



Co-funded by the Horizon 2020
Framework Programme
of the European Union



CAN MATERIAL PASSPORTS LOWER FINANCIAL BARRIERS FOR STRUCTURAL STEEL RE-USE?

VITO
RECBE MEETING
24 AUGUST 2018, LONDON





AGENDA

Introduction:

- Who am I?
- What is BAMB?
- What is VITO's contribution in BAMB?

BAMB key outputs & business cases:

- Overview
- Material passports for structural steel re-use

Feedback?





WHO ARE WE?

Anse Smeets

Circular Economy business model researcher from VITO (Flemish Institute for Technological Research).

WHAT IS BAMB?

In the Horizon2020 project BAMB – Buildings As Material Banks 15 partners from 7 European countries are working together with one mission – enabling a systemic shift in the building sector by creating circular solutions.



WHAT IS VITO'S CONTRIBUTION IN BAMB?

- Coordination of the co-creation process for a vision on circular and reversible building design.
- Development of circular business models for the building industry and experiments in pilots.
- **Quantitative financial analyses of business cases.**





Co-funded by the Horizon 2020 Framework
Programme of the European Union



BAMB KEY OUTPUTS & BUSINESS CASES

REVERSIBLE BUILDING DESIGN PROTOCOL

MATERIAL PASSPORT

CIRCULAR BUILDING ASSESSMENT



BAMB KEY OUTPUTS & BUSINESS CASES

REVERSIBLE BUILDING DESIGN PROTOCOL

MATERIAL PASSPORT



CIRCULAR BUILDING ASSESSMENT



MATERIAL PASSPORT

What is it?

Sets of data describing defined characteristics of materials in (building) products that give them value for recovery and reuse.

Target user groups?

Diverse groups along the value chain

But how much does the data worth, and which user groups may be willing to pay for it?

Business case study: Structural steel re-use



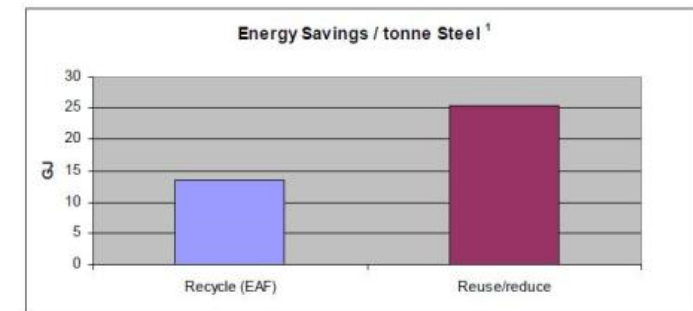
CAN MATERIAL PASSPORTS LOWER FINANCIAL BARRIERS FOR STRUCTURAL STEEL RE-USE?



STRUCTURAL STEEL RE-USE SOUNDS VERY LOGICAL

It's better for the environment

Reduce & Reuse Vs Recycle



Source: The Crucible Group - A lifecycle perspective in steel building materials. April 2006
1 – Comparison with Basic Oxygen Furnace

BedZED
London



It's technically feasible

And it can be economically
attractive

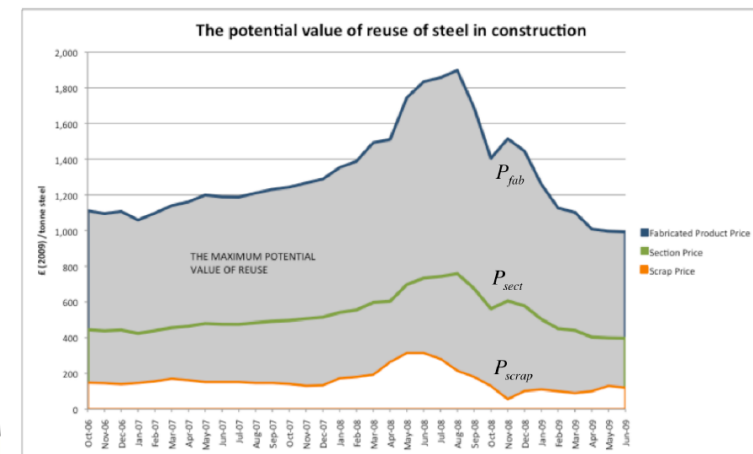


Figure 2: The maximum potential value of reuse Oct 2006 -Jun 2009

Source: Cullen & Drewniok, Univ. Cambridge (2016)

BUT IT'S NOT REALLY HAPPENING YET...

