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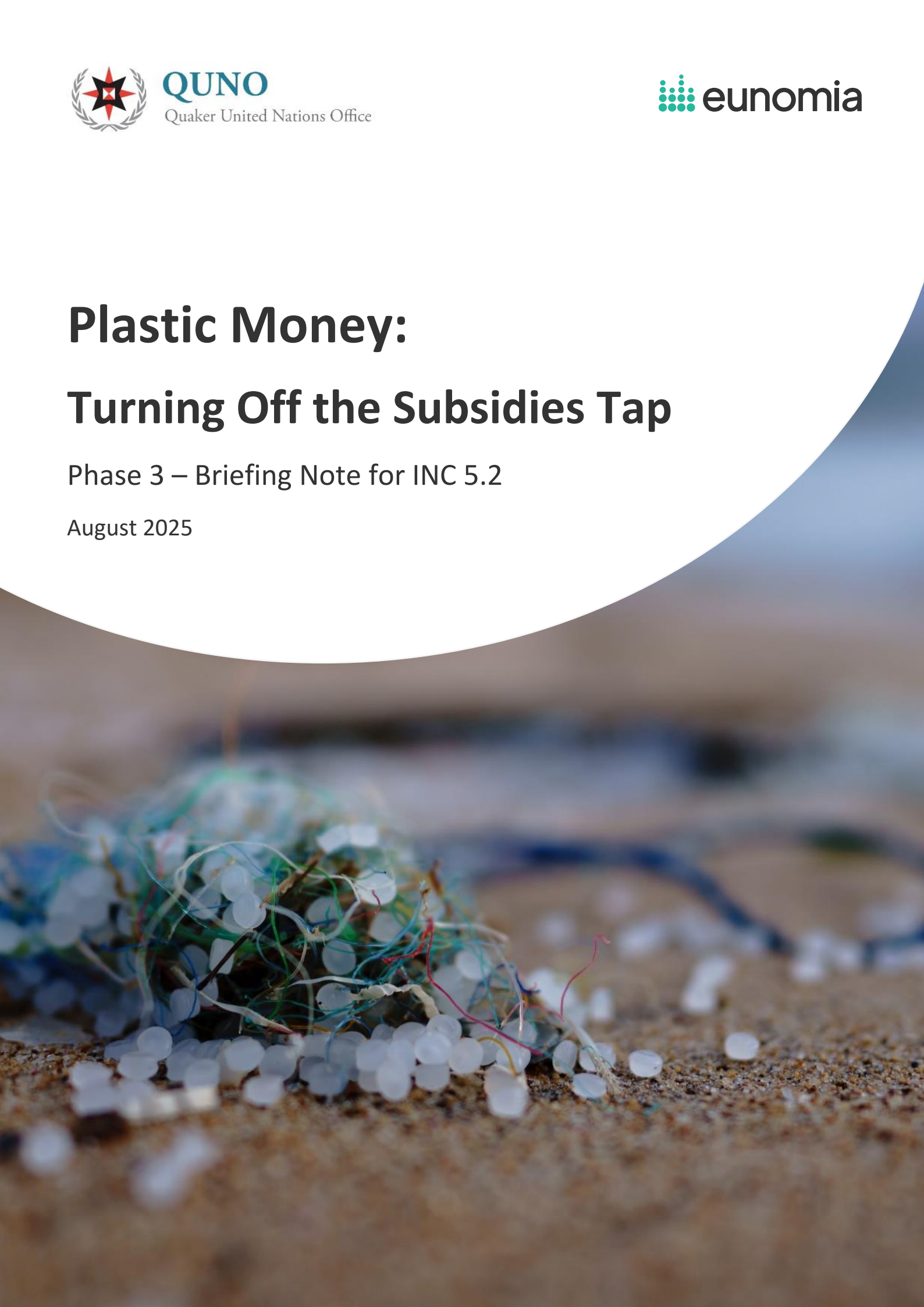
Plastic Money:

Turning Off the Subsidies Tap

Phase 3 – Briefing Note for INC 5.2

August 2025



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About Eunomia

Eunomia Research & Consulting Ltd ('Eunomia') is a full-spectrum, independent environmental consultancy, established in 2001 and focused on improving environmental outcomes around climate, nature, energy, and materials in ways that also enhance social value. It is our mission to shape a more sustainable future, building a world that benefits both the environment and local communities. We combine practical experience with academic excellence, and a genuine passion for the subject matter, to offer creative solutions. Our clients include local, national, and suprainternational governments and agencies, NGOs, and businesses.

About QