



Protecting Nature by Reforming Environmentally Harmful Subsidies: An Update



earth track

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Any remaining errors or omissions in this document are the authors' joint responsibility. The content and conclusions should not be attributed to, or assumed to be endorsed by, any current or past organizations for which the authors have worked.



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Overview



In the two years since the release of our report, *Protecting Nature by Reforming Environmentally Harmful Subsidies: The Role of Business*, concerns over the scale of these subsidies have continued to grow. This brief provides some important updates to our work. First, we are delighted to announce the release of the *Mandarin version* of both the original report and update. Protecting critical global habitats and shifting to a nature positive environment is impossible without the active engagement of, and innovation by, China. The country's role in scaling key renewable energy technologies accelerated the uptake of these technologies worldwide, and we are confident there are similar opportunities for Chinese innovation that better protects critical habitats and reduces the need for the primary materials now accelerating ecosystem losses. We are grateful for the help provided by the Society of Entrepreneurs and Ecology (SEE) to translate materials and help expand the conversation on EHS reform within China.

Second, there has been important progress in setting global targets to reform and eliminate EHS. Foremost is the adoption of the Kunming-Montreal Global Biodiversity Framework (GBF) at the 15th Conference of Parties of the Convention on Biodiversity (CBD COP15) in December 2022. While earlier initiatives (Table 1) focus on specific economic sectors that are relevant to protecting nature such as fisheries and fossil fuels, **Target 18** of the GBF includes a global target, committing all signatory governments to identify, and then eliminate, phase out or reform incentives and subsidies harmful for biodiversity. This is important because threats to nature and key biodiversity resources are driven by the joint effect of subsidies to multiple sectors; looking at one area in isolation understates the threat.

Target 18 calls for the identification of EHS by 2025 and reduction by “at least \$500 billion per year by 2030, starting

with the most harmful incentives ...” Continued attention to EHS disclosure will be needed to build a strong base for material action on reform.

Finally, the scope and scale of EHS continually shifts based on market conditions, new policies, and in some cases subsidy reforms. We thought it useful to revisit our earlier figures and update them where possible to do so. Our review includes integrating new estimates done since early 2022, as well as continuing to fill in some of the larger gaps highlighted in the initial review where possible. Our overall estimate aims to provide a rough idea of the global scale of EHS, which now exceeds USD 2.6 trillion annually. Data availability continues to vary widely by category and region. Further, we had to make judgement calls about whether broad types of subsidies were, on balance, more environmentally harmful than beneficial. Some subsidies to encourage a particular activity may reduce one or more types of environmental harms while exacerbating others. Our hope is that as countries move to reform their EHS, information on the scope, scale, and impacts will also improve.

As expected, gap filling remains challenging. In many important resource areas it is clear we continue to lack even the most basic needed data, and as a result are still dramatically underestimating subsidy totals. However, this update includes some data on non-energy mining and the plastics industry, as well as estimates for national subsidies to biofuels in the US. We also reached out to many experts in the sectors evaluated, and anticipate that they will pursue some of these inquiries. This would help to expand the available data in the future.

An overview of key reporting and reform frameworks on EHS and relevant components is followed by our updated subsidy figures.





Formal targets for EHS reporting and reforms adopted



Kunming-Montreal Global Biodiversity Framework

The most exciting recent development with the potential to shift the economy in a nature positive way is the adoption of the Kunming-Montreal Global Biodiversity Framework (GBF) at CBD COP 15 in December 2022.¹ Of particular interest is Target 18, which reads in full:

Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least 500 billion United States dollars per year by 2030, starting with the most harmful incentives, and scale up positive incentives for the conservation and sustainable use of biodiversity.

Progress to date has delineated two main headline **indicators**. Target 18.1 focuses on positive incentives in place to promote biodiversity conservation and sustainable use. Target 18.2 aims to track the value of subsidies and other incentives harmful to biodiversity that have been eliminated, phased out or reformed. Tracking progress on the elimination, phase out or reform of EHS requires having a baseline list of EHS in place as a starting point. Since GBF adoption, work has focused on definitions, integration with related efforts to track relevant metrics, and developing approaches to data collection and sharing by reporting entities. The official body overseeing this work is the **CBD Ad Hoc Technical Expert Group (AHTEG)** on Indicators, which is working on translating the targets of the agreement into measurable indicators, with the support of the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC).

Additional assessment is also being conducted at the country and regional levels. For example, in February 2024 the Dutch government released a method for their early compliance on Target 18.² In addition to identifying “financial public incentives detrimental and beneficial to biodiversity,” they also include direct and indirect impacts on biodiversity outside of the country resulting from activities within it.

The Brazilian Federal Court of Accounts is conducting a performance audit to assess the Federal Government’s actions to identify and monitor subsidies potentially harmful to the environment. This audit will also map the obstacles to the gradual reduction and subsequent elimination of these incentives, in line with the goal proposed by Target 18 of the Kunming-Montreal Global Biodiversity Framework.

Their review includes a stock-take of actions by other countries, and the identification of approaches for an EHS policy review. As Brazil currently chairs the International Organization of Supreme Audit Institutions (INTOSAI), a nongovernmental organization with more than 195 participating nations, such a national review could potentially act as a precursor to similar national audits across the INTOSAI membership.

At the regional level, the EU has formulated an **EHS working group** and produced a draft **EU methodology for EHS Reform** to aid in the identification of EHS by 2025 (GBF T18).³ UNDP Biofin’s recent report, *The Nature of Subsidies*, provided a useful summary of the actions for developing countries to address EHS reform.⁴ A review of sectors and approaches was also released by the OECD in 2022.⁵ To help achieve a coordinated response, the Global Environment Facility (GEF), together with the CBD, intends to hold a global EHS reform conference at the UN CBD COP16 to drive action on EHS reforms.

These efforts are starting to shape the way countries will monitor EHS and move to redirect, reform, and eliminate them. While early still, a few themes are starting to emerge that are worth mentioning:

- ▶ **An iterative approach will be needed.** Policy impacts cannot always be precisely quantified; instead, many countries have adopted a rough categorization approach (positive impacts on biodiversity, neutral, mixed, and negative). Sub-categories to delineate the anticipated degree to which a policy will have a positive or negative impact have been added by some countries as well.⁶ Iterative improvement in both indicators and associated data should be expected and would help to ensure that potentially damaging policies start being tracked at the country level even if they cannot yet be fully quantified.
- ▶ **To be effective, monitoring must go beyond national borders.** As with carbon emissions, long and complicated supply chains mean that policy impacts will frequently cross borders. The inclusion of international impacts within country-level EHS reporting is important, particularly for goods with the potential to drive habitat loss in countries of origin due to where they are sourced or how they are extracted.



