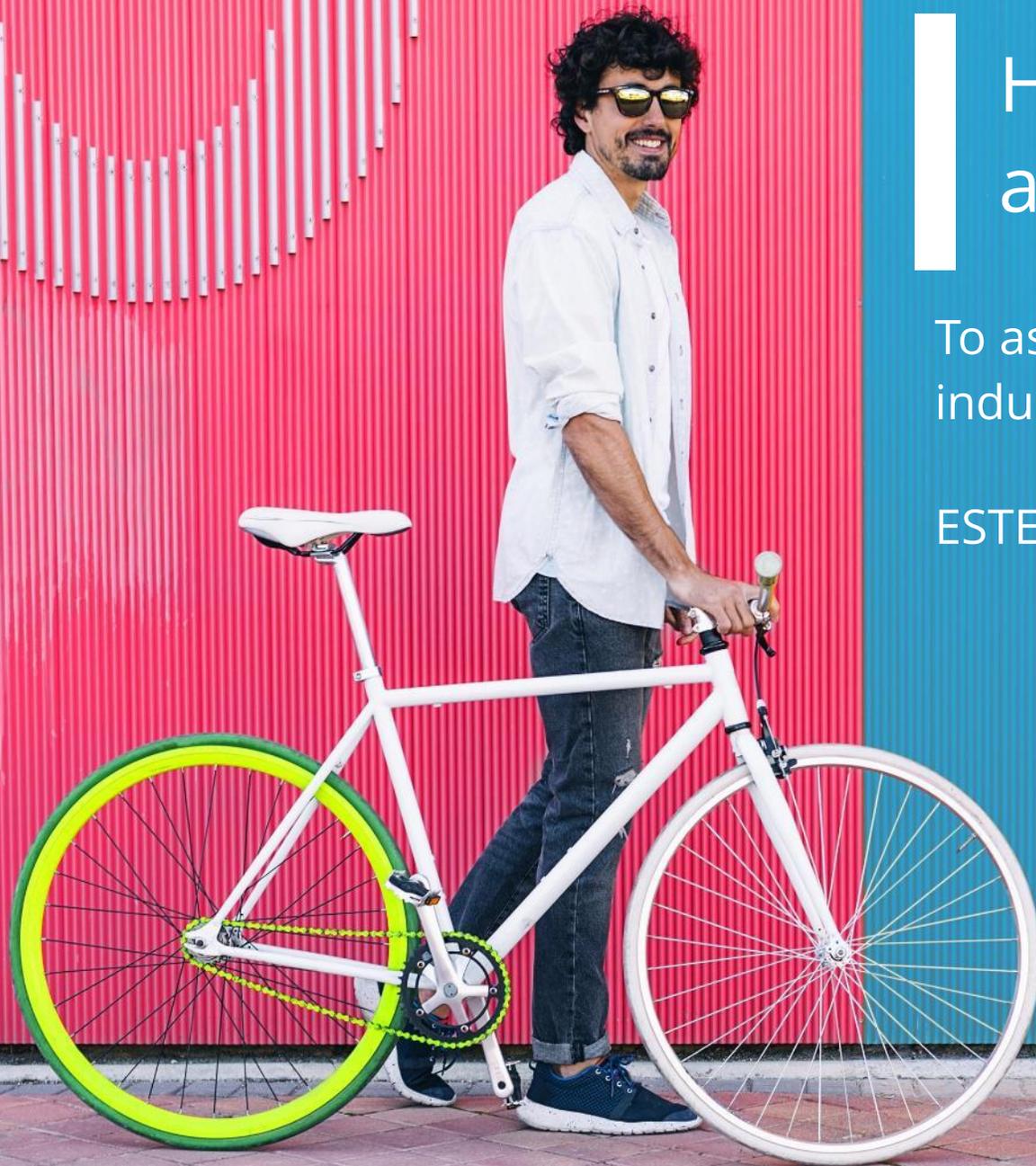
Harmonisation of GHG accounting methodologies

To assist in the decarbonisation of the steel industry – a focus on by-products

ESTEP / FEhS – 6th March 2025

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- Iain Millar (worldsteel)
- Nicholas Avery (EUROFER)
- Peter Hodgson and Nick Coleman (Tata Steel)
- And the worldsteel co-product working group



