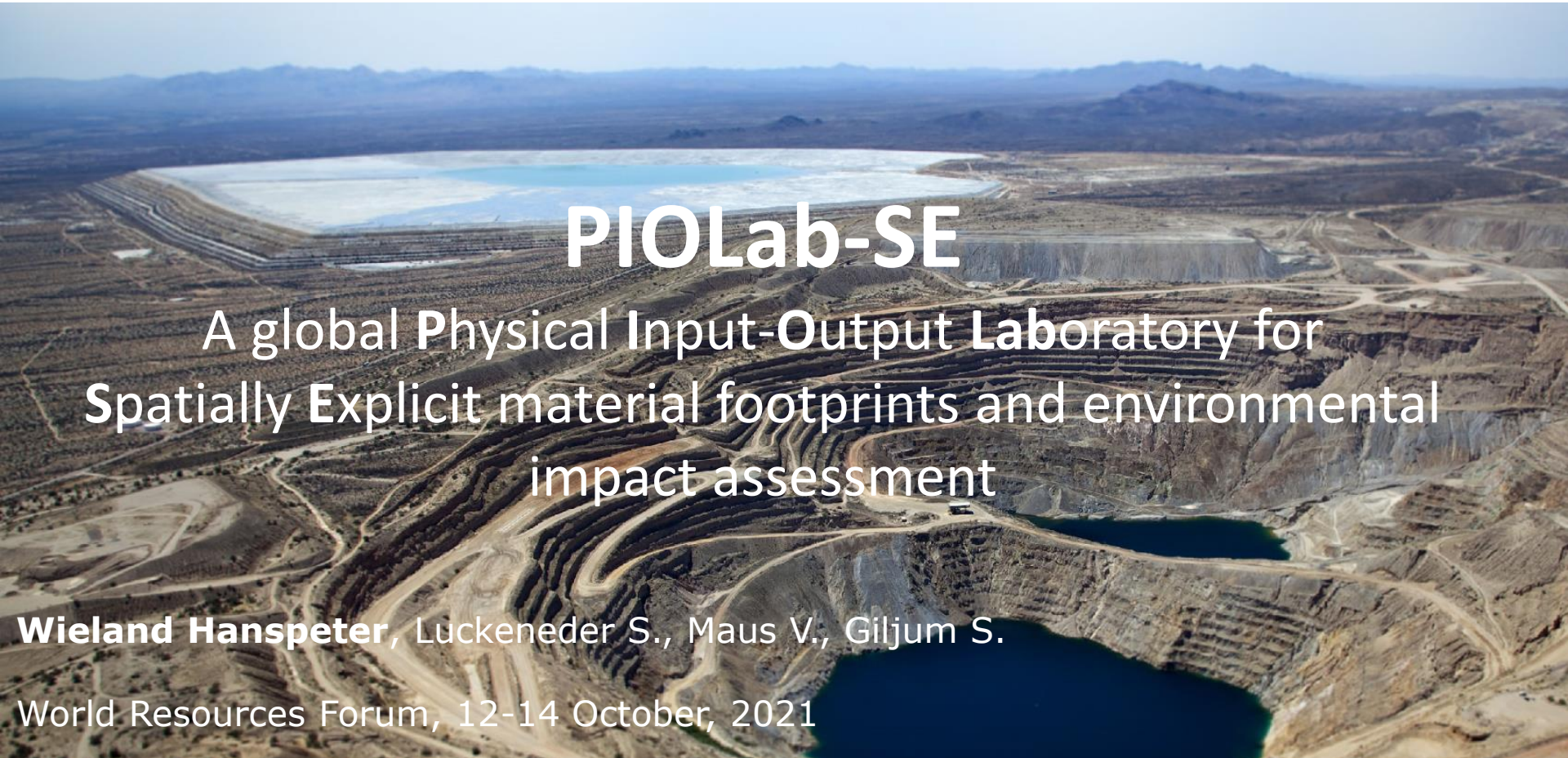


PIOLab-SE

A global **P**hysical **I**nput-**O**utput **Lab**oratory for **S**patially **E**xplicit material footprints and environmental impact assessment

Wieland Hanspeter, Luckeneder S., Maus V., Giljum S.

World Resources Forum, 12-14 October, 2021

Multi-region physical IO table in PIOLab

Intermediate inputs: e.g. pig iron & liquid steel (**Z**)

steel in car & building (**Y**)

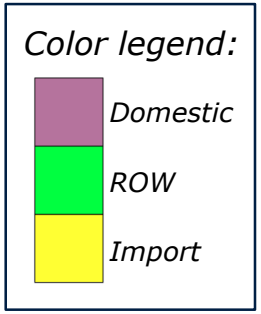
emissions & slag (**f**)

		Region 1			Region 2			Final use (addition to stock)		Boundary output		Total output
		Process 1	Process 2	Process 3	Process 1	Process 2	Process 3	Region 1	Region 2	to economy	to Nature	
Region 1	Process 1											Σ
	Process 2											Σ
	Process 3											Σ
Region 2	Process 1											Σ
	Process 2											Σ
	Process 3											Σ
Boundary Input	from economy											
	from Nature											
(x) Total input		Σ	Σ	Σ	Σ	Σ	Σ					

