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

L'Economia Circolare nella transizione alla neutralità climatica

3° Rapporto CEN-ENEA sull'Economia Circolare in Italia

Roberto Morabito

Direttore Dipartimento Sostenibilità dei Sistemi Produttivi e Territoriali – ENEA

Presidente ICESP

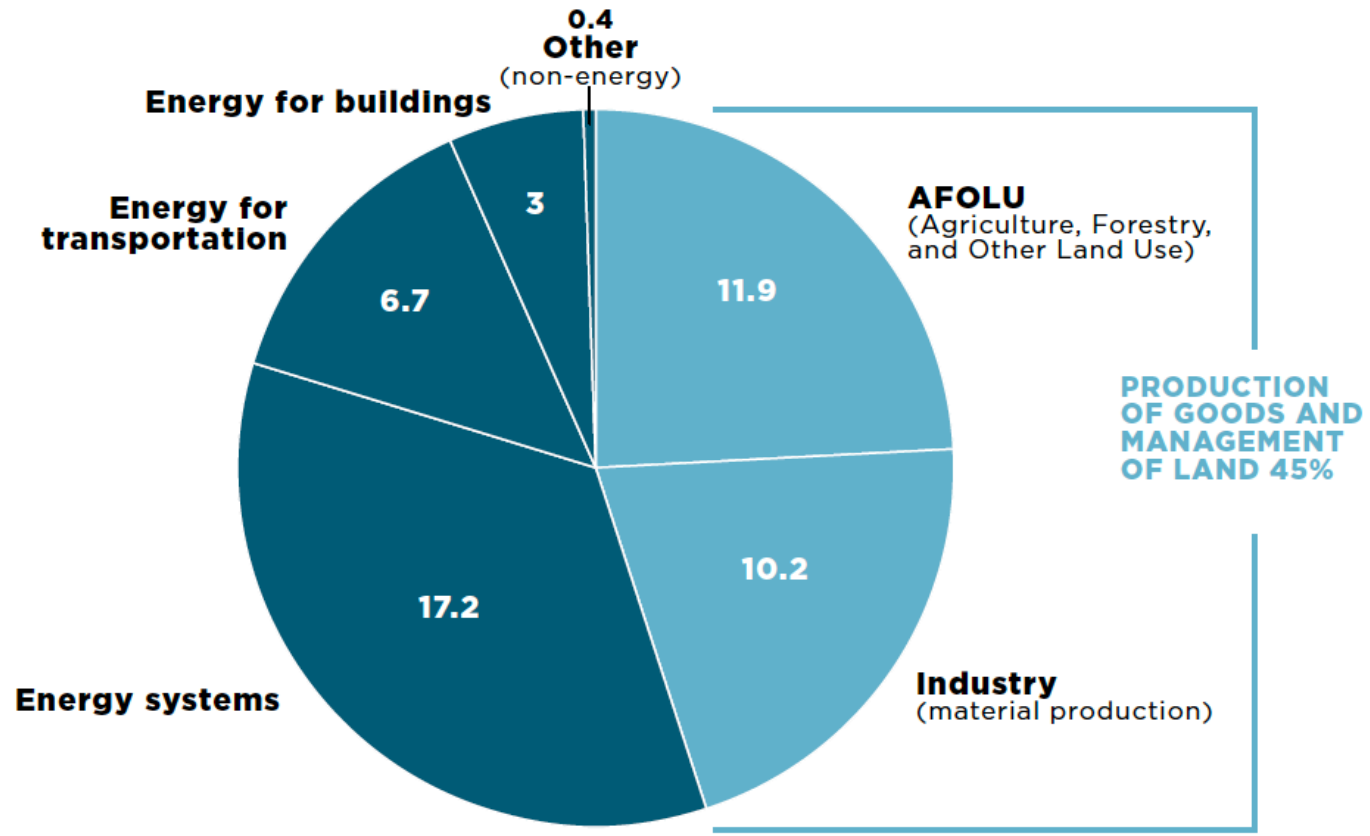
roberto.morabito@enea.it

III Conferenza Nazionale sull'Economia Circolare

Webinar 23 Marzo 2021

Emissioni globali di GHG

FIGURE 1: 45% OF GLOBAL GHG EMISSIONS CAN BE ATTRIBUTED TO THE PRODUCTION OF MATERIALS, PRODUCTS, AND FOOD, AS WELL AS THE MANAGEMENT OF LAND



Note: 'Industry' and 'AFOLU' include their own energy-related emissions but not indirect emissions from electricity and heat production.
Source: IPCC, "IPCC's Fifth Assessment Report (AR5)" and Material Economics analysis.

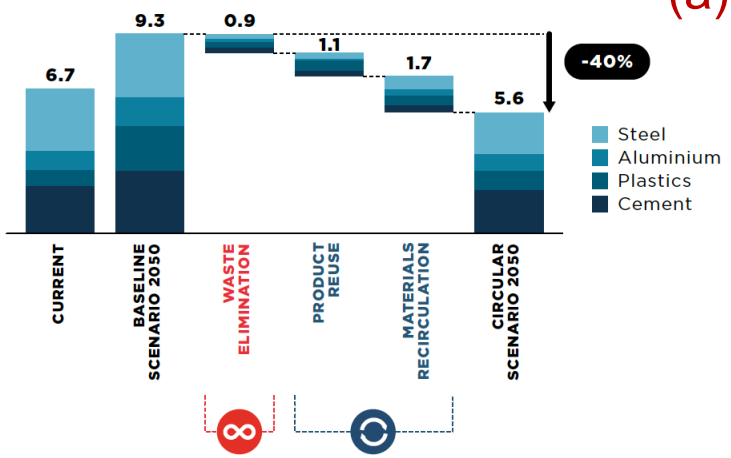
Ellen Macarthur Foundation - Completing the picture how the Circular Economy tackles Climate Change – Sept. 2019