Disclaimer

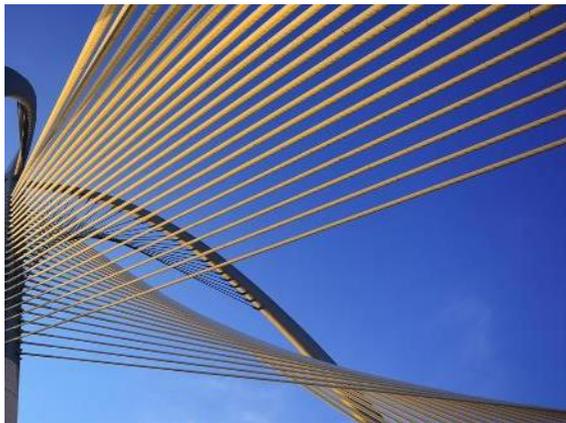
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worldsteel – who we are



The World Steel Association (worldsteel) is a non-profit organisation.

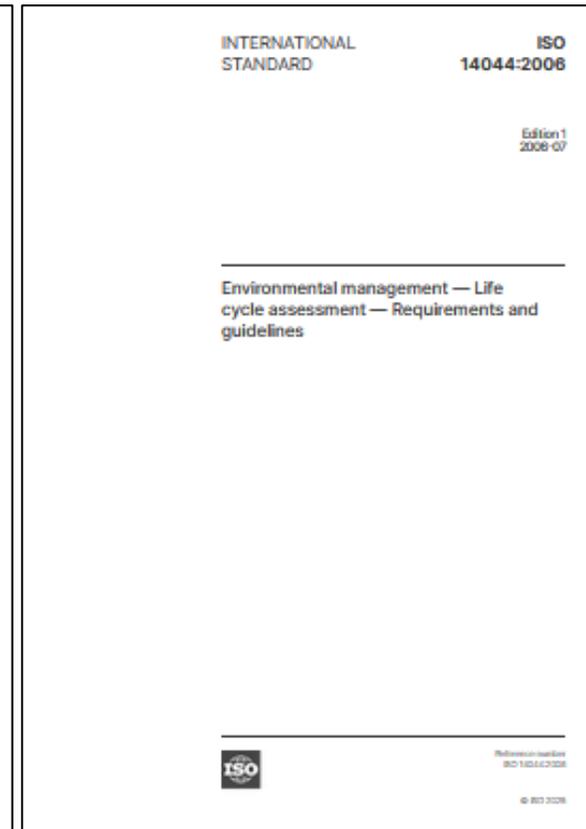
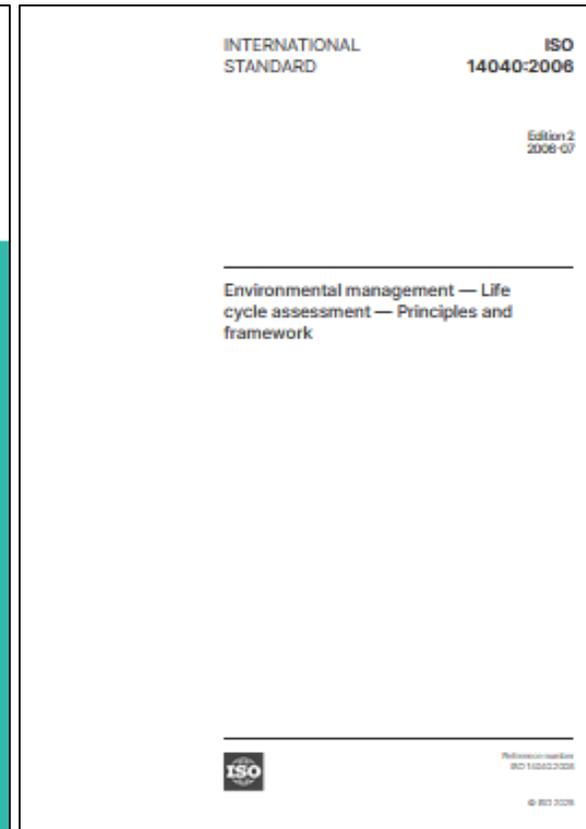
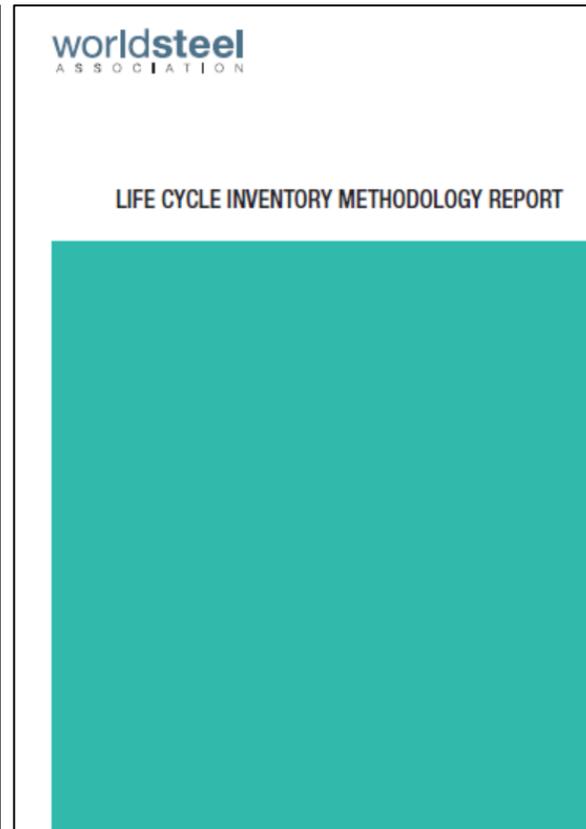
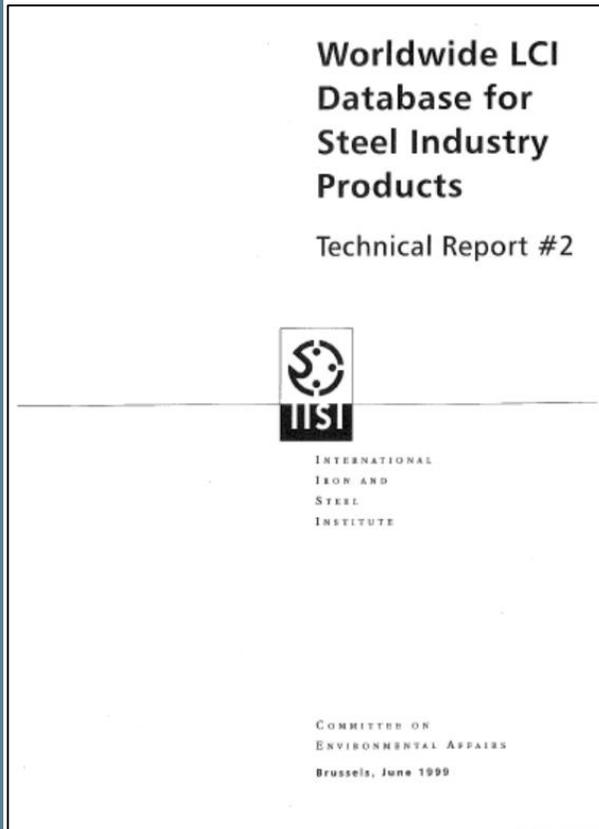
It has headquarters in Brussels, Belgium and Beijing, China.