- ▶ **The weighting of impacts may differ across countries and be a source of conflict or inconsistency.** There may be significant disagreements across reporting states on how to classify specific policies. Those with mixed impact will require weighing tradeoffs and countries may disagree on the best approach to use. Similarly, some subsidies may be targeting activities that seem environmentally beneficial within a specific production chain but are environmentally harmful because they improve the economic prospects of that activity relative to more sustainable substitute products or services. Subsidies to anaerobic digesters to manage wastes at large animal feedlots is one example, with less meat consumption as an alternative were the cost of meat production not to be subsidized. Carbon capture is another, since the subsidies are expected to keep coal-reliant infrastructure operating longer (and at higher load factors) than would occur absent the subsidies.
- ▶ **Equity issues.** Even where subsidies may be defined as on balance environmentally positive, there may be equity issues in providing state support to large firms that are capable of covering the full costs of their operations and should be doing so according to the Polluter Pays Principle. A review of policies identified as biodiversity-positive within the Target 18.1 metadata page (hosted by UNEP WCMC and managed by the CBD) indicate payments to farms or timber managers to restore damaged land or reduced taxes for reforestation.⁷ Implementation of tradable resource rights for water and fishing are included as well, though if the initial allocations were not done fairly, the tradable rights may monetize gains to the wrong groups. Similarly, government payments to megafarms for not damaging their land may seem unfair; and reforestation of plantation trees may not yield the targeted ecosystem benefits. There are likely many similar examples that will need to be worked through. One given is that public funding is always limited. Thus, directing subsidies to enterprises that can and should cover the costs of operating sustainably reduces what is available to lower income quintiles and very small business enterprises that will be unable to improve practices without public support.

- ▶ **Obtaining adequate data will remain a challenge.** Compiling adequate data will be an ongoing challenge.⁸ At present, data in OECD's Policy Instruments for the Environment (PINE) database is allowing Target 18.1, on policies protecting biodiversity, to move forward more quickly. Relying on PINE as the main data source is a reasonable choice since it is well vetted with familiar and standardized data fields across many countries and a strong base of reporting entities. However, entries vary in terms of data capture, and the degree to which their costs or benefits are quantified and the expected environmental benefits verified. At present, the unit of measurement to evaluate alignment with the Target is simply "Number of positive incentives (by type)" (see section 5a(6)). The number of policy interventions is a crude metric of impact. The relative magnitude of different policies, or even simply confirming that there really are positive benefits to nature as claimed, are not being evaluated at this stage. In order to benchmark nature positive support against the baseline EHS, this will need to change.

Data to support Target 18.2 are more limited at present. Existing OECD datasets will be used for subsidies to fishing and to agriculture; the UN platform related to the SDG 12.1(c) will be used for data on fossil fuels. Other impact areas have no listed data sources, and the fossil fuels data within the SDG (and OECD) reporting framework are heavily focused on reductions in excise taxes and VAT, direct government funding, and market price support. Other subsidy types are not well captured.





Other efforts to discipline subsidies affecting nature

A series of important government actions over the past few decades are relevant to EHS reform. These include multilateral efforts that involve many or most of the world's governments as well as plurilateral initiatives involving a smaller group of countries. A few of these, mainly those negotiated at the World Trade Organization (WTO), are or will eventually be legally binding in the sense that other governments have available remedies to discipline governments that violate the terms of the agreement. The main examples are the WTO's Agreement on Subsidies and Countervailing Measures and its Agreement on Agriculture, both products of the Uruguay Round of multilateral trade negotiations, which were concluded in 1994.⁹ Both agreements aim to discourage the most trade-distorting subsidies, and neither agreement targets environmentally harmful subsidies per se. However, they create disciplines on subsidies related to the production of both non-agricultural and agricultural goods; and to the extent that there is a correlation between trade-distorting subsidies and environmentally harmful subsidies, they may be helping to reduce EHS.

More recently, in June 2022, WTO Members adopted the Agreement on Fisheries Subsidies.¹⁰ This agreement, which has not yet entered into force, does target some of the most environmentally harmful subsidies to marine capture fishing. Of particular focus are those that encourage illegal, unreported and unregulated (IUU) fishing and those that target overfished stocks. The Agreement on Fisheries is an important indication that the WTO could also be used to create disciplines on other types of EHS in the future.

One binding agreement targeted at an environmentally harmful subsidy — fossil fuel subsidies — that has not been negotiated under the auspices of the WTO is the Agreement on Climate Change, Trade and Sustainability (ACCTS). Instead, it has been negotiated by a small number of governments (initially Costa Rica, Fiji, Iceland, New Zealand, Norway, and Switzerland) and will, among other aims, establish rules relating to fossil fuels provided by the ACCTS parties. Negotiations on the ACCTS officially concluded in July 2024, but the text of the Agreement will only be released publicly after all Parties have signed it.¹¹

Most other multi-government commitments and initiatives that target subsidies to particular sectors are non-binding in a strictly legal sense. Nonetheless, they have provided an important basis for data collection and increased public scrutiny (Table 1) and are generally supportive of achieving a nature-positive economy. An increasing number of bilateral and regional free-trade agreements also contain language encouraging each partner to commit to transparency in respect of particular environmentally harmful subsidies and to support efforts to phase them out. Both the 2022 UK-New Zealand Free Trade Agreement¹² and the 2023 EU-New Zealand Free Trade Agreement,¹³ for example, contain such language relating to fossil fuel subsidies.

As many non-binding commitments, especially those relating to fossil fuels, were launched more than a decade ago, lessons can be drawn from the experiences and impediments these efforts have faced. The time between inception to full implementation has typically been quite long, and often an initiative will stall before formal adoption by enough countries allows them to come into force. Common political or institutional hurdles include:

- ▶ Often the impetus to push forward a commitment to address a particular set of subsidies comes initially from a leading country or group of countries. But governments and economic circumstances can change, causing enthusiasm to wane and with it the funding for activities such as data collection or peer reviews.
- ▶ When reporting of subsidies is voluntary, it becomes more challenging to discipline countries who do not report their subsidies or report them inaccurately or incompletely. Specialized tracking by inter-governmental organizations (IGOs), helps overcome these challenges as trained teams of experts can proactively work to pull and standardize data.