Il contributo dell'Economia Circolare alla riduzione delle emissioni

Settori Industria (a), Edilizia (b), Alimenti (c) e (d) Mobilità

FIGURE 4: A CIRCULAR ECONOMY COULD REDUCE ANNUAL GLOBAL CO_2 EMISSIONS FROM KEY INDUSTRY MATERIALS BY 40% OR 3.7 BILLION TONNES IN 2050

(a)



(b)

FIGURE 6: A CIRCULAR SCENARIO FOR THE BUILT ENVIRONMENT COULD REDUCE CO_2 EMISSIONS BY 38% IN 2050 (OR 56% BEYOND 2050)

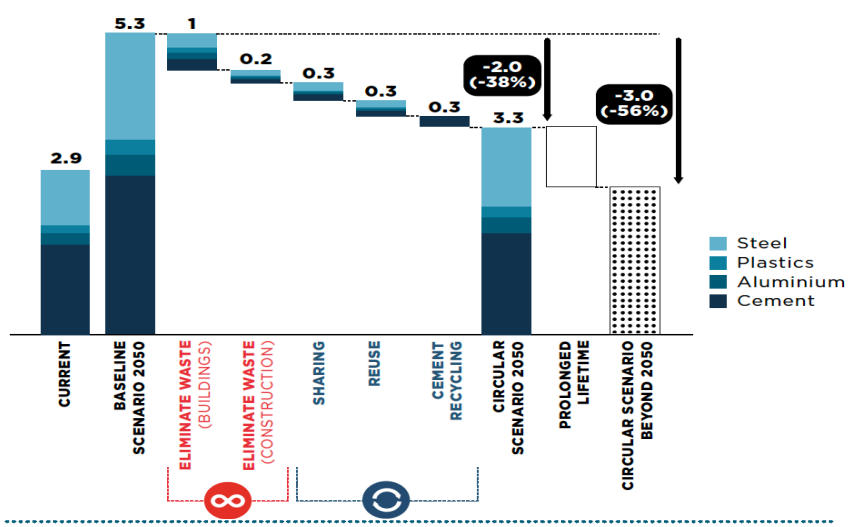
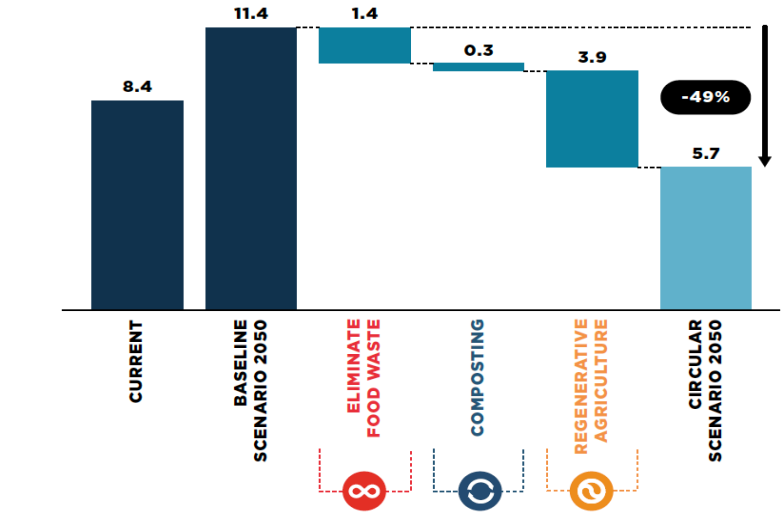


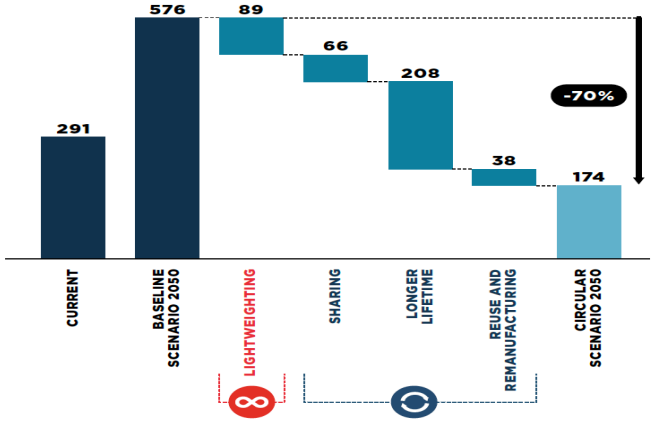
FIGURE 8: A CIRCULAR SCENARIO FOR FOOD COULD REDUCE ANNUAL CO_2e EMISSIONS BY 49% IN 2050

(c)



(d)

FIGURE 7: A CIRCULAR SCENARIO FOR PASSENGER CARS COULD REDUCE CO_2 EMISSIONS BY 70% IN 2050



Source: Material Economics, "The Circular Economy – A Powerful Force for Climate Mitigation" (2018). International Energy Agency, "Energy Technology Perspectives - Transport" (2017).

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Material Efficiency Strategies for a Low-Carbon Future
RECC 2020 Report

UN environment programme

International Resource Panel

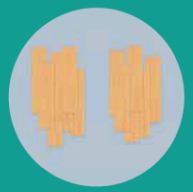
Resource Efficiency and Climate Change

Box 2. Material Efficiency Strategies for Climate Action

The following material efficiency strategies were considered in the report:

Using less material by design

Designing lighter and smaller products that deliver the same service, reduces the amount of materials incorporated in the product and often the energy required to operate the product as well. In this report, we address both the construction of lighter structures (less steel and concrete in the bearing structure of multifamily buildings) and the downsizing of vehicles, i.e., the shift from large vehicles (light trucks, sports utility vehicles) to smaller ones (passenger cars, minicars).

