

The logo for ENEA, featuring the word "ENEA" in a bold, white, sans-serif font against a dark blue background with a stylized sunburst or energy symbol.

AGENZIA NAZIONALE
PER LE NUOVE TECNOLOGIE, L'ENERGIA
E LO SVILUPPO ECONOMICO SOSTENIBILE

LCS-Rnet 8th annual meeting

An outlook at an Italian experience in the implementation of circular economy at industrial level. Opportunities and concerns.

Laura Cutaia

Lab. Valorizzazione delle risorse

(SSPT-USER-RISE)

Wuppertal, September 6th 2016

ENEA

2700 staff employees,
 9 research centers
 research and innovation activities, and provides public administration, enterprises and citizens with its advanced services.

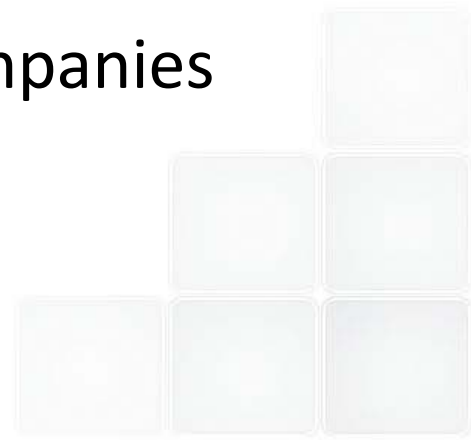
Department for Sustainability

efficient use of resources, circular economy and eco-innovation. |
 Technologies for recovery and/or recycling of secondary raw materials, and substitution.
 eco-innovation at process, product and systemic level.
 coordination of the South Co-Location centre for the EIT KIC on Raw Materials.

Division for Resource Efficiency

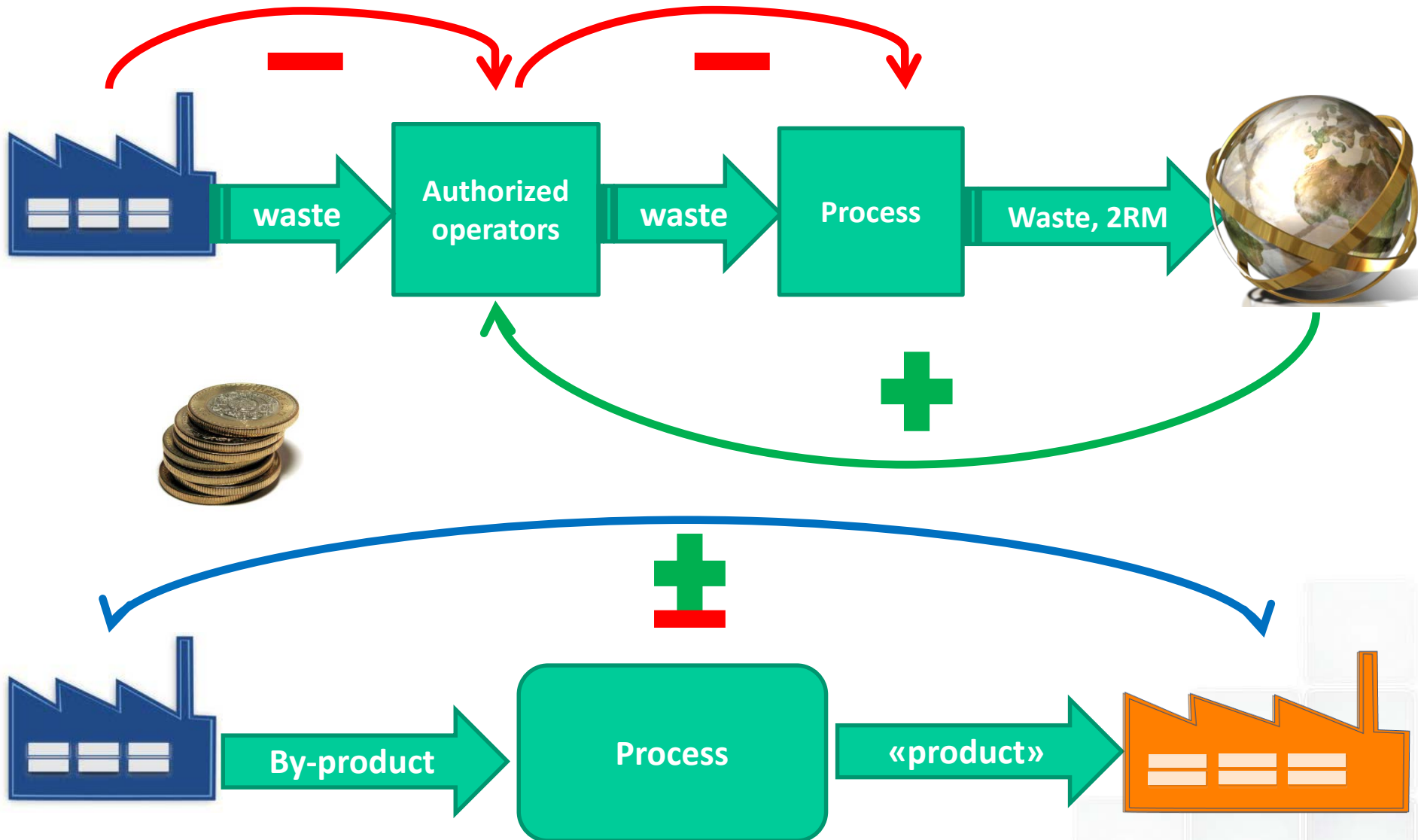
recovery/recycling of secondary raw materials;
 eco-innovation at process, products and systemic level;
 eco-design and application of innovative materials; substitution.
 Life cycle thinking
 industrial ecology - industrial symbiosis.
 USER implements the ENEA Industrial Symbiosis Platform and its databases.