- ▶ Data capture varies by initiative, though certain types of subsidies are more commonly captured than others. Direct spending, price support, tax credits and reductions in excise taxes or VAT tend to be captured more effectively than support provided through credit or insurance markets, targeted adjustments to corporate income tax rules, support provided by or channeled through state-owned enterprises, and support provided through generous terms in mineral leases. Credit support data may already be collected for trade purposes, though is usually held as confidential. Ways to leverage those data to support EHS reform would be helpful.
- ▶ Many of these initiatives, including Target 18, pull from similar data sets. This provides economies of scale in data collection and management. The downside is that it also increases the chances of the same areas of weakness will ripple through all of the subsidy reform efforts at once. Creating standing expert working groups that provide guidance on how to capture data by policy type might be a way to reduce this weakness over time.

Table 1. Summary of key multilateral and plurilateral agreements and Initiatives of relevance to EHS

Framework	Key Dates and Targets	Progress and Constraints
Cross-cutting environmentally harmful subsidies		
Convention on Biological Diversity (CBD)	<p>2022.12 — Kunming-Montreal Global Biodiversity Framework (GBF) adopted at CBD COP15. Target 18 expressly addresses EHS.¹⁴</p> <p>2024 — Updated national biodiversity plans.</p> <p>2025 — EHS reported.</p> <p>2030 — Reduction in EHS by at least USD 500 billion annually.</p>	<ul style="list-style-type: none"> • Compliance towards meeting the target is voluntary. • A formal and comprehensive process to track EHS is still evolving, making achieving the 2025 deadline on reporting challenging.
Agriculture		
WTO	<p>1994 — Agreement on Agriculture adopted; entered into force in 1995: Initially set binding reduction targets for the most trade-distorting forms of domestic support.</p> <p>2015 — WTO members agreed to end export subsidies for agricultural goods.</p> <p>Current Status — negotiations on outstanding issues continue.</p>	<ul style="list-style-type: none"> • Currently negotiating seven issues, including possible further cuts in domestic support to producers.¹⁵ • The WTO's 13th Ministerial Conference (MC13), in February-March 2024, resulted in no new agreements.
Fisheries		
WTO	<p>2022.06 — Agreement on Fisheries Subsidies adopted; not yet in force.</p> <ul style="list-style-type: none"> • To enter into force, 2/3 of members (i.e., 110) need to deposit an “instrument of acceptance” with the WTO; as of mid-August 2024, 82 had (counting the EU's acceptance as 27 members). • Developed-country members to end subsidies immediately once the Agreement enters into force; other countries are given more time. 	<ul style="list-style-type: none"> • Since the Agreement was adopted, Members have continued negotiations on outstanding issues, and had intended to make recommendations to MC13 on additional provisions that would enhance the disciplines of the Agreement. While they were unable to do so, progress was made in some areas.¹⁶



Framework	Key Dates and Targets	Progress and Constraints
Fossil Fuels		
Group of Twenty (G20)	2009.09 — Non-binding commitment by leaders to “rationalize and phase out over the medium-term inefficient fossil-fuel subsidies that encourage wasteful consumption.” ¹⁷	<ul style="list-style-type: none"> • Voluntary; inconsistent definitions on what is covered. • Data on many subsidy types not being captured. • Very limited progress by the group as a whole: The last peer reviews of country reports were conducted pre-Covid pandemic.
Asia-Pacific Economic Cooperation (APEC)	2009.11 — Non-binding commitment by leaders to “rationalize and phase out fossil-fuel subsidies that encourage wasteful consumption over the medium-term.” ¹⁸	<ul style="list-style-type: none"> • Peer reviews of several non-G20 APEC economies conducted 2015–2017, but no new reviews have been conducted since then. • Voluntary standstill on inefficient fossil fuels subsidies launched in 2021, with self-reporting of participating economies’ subsidies. Little progress has been reported since then.
Group of Seven (G7)	2016.05 — Non-binding statement by leaders that they remain “committed to the elimination of inefficient fossil fuel subsidies and encourage all countries to do so by 2025.” ¹⁹	<ul style="list-style-type: none"> • Target reaffirmed in April 2024, but language was added explaining that it applied to “inefficient fossil fuel subsidies that do not address energy poverty and just transitions.”²⁰ • Committed to work with “relevant international organizations” on standard subsidy definitions and measurement, and to ensure subsidy introductions due to economic or other crises are visible, targeted to groups most in need, and time-limited.
United Nations Sustainable Development Goals (SDGs)	2017.09 — SDGs endorsed, including the non-binding Target 12.c on fossil fuel subsidies, which are supposed to be achieved by 2030. ²¹ <ul style="list-style-type: none"> • The UN Environment Program (UNEP) is custodian of the indicator for Target 12.c.1. • Reporting is by UN members to UNEP and is voluntary. 	<ul style="list-style-type: none"> • UNEP is supporting members with reporting, though the reports capture only a portion of subsidy mechanisms. • Reporting is voluntary and few members (mainly OECD countries) have done so. • At the UN General Assembly in September 2023, world leaders expressed the view that “progress on most of the SDGs is either moving too slowly or has regressed.”²²
United Nations Framework Convention on Climate Change (UNFCCC)	2021.12 — Non-binding language on commitment to accelerate “efforts towards the ... phase-out of inefficient fossil fuel subsidies” adopted (at COP 26). ²³	<ul style="list-style-type: none"> • At COP28, exclusions of energy poverty and subsidies to support a just transition were added.²⁴ • A group of 12 parties for the UNFCCC announced a plan to report their fossil fuel subsidies to COP29, based on a new definition.²⁵



Framework	Key Dates and Targets	Progress and Constraints
<p>Agreement on Climate Change, Trade and Sustainability (ACCTS)</p>	<p>2019.09 — Agreement to start negotiations on a plurilateral (six-nation) legally binding agreement launched.²⁶</p>	<ul style="list-style-type: none"> • Negotiations on all components of the ACCTS were concluded in July 2024. However, only four of the original six Parties (Costa Rica, Iceland, New Zealand, and Switzerland) issued a joint statement. The Agreement is expected to be signed by those four Parties later in 2024.
<p>WTO</p>	<p>2022.06 — Fossil Fuel Subsidy Reform (FFSR) Working Group launched.²⁷</p> <p>-Includes 48 WTO Members, meeting roughly quarterly; focus is on potential WTO role in fossil fuel subsidy reform.</p>	<ul style="list-style-type: none"> • A new two-year work program for the Group was unveiled at MC13. It seeks to make more use of existing WTO processes to raise questions about WTO Members’ fossil fuel subsidies and rank which types of subsidies are most urgently in need of reform.²⁸
<p>Plastics</p>		
<p>World Trade Organization (WTO)</p>	<p>2020.11 — Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP) launched.²⁹</p> <ul style="list-style-type: none"> • As of July 2024 has 82 WTO member sponsors. • Target: use WTO to help ensure trade-related measures contribute to reducing plastic pollution, increase sustainability of plastics trade. 	<ul style="list-style-type: none"> • A new, two-year program of work for the working Group was unveiled at the WTO’s 13th Ministerial Conference (MC13), in February-March 2024, that envisages improving transparency on trade-related measures used by WTO Members, including subsidies.³⁰
<p>United Nations Environment Assembly (UNEA)</p>	<p>2022.03 — UNEA approves resolution to launch negotiations to develop “an international legally binding instrument to end plastic pollution, including in the marine environment,” by 2040.³¹</p> <p>2024.12 — Target deadline for final Global Plastics Treaty.</p> <ul style="list-style-type: none"> • Process overseen by the Intergovernmental Negotiating Committee (INC). • Current status: still being negotiated. 	<ul style="list-style-type: none"> • Most recent negotiations (INC-4, April 2024) have few areas of broad agreement. • Conflicts over whether treaty would address the production of primary plastic polymers and chemical additives, or just downstream impacts. • Efforts to inform the negotiations with better data are being pursued by NGOs and academic institutions.