LESS THAN 10% GETS RE-USED. RATE STILL FALLING

Year	Author	Reuse	Recycle	Landfill	Note
2001	Steel Construction Institute	12%	93%	5%	Heavy sections
2006	Gorgolewski <i>et al.</i>	10%	90%	nil	Sections, Canada
2012	EUROFER	7%	96%	2%	Heavy sections



Co-funded by the Horizon 2020 Framework
Programme of the European Union

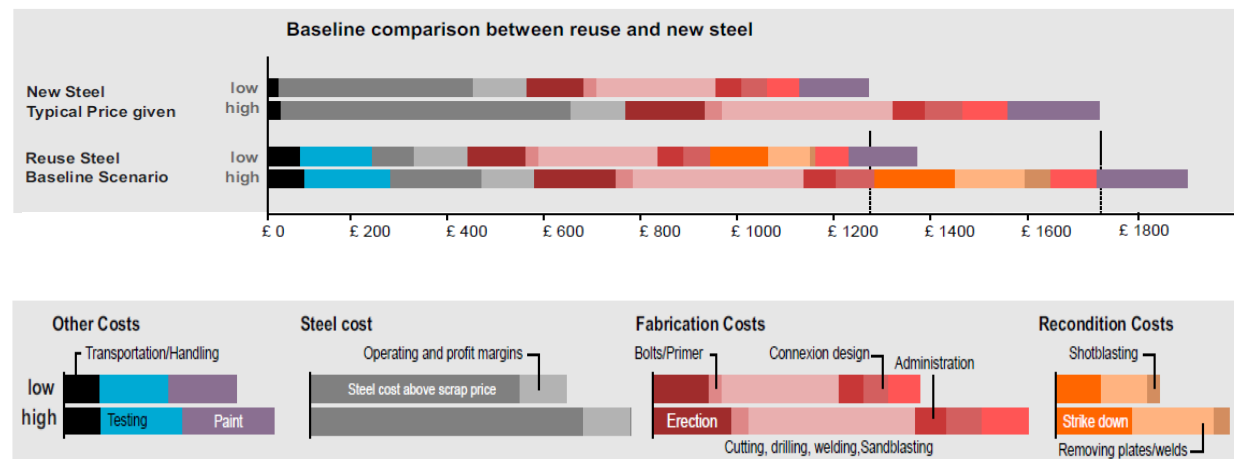


WHY?

AMONG MANY REASONS...

Liability
Lack of demand
Traceability
Sourcing
Old/new perception

RE-USE IS OFTEN MORE EXPENSIVE THAN NEW!