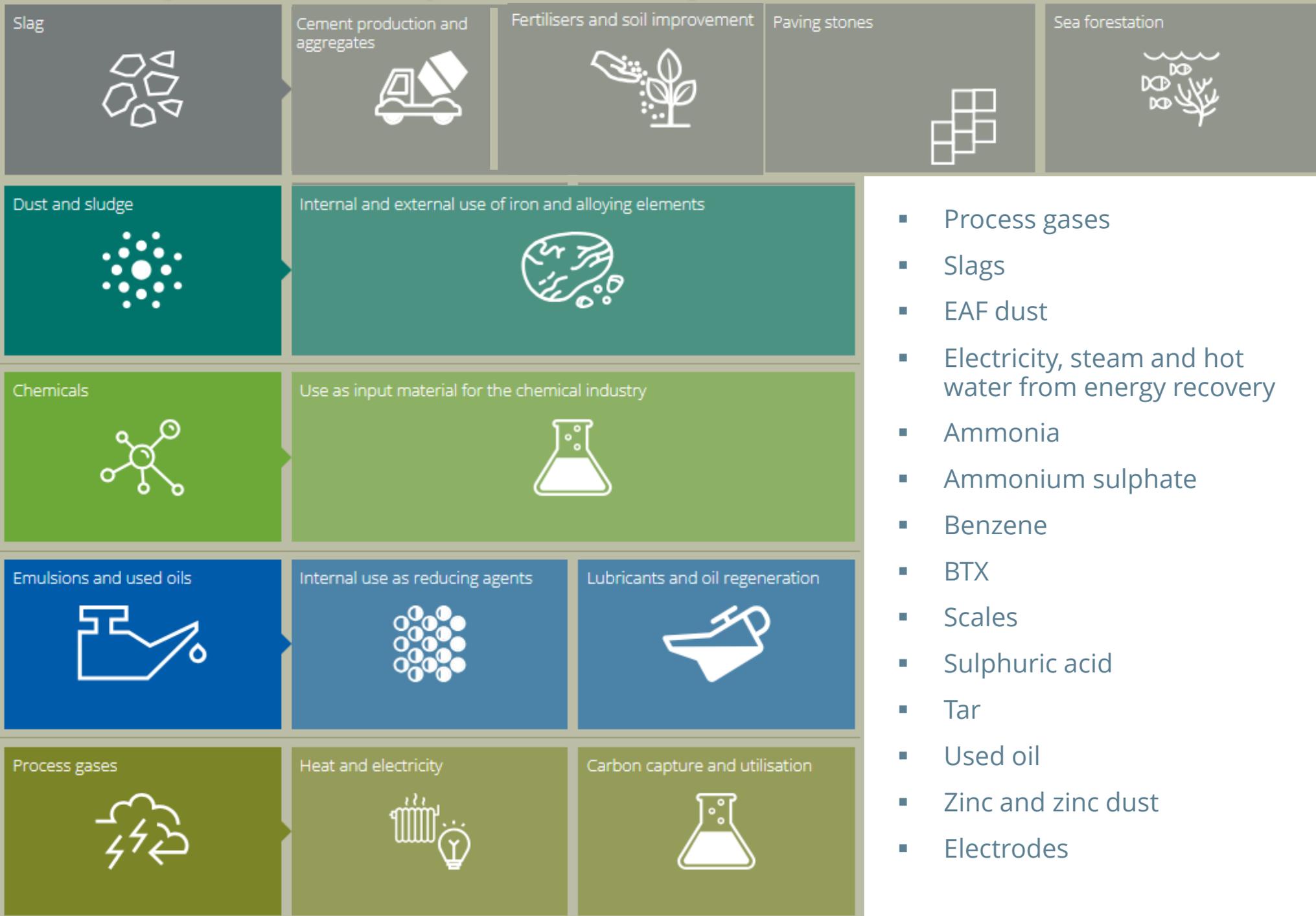
worldsteel represents steel producers, national and regional steel industry associations, and steel research institutes.