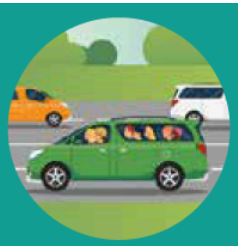


Material substitution

Replacing cement and steel with wood in buildings and steel with aluminium in cars can reduce life cycle emissions. The mechanisms of emission reductions vary. While wooden structures require less carbon in the construction and even store carbon, aluminium in cars causes an increase in material-related emissions but reduces operational energy use, resulting in a reduction of life cycle emissions.

Fabrication yield improvements

Reducing material scrap used in the fabrication and manufacturing process can decrease the demand for material input. For example, reduction of trimmings or amount of machining needed in car manufacturing.



More intensive use

It implies that less product is required to provide the same service. In the case of vehicles, ride sharing (car-pooling) and car sharing imply that fewer vehicles are used more intensively to provide transport services to a given population. For buildings, both higher utilization rates, e.g., through peer-to-peer lodging, smaller, more efficiently designed residential units, and increased household size/cohabitation can achieve a reduction of building space required.

Enhanced end-of-life recovery and recycling of materials

This increases the amount or quality of secondary materials available, which can reduce the amount of primary materials used to produce the same or another product. More of the materials in homes and cars can be recycled but it may require more dismantling/deconstruction to avoid contamination of the different material flows.

Recovery, remanufacturing, and reuse of components

Replacing production of spare parts or even primary products. For example, I-beams of buildings can be reused.

Product lifetime extension

Through better design, increasing repair, and enhancing secondary markets. For example, the lifetime of buildings can be enhanced through flexible design which makes it easier to modify interior walls, thus accommodating changing use patterns.

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Material Efficiency Strategies for a Low-Carbon Future
RECC 2020 Report

Figure 5. Life-cycle emissions from homes with and without Material Efficiency strategies in 2050 in G7 countries, China and India

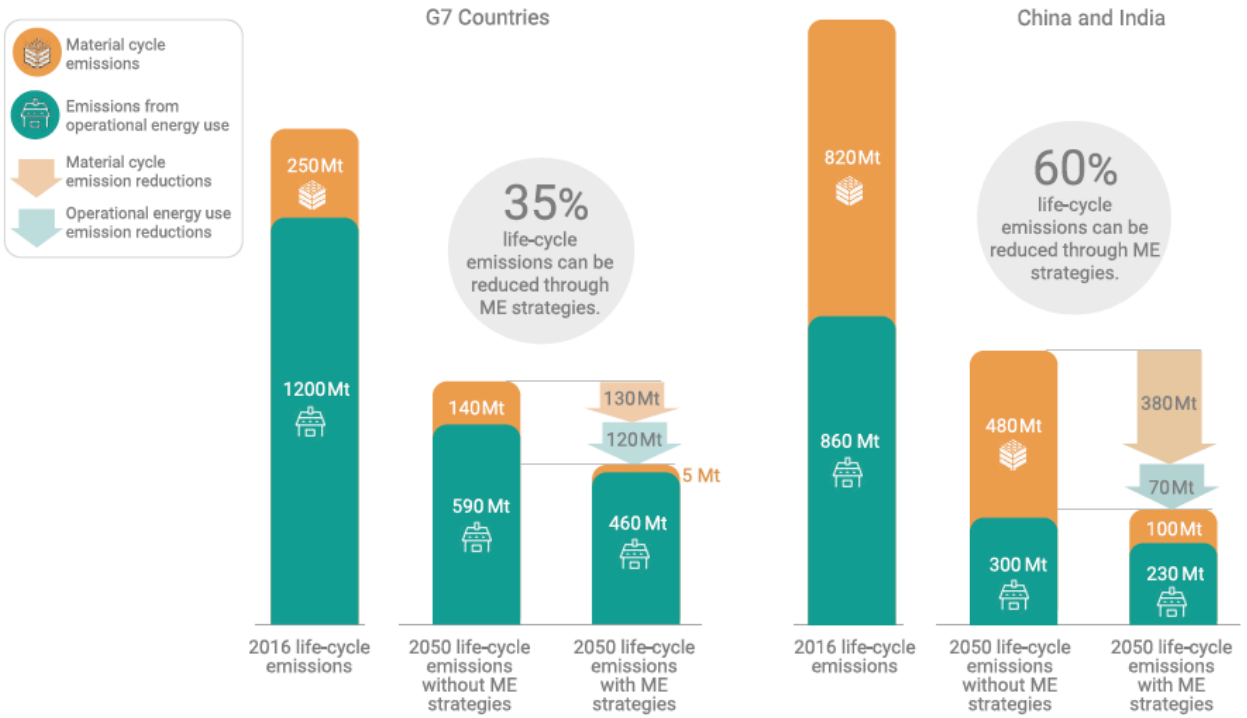
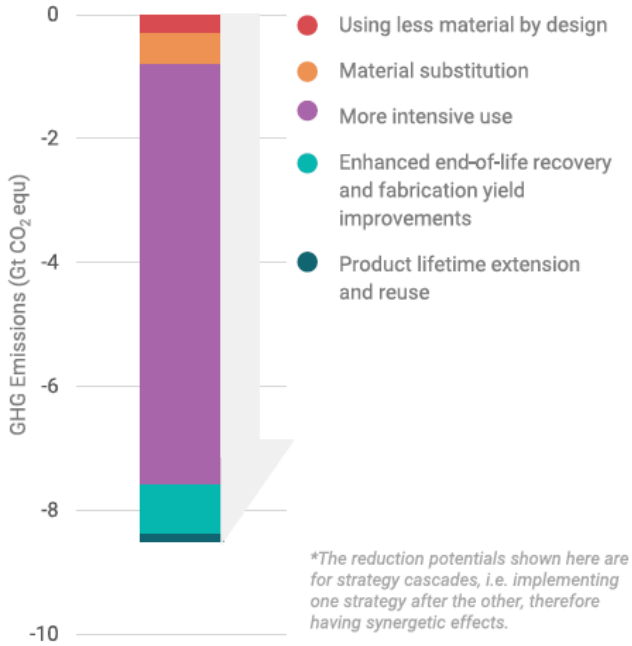