3

Updated estimate of global EHS



Our review of EHS estimates involved revisiting key data sources from two years ago, as well as a literature and expert review to fill known holes in the 2022 estimate where possible. Relative to our analysis two years ago, estimated EHS are significantly higher, at USD 2.6 trillion, or an amount equivalent to about 2.5 percent of global GDP (Table 2). Individual sectors are described in more detail in Table 3.

Adjustments for high inflation over the past two years contributes a portion of this change. However, the largest jump was in the **fossil fuels** sector as surging energy prices from the Russian invasion of Ukraine led to a large increase in subsidy programs to consumers in many countries around the world, peaking at more than USD 1.5 trillion in 2022 before dropping in 2023. This example highlights the sensitivity of EHS to macroeconomic conditions. As countries grapple with ways to reduce and redirect EHS under the GBF, it is worth evaluating how decentralization, diversification, and accurate price signals on both inputs and environmental damages can be built into their strategies. Such actions can help build economic resiliency and reduce the pressures to implement an environmentally harmful reversal in the face of periodic economic or geo-political shocks.

Overall, subsidies to **fisheries, forestry, and water** were all roughly flat, reflective of the absence of new data on the sectors. Support to **mining** other than fossil fuel extraction is a new addition in the update, estimated at USD 40 billion. This should be viewed a placeholder: satellite imaging suggests a large portion of mining activity globally is not being tracked. Indeed, emerging observational techniques suggest that a large portion of activity is not being monitored or reported in the fisheries sector as well; and in timber, while cutting can be detected fairly easily in regions with satellite observation, linking it to contributing factors (e.g., road building) and specific firms continues to lag. The risk that much of this illegal and unmonitored activity is occurring in areas with important biodiversity and habitat resources is high. Rapidly growing international consortia of universities, governments, and NGOs to monitor these areas, combined with promising applications of machine learning to process hundreds of thousands of images, are a bright spot in the effort to better protect our natural resource endowments.

Since the original report, increases in **agricultural subsidies** were primarily to support food security (which is not counted as EHS). Important gaps in **irrigation subsidies** remain a major deficit in reporting. Although agriculture and industry comprise more than 85 percent of global freshwater consumption, we found no reliable data tracking the economic side of these withdrawals. The closest indicator was the value added from irrigation water to produce different crops, which can help identify misallocation of water within a country. However, this metric does not consider the full cost (including scarcity value) of the extraction. A general tendency for more powerful interests to benefit disproportionately from subsidies suggests that better management of limited water resources will not be possible if these critical data gaps are not filled.

Our agricultural estimate includes energy-sector subsidies targeted to **biofuels** into the totals for the first time, albeit only at the federal level of the United States. Still, we found that the US Renewable Fuel Standard, which requires biofuel products to be blended into gasoline and diesel even if more expensive, provides subsidies that exceed USD 35 billion a year. This is nearly 12x the scale of tax credits to biodiesel, a separate biofuel subsidy that is more frequently estimated and published. The example provides a sobering reminder of why it is so important that all commonly utilized approaches to confer EHS be captured in the global data.

The update provides incremental improvements to both **transport** and **construction** estimates. However, key questions in both areas remain unanswered. For example, insurance-related subsidies for the built environment, particularly in areas of high biodiversity value, are an important leverage point to redirect construction to less problematic locations and warrant much more evaluation.

Finally, we have included the **plastics** sector in the update because microplastics and plastic pollution are increasingly recognized as significant threats to many ecosystems and human health, and because negotiations are taking place to develop a global plastics treaty. A recent preliminary report places global subsidies to the upstream segment of the industry (the production of primary plastic polymers and their monomers) at around USD 30 billion a year.³²



Table 2. Estimated scale of environmentally harmful subsidies

Sector	Scale of Subsidy (Billions of 2023 USD, rounded)
Fossil fuels	1,050
Non-energy mining	40
Agriculture	610
Fisheries	55
Forestry	175
Transport	180
Water	390
Construction	150
Plastics	30
Total	2,680 <i>Equivalent to 2.5% of 2023 Global GDP</i>



Table 3. Environmentally harmful subsidies: Overview of scale, impacts, and benefits of reform

Resource Type and Environmental Benefits of Reform	Environmentally Harmful Subsidies/Year (Billions of 2023 USD, rounded*)	Commentary
<p>Fossil fuels — Subsidy removal is a tandem policy to carbon pricing; redirects investment and reduces pollution and GHG emissions.</p> <p>Residual gaps: Credit and risk; support from state, provincial, and municipal governments outside of OECD countries; below-market terms on mineral leases and state-owned enterprises; subsidies to energy stockpiling and security; subsidies to carbon capture and sequestration.</p>	<p>\$1,050³³</p> <p>Trend: Quite volatile year-to-year, with a three-year average of more than USD 1 trillion/year. Rapid and large subsidy increases following Russia's invasion of Ukraine seem to have reverted, but highlight the challenge of sustaining policies that support decarbonization and habitat protection.</p>	<p>Data based on joint estimates by OECD and IEA. We have added to IEA's 2023 estimate to approximate this joint value for 2023, pending updates from the OECD. The total also includes USD 3.5 billion in subsidies to carbon capture from one program, though these are expected to surge in the coming decade.</p> <p>Fossil fuel subsidies were thus more than 10x total revenues from carbon pricing schemes world-wide.³⁴</p> <p>Additional large-scale financing of international fossil fuel projects via public lending institutions provided nearly USD 50 billion/year during 2020-22.³⁵ Lending has been heavily skewed to fossil over clean energy.³⁶</p>