Members represent around 85% of global steel production.

We've been assessing our impact for a long time



Co-products and their uses



Evolution of standards

- However, since then, other methods proliferated
- Particularly in construction
- Other sectors heavily influencing standards development
- We're losing out:
 - Slags
 - Emissions associated with burning waste
 - End-of-life
 -?

Steel Standards Principles

Common emissions measurement methodologies to accelerate the transition to near zero

Endorsed by:



9

Steel applications

Wind turbines



Packaging



Motor vehicles



Bridges



White goods



Rail tracks and trains



Pipes



Buildings and factories



Ships and containers



Machinery



Medical equipment



Metal products



Solar panels



Furniture



Electrical steels



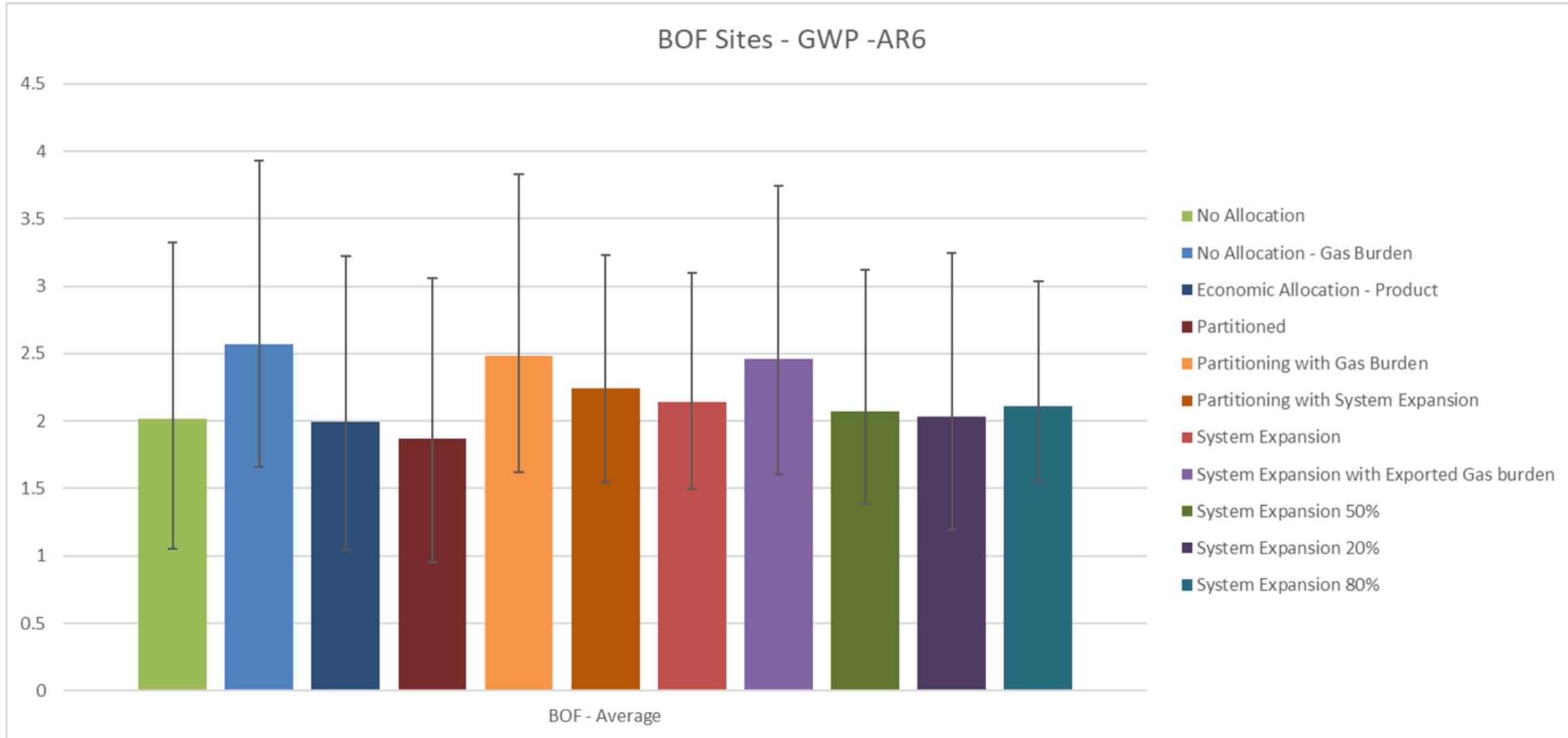
What is the issue and what has been tried?

- The issue? Double counting
 - We take the credit for slag use; use of the slag is taken as zero (no burden)
- Much work has been done to develop an LCI for slag
 - EUROFER project 2005/7 – now on worldsteel.org – physical partitioning
 - being used by some steel companies for EPDs
 - North American PCR (based on physical partitioning)
 - French EPDs using economic allocation
 - German approach in the LESS standard to use a value around 100kg CO₂ per tonne slag
 - Others?

Considerations for comparing different methods

1. How complex is the method to implement in LCA models?
2. Are there any additional data collection challenges?
3. How could the method influence steelmaking practices e.g. export more process gas to get a lower result?
4. Can the method be justified on scientific principles?
5. Does the method require users of co-products to take a burden?
6. Is the burden for the co-product acceptable compared to emissions from competing sources?
7. How are the steel product emissions affected relative to competing materials in different markets?