- Core partner in the EIT KIC on Raw Materials and coordination of the South co-Location Centre
- Cooperation with the Italian Ministry of Economic development
- Cooperation with the Italian Ministry of Environment
- Cooperation with national and regional association and companies (e.g. Confindustria, Camere di commercio, industrial areas, ...)
- Cooperation and support to consortia, companies associations, local operators



- “...There are relationships between industries, sometimes simple, but often quite complex, which enter into and complicate the analysis. Chief among these is the phenomenon of **industrial symbiosis**. By this is meant the **consorting together of two or more of dissimilar industries**.
...”
 - Renner, Renner, G.T.. Geography of Industrial Localization. Economic Geography 23, no. 3: 167–189., 1947
- “Industrial symbiosis engages traditionally separate industries and other organisations in a **network** to foster **innovative strategies** for more sustainable resource use (**including materials, energy, water, assets, expertise, logistics etc.**).....”
 - Lombardi & Laybourn, NISP

SI vs BaU





European Resource Efficiency Platform (EREP)



“Tabella di marcia verso un'Europa efficiente nell'impiego delle risorse



Funding programs (H2020, ..)



COM(2014) 398 “Verso un'economia circolare: programma per un'Europa a zero rifiuti”



G7 - “Alliance on Resource Efficiency”



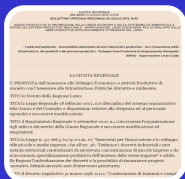
2.12.2015 - Closing the loop - An EU action plan for the Circular Economy



Regione Emilia Romagna – Regional Waste Plan



Rete Cartesio - Guidelines for Ecologically Equipped Industrial Areas



Regione Lazio - Guidelines for Ecologically Equipped Industrial Areas



Regione Lazio – Regional plan for energy and energy efficiency. “Energetica”



Regione Friuli Venezia Giulia - Legge Regionale 20 Febbraio 2015 n. 3.

ENEA- dissemination and networking activities for Industrial Symbiosis



Industrial Symbiosis **platform**:
www.industrialsymbiosis.it



Symbiosis Users **Network**: Italian network of Industrial Symbiosis, promoted by ENEA. www.sunetwork.it



Eur-ISA, launched on November 6th 2013, aims to connect the industrial symbiosis **networks across European** member states.

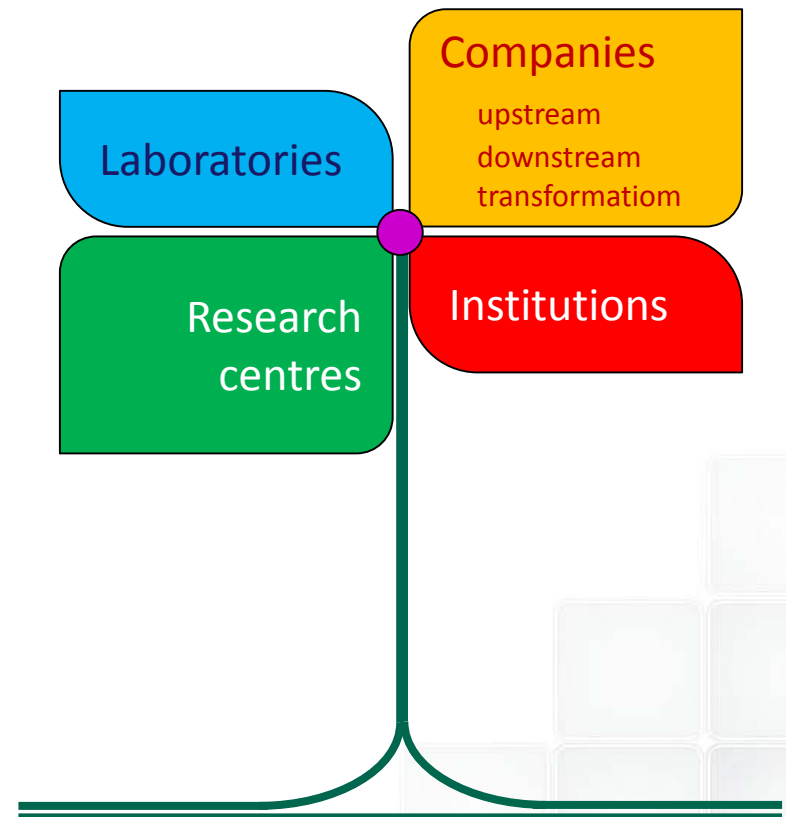


ENEA is a founding member (with Belgium, Denmark, England, Finland, Hungary, Ireland, Netherlands, Northern Ireland and Turkey).
www.eur-isa.org

ROLE OF ENEA

Support to the creation of:

- cross-relations between companies, research and territory
- network between companies (upstream, downstream and transformation)
- ideas for recovery of resources