Figure 6. Potential GHG savings from material efficiency strategies for homes in G7 (2016-2060)



**The reduction potentials shown here are for strategy cascades, i.e. implementing one strategy after the other, therefore having synergetic effects.*

Material Efficiency Strategies for a Low-Carbon Future
RECC 2020 Report

Figure 7. Life-cycle emissions from cars with and without Material Efficiency strategies in 2050 in G7 countries, China and India

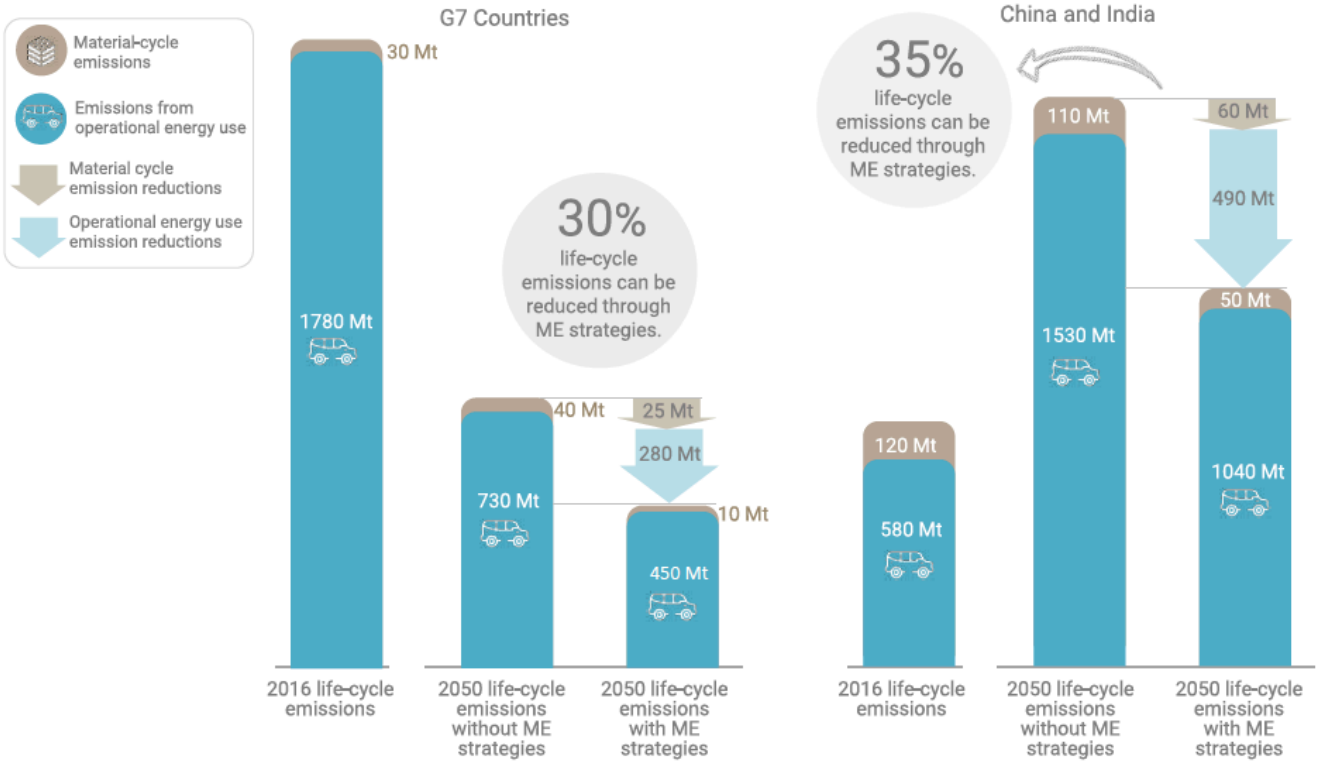
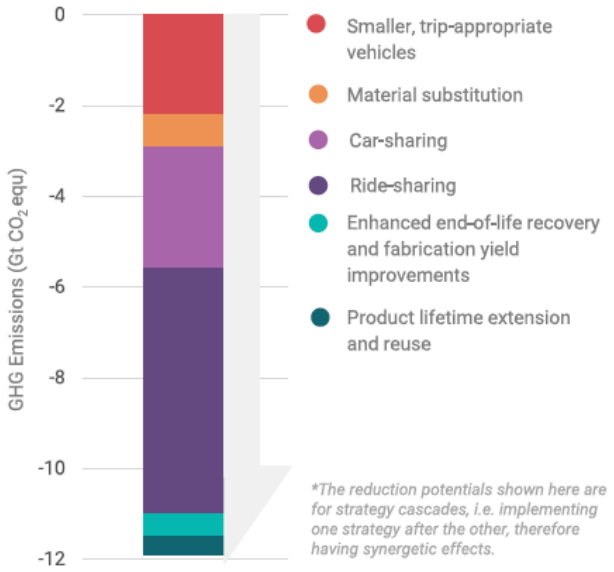


Figure 8. Potential GHG savings from material efficiency strategies for cars in G7 (2016-2060)



PACE
Platform for Accelerating the Circular Economy

The Platform for Accelerating the Circular Economy (PACE): This report is published as part of the Platform for Accelerating the Circular Economy (PACE). PACE is a public-private collaboration mechanism and project accelerator dedicated to bringing about the circular economy at speed and scale. It brings together a coalition of more than 70 leaders and is co chaired by the heads of Royal Philips and the Global Environment Facility. It was initiated at the World Economic Forum and is currently hosted by the World Resources Institute.