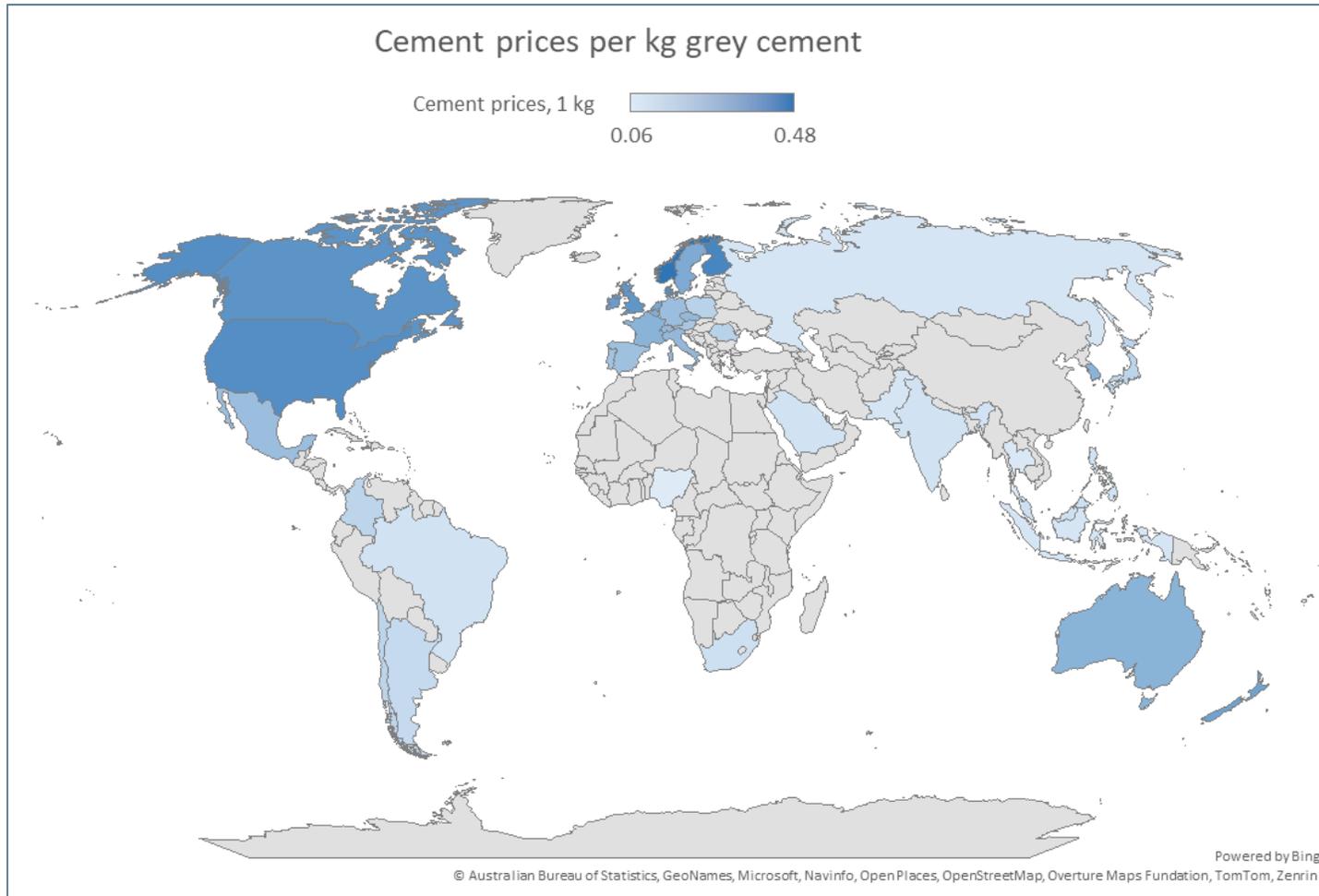
Early investigation of methodologies



worldsteel proposal

- We want a harmonised approach
 - Continue using system expansion
 - And for slag: sharing the benefit/burden using partial system expansion with allocated benefits
 - Uses system expansion to determine the avoided impact of the product that the slag is replacing (e.g. clinker, roadstone, fertiliser)
 - Then these benefits are shared between the relevant sectors, with a justification of the factor that has been applied.
- What is the factor?
 - Share benefits 50/50?
 - Using economics (ratio of prices of 1 tonne cement vs prices of 1 tonne steel/hot metal)?
 - The ratio of the weight of the useful slag generated per tonne hot metal/steel?

Global Cement Prices



- There is a wide range of prices globally for cement.
- There is no price for China, which represents over 50% of global cement/concrete production.
- Allocation using economics is not viable for globally traded products and local co-product markets.