input – output tables



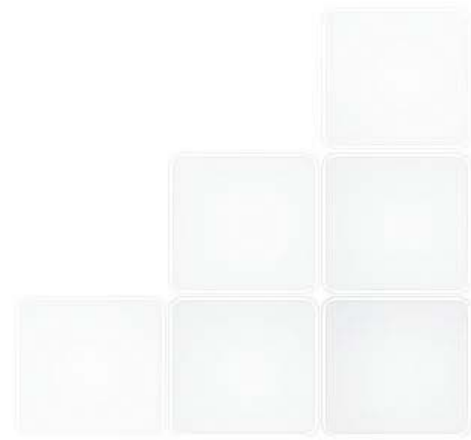
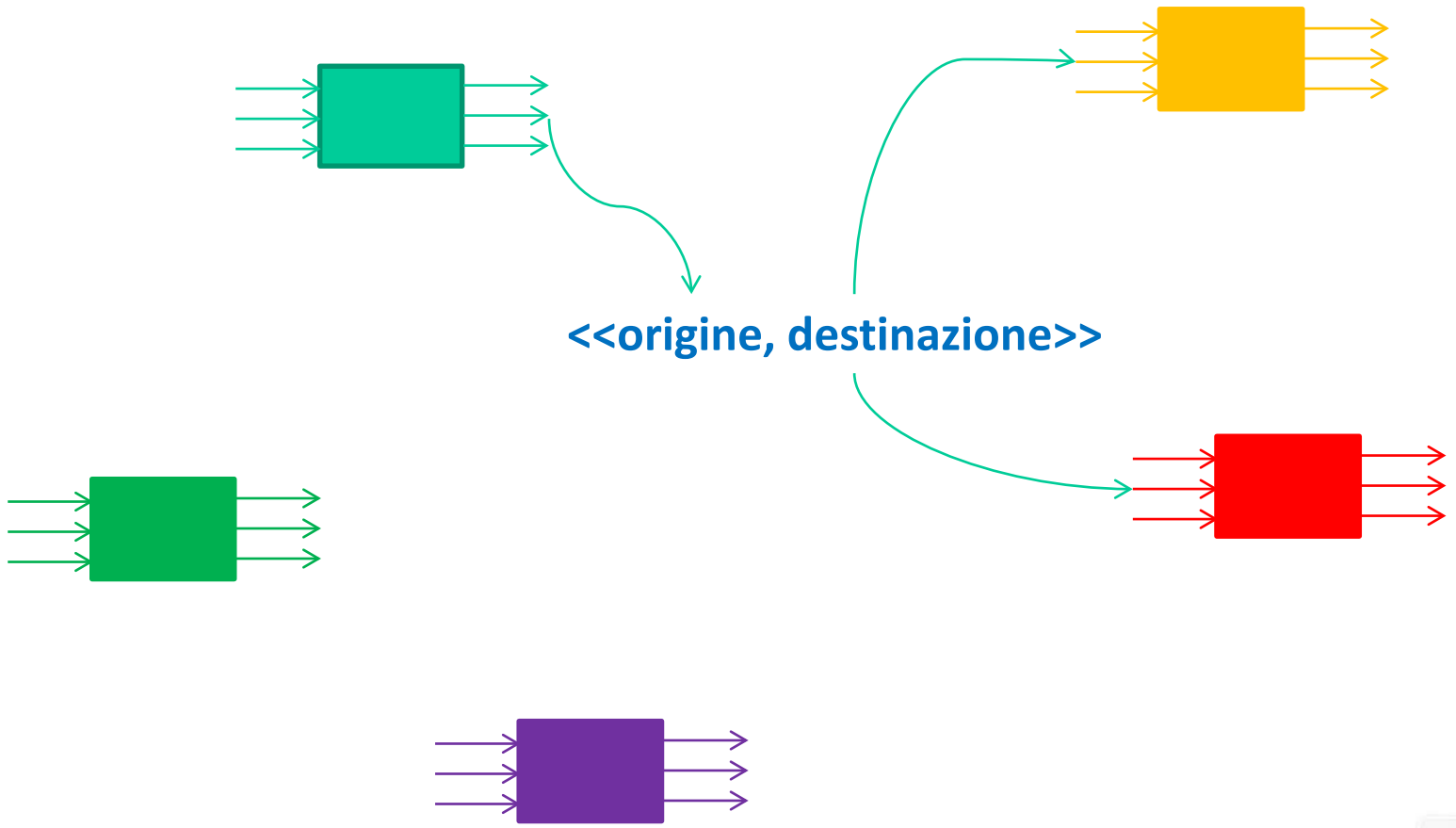
input

Risorsa (descrizione)	Risorsa (nome commerciale)	Risorsa (tipologia)	Risorsa (codice ProdCom) [se tipologia a)]	Risorsa (codice NACE) [se tipologia c)]	Tipo di quantitativo risorsa	quantità	unità di misura
		a) materiale			annuale		
		b) vettore energetico			batch		
		c) servizio					
		d) competenza					

output

Risorsa (descrizione)	Risorsa (nome commerciale)	Risorsa (tipologia 1)	Risorsa (tipologia 2 - a)	Risorsa (codice) [CER - se rifiuto]	Risorsa (codice) [ProdCom - se sottoprodotto]	Risorsa (codice) [NACE - se servizio]	Tipo di quantitativo risorsa	quantità	unità di misura
		a) materiale	rifiuto				annuale		
		b) sottoprodotto energetico	sottoprodotto				batch		
		c) servizio							
		d) competenza							

<origin, destination> vector



ENEA- Projects on Industrial Symbiosis

Name

Eco-Innovation Sicily



Main Aim

Actions for sustainability and competition of tourism and industrial areas

Territory

Sicily Region

Funding

Italian Government (art. 2 – c.44, Financial Law 2010)

Duration

May 2011 – December 2015

Stakeholders

Confindustria Sicilia, Chamber of Commerce (ENEA= technical and scientific coordination)

Value chain

Regional waste (WEEE, plastics, agrifood, construction,..)

Main results

Successful cooperative approach! 90 participating companies are geo-referred and provided about 400 I/O; 600 potential synergies

Green Industrial Symbiosis



Cross-relations between production sectors, industrial research and territory

Emilia-Romagna Region

Unioncamere Emilia Romagna and ASTER

October 2013 – March 2016

Unioncamere Emilia-Romagna and ASTER (ENEA= technical and scientific coordination)

Agro-industrial waste and residues

Successful cooperative approach! 10 companies are geo-referred and provide about 100 I/O; 90 potential synergies

Eco-Industrial Park Rieti



A green development opportunity for the Rieti's industrial cluster

Industrial Cluster: ASI Rieti

PhD co-funded by ENEA and Tuscia University

September 2014 – March 2016

Consortium for industrial development in Rieti province (ENEA= coordination)

Local waste (WEEE, plastics, agrifood, construction,..)

Creation of companies DB to select the suitable ones

Network model

Industrial Park model



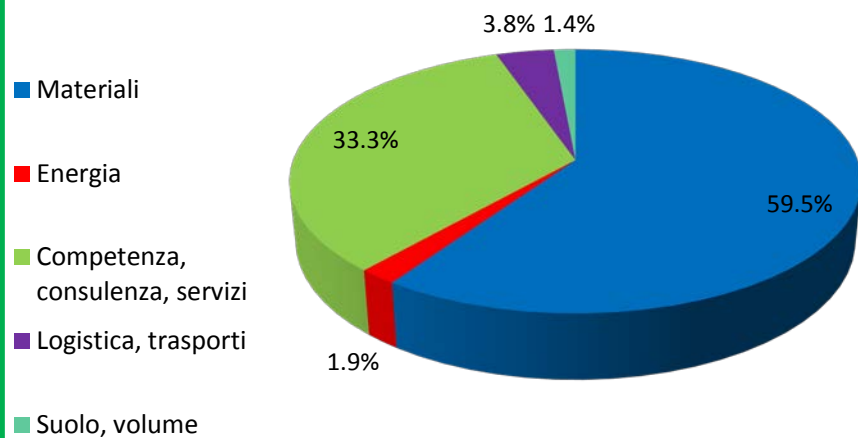
Tavolo di Lavoro “Nuove opportunità per le imprese attraverso la simbiosi industriale”

