COBENARE CONFERENCE 2024
University of Naples Parthenope

"Consumption Behavior and Sustainable Uses of Natural Resources"

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key topics - Consumption preferences and natural resources

"The role played by households in greenhouse gas production through consumption activities"

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The presentation is organized as follows:

- **Introduction:** urgency to understand household spending on climate change mitigation and adaptation, Emissions CO2 in Europe, Greenhouse gas emissions by Italian households and actions of the European Commission.
- **Purpose and structure of the paper: t**owards a new classification scheme with criteria that define the purpose and structure the Environmentally Sustainable household consumption provide some background information on the purpose and structure of the paper and presents an example of the connection of the new classification ECO-SEA - codification of eco-sustainable economic activities linked to the classification of each main actor households (COICOP).
- **Classification criteria:** presents the structure of the new classification with the actions in favour of the six environmental objectives and explanatory notes to the actions of the classification integrated with the environmental objectives.
- **Household:** the role played by Households in greenhouse gas emission through consumption activities:
    - CO2 emissions of Italian households
    - Household consumption expenditure in the National Accounts System
    - Household expenditure for environmental protection
- **Conclusion and Outlook**

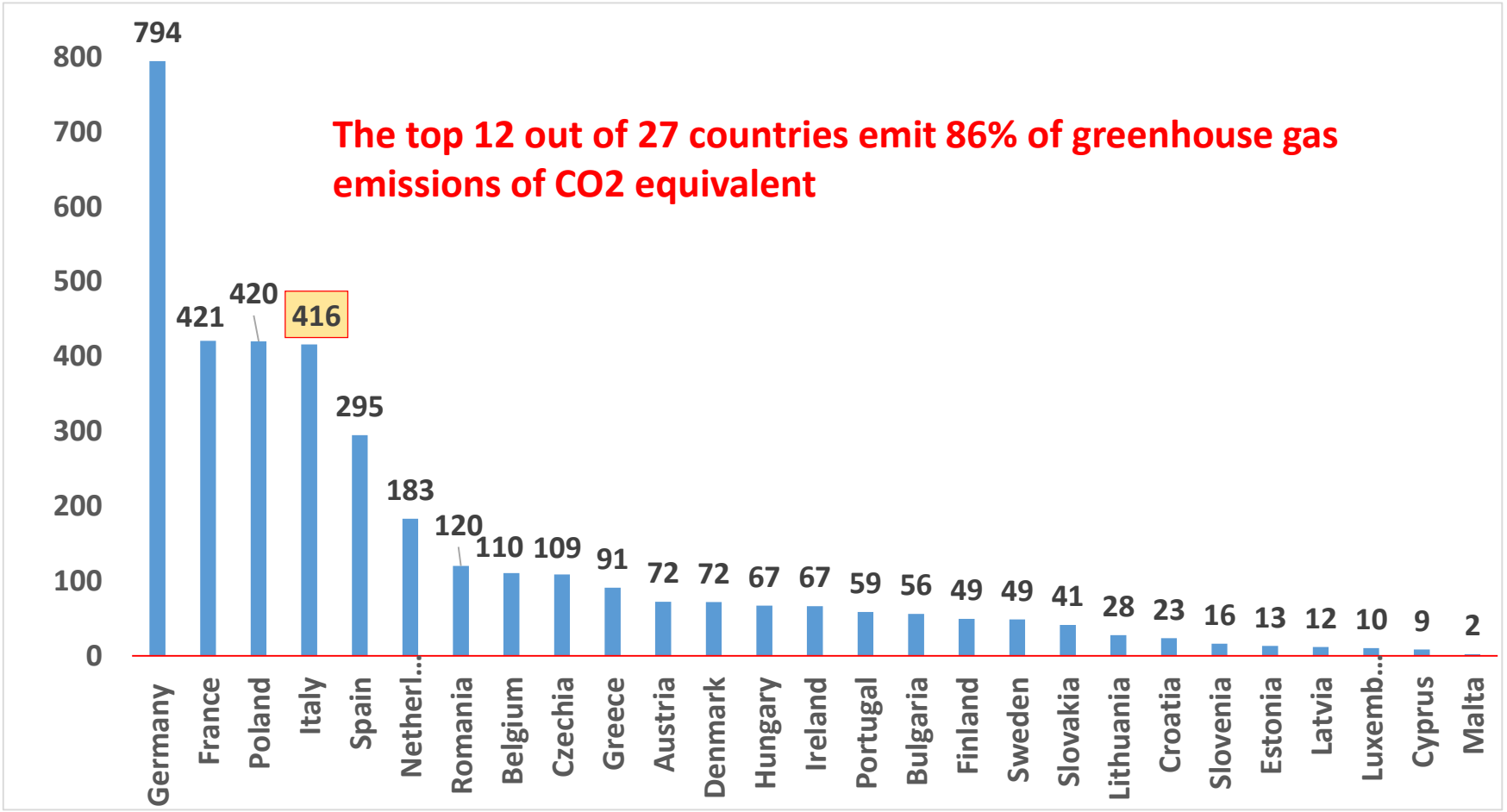
Introduction

- ✓ Urgency to understand household spending on climate change mitigation and adaptation to achieve climate neutrality and combat environmental degradation.
- ✓ Use of the **'carbon footprint**' indicator to measure consumer behavior and emissions linked to final demand.