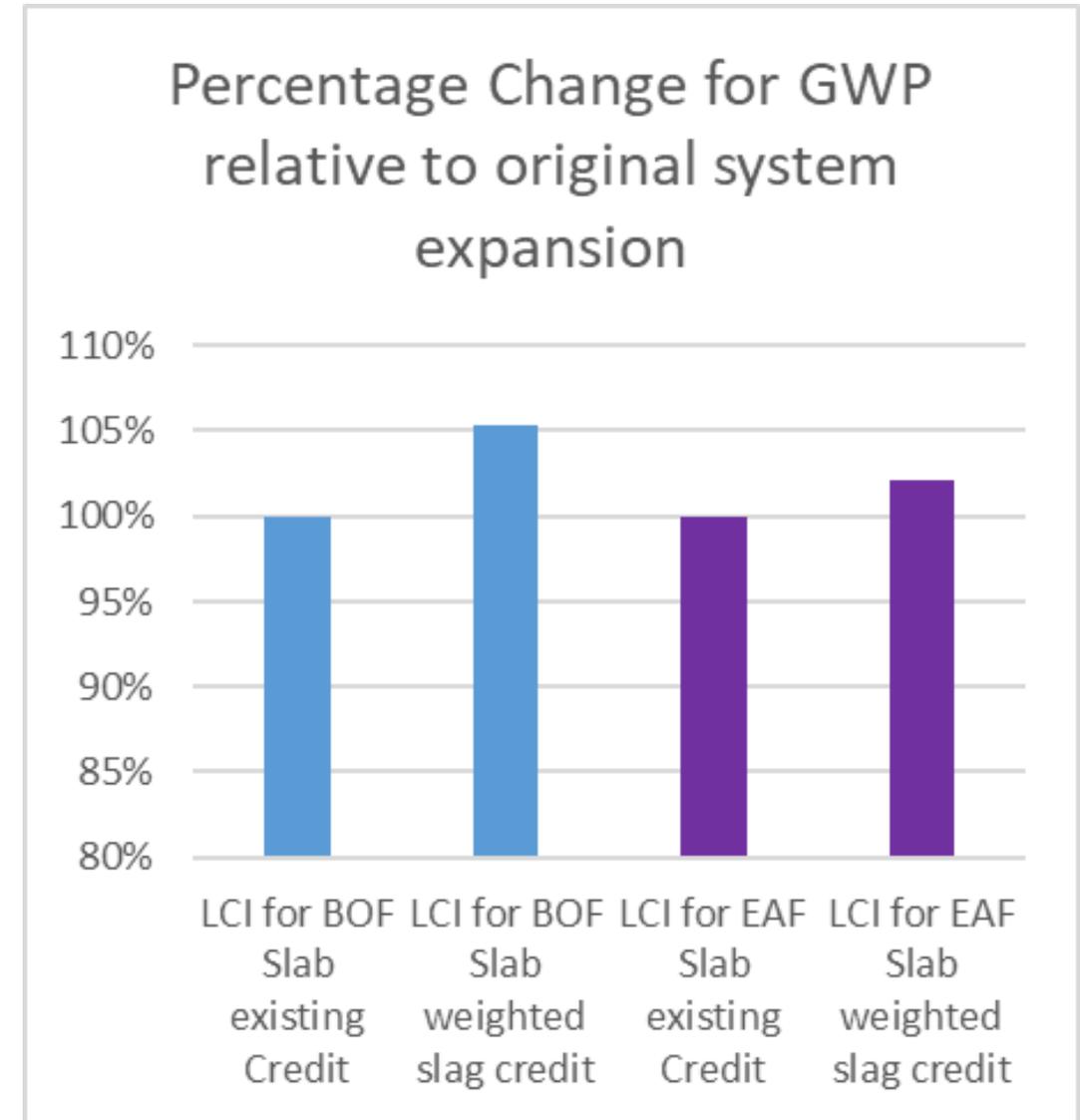
Example ratio of slags in iron and steel making

- Ratio calculated using the amount of **useful/sold** co-product made in the BF/BOF/EAF over the amount of metal product manufactured.
- This is a physical calculation fixed by the performance of the steel making operations.
- This therefore excludes any co-product material that is sent to waste.

Slag / steel product	Mass	%
BF Slag Co-product	0.293	29%
Hot metal	1	
BOF Slag Co-product	0.0669	7%
BOF Slab	1	
EAF Slag Co-product	0.118	12%
EAF Slab	1	