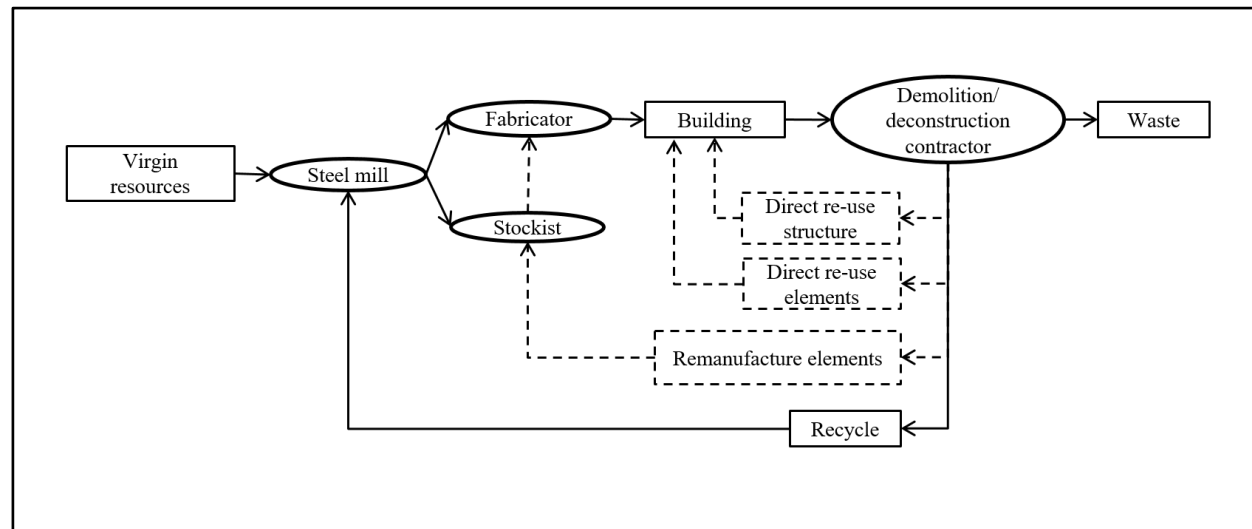


Sources: Dunant et.al., 2018
Tingley, Cooper & Cullen, 2017



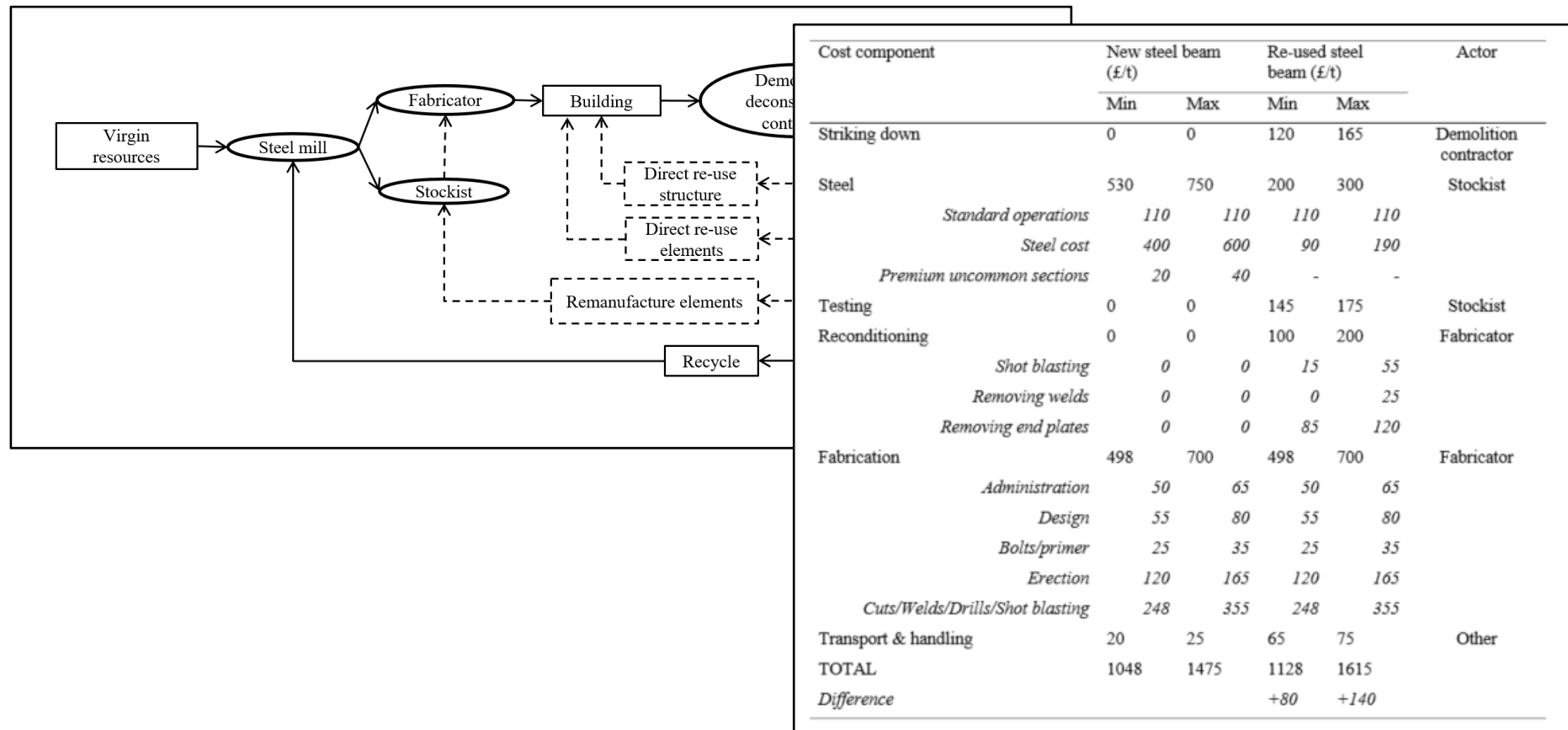
CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