- ✓ Earth Overshoot Day signifies when resource consumption exceeds Earth's regenerative capacity, leading to depletion of natural resources for future generations. From that day onward, natural capital stock is depleted, and waste and harmful emissions accumulate.
- ✓ Growing recognition of natural capital's importance has led the UN's 2030 Agenda to focus on three Sustainable Development Goals (SDG-6, SDG-14, SDG-15) for ecosystem protection and water cycle restoration.
- ✓ Advocates for a more rational use of raw materials to reduce CO2 emissions.
- ✓ Need for new indicators to measure progress on sustainability.
- ✓ However, to construct new indicators, it is necessary, at the same time, to use a common language to define actions taken at the World and European level.
- ✓ This proposal informs environmental accountants of the need to adopt it to collect new information on household consumption. This classification focuses on the transition of the sustainable economic activities system, or “ECO list.”

Emissions CO2 in Europe

Europe – Greenhouse gas emissions (NAMEA) by member state, by total Nace Rev. 2 production activities, and by **Households**

Year 2021 (million tons of CO2 equivalent)



Source: Eurostat, data processing

Greenhouse gas emissions

Europe

- In 2021, greenhouse gas emissions from the 27 European countries totalled 3,605 million tons of CO2 equivalent.
- The energy sector is responsible for about 75 percent of the European Union's greenhouse gas emissions and thus plays a key role in climate change mitigation and adaptation.
- In Europe, Italy together with Poland, after Germany and France, is the country that contributes 416 million tons of greenhouse gas emissions to global warming.
- Shifting from the “Do No Significant Harm” (DNSH) principle to actively measuring positive contributions toward the six environmental goals of the European taxonomy involves a proactive approach to sustainability.