HEIGHT
expresses the **mass material** reduction in **Gt**

WIDTH
expresses the **emissions** reduction in **Gt CO_2 eq**

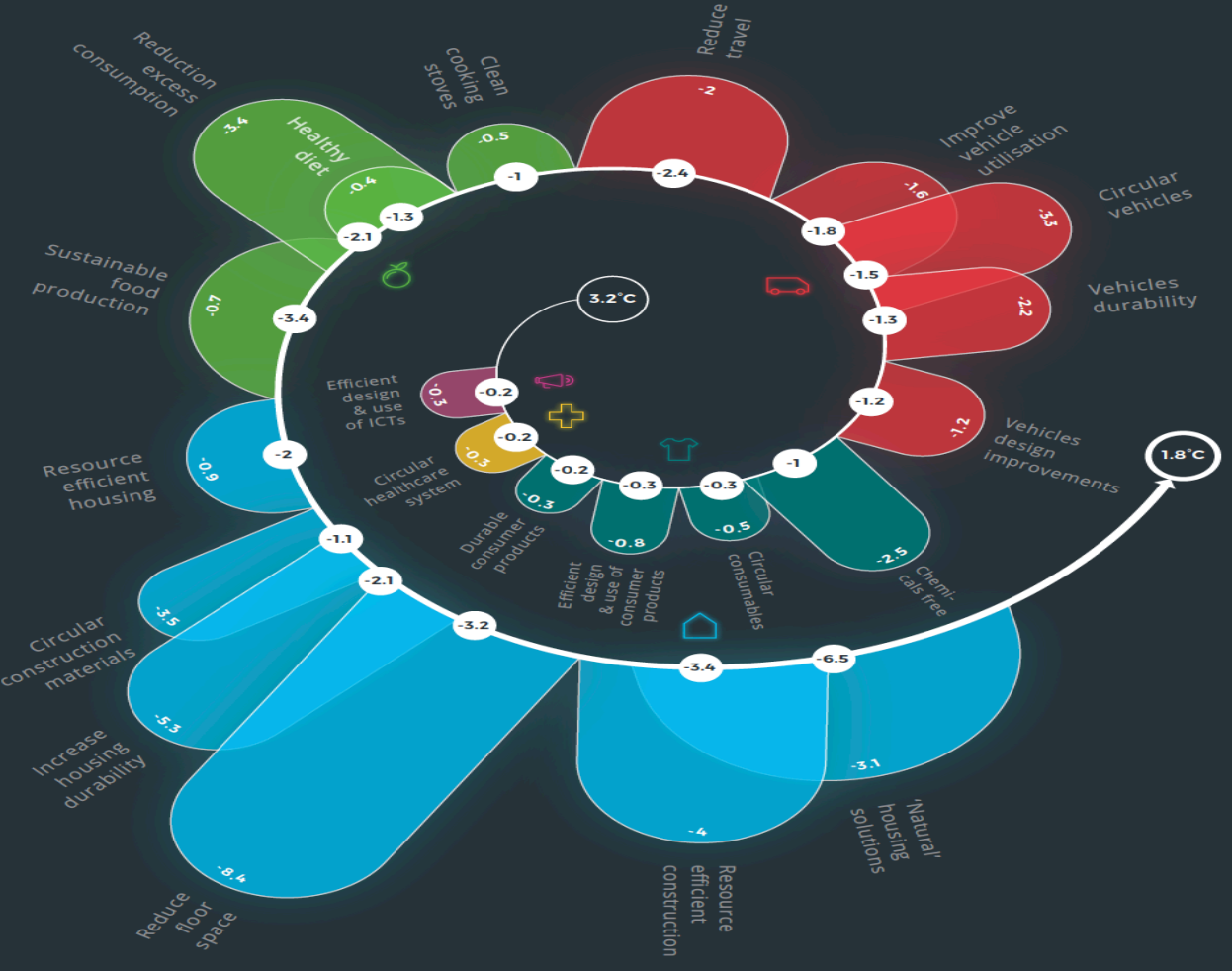
COLOUR
represents a societal need:

- CONSUMABLES
- COMMUNICATIONS
- HOUSING
- MOBILITY
- HEALTHCARE
- NUTRITION

TEMPERATURE
otal mitigation of expected global temperature increase by 2050

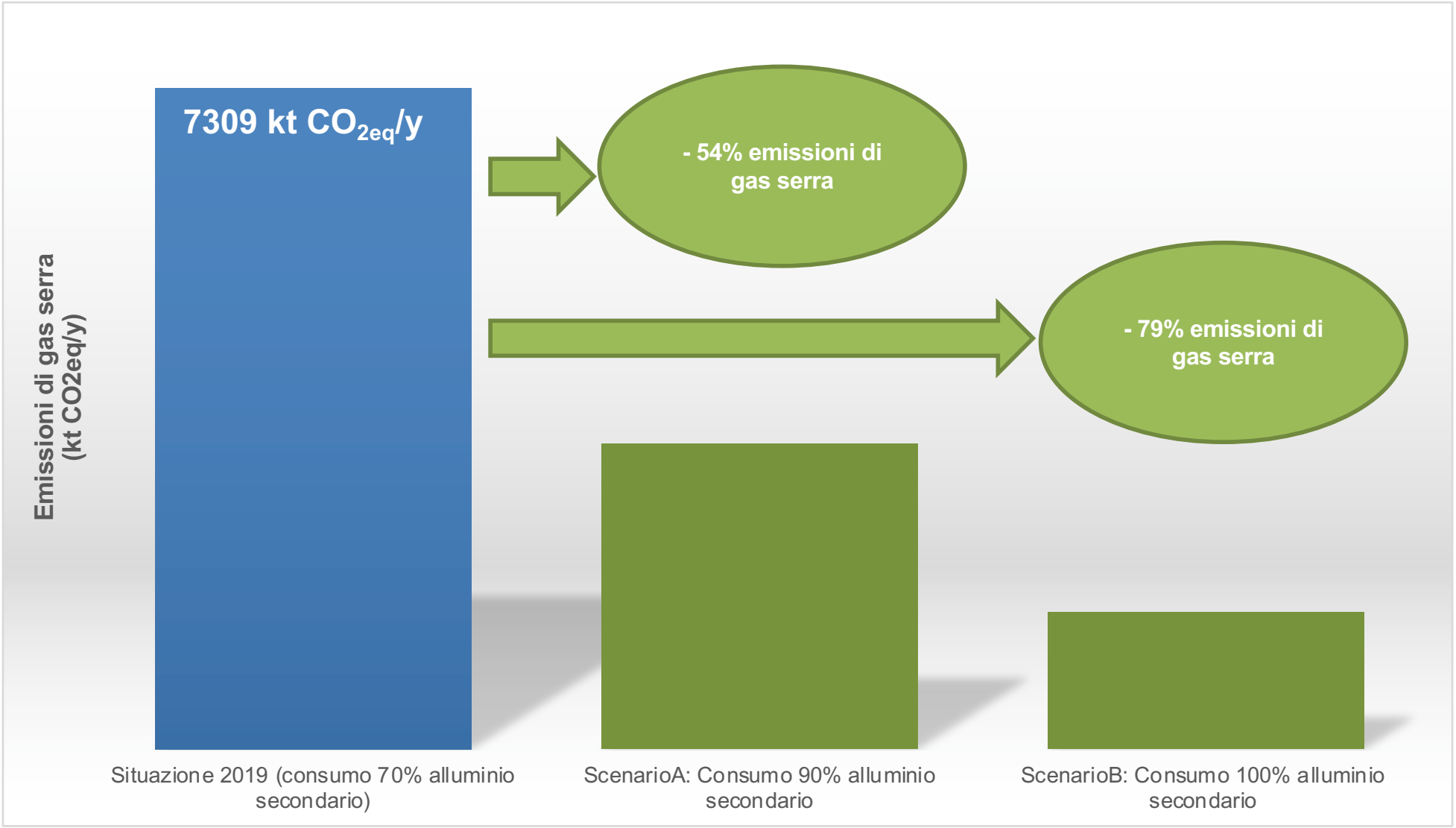
INTERVENTIONS VORTEX

Figure Four shows the impact of our interventions on the Circularity and Emissions Gaps



Economia circolare e emissioni di gas serra

Analisi di scenari relativi al consumo di alluminio in Italia



Bioeconomia Circolare - Azioni «dal campo alla tavola»

- Prevenzione spreco alimentare
- Gestione spreco alimentare
- Riciclo scarti e residui organici

ESEMPIO IN ITALIA

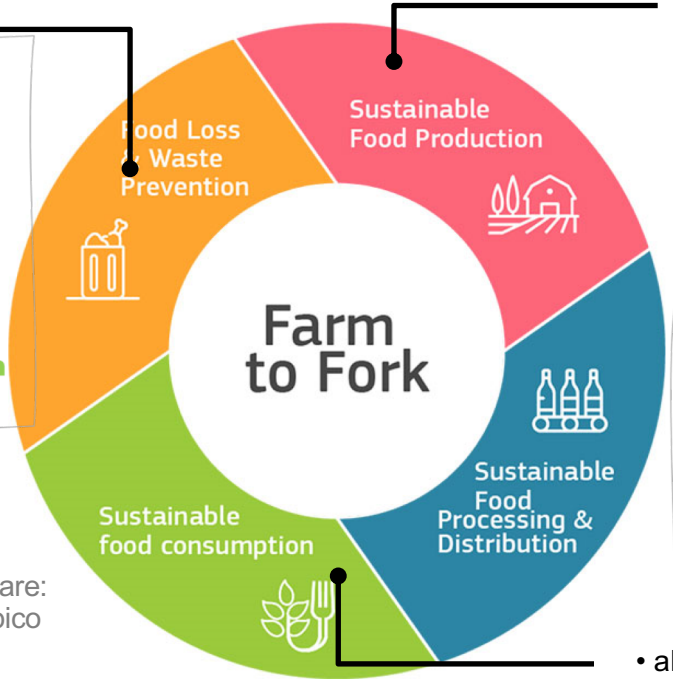
28 kg/anno di spreco alimentare a persona

RIDUZIONE DEL 50%

14 kg/anno di spreco alimentare a persona

= **-1,66 $kgCO_2eq$/anno a persona**
(-42% rispetto allo scenario attuale)

Calcoli ENEA basati su:
- UN SDGs 2030 Goal 12, target 12.3
- Gestione futura rifiuti da spreco alimentare: Trattamento integrato anaerobico/aerobico (60%) Compostaggio (40%)