Resource Type and Environmental Benefits of Reform	Environmentally Harmful Subsidies/Year (Billions of 2023 USD, rounded*)	Commentary
<p>Non-energy mining — Improved price signals among alternative minerals and metals; and between primary production and recycled options. Reduced environmental damage from illegal operations.</p> <p>Residual gaps: Below-market and illegal leasing; tax breaks; socialized mine reclamation costs. Growing state interventions to bolster lithium and other critical minerals, though not aggregated across projects.³⁷</p>	<p>\$40³⁸ (illustrative)</p> <p>Trend: No prior estimate, but this value is still a large undercount.</p>	<p>Current estimate dominated by value of illegal gold and diamond mining. The scope and scale of mining activity is poorly documented, with analysis using satellites indicating that 56% of the total area mined (67,000 km²) is not captured in existing mining activity datasets.³⁹</p> <p>Widespread illegal gold mines cause billions of U.S. dollars in environmental damage each year. A survey of 3,000 newer metal mines indicated nearly 80% of extraction in 2019 occurred in five of the six most ecologically-diverse biomes in the world.⁴⁰</p>
<p>Agriculture – Resource-conserving crop selection and management; reduced water diversion and aquifer depletion; expanded requirements for crop varieties increases food system resiliency.</p> <p>Residual gaps: Irrigation-related infrastructure, free or below-market irrigation water, biofuel subsidies outside of US, downstream damages from farm runoff.</p>	<p>\$610⁴¹</p> <p>Trend: Flat, aside from increased capture of some biofuels support.</p>	<p>While total agricultural subsidies were up significantly relative to past years, much of this was support to food consumers, so not treated as EHS or included in our estimate.</p> <p>Total support was 25% of agricultural value added within OECD countries 2020-22, down from more than 42% for 2018-20.⁴²</p> <p>Liquid biofuels continue to scale globally, propelled by a variety of state subsidies and mandates. In the US, tax credits for biodiesel are USD 3 billion annually,⁴³ and market price support through the Renewable Fuel Standard’s purchase mandates worth about USD 35 billion annually.⁴⁴ Subsidies outside of the US, and those through purchase mandates in California could not be tabulated.</p>
<p>Fisheries — Recovery of damaged and overfished marine regions; reduced risk of fish loss to poor nations from international fishing fleets. Reduced bycatch of seabirds, turtles and mammals.</p> <p>Residual gaps: Aquaculture may be relevant for EHS inclusion, particularly in sensitive areas such as mangroves;⁴⁵ linkage between untracked vessels and IUU in order to generate more accurate estimates of illegal fishing.</p>	<p>\$55⁴⁶</p> <p>Trend: Flat, though new data suggest IUU may be much bigger than previously estimated</p>	<p>Subsidy value is roughly half subsidies to marine fishing effort and equipment, and half illegal, unregulated, and unreported catch (IUU). Of the 10 largest providers of subsidies to fishing effort nearly 85% supported large scale fishing operations.⁴⁷ Between 20% and 37% of all harmful fisheries subsidies support fleets sent to foreign jurisdictions or international waters.⁴⁸</p> <p>Machine learning analysis of satellite data from areas where 70% of the industrial fishing occurs indicated that untracked vessels could harvest an amount equal to the legal catch (USD 140 billion/year in 2020 based on FAO estimates of marine capture harvest values),⁴⁹ much higher than previously estimated.⁵⁰ If catch from untracked vessels is close to that large, even if not all is illegal, it would mean that IUU and the associated subsidies and environmental damages could be greatly understated.</p>



Resource Type and Environmental Benefits of Reform	Environmentally Harmful Subsidies/Year (Billions of 2023 USD, rounded*)	Commentary
<p>Forestry — Improved retention of forest biodiversity; reduction of ecosystem fragmentation and damage at illegal sites.</p> <p>Residual gaps: Tax breaks, public funding of timber roads and fire prevention and suppression services, post-cut reclamation, subsidies to woody biomass energy.</p>	<p>\$175⁵¹</p> <p>Trend: Flat; continued large data gaps.</p>	<p>In addition to illegal cutting, the estimate includes a placeholder of roughly USD 2 billion annually for wood pellet subsidies in the UK.⁵² Other subsidies to wood production from forests likely to be large, but have not been quantified.</p> <p>Illegal logging reduces timber prices by up to 16%, muting incentives to keep land in forests.⁵³ Lost ecosystem values, including sequestration, from illegal cutting estimated at USD 935–1,930 billion/year.⁵⁴</p>
<p>Transport — More accurate delivered price for bulk fuels and freight; improved infrastructure decisions across modes and high-cost users; reduced pressures for sprawl; reduced subsidies to purchase of individual cars and associated parking.</p> <p>Residual gaps: Estimates should include global public infrastructure spending net of user fees, cross-subsidies to heavy trucks, tax exemptions and other subsidies to users or vehicle purchases.</p> <p>Subsidies to Electric Vehicles are growing in many countries and viewed as a critical path item for decarbonization. Impacts on nature may warrant detailed evaluation, however.</p>	<p>\$180⁵⁵ (illustrative)</p> <p>Trend: Higher due to inclusion of new data on aviation and maritime subsidies and higher estimates for shortfalls in US highway funding. Some reductions as large maritime vessels came under EU emissions trading system.</p>	<p>Spotty coverage on the many potential subsidy mechanisms. This estimate includes a handful: highway user fee shortfalls and tax breaks for commuter parking (US); and lack of fuel taxes on international maritime shipping as well as select tax exemptions for company cars and aviation in the EU.</p> <p>Infrastructure spending is a large budget item: OECD countries averaged USD 365 billion/year from 2015-20 on roads (which may not fully capture municipal-level spending and maintenance) and USD 275 billion on rail.⁵⁶ The McKinsey Global Institute estimated global road spending, adjusted to current dollars, at more than USD 850 billion per year.⁵⁷ User fee contributions vary widely by country, but net subsidies are believed to be large.</p>
<p>Water — Improved efficiency in all uses, including agriculture, power plants, manufacturing, and municipal. Price-rationing during drought, declining water table.</p> <p>Residual gaps: Subsidies to direct water withdrawal for agriculture and industry; data on China and India for all uses.</p>	<p>\$390⁵⁸</p> <p>Trend: Flat due to continued data gaps.</p>	<p>Only 6% of subsidies benefit the lowest income quintile; subsidies comprise >1.5% of GDP in lower and middle income countries evaluated.⁵⁹</p> <p>Agriculture and industry comprise 71% and 16% of total freshwater withdrawals, respectively,⁶⁰ but are poorly captured in this estimate. Most often these offtakes are pulled directly from groundwater, rivers, or lakes, and charges for the water are set below its marginal value, if a price is charged at all.</p>