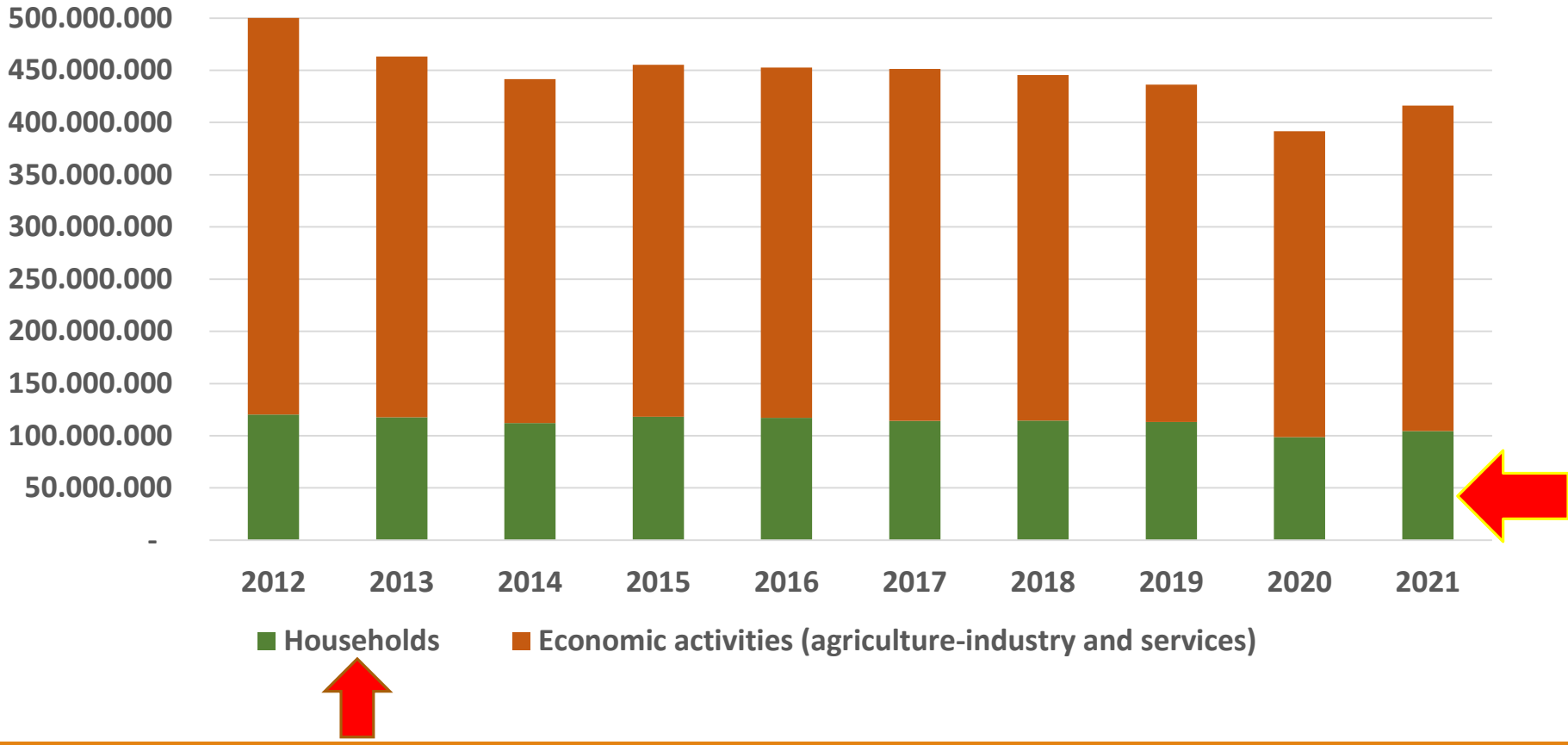
Italy

- Italy's manufacturing system generates 3 quarters of the total climate-changing emissions (industry 48%, services 17% and agriculture 10%) of the entire economy, compared to **households that contribute only 25% of emissions.**
- In particular, the manufacturing and energy industries absorb around 166 million tonnes of CO2 out of a total of 199 million tonnes and contribute significantly to greenhouse gas emissions.

Emissions of CO2 and other climate-changing gases

Italy – Emissions of CO2 and other climate-changing gases generated by economic activities and households

Year 2021 (million tons of CO2 equivalent)



Source: Eurostat, data processing

European Commission

- The European Commission has presented a plan to reduce EU greenhouse gas emissions by at least 55 percent in 2030 (compared to 1990 levels).
- The New European Taxonomy (EU Regulation 2020/852, which came into effect on July 12, 2020) describes the actions of environmentally sustainable economic activities and the "**Do no significant harm**" principle enshrined in Article 17, and effectively provides a new **"classification system for environmentally sustainable economic activities."**
- Thus, It is necessary to propose new indicators capable of measuring in progress at the same time to use a common language to define the actions taken at the European level.