ESEMPIO IN ITALIA

Calcoli ENEA basati su scenario ipotetico di sostituzione

1,71 Mt concimi minerali di sintesi

50% SOSTITUITO CON

20% concimi organo-minerali

30% concimi organici

= **-2.388 tCO_2eq/anno**
(-38% rispetto allo scenario attuale)

- Riduzione/sostituzione input esterni al sistema
  - ✓ Riduzione fertilizzanti di sintesi
  - ✓ Utilizzo effluenti zootecnici e digestati agroindustriali
  - ✓ Utilizzo compost
  - ✓ Valorizzazione fanghi di depurazione
  - ✓ Riutilizzo irriguo acque reflue urbane depurate
- Uso efficiente delle risorse
- Riduzione scarti e rifiuti + loro riutilizzo e riciclo

ESEMPIO IN ITALIA

abitudini alimentari attuali

PASSAGGIO A

consumo carni bianche o dieta mediterranea

= **-0,26 tCO_2eq/anno a persona**
(-13% rispetto allo scenario attuale)

dieta vegetariana

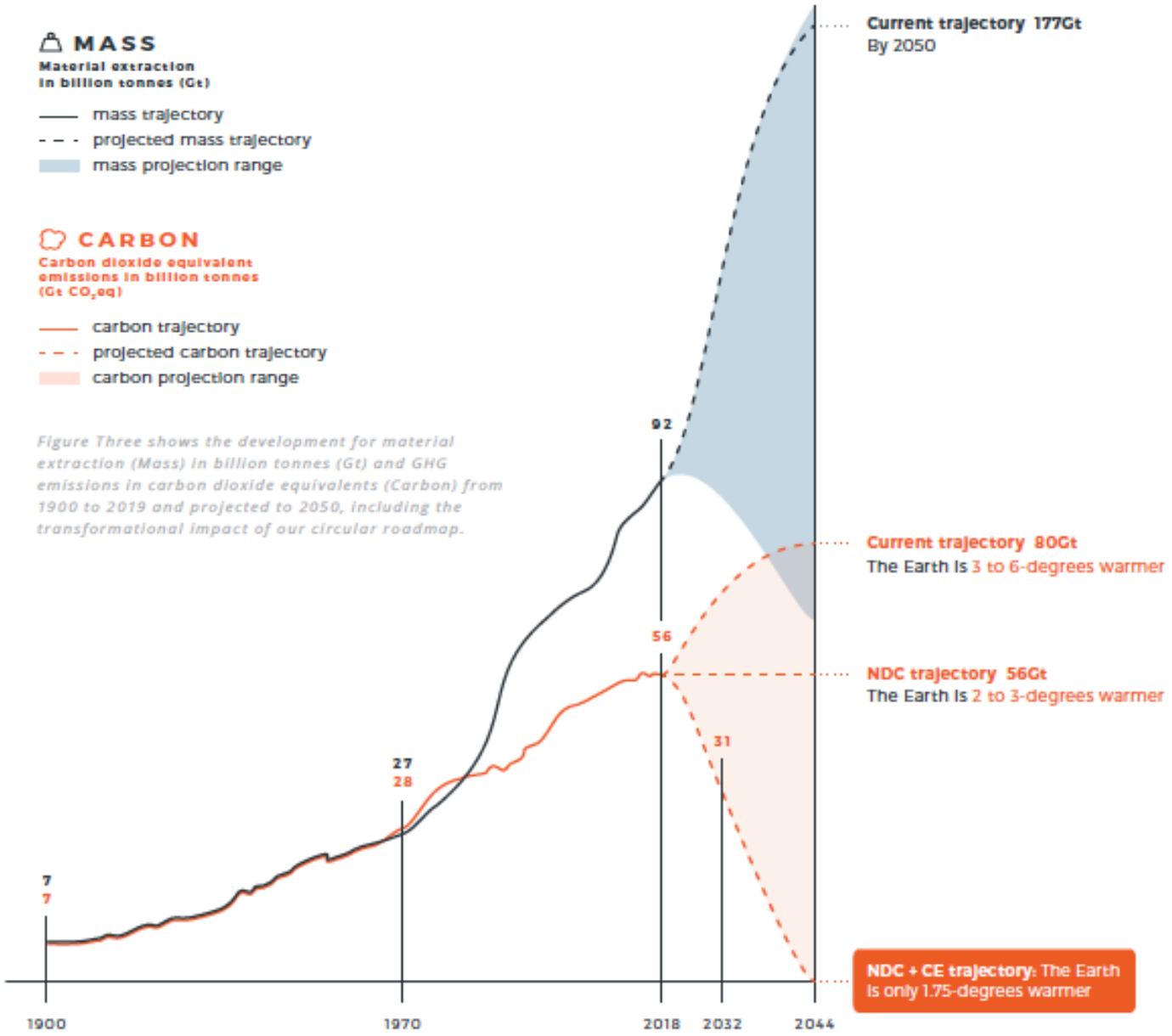
= **-0,48 tCO_2eq/anno a persona**
(-25% rispetto allo scenario attuale)

- abitudini alimentari più sane e sostenibili

Stima basata su:
«Carbon footprint of Italian eating habits: how consumer food choices might lead to a reduction of greenhouse gas emissions»