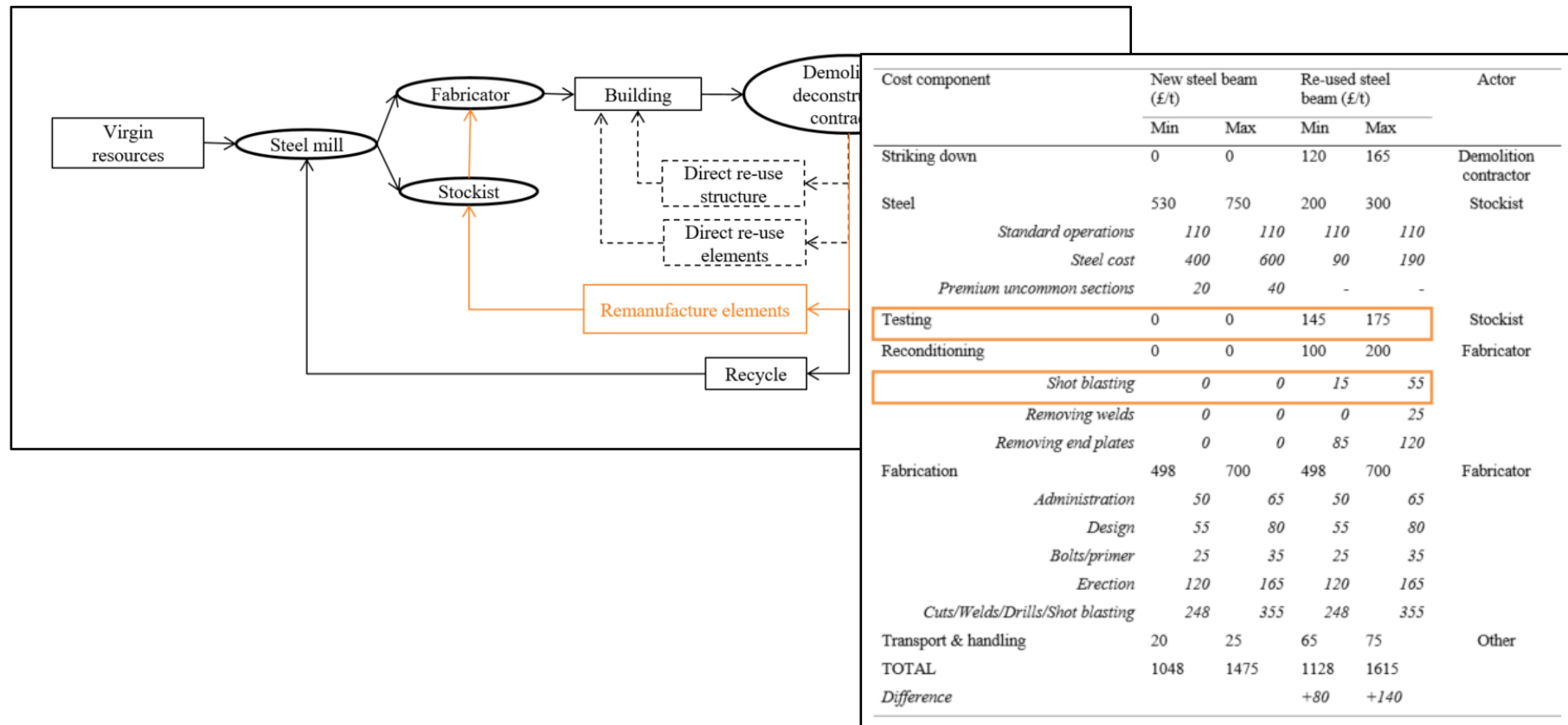
CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE

Data requirement	Supplier
Material properties	Fabricator original structure
<i>Steel grade</i>	
<i>Weldability</i>	
Source mill	Fabricator original structure
Production date	Fabricator original structure
Fabrication original building	
<i>Details original building</i>	Architect(s)/Structural engineer original structure
<i>Section sizes</i>	Fabricator original structure