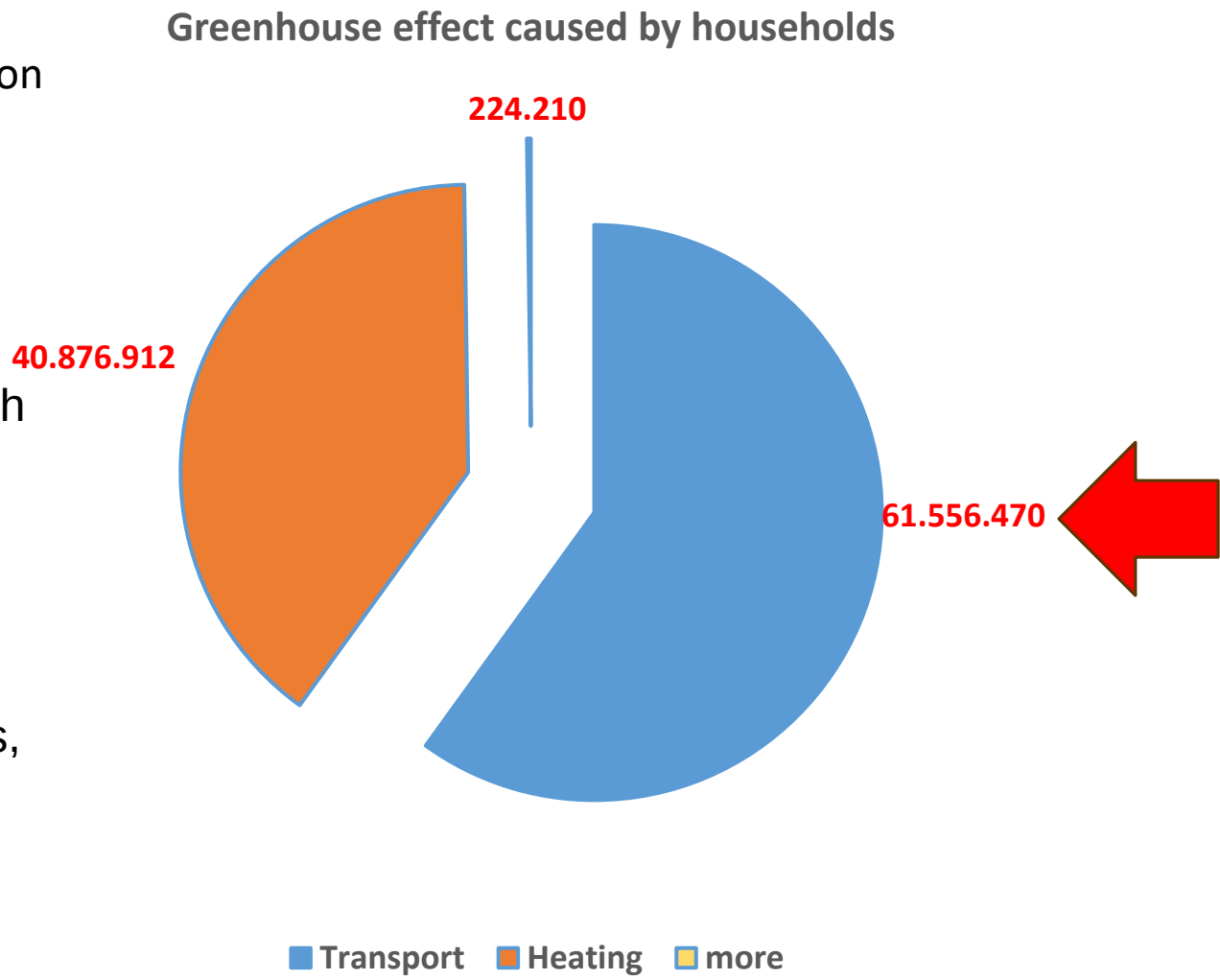
How can coordinated action at the European level be measured to achieve the six environmental objectives?

Greenhouse gas emissions by Italian Households

(NAMEA), Year 2022 (million tons of CO2 equivalent)

Domestic Transport emission of 61 million tons of CO2 equivalent

•**Car Usage**: personal vehicles are a major contributor to emissions, with gasoline and diesel cars being predominant.
•**Public Transport**: while public transport is available, its use varies by region. Increased reliance on buses, trams, and trains can help reduce overall emissions.