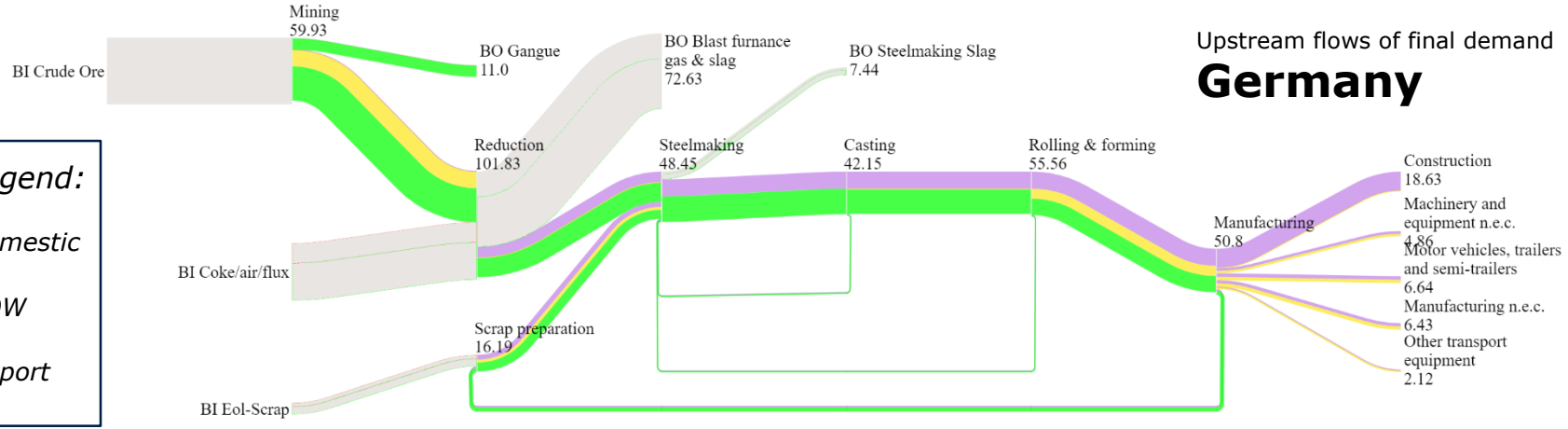
(x)

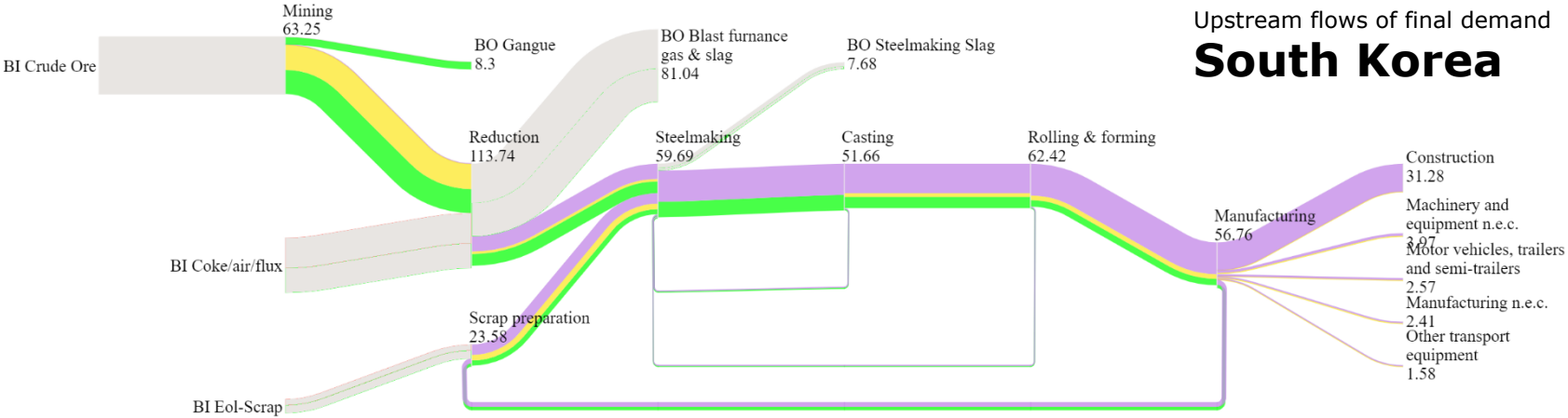
EoL-scrap, coke or crude ore (**f**)

Opening up the ‘black box’ of resource footprints



UNIT: Mt; Year 2008; BI & BO (grey color) stand for boundary input & output respectively





The PIOLab: a virtual laboratory for physical IO

- **Prototype for global iron and steel supply chains**
  - 32 regions, 30 processes & 39 flows
- Based on IELab technology
  - constrained optimization & high-performance computing
- Publication forthcoming, first PIOTs available on Zenodo
- Next step: global subnational PIOTs for iron, copper and aluminum
  - Extending PIOTs with proxy information on environmental impacts of mining

Example: Global subnational physical IO table

		WA (Western Australia)			RoW (Rest of the World)			Final use		Boundary output to		Total output
		Mining	Smelting	Manufact.	Mining	Smelting	Manufact.	WA	RoW	SEM	Nature	
WA	Mining		20			40					40	100
	Smelting			100						20		120
	Manufacturing							190	10			200
RoW	Mining		10			490					500	1000
	Smelting			100			1820			200		2120
	Manufacturing							200	1620			1820
Boundary Input from	SEM		90			1590						
	Nature	100			1000							
	Total input	100	120	200	1000	2120	1820					

[kt]

Land use	species-rich biome	20			1500		
	species-poor biome	140			600		
Water use	water scarce region	200			1100		
	water abundande region	0			1100		
Extraction from	large reserves	80			200		
	minor reserves	20			800		

[km²]

[1000 m³]

[kt]

Extension of gsub-PIOT

Intersects pressure data with information on the state of local environment

European Research Council
Established by the European Commission

fineprint

WU WIRTSCHAFTS UNIVERSITÄT WIEN VIENNA UNIVERSITY OF ECONOMICS AND BUSINESS

Thank you!

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