Siracusa, 28 marzo 2014
Camera di Commercio, via duca degli Abruzzi 4
9.00-15.00



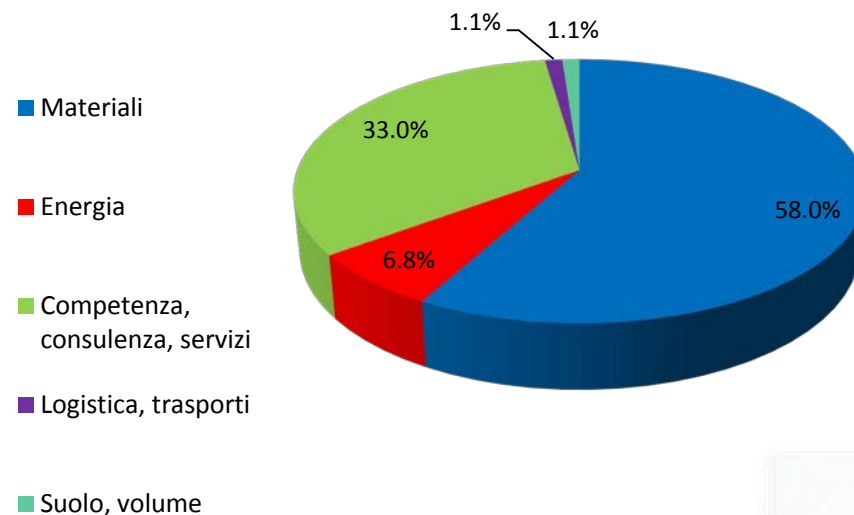
SYMBIOSIS, la prima Piattaforma di Simbiosi Industriale realizzata in Italia da ENEA, è uno strumento al servizio delle imprese per condividere e trasferire risorse (materiali, sottoprodotti energetici, servizi, competenze)

OUTPUT – 211 offered



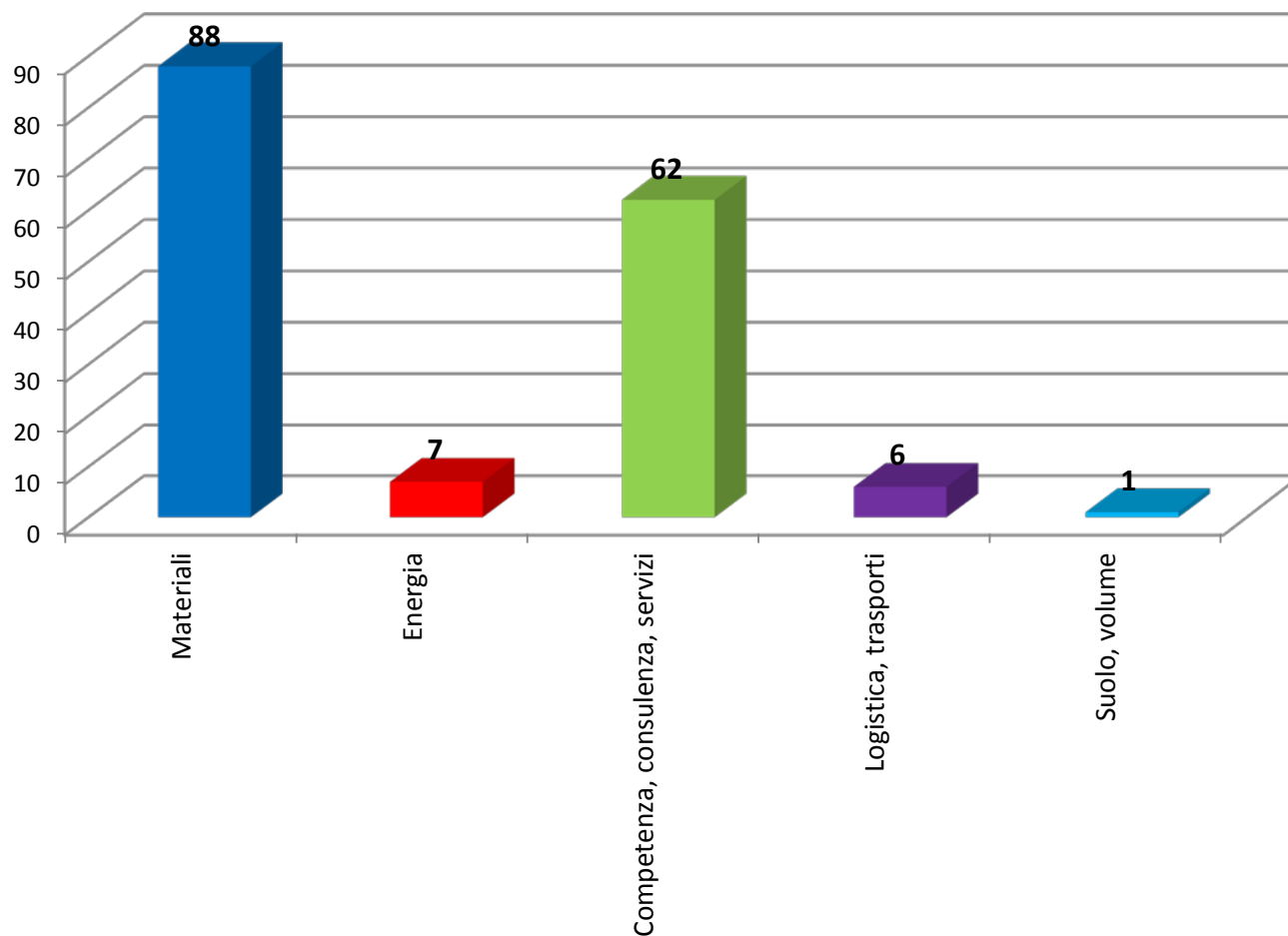
151 risorse input condivise durante il TdL
60 risorse input condivise mediante schede I/O
prima (36 risorse) e dopo il TdL (24 risorse)