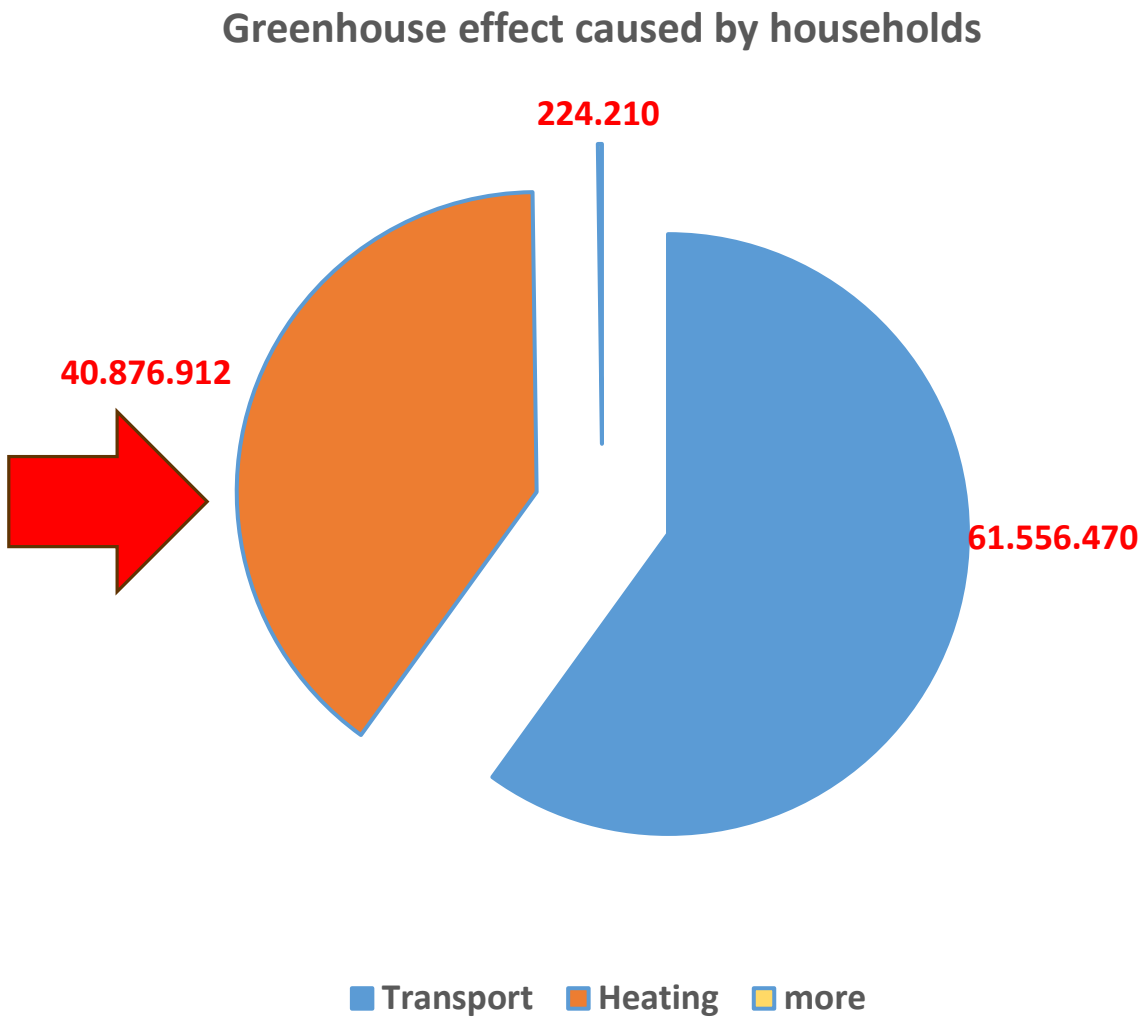
Source: Eurostat, data processing, environmental statistics, accounts

Greenhouse gas emissions by Italian Households

(NAMEA), Year 2022 (million tons of CO2 equivalent)

Energy consumption through combustion is one of the main causes of atmospheric emissions of pollutants, particularly greenhouse gases.

Domestic energy emission of 41 million tons of CO2 equivalent
Heating uses: by households is derived:
-51% from natural gas (and to a lesser extent from other gaseous fossil fuels),
-20% from wood and wood charcoal, and 18% from electricity;
-the remaining shares come from purchased waste heat, liquefied petroleum gas (LPG), and diesel.



Source: Eurostat, data processing, environmental statistics, accounts

Greenhouse gas emissions by Households

- In Italy Households contribute to emissions only with 25.6 percent of the entire economy.
- Households' emissions are attributable almost equally to transportation (45.1 percent) and home heating (42.3 percent) with the remainder attributable to solvent use.
- Households, despite the sharp reduction in the decade examined in the emissions for which they are responsible, continue to play an important role in emissions of particulate matter (52.8 percent of the 2018 total) and tropospheric ozone precursors (34.4 percent of the total) caused mainly by the use of biomass for space heating households and of fossil fuels in transportation.
- Households spend on environmental protection as consumers of waste management services, sewage treatment and other environmental protection services.
- Currently in national accounts, household spending is measured for the largest component, namely the purchase of water purification or waste management services.
- We today still do not know the extent to which households are contributing to reducing the impact of the six environmental objectives. The following table can be a proposal.
- **We can measure a new eco-sustainable consumption indicator.**

Greenhouse gas emissions by Households

Proposed Eco-Sustainable Households Consumption Indicator

- **Transportation Emissions**:

Sub-indicator: Percentage of trips made using public transport, cycling, or walking.
Data Source: the household budget *survey* (HBS) focuses on consumption expenditure behaviors of the Italian resident households.