<i>Beam location</i>	Structural engineer/Fabricator original structure
<i>Connection geometry</i>	Fabricator original structure
Usage history	Facility manager original building
<i>Loading history</i>	
<i>Building purpose</i>	
<i>Exposure to fire</i>	
Coating	Fabricator original structure
<i>Supplier tradename</i>	
<i>Technology used</i>	
<i>Date of application</i>	
<i>Applicator</i>	
<i>Warranties supplied</i>	

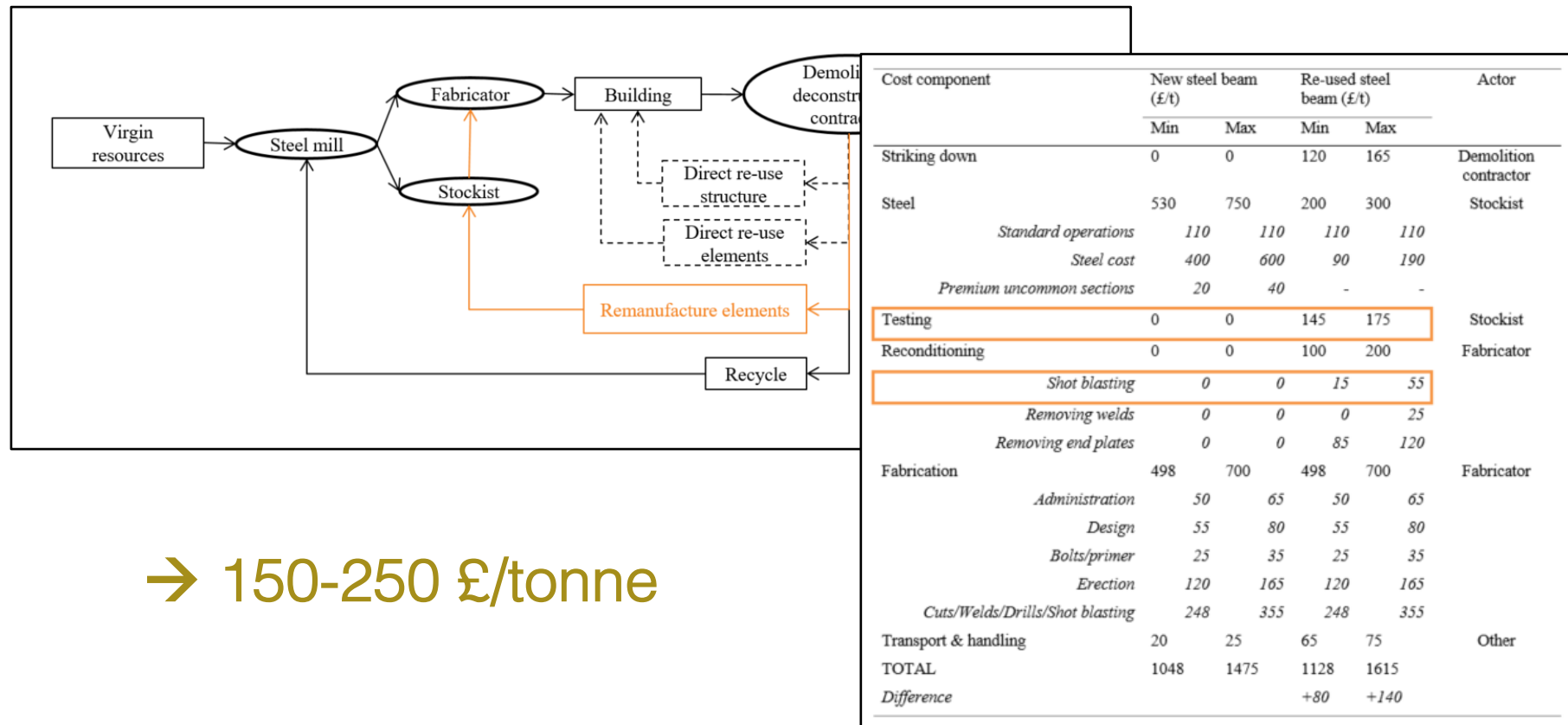
CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