INPUT – 88 requested



57 risorse input condivise durante il TdL
31 risorse input condivise mediante schede I/O
prima del TdL

Siracusa – matches (164)



Complessivamente più di 160 potenziali sinergie emerse al TdL



I relatori

I tavoli con i delegati e i facilitatori



I tavoli con i delegati e i facilitatori



Agenzia nazionale per le nuove tecnologie,
l'energia e lo sviluppo economico sostenibile



Piattaforma di simbiosi industriale

Sicilia

“Nuove opportunità per le imprese attraverso la simbiosi industriale”

Secondo Tavolo di Lavoro

Catania, 24 ottobre 2014

Confindustria Catania (Sala ANCE) - Viale Vittorio Veneto, 109

9.00-15.00



SYMBIOSIS[®], la prima Piattaforma di Simbiosi Industriale realizzata in Italia da ENEA, è uno strumento al servizio delle imprese per condividere e trasferire risorse (materiali, sottoprodotti energetici, servizi, competenze)

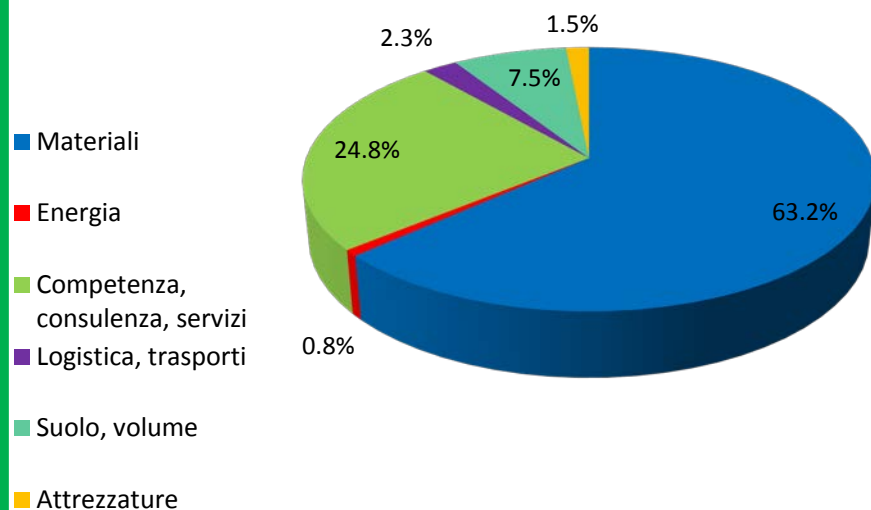


CONFINDUSTRIA CATANIA

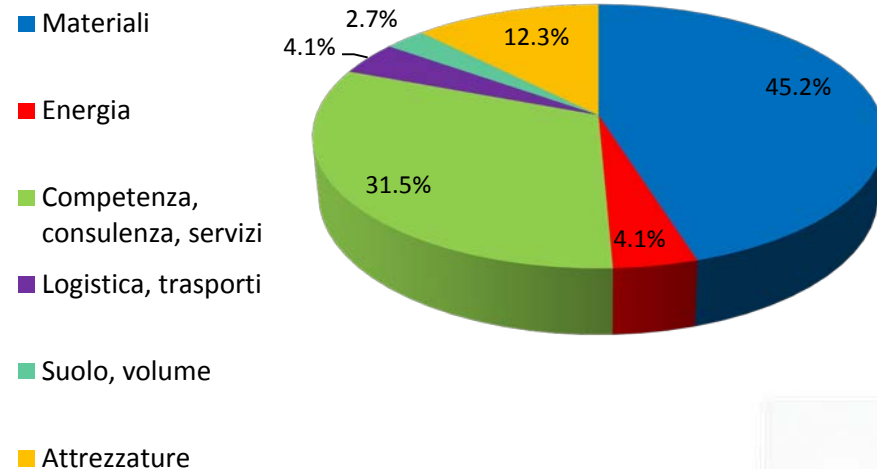


UNIVERSITÀ
degli STUDI
di CATANIA

OUTPUT – 133 offered

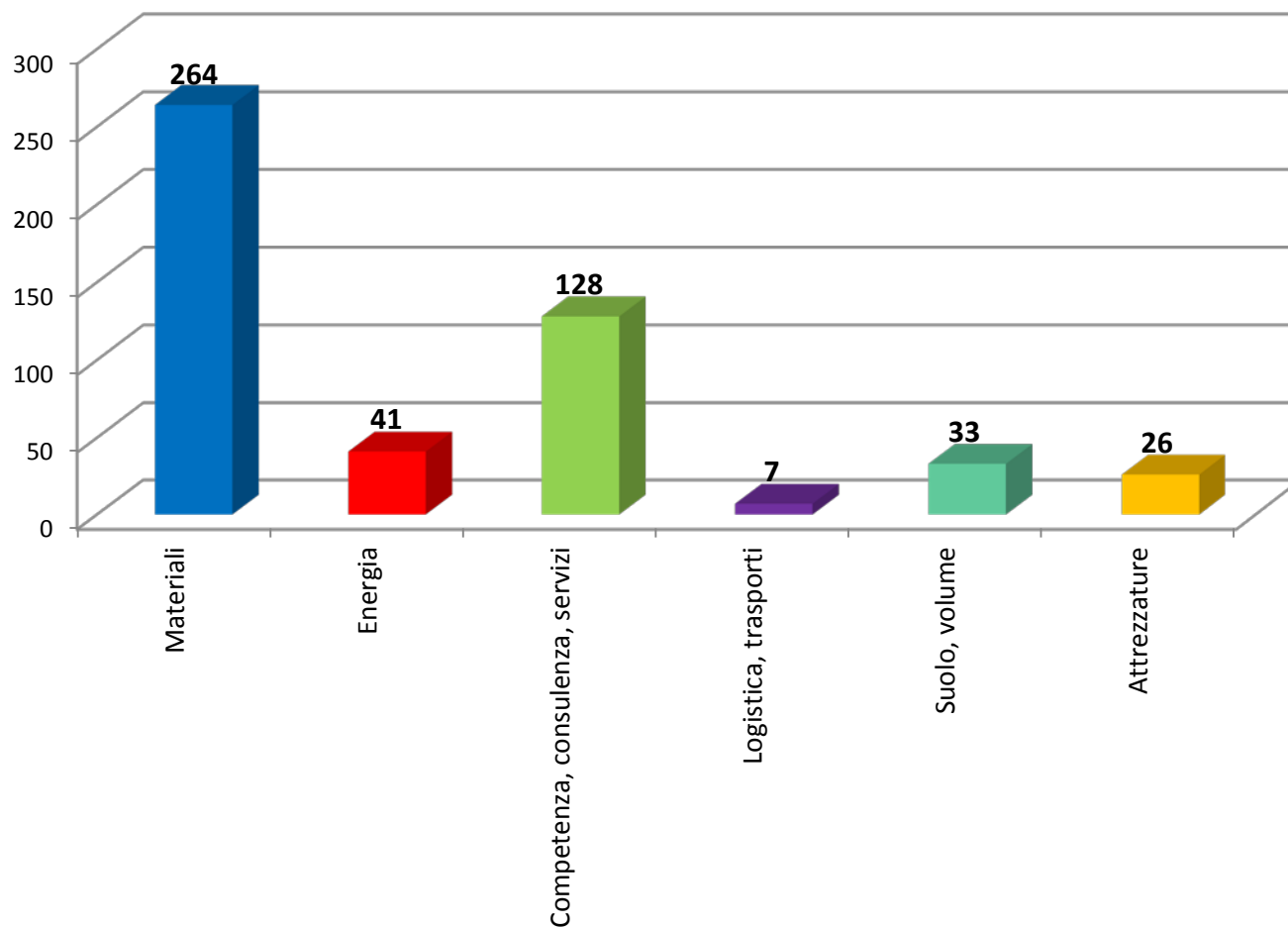


INPUT – 77 requested



Complessivamente più di 200 risorse condivise al TdL

Catania – matches (499)



Complessivamente 500 potenziali sinergie emerse al TdL

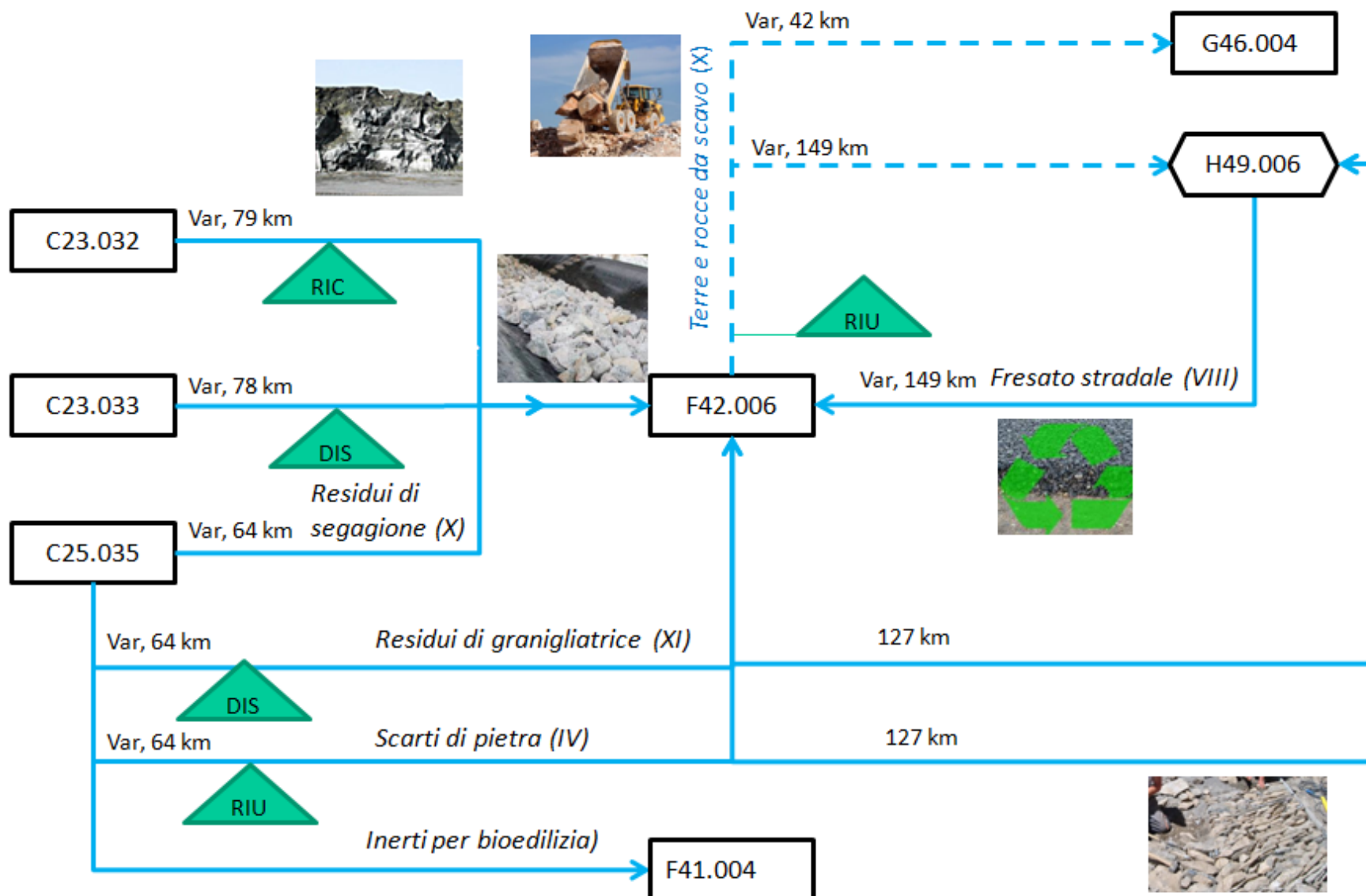
Going from the “match” to the “sinergy”