- **Home Heating Emissions:**

Sub-indicator: Percentage of homes using renewable energy sources (solar, biomass) versus fossil fuels.
Data Source: Energy consumption statistics.

- **Waste Management**:

Sub-indicator: Percentage of waste recycled or composted by households.
Data Source: Municipal waste management data.

- **Water Use:**

Sub-indicator: Volume of water saved through eco-friendly appliances or practices.
Data Source: the household budget *survey* (HBS) focuses on consumption expenditure behaviors of the Italian resident households.

- **Sustainable Product Purchases:**

Sub-indicator: Percentage of household expenditure on organic or sustainably sourced products.
Data Source: the household budget *survey* (HBS) focuses on consumption expenditure behaviors of the Italian resident households.

Potential Benefits of the Indicator: Provides a comprehensive view of household impacts on sustainability.
Policy Development: Aids to household

A new proposal use European Taxonomy: classification of six environmental objectives

The European taxonomy has introduced the classification of six environmental objectives to which an economic activity shall qualify to connect such as:

1. Climate change mitigation (starting from 1 January 2022);
2. Climate change adaptation (starting from 1 January 2022);
3. The sustainable use and protection of water and marine resources (starting from 1 January 2023);
4. The transition to a circular economy (starting from 1 January 2023);
5. Pollution prevention and control (starting from 1 January 2023);
6. The protection and restoration of biodiversity and ecosystems (starting from 1 January 2023).

Source: European Regulation 852/2020 New Taxonomy

Monitor environmentally sustainable economic expenditure

- **Households** through their consumption choices can contribute to achieving the six environmental objectives, through the reclassification of the data on household consumption in the Italian economic territory we can know the positive or negative impact of choices on the environment.

In order to establish the degree of an environmentally sustainable economic expenditure can be classified consumption:

1. **"eco-sustainable economic expenditure"** which complies with the criteria for which an consumption qualifies as eco-sustainable;
2. **“transitional economic expenditure”** are those that contribute substantially to climate change mitigation;
3. **“enabling economic expenditure”** which contributes substantially to one or more of the environmental objectives;
4. **"economic expenditure eligible for the taxonomy"** described in the acts delegated by the European Commission;
5. **"non-sustainable economic expenditure - ineligible for taxonomy"** is that which cause significant damage to the environment.

Tracking households' achievement of environmental goals

Households play a crucial role in environmental sustainability through their consumption choices. By reclassifying data on household consumption in Italy, we can assess how these choices align with the six environmental objectives, which typically include climate action, sustainable use of resources, protecting biodiversity, and more.

Energy Consumption: analyzing energy sources used by households can reveal reliance on fossil fuels versus renewable energy. Promoting energy-efficient appliances and practices can reduce carbon footprints.

Food Choices: the type of food consumed—whether local, organic, or processed—can significantly impact resource use and emissions. Encouraging plant-based diets can also help achieve sustainability goals.

Waste Management: households generate a significant amount of waste. Evaluating recycling practices and waste reduction strategies can highlight areas for improvement.

Water Usage: monitoring water consumption patterns can identify opportunities for conservation, particularly in regions facing water scarcity.

Transportation: the choices households make regarding transportation—whether they use public transit, carpool, or drive fuel-efficient vehicles—affect overall emissions.

Purchasing Habits: supporting local businesses or sustainable brands can contribute positively to the economy and the environment.

By gathering and analyzing this data, policymakers can create targeted initiatives to encourage more sustainable household practices, helping to meet environmental objectives.

To monitor sustainable household expenditure

- We need a new classification to track positive actions related to the six environmental goals introduced with the European taxonomy undertaken by key economic actors such as Households.
- The type of economic expenditure by Classification of Individual Consumption by Purpose (COICOP) related to the eco-sustainable one will be analysed and coded with the one to which it belongs:
  - **all-sustainable (A);**
  - transitional and enabling, partially sustainable (B, C, D);
  - completely unsustainable (E).

How can we monitor sustainable household expenditure?

Classification Framework

All-Sustainable (A):

Definition: expenditures that contribute directly to environmental goals, promoting eco-friendly practices, renewable resources, and sustainability.

Examples:

- Solar panels and renewable energy systems
- Organic food products
- Electric vehicles
- Eco-friendly home improvements (e.g., insulation, energy-efficient appliances)

Transitional and Enabling, Partially Sustainable (B, C, D):

Definition: expenditures that have mixed impacts on sustainability. These may support a transition towards more sustainable practices but are not fully aligned with all environmental goals.