Resource Type and Environmental Benefits of Reform	Environmentally Harmful Subsidies/Year (Billions of 2023 USD, rounded*)	Commentary
<p>Construction (including housing) — Smaller residential footprints; reduced sprawl; more infill construction. Improved integration of risk-reduction strategies in building location and the materials and construction techniques used during both initial construction and renovations.</p> <p>Residual gaps: In addition to subsidies to construction, tax breaks to ownership and liabilities (such as flood, fire, and mortgage insurance) are also important. Insurance shortfalls are studied in relationship to specific events, but data on the going-forward coverage gap could not be identified.</p>	<p>\$150 (illustrative)</p> <p>Trend: Some increase due to additional data, but remaining gaps are large.</p>	<p>Estimate is primarily from two US tax breaks for single family homes.⁶¹ Less than 10% of the subsidy cost of those provisions supports the bottom three income quintiles.⁶² Similar supports exist in 21 OECD countries and reduce the marginal effective tax rate on owners by more than 27 percentage points.⁶³ Although OECD did not have a revenue loss estimate, data on some of the mortgage tax breaks available (~\$20 billion) across the world were tabulated from the Global Tax Expenditures Database.⁶⁴</p> <p>Obtaining insurance for high-risk structures near forest fires, storm events and flooding is a growing challenge and believed to be a large source of EHS. Government provision of below-market policies dampens incentives for structures to be located in lower risk locations and reduce onsite vulnerabilities. A side-effect is increased building along the wildland urban interface.</p> <p>The US federal flood program ran losses on past policies of USD 37 billion, and annual premiums going forward are estimated to be USD 2 billion too low.⁶⁵ State FAIR plans, insurers of last resort, covered USD 840 billion in liability in 2022, up nearly 40% since 2008.⁶⁶ Owing to surging fire risks, California's FAIR plan saw policies jump from USD 50 billion to USD 320 billion between 2018 and 2024. It has inadequate capital to cover losses.⁶⁷</p>
<p>Plastics — Reduced growth of plastics production and associated emissions, including microplastics. Improved competitiveness of competing materials as well as plastics recycling and reuse.</p> <p>Residual gaps: The collection of internationally comparable data on subsidies to plastics is still in its early stages, hence the gaps are large. Subsidies to collection and recycling are also not captured in many regions without producer responsibility laws to shift the management costs back on to producers.</p>	<p>\$30⁶⁸</p>	<p>Subsidies for process energy used in manufacturing plastics are already included in international compilations of fossil fuel subsidies, but subsidies for feedstock chemicals are not. Initial data suggests the total value of subsidies to the production of primary plastic polymers and their monomers is around USD 30 billion a year.</p>
<p>TOTAL</p>	<p>USD 2,680</p>	<p>Although comparisons to GDP are imperfect because of the variety of subsidy types, they provide a useful metric of EHS scale. For 2023, even with large remaining gaps, our estimate of EHS was equivalent to 2.5% of global GDP.⁶⁹</p>

*Values based on the most recent data available from reliable sources, scaled to 2023 USD. The original data year varies by source.



4

Endnotes

- ¹ Conference of the Parties to the Convention on Biological Diversity, “15/4. Kunming-Montreal Global Biodiversity Framework,” Decision adopted at the fifteenth meeting, CBD/COP/DEC/15/4, 19 December 2022.
- ² Government of the Netherlands, Ministry of Agriculture, Nature and Food Quality, “Assessing biodiversity effects of public financial incentives: a methodology for the Dutch government,” 29 February 2024.
- ³ European Commission, Sub-group on Environmentally Harmful Subsidies and the Polluter Pays Principle **Guidance document for reporting of non-energy Environmentally Harmful Subsidies (EHS)**, Draft, Ref. Ares(2024)3350447, 8 May 2024.
- ⁴ United Nations Development Program Biodiversity Finance Initiative (BIOFIN), **The Nature of Subsidies: A step-by-step guide to repurpose subsidies harmful to biodiversity and improve their impacts on people and nature**, 2024.
- ⁵ Alan Matthews and Katia Karousakis, “Identifying and assessing subsidies and other incentives harmful to biodiversity: A comparative review of existing national-level assessments and insights for good practice,” OECD Environment Working Papers No. 206, 22 Nov. 2022.
- ⁶ Government of the Netherlands, op. cit., p. 24.
- ⁷ UN WCMC, “**Metadata Factsheet, Target 18.1**,” accessed on 25 August 2024.
- ⁸ UN WCMC, “**Metadata Factsheet, Target 18.1**,” and “**Metadata Factsheet, Target 18.2**,” accessed on 25 August 2024.
- ⁹ See the WTO’s gateway to its legal texts, at https://www.wto.org/english/docs_e/legal_e/legal_e.htm.
- ¹⁰ WTO, “**Agreement on Fisheries Subsidies — Ministerial Decision Of 17 June 2022**,” Doc. No. WT/MIN(22)/33 WT/L/1144 of 22 June 2022. See also the WTO’s “**Agreement on Fisheries Subsidies**” web page.
- ¹¹ See “**Joint Ministerial Statement on Conclusion of Negotiations for the Agreement on Climate Change, Trade and Sustainability**,” 2 July 2024.
- ¹² UK-New Zealand Free Trade Agreement, accessed at <https://www.gov.uk/government/collections/uk-new-zealand-free-trade-agreement>.
- ¹³ European Union, “**Free Trade Agreement between the European Union and New Zealand**,” Official Journal of the European Union, 2024/866 of 25 March 2024.
- ¹⁴ Convention on Biological Diversity, “**Kunming-Montreal Global Biodiversity Framework**,” Doc. No. CBD/COP/DEC/15/14 of 19 Dec. 2022.
- ¹⁵ See “Agricultural Negotiations” at https://www.wto.org/english/tratop_e/agric_e/negoti_e.htm.
- ¹⁶ See “Agreement on Fisheries Subsidies” at https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm.
- ¹⁷ G20, “**Leaders Statement — The Pittsburgh Summit**,” 24-25 September 2009.
- ¹⁸ APEC, “**2009 Leaders’ Declaration**” (Singapore: Asia-Pacific Economic Cooperation), Nov. 2009.
- ¹⁹ G7, “**G7 Ise-Shima Leaders’ Declaration**,” 26-27 May 2016.
- ²⁰ G7 (2024), **Climate, Energy and Environment Ministers’ Meeting Communiqué**, Torino, Italy, 29-30 April 2024.
- ²¹ See “The Sustainable Development Agenda” at <https://www.un.org/sustainabledevelopment/development-agenda-retired/>
- ²² See “**General Assembly Endorses Political Declaration Reaffirming Shared Pledge to Lift Millions from Poverty, Fight Extreme Hunger, as Called for in 2030 Agenda**,” 29 Sept. 2023.
- ²³ United Nations Framework Convention on Climate Change (UNFCCC), “**Report of the Conference of Parties Serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November 2021**,” Doc. No. FCCC/PA/CMA/2021/10/Add.1 of 8 March 2022.
- ²⁴ UNFCCC, “**Outcome of the first global stocktake**,” Doc. No. FCCC/PA/CMA/2023/L.17 (Bonn: United Nations Framework Convention on Climate Change), 13 Dec. 2023.
- ²⁵ Netherlands, Ministry of Economic Affairs and Climate Policy, “**Joint statement on Fossil Fuel Subsidies**,” 9 Dec. 2023.
- ²⁶ New Zealand Ministry of Foreign Affairs and Trade, “**Announcement of Negotiations**” Agreement on Climate Change, Trade and Sustainability (ACCTS) negotiations, accessed 10 May 2024.
- ²⁷ WTO, “**Ministerial Statement on Fossil Fuel Subsidies — High-Level Work Plan**,” Doc. No. WTO/MIN(22)/8 of 10 June 2022.