ENEA

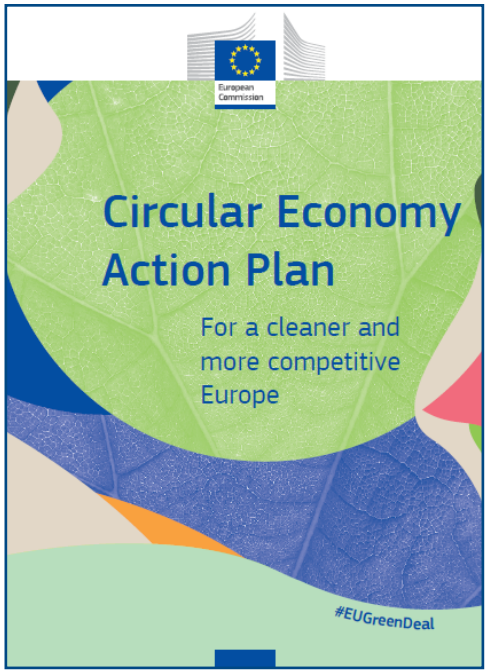
The Circularity Gap Report 2021



Il Green Deal e il Piano d'azione EU per l'Economia Circolare 2020

«Questa è la nostra tabella di marcia dell'Europa per **rendere sostenibile l'economia dell'UE e** diventare il primo continente a **neutralità climatica entro il 2050. Realizzeremo questo obiettivo** trasformando le problematiche climatiche e le sfide ambientali in opportunità in tutti i settori politici e rendendo la transizione equa e inclusiva per tutti».

- Promozione dei **prodotti sostenibili e circolari - misure di incentivazione dell'eco-design** finalizzato alla durabilità, riparabilità e riciclabilità dei prodotti.
- Azioni per **sensibilizzare e informare i consumatori**
- Criteri e obiettivi obbligatori per gli appalti pubblici verdi (GPP) nella legislazione settoriale e introduzione progressiva di relazioni obbligatorie sul GPP (**requisiti di circolarità** oltre che di efficienza energetica).
- Garantire meno sprechi - **prevenzione dei rifiuti** e loro valorizzazione per il riciclo, mercato incentivante per le **materie prime seconde**.
- Quadro di monitoraggio dell'economia circolare – **nuovi indicatori**
- **Focus su filiere di maggior rilievo**: ICT ed elettronica, veicoli e batterie, plastica e imballaggi, tessile, costruzione e demolizione, acqua, cibo e nutrienti

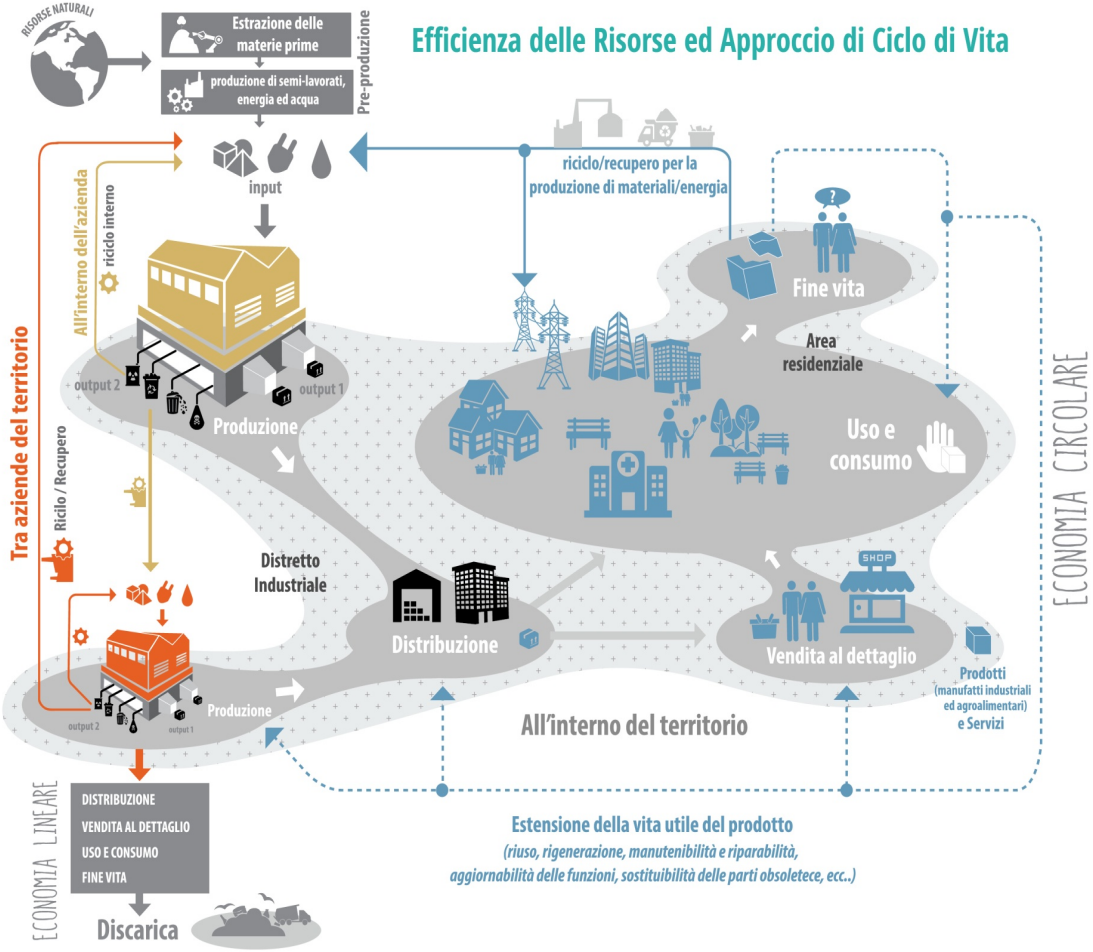


https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf

Le Priorità ICESP per la ripresa post COVID-19

Conferenza annuale ICESP 11/12/2020

La transizione circolare nel PNRR: Luci ed ombre



- Necessari obiettivi più ambiziosi sia dal punto di vista quantitativo, degli investimenti allocati, che dal punto di vista qualitativo, delle azioni da implementare.

- Strategia Nazionale per l'Economia Circolare