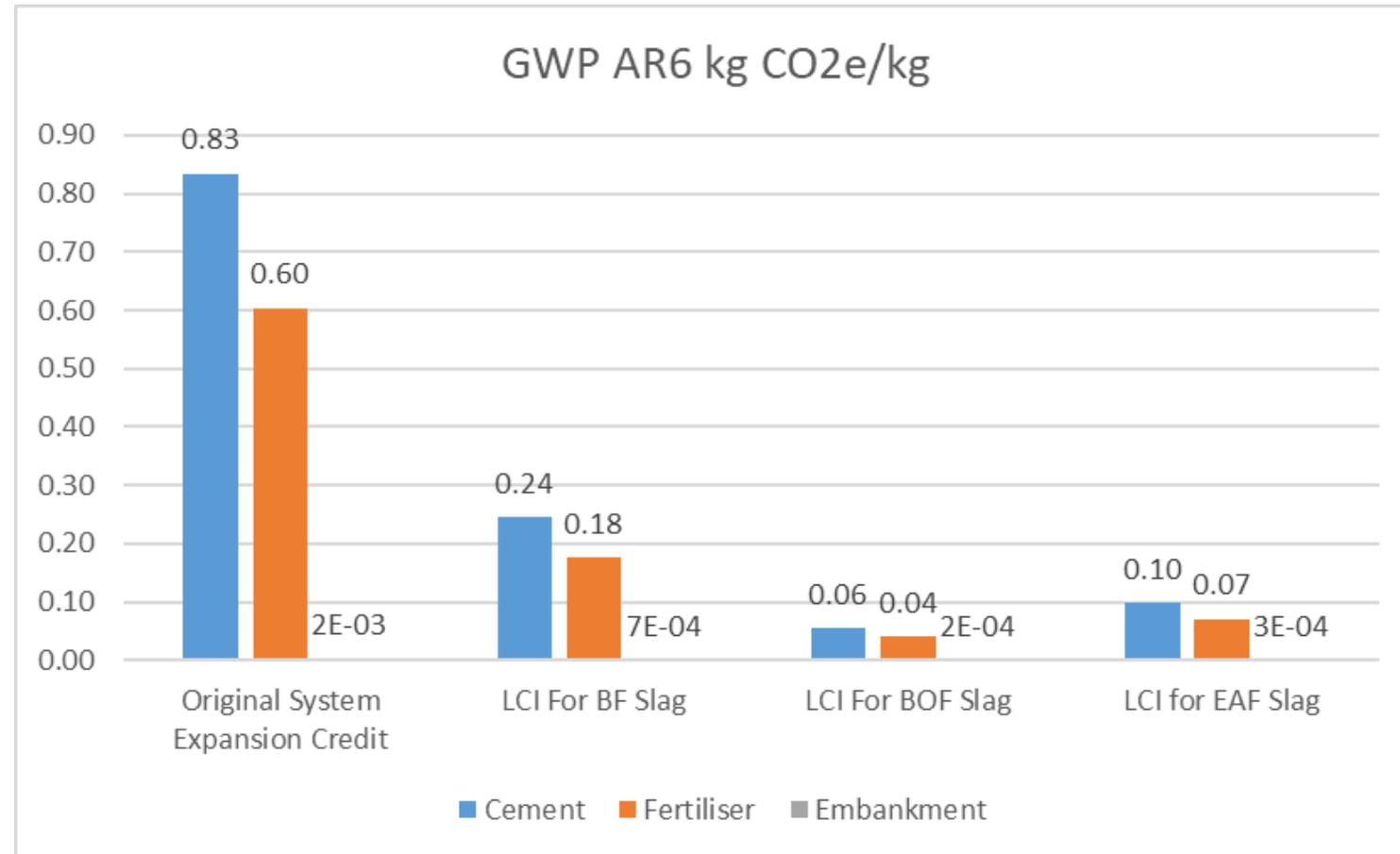
Impact on global average steel GWP impacts

- Applying these weightings to the relative co-product slags
 - There is an average increase of 5% on BOF slab and 2% on EAF slab.
- The more slag produced for the cement industry by a steel company, then the increase on the steel LCI will be greater.



GWP impacts of weighted co-products

- Calculated GWP impacts of slags depending on their use compared to full system expansion credit
- The fertilizer credit already was reduced by 50% to allow for functional equivalence, so there is a double reduction including the weighting reduction.
- Embankment credit is very small compared to the other co-products.



Next steps

- Finalise the approach and review
- Incorporate into the worldsteel methodology and other relevant methods/standards through the Steel Standards Principles and others
- Stakeholder engagement – that’s why we’re here.....any feedback welcome
- worldsteel would generate:
 - the ratios annually (like value of scrap)
 - the impact on steel LCI and slag / fertilizer / roadstone LCIs
- Assess the applicability of this approach for other materials



worldsteel contacts



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A S S O C I A T I O N

worldsteel.org | constructsteel.org | steeluniversity.org | worldautosteel.org | worldstainless.org