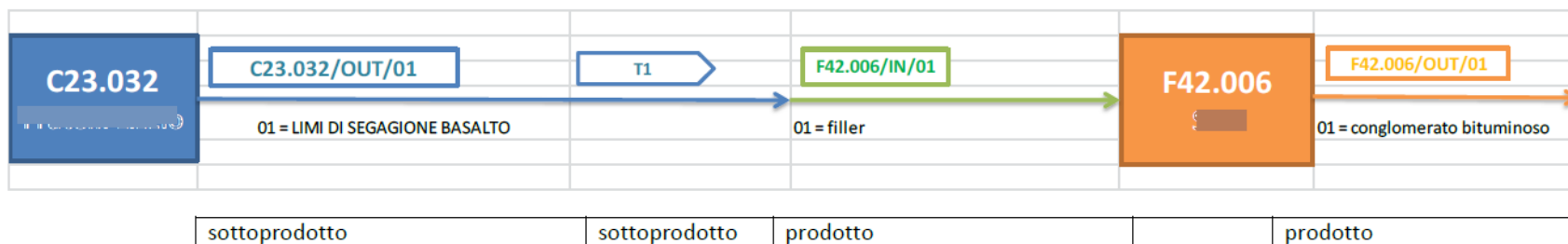
- For each group of match:
- Operative manual with its technical documentations.
- Within Eco-Sicilia project:
 - Industrial symbiosis for the recovery of scraps from quarry activities
 - Industrial symbiosis for the recovery of organic fractions from scraps from agroindustry for various applications



Industrial symbiosis scheme resource flow: construction and demolition waste; excavated inert materials.



Layout and synoptinc scheme of the synergie



CARATTERISTICHE DEGLI SCARTI E POSSIBILI RIUTILIZZI

<u>Tipologie di scarti provenienti dalla lavorazione dei materiali lapidei</u>		-			
<u>Possibili riutilizzi degli scarti:</u> - <u>Riutilizzo degli scarti di varia pezzatura</u> - <u>Possibili riutilizzi dei limi di segazione</u>					
NORMATIVA					
<u>Regolamentazione degli scarti provenienti dalla lavorazione dei materiali lapidei</u>			<u>Normativa e norme tecniche per il riutilizzo nel campo delle costruzioni</u>		
<i>D.M. 161/2012 - Art 1 lett. b (I residui di lavorazione dei materiali lapidei sono considerati materiali di scavo)</i>			<i><u>Direttiva 89/106/CEE</u> relativa ai prodotti da costruzione (abrogata) DIRETTIVA DEL CONSIGLIO del 21 dicembre 1988 relativa al ravvicinamento delle disposizioni legislative, regolamentari e amministrative degli Stati membri concernenti i PRODOTTI DA</i>		

The project “Green-Industrial Symbiosis” in RER



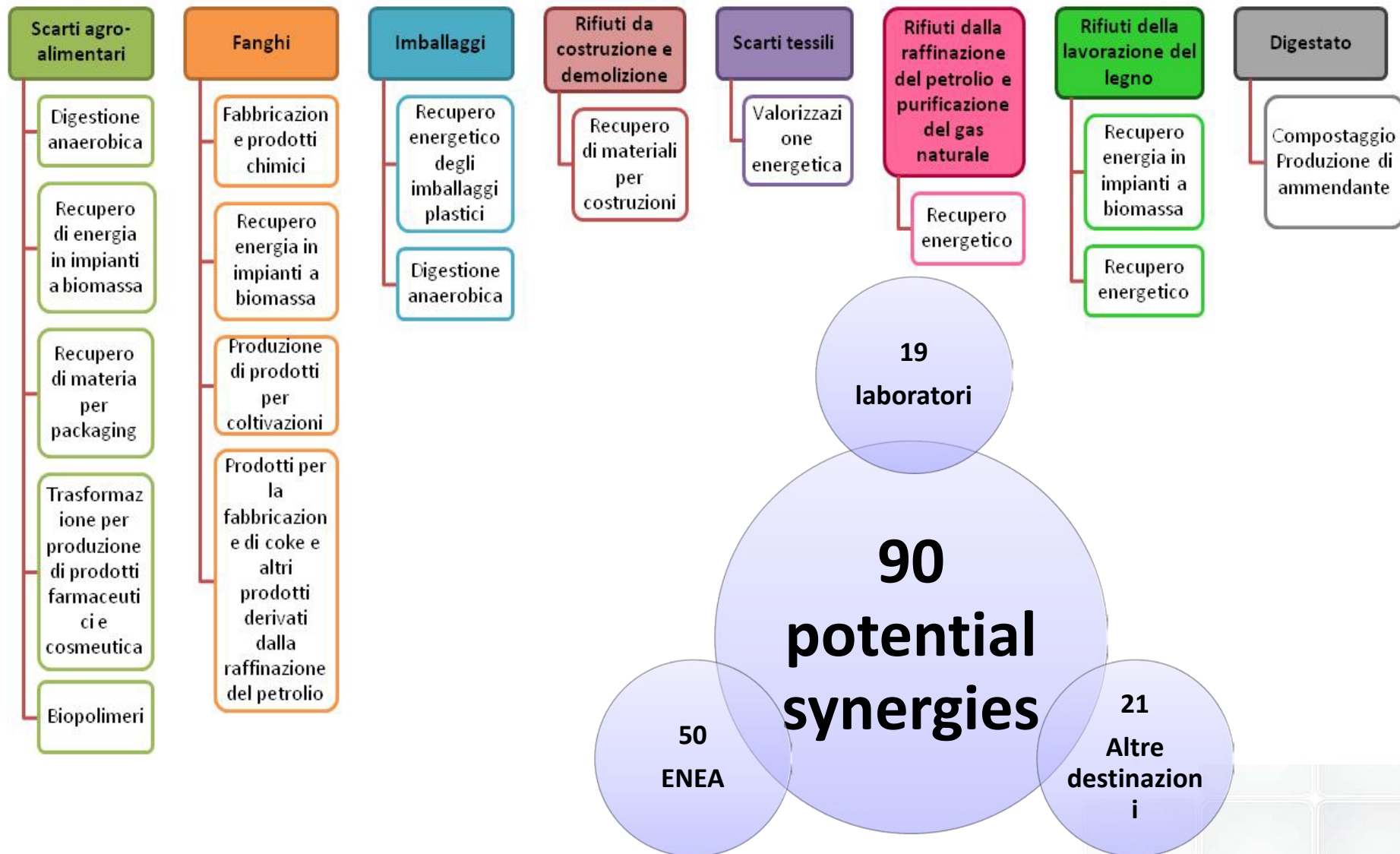
13
Aziende
5 upstream
1 Trasformazione
7 downstream