Examples:

- Hybrid vehicles (B)
- Energy-efficient appliances (C)
- Public transportation (D)
- Products made from recycled materials (C)
- Home renovations that improve energy efficiency but involve unsustainable materials (D)

Completely Unsustainable (E):

Definition: expenditures that negatively impact environmental goals, promoting practices that are harmful to the ecosystem.

Examples:

- Fossil fuels (gasoline, coal)
- Non-recyclable plastics
- Conventional meat products with high carbon footprints
- Single-use products that contribute to waste

Households: eco-sustainable consumption indicator

Codification of eco-sustainable economic product qualifies as environmentally sustainable	Classification of individual consumption by purpose (COICOP)													Total consumption by eco-sustainable action
	01 FOOD AND NON-ALCOHOLIC BEVERAGES	02 ALCOHOLIC BEVERAGES, TOBACCO AND NARCOTICS	03 CLOTHING AND FOOTWEAR	04 HOUSING, WATER, ELECTRICITY, GAS AND OTHER FUELS	05 FURNISHINGS, HOUSEHOLD EQUIPMENT AND ROUTINE HOUSEHOLD MAINTENANCE	06 HEALTH SERVICES	07 TRANSPORT	08 INFORMATION AND COMMUNICATION	9 RECREATION, SPORT AND CULTURE	10 EDUCATION SERVICES	11 RESTAURANTS AND ACCOMMODATION SERVICES	12 INSURANCE AND FINANCIAL SERVICES	13 PERSONAL CARE, SOCIAL PROTECTION AND MISCELLANEOUS GOODS AND SERVICES	
New classification ECO	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	COICOP ...	
A. "eco-sustainable economic activity" that respects criteria an economic activity qualifies as environmentally sustainable;														
1. the mitigation of climate change	X			X	X	X	X						X	X
OAMCC 1.1											X			
OAMCC 1.1.1 improving energy efficiency etc.									X					
2. adaptation to climate change				X									X	X
3. sustainable use and protection of water and marine resources														X
4. the transition to a circular economy		X							X					X
5. the prevention and reduction of pollution								X						X
6. the protection and restoration of biodiversity and ecosystems				X										X
B. "transitional economic activities" which contribute substantially to the mitigation of climate change;			X	X										X
C. "enabling economic activity" which contributes substantially to one or more of the environmental objectives;														
D. "economic activity eligible for taxonomy" described in the acts delegated by the European Commission;														
E. "non-eco-sustainable economic activity - not eligible for taxonomy" not described in documents, that which causes significant damage to the environment.	X	X	X	X	X	X	X	X	X	X	X		X	X
Tot A by purpose (COICOP)	X	X		X	X	X	X	X	X		X		X	ECO Consumption (10%)
Tot B-D by purpose (COICOP)	X	X	X	X	X	X	X	X	X	X	X		X	TRANSITION consumption (30%)
Tot E by purpose (COICOP)	X	X	X	X	X	X	X	X	X	X	X		X	No ECO Consumption (60%)
Total Household consumption in the economic territory by purpose (COICOP)														(Year 2021- 1.028.391)

By linking the consumption expenditure of households classified by COICOP with eco-sustainable economic activities, it is possible to reclassify household consumption expenditure choices for the six environmental goals. We can measure A in the green area of the table.

Source: WP SEEDS 02/2023 MONTELLA M. THE ROLE PLAYED BY HOUSEHOLDS IN GREENHOUSE GAS PRODUCTION THROUGH CONSUMPTION ACTIVITIES

Environmental protection expenditure accounts

- **National Environmental Protection Expenditure in Italy (2021)**: nearly 47 billion euros.
- **Household Contribution**: approximately 10 billion euros.
- **Growth**: 10.6% increase in expenditure, representing 2.6% of GDP, largely due to investments in waste management by businesses, households, and public administrations. For example, out of the 7 billion euros spent by households on the maintenance and repair of homes, how much can be considered sustainable spending for energy-efficient and resource-efficient construction and renovations?
- **Circular Economy Contribution:** integrating all design initiatives for waste prevention, reuse, and recycling, increasing the durability and recyclability of products and materials. By selecting their consumption, household can promote sharing, borrowing, reuse, repair, and recycling of materials and products to efficiently use resources and reduce the consumption of non-renewable raw materials.
- **An important environmental objective** to which households can actively contribute is the transition to a circular economy including waste prevention, re-use, and recycling when it increases durability, reparability, recyclability of products, prolongs the use of products, prevents or reduces waste generation, increases preparation for reuse and recycling of waste.