- ²⁸ WTO, “[Ministerial Statement on Fossil Fuel Subsidies](#),” Doc. No. WTO/MIN(24)/19, 26 Feb. 2024.
- ²⁹ See “[Plastics pollution and environmentally sustainable plastics trade](https://www.wto.org/english/tratop_e/ppesp_e/ppesp_e.htm)” at https://www.wto.org/english/tratop_e/ppesp_e/ppesp_e.htm.
- ³⁰ WTO Dialogue on Plastic Pollution and Environmentally Sustainable Plastics Trade (DPP), “[Ministerial Statement on Plastic Pollution and Environmentally Sustainable Plastics Trade](#),” Doc. No. WTO/MIN(24)/14 of 23 February 2024.
- ³¹ United Nations Environment Assembly, UNEA Resolution 5/14 entitled “[End plastic pollution: Towards an international legally binding instrument](#),” Doc. UNEP/PP/OEWG/1/INF/1, 10 May 2022.
- ³² Eunomia and QUNO, “[Plastic Money: Turning Off the Subsidies Tap - Phase 1 Report](#),” London and Geneva, August 2024.
- ³³ OECD, [OECD Inventory of Support Measures for Fossil Fuels 2023](#) (Paris: OECD Publishing), December 2023 ; OECD, “[Fiscal cost of support measures for fossil fuels](#),” bar chart of combined OECD-IEA fossil fuel subsidy estimates, accessed 27 August 2024; IEA, [Strategies for Affordable and Fair Clean Energy Transitions, 2024](#); IEA, “[Fossil fuel consumption subsidies, 2010-2022](#)” database, 24 October 2023 update.
- ³⁴ The World Bank estimated that emissions trading systems and carbon taxes raised USD 100 billion in 2022, with an additional USD 2 billion from voluntary carbon markets. See World Bank, [State and Trends of Carbon Pricing 2023](#), May 2023, p. 14.
- ³⁵ USD 62 billion in 2020, USD 36 billion in 2021, and USD 43 billion in 2022. See Oil Change International, “[Public Finance for Energy Database](#),” accessed at <https://energyfinance.org/#/> on 2 May 2024.
- ³⁶ Lending data from 18 export credit agencies favored fossil over clean energy 14:1; and from more than 30 Development Finance Institutions by 3:1. Data for 2016-18, based on analysis by Oil Change International and Friends of the Earth, [Still Digging: G20 Governments Continue to Finance the Climate Crisis](#), 2020.
- ³⁷ For example, the US Department of Energy recently provided credit support of USD 2.3 billion to develop a privately-owned lithium mine in the US state of Nevada. See Scott Sonner, “[Energy Department conditionally approves \\$2.26 billion loan for huge lithium mine in Nevada](#),” Associated Press, 15 March 2024.
- ³⁸ C. Nellemann, R. Henriksen, A. Kreilhuber, et al., eds. (2016), [The Rise of Environmental Crime – A Growing Threat To Natural Resources Peace, Development, and Security](#), UNEP-INTERPOL Rapid Response Assessment, United Nations Environment Programme and RHIPTO Rapid Response–Norwegian Center for Global Analyses, www.rhipto.org.
- ³⁹ V. Maus, S. Giljum, and D.M. da Silva, et al. (2022), “[An update on global mining land use](#),” *Sci Data* 9, 433.
- ⁴⁰ Sebastian Luckeneder, Stefan Giljum, Anke Schaffartzik, et al. (2021), “[Surge in global metal mining threatens vulnerable ecosystems](#),” *Global Environmental Change*, Vol. 69.
- ⁴¹ As was done in our 2022 paper, the total support estimate has been adjusted downwards to remove implicit taxes on farmers, food support programs, food security and monitoring as a better proxy for EHS. Data are from OECD (2023), [Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change](#), OECD Publishing, Paris. This replaced FAO, UNDP and UNEP (2021), [A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems](#), Rome, FAO, which was used for the 2022 release, but which has not been updated. Data consistency across the sources is good, although the FAO, UNDP, and UNEP analysis captured significantly more countries. The authors estimated that two-thirds of agricultural support is “price-distorting and largely harmful to the environment,” a ratio that is broadly in line with our estimate after deductions using data from OECD (2023).
- ⁴² OECD (2023), [Agricultural Policy Monitoring and Evaluation 2023: Adapting Agriculture to Climate Change](#), OECD Publishing, Paris, p. 84; and OECD (2021), [Agricultural Policy Monitoring and Evaluation 2021: Addressing the Challenges Facing Food Systems](#), OECD Publishing, Paris, p. 44.
- ⁴³ Taxpayers for Common Sense, “[Updated: Biodiesel Subsidy Bonanza](#),” Fact Sheet, August 2022.
- ⁴⁴ Author’s calculations using data on the generation and sale price data for compliance credits for 2023 published by the US Environmental Protection Agency on their [RIN Trades and Price Information](#) page, accessed 12 May 2024.
- ⁴⁵ See, e.g., Luiz Drude Lacerda, Raymond D. Ward, Mario Duarte Pinto Godoy, et al. (2021), “[20-Years Cumulative Impact From Shrimp Farming on Mangroves of Northeast Brazil](#),” *Frontiers in Forests and Global Change*, Vol. 4.
- ⁴⁶ Estimate is roughly half from subsidies to excess capacity and overfishing (Daniel Skerritt and U. Rashid Sumaila, [Assessing the spatial burden of harmful fisheries subsidies](#), Fisheries Economics Research Unit at University of British Columbia and Oceana, February 2021) and half from illegal fishing (World Bank, [Illegal Logging, Fishing, and Wildlife Trade: The Costs and How to Combat It](#), October 2019).

