



# Assessment of the French metals demand induced by national consumption and its associated environmental footprints

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 Among the objectives of the French roadmap towards a circular economy:

## **STUDY OBJECTIVES**

• Use of environmentally extended multi regional input (EEMRIO) approaches to assess the output footprings induced by French final demand



### **GHG** emissions & **Resources consumption**

- How to simultanously assess these elements in order to avoir burden shifting?
- How to assess the impacts of a specific value chain?
- Use of different EEMRIO databases to test the effects of their specific characteristics on the results



Metal carbon footprint

X

## **METHODS**

Domestic IO table Country A	Imports from B to supply A intermediary use	From C to A	rofits + sumption	rmation	d valuables	
From A to B	Domestic IO table Country B	From C to B	d + non pr final con	capital fo	ntories an	al output
From A to C	From B to C	Domestic IO table Country C	Household	ross fixed	ge in inver	Tot
Total i	ntermediate consu	mption	δΩ Ω	Ū	Chan	

#### **CALCULATIONS**

Total production:  $x = (I-A)^{-1}$ . y y: French final demand Total footprint: E = B.x

Footprint expressed by element of the final demand:  $E=B.(I-A)^{-1}.\dot{y}$ Footprint expressed by element of the total production:  $E = B \hat{x}$ 

For the metal carbon footprint:

In the B matrix, for the non-metal related sectors, GHG emissions are set to 0.

Value added Output at basic prices **Environmental extensions** - emissions, extractions, land use, ... -

Matrix modelling interindustries exchanges – Input to define the technology matrix A

#### **Environmental** extensions table – Input to define the B matrix

#### **CONSIDERED DATABASES**

	WIOD2013	EXIOBASE V2
Temporal coverage	1995 - 2009	2007
Geographical coverage	40 countries + 1 ROW	43 countries + 5 ROW
Technological coverage	35 activities (1 metal sepecific)	163 activities (22 metal specific)
Metal extraction	1: Minerals metals	10

## SOME RESULTS



Elements of the final demand with the highest metal and metal carbon  $\bullet$ footprints are the same and are mainly due to their iron and steel content (assessment using EXIOBASE v2)





47% of the metal footprint **71%** of the metal carbon footprint

1995 1996 1997 1998 1999 1999 1999 1996 1996 1996 1996	:+10																1.
Years		1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
								Y	'ear	S							

Metal carbon footprint Total Metal footprint

- Metals represent **13%** of French carbon footprint
- Metals represent **11%** of French material fooprint
- Evolution of the location of GHG emissions induced by metal  $\bullet$ production for the French final demand, between 1995 and 2009 (assessment using WIOD)

 $30 \% \rightarrow 20\%$ 



## **PERSPECTIVES AND CONCLUSION**

EEMRIO permits to understand in details the impacts linked to consumption and to take specific actions to limit them:

WHICH PRODUCTS? TEMPORAL EVOLUTION? WHERE? WHAT PRODUCTION ACTIVITIES?

Limitations: age of the data in publicly available databases (2011 for EXIOBASE v3, 2015 for EUROSTAT) and transparency in EEMRIO development

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