What we do not measure

These points highlight important areas where investment and spending related to climate change mitigation and adaptation might be underrepresented in assessments of environmental protection. Here is a breakdown of the green areas I have mentioned and their potential impact:

- **Sustainable and Smart Mobility**: investments in public transport, cycling infrastructure, and low-emission vehicles can significantly reduce greenhouse gas emissions. These initiatives not only contribute to cleaner air but also promote healthier lifestyles. Their absence in environmental budgets can undermine efforts to transition to sustainable urban environments.
- **Electromagnetic Pollution**: as wireless technologies proliferate, addressing the potential health and environmental impacts of electromagnetic pollution is crucial. This issue can affect both human health and biodiversity, and its oversight in environmental assessments can lead to inadequate regulatory measures.
- **Energy-efficient Public Buildings**: renovating and constructing public buildings to be energy-efficient can lead to substantial long-term savings and emissions reductions. Ignoring these investments in impact assessments may limit progress toward national and international climate goals.
- **Combating Land Consumption**: sustainable urban planning that prioritizes green spaces, compact city designs, and preservation of natural areas is essential for reducing land consumption. These strategies can help mitigate habitat loss and enhance biodiversity, yet they often lack sufficient funding and recognition in environmental policies.
- **Carbon Capture and Sequestration Technologies**: investment in carbon capture and sequestration is vital for industries that are hard to decarbonize. These technologies can play a crucial role in achieving net-zero emissions, yet they are frequently underfunded and undervalued in environmental impact assessments.

The “new” environmental protection account

CEPA class	Final consumption of environmental protection services 2021	 1 - Fighting Climate Change Mitigation	 2 - Climate Change Adaptation	 3 - Managing water resources	 4 - Circular economy, waste; preventing technological risks	 5 - Fighting pollution	 6 Conserving biodiversity and protecting natural areas, farmland and forests	TOTAL BALLS
CEPA 1: air and climate protection	60	●	●			●		3
CEPA 2: waste water management	2.545			●				1
CEPA 3: waste management	7.003				●	●	●	3
CEPA 4: protection and remediation of soil, groundwater and surface water	3			●				1
CEPA 5: Noise and vibration reduction	-					●		1
CEPA 6: protection of biodiversity and landscape	58						●	1
CEPA 7-8-9 : Radiation protection, Research and development for environmental protection, Other environmental protection activities	148					●		1
Sustainable and smart mobility	na	●	●			●		3
Electromagnetic pollution	na					●		1
Energy-efficient public buildings	na	●						1
Combating land consumption	na	●					●	2
Carbon capture and sequestration technologies	na	●	●					2
TOT CEPA Final consumption of environmental protection services	9.817	5	3	2	1	6	3	20

This figures show the relatively low percentage of household expenditure devoted to environmental protection, at just 0.8% of final consumption expenditure. This result shows that actual household expenditure on environmental protection is probably underestimated. All the part in green that is not captured in the final consumption of environmental protection account. How can we monitor sustainable household expenditure? If we notice the green balls representing the expenditure allocated to the six environmental objectives, we can see that a part of the balls is not measured in terms of expenditure for environmental protection.

Source: Istat, data processing

Conclusions and Outlook

- This paper suggests two possible types of tables to be built in the future:
  - one that estimates individual household eco-friendly consumption (given future data availability);
  - and another that expands households' final expenditure on environmental protection to encompass the six environmental objectives.
- The statistic showing that only 0.8% of household expenditure is devoted to environmental protection suggests a disconnect between public spending priorities and the urgent need for environmental action. This underlines the importance of incorporating these overlooked green areas into more comprehensive environmental policies and budgets to better reflect their significance in tackling climate change.
- To monitor countries' progress towards achieving ambitious climate goals, a new global indicator needs to be proposed.
- This paper suggests using a new classification system for environmentally sustainable economic activities called the "ECO list." Alignment with the EU taxonomy can be integrated at three levels.
- Environmental accountants should follow the development of these new sources and find solutions to incorporate them into environmental accounts. This will ensure a comprehensive approach to monitor and encourage progress towards environmentally sustainable economic activities at the household level.

Thanks for your attention

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