- ⁴⁷ Skerritt and Sumaila, pp. 10, 17.
- ⁴⁸ Daniel J. Skerritt, Anna Schuhbauer, Sebastian Villasante, et al. (2023), "[Mapping the unjust global distribution of harmful fisheries subsidies](#)," *Marine Policy*, Volume 152, 105611, ISSN 0308-597X.
- ⁴⁹ F.S. Paolo, D. Kroodsma, J. Raynor, J. et al. (2024), "[Satellite mapping reveals extensive industrial activity at sea](#)," *Nature* 625, 85–91.
- ⁵⁰ UN Food and Agriculture Organization (2022), "[The State of World Fisheries and Aquaculture 2022](#)," page 1. Value of first catch data from 2020 used to better match the time period of satellite mapping used in Paolo, Kroodsma, Raynor et al. to assess illegal and unreported vessels.
- ⁵¹ Value of illegally-harvested wood based on Interpol, "[Forestry crime: targeting the most lucrative of environmental crimes](#)," 14 December 2020. No global estimates could be identified quantifying subsidies to timbering roads or tendered forest concessions. Interpol is in the process of updating its estimate for illegally-harvested wood but does not yet have a target release date.
- ⁵² Jillian Ambrose, "[Drax gets go-ahead for carbon capture project at estimated £40bn cost to bill-payers](#)," *The Guardian*, 16 January 2024; David Vetter, "[U.K. Bets On '\\$40 Billion' Carbon Capture Tech, But Critics Say It's Hot Air](#)," *Forbes*, 19 January 2024.
- ⁵³ US. Congressional Research Service, "[International Illegal Logging: Background and Issues](#)," 9 February 2019, Washington, D.C.
- ⁵⁴ World Bank, [Illegal Logging, Fishing, and Wildlife Trade: The Costs and How to Combat It](#), October 2019.
- ⁵⁵ Some potential overlap between OECD producer subsidy inventory for fuel tax reductions. Because this estimate reflects a narrow set of available studies, the actual level of subsidies to expanded transport infrastructure and subsidizing bulk commodity movements is anticipated to be much larger. Data sources for estimate components: US Congressional Research Service, [Funding and Financing Highways and Public Transportation Under the Infrastructure Investment and Jobs Act \(IIJA\)](#), Congressional Research Service, 24 May 2023; US Treasury, Office of Tax Analysis, US Dept of the Treasury, "[Tax Expenditures FY 2025](#)," 11 March 2024; OECD, [Effective Carbon taxes \(2023\)](#). OECD (2023), [Effective Carbon Rates 2023: Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading](#), OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris; International Maritime Organisation (2023), "[Fuel Consumption and Carbon Intensity](#)," 2022 reporting period; Energy & Transport, [Company cars: how European governments are subsidising pollution and climate change](#), October 2020; Transport & Environment, "[Applying Kerosene Duty to Aviation: What would the effects of different duty levels be](#)," November 2022.
- ⁵⁶ International Transport Forum, Datasets "Total Road Spending," "Rail Infrastructure Maintenance," and "Rail Infrastructure Investment," part of the Transport infrastructure investment and maintenance spending dataset, accessed 6 May 2024 at https://stats.oecd.org/Index.aspx?DataSetCode=ITF_INV-MTN_DATA.
- ⁵⁷ McKinsey & Company, [A better road to the future: Improving the delivery of road infrastructure across the world](#), 2018.
- ⁵⁸ Midpoint of range in Andres et al. Does not include subsidized water through direct withdrawal by industrial, power, and agricultural users. See Luis A. Andres, Michael Thibert, Camilo Lombana Cordoba et al. (2019), "[Doing More with Less: Smarter Subsidies for Water Supply and Sanitation](#)," World Bank, Washington, DC.
- ⁵⁹ *Ibid.*, p. 32.
- ⁶⁰ Average shares from 2017-20, based on country data compiled by the UN Food and Agriculture Organization and compiled into World Bank development indicators. Accessed on 6 May 2024 at <https://data.worldbank.org/indicator/ER.H2O.FWDM.ZS>.
- ⁶¹ US Treasury, Office of Tax Analysis, US Dept of the Treasury (2024), "[Tax Expenditures FY 2025](#)," 11 March.
- ⁶² William Gale, "[Commentary: It's time to gut the mortgage interest deduction](#)," Brookings Institution, 6 Nov. 2017.
- ⁶³ Bethany Millar-Powell, Bert Brys, Pierce O'Reilly, et al. (2022), "[Measuring effective taxation of housing: Building the foundations for policy reform](#)," OECD Taxation Working Papers No. 56, pp. 29, 30.
- ⁶⁴ German Institute for Development and Sustainability (IDOS) & Council on Economic Policies (CEP), [Global Tax Expenditure Database](#), 25 January 2024 version. Analysis by the authors.
- ⁶⁵ US Government Accountability Office, "[Flood Insurance: FEMA's New Rate-Setting Methodology Improves Actuarial Soundness but Highlights Need for Broader Program Reform](#)," July 2023. GAO-23-10597.

- ⁶⁶ FAIR is an acronym for “Fair Access to Insurance Requirements,” statutorily mandated programs in many US states. Data from Property Insurance Plans Service Office, “Insurance Provided by FAIR Plans by State,” various fiscal years. See the Insurance Information Institute at <https://www.iii.org/insurance-provided-by-fair-plans-by-state-fiscal-year-2022-1>, accessed on 6 May 2024.
- ⁶⁷ Thomas Frank, “California’s insurer of last resort is a ‘ticking time bomb,” E&E News Climate Wire, 18 March 2024.
- ⁶⁸ Quaker United Nations Office and Eunomia Research & Consulting Ltd, “Plastic Money: Turning Off the Subsidies Tap - Phase 1 Report,” August 2004.
- ⁶⁹ Global GDP estimate for 2023 is from the IMF data dashboard, “GDP Trend, 1980-2029,” World Economic Outlook, April 2024, accessed 13 May 2024.



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