CAN WE MAKE IT CHEAPER AND EASIER?

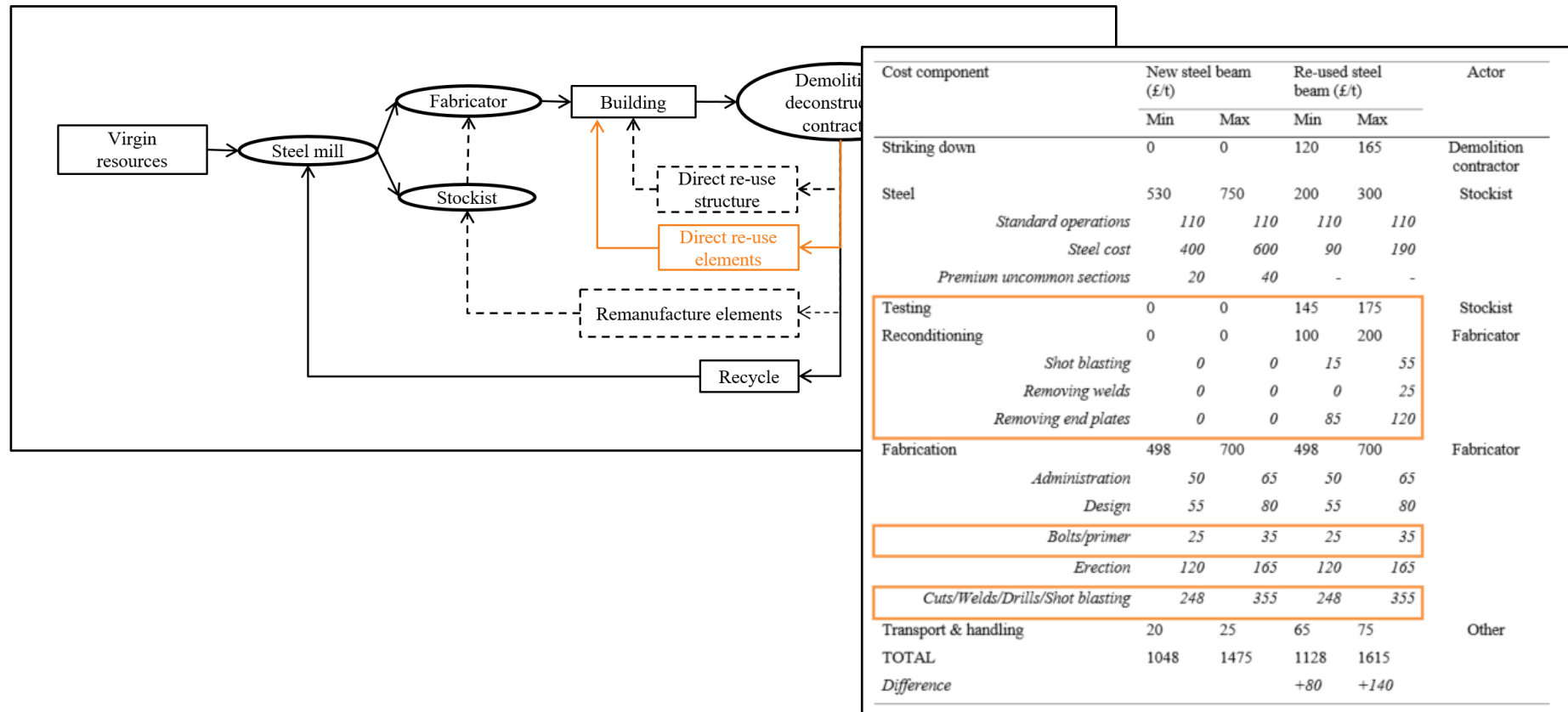
BY MAKING THE RIGHT DATA AVAILABLE



→ 150-250 £/tonne

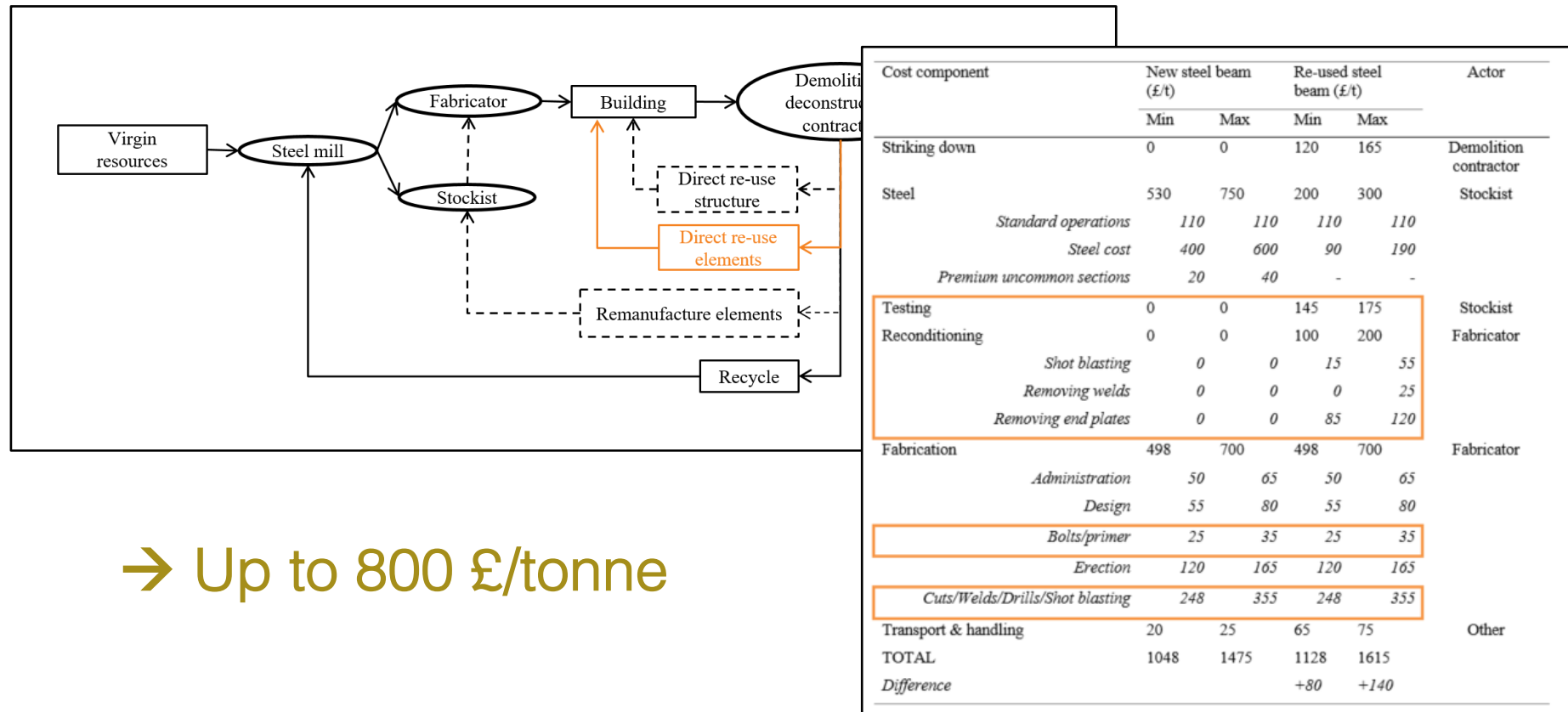
CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



CAN WE MAKE IT CHEAPER AND EASIER?