2
Enti
istituzionali

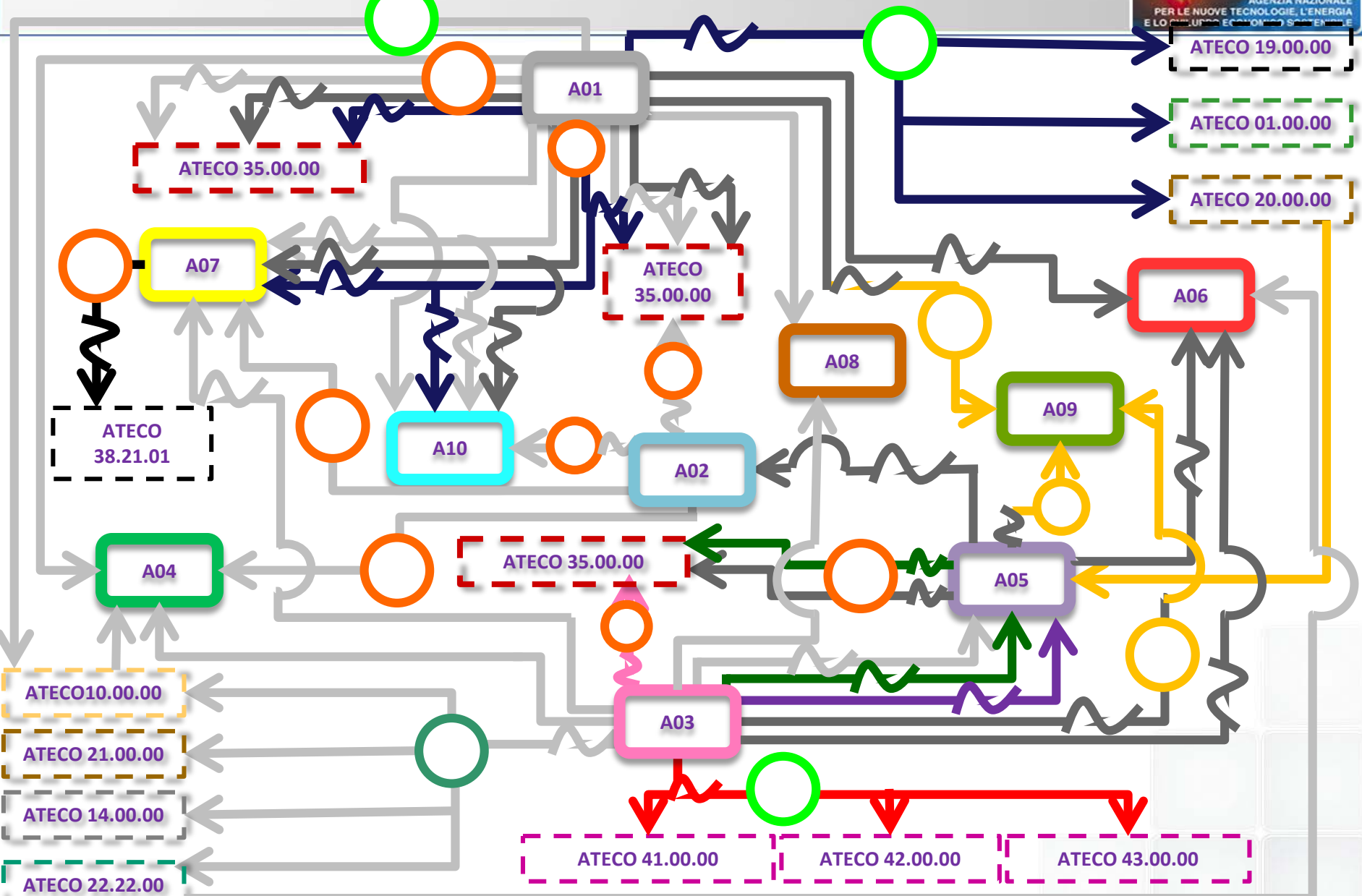
7
Laboratori



Main resources flows

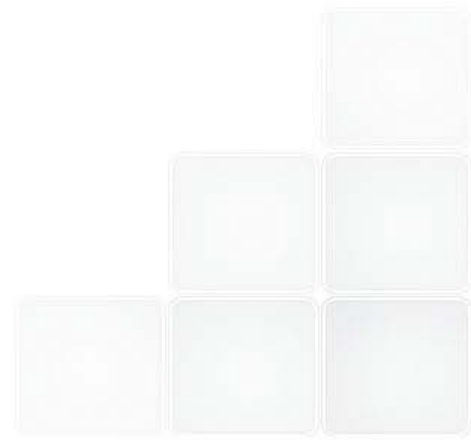


Industrial symbiosis scheme

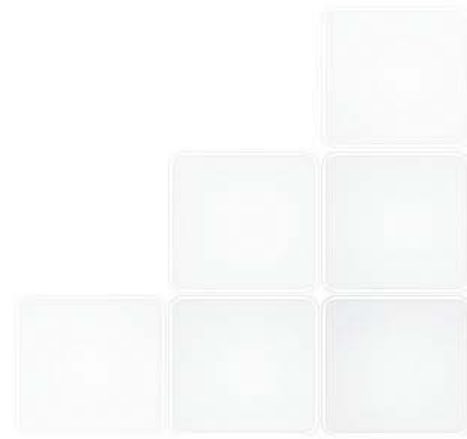


Elaborazione risultati:

- Less consumption of raw materials
- Less landfilling
- Less transportation
- Local development
- Direct and indirect economic benefit
- Ecoinnovation
- Collaboration between companies
-



- Application of regulation
- Waste or not-waste?
- By-products or not
- Local authorities
- End-of-waste regulation
- Conflict with other regulations (e.g. Reach regulation)
- Market
- Behaviour



Thank you!



laura.cutaia@enea.it