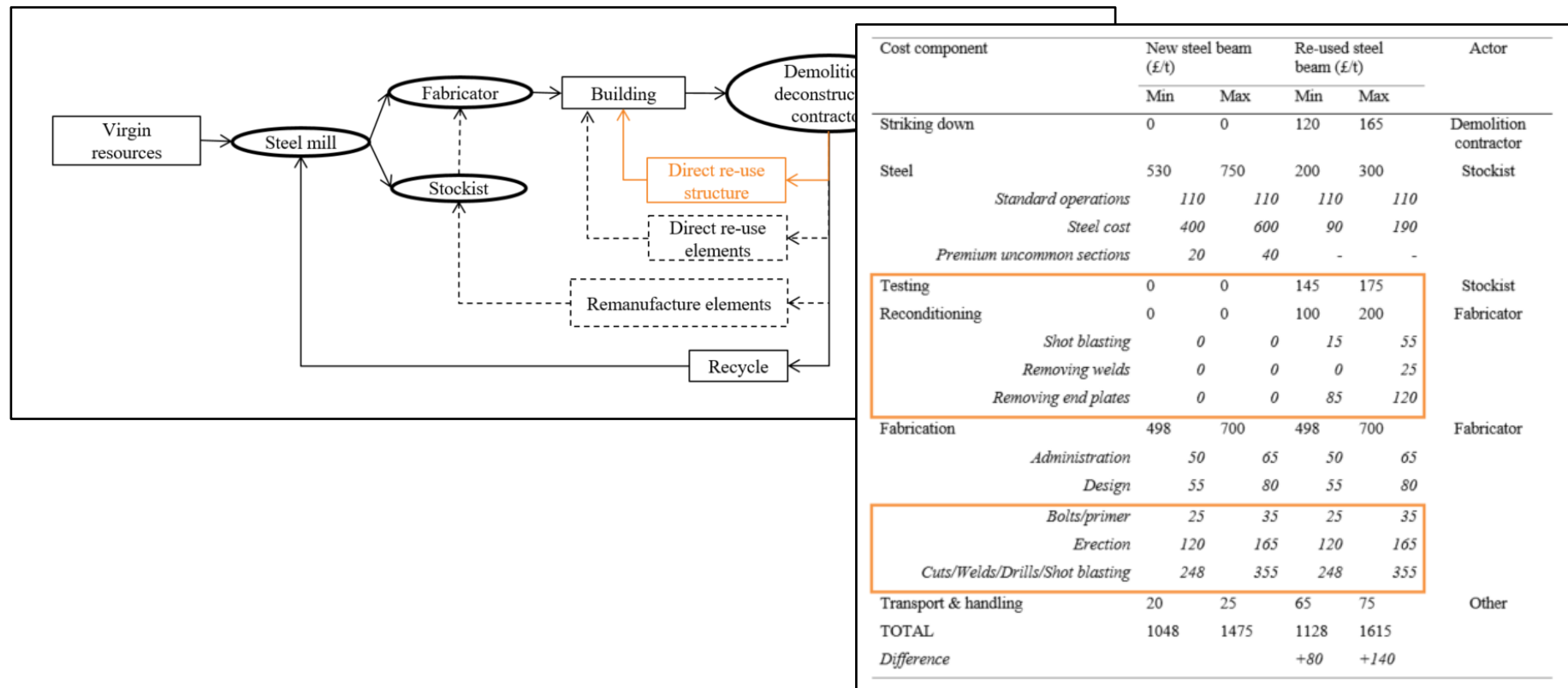
BY MAKING THE RIGHT DATA AVAILABLE



→ Up to 800 £/tonne

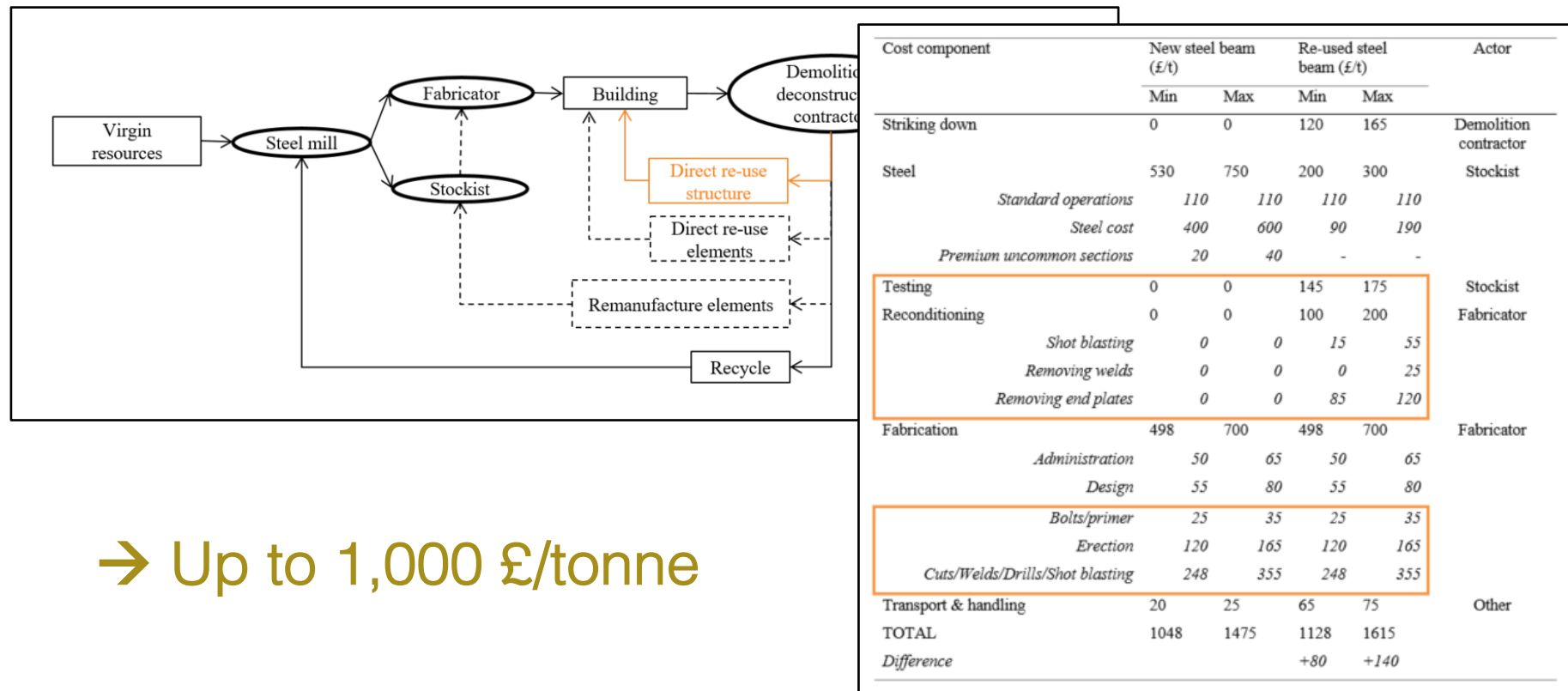
CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE



CAN WE MAKE IT CHEAPER AND EASIER?

BY MAKING THE RIGHT DATA AVAILABLE

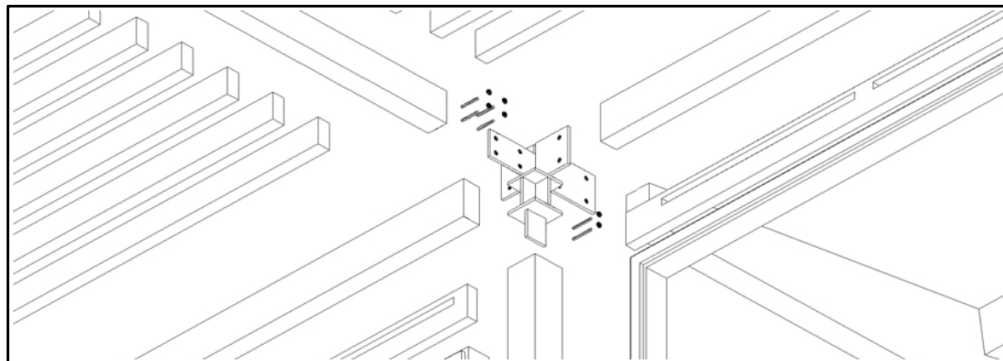
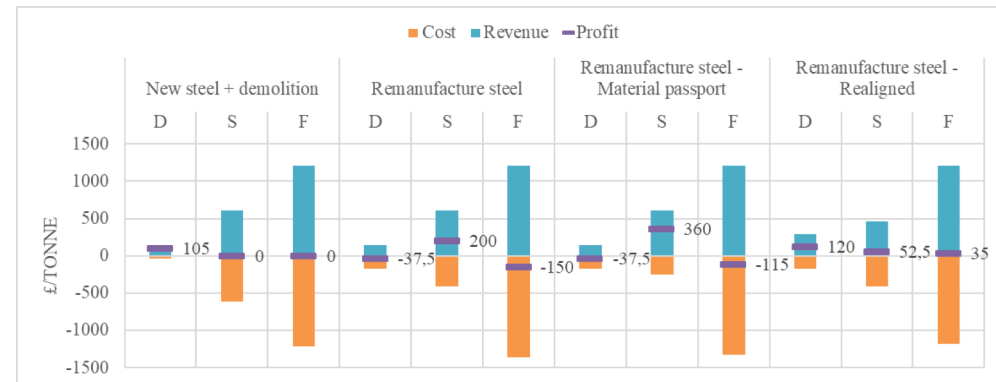
**Material Passports can help to lower financial
barriers of structural steel re-use**

BUT DATA ALONE MAY NOT BE SUFFICIENT...



STRONGER BUSINESS CASE IF...

Realignment of value chain transfer
prices



Standardization of dimensions and
reversible design



Co-funded by the Horizon 2020
Framework Programme
of the European Union



Thank you!

Feedback is very welcome!

For further questions/remarks:

anse.smeets@vito.be

+32 14 33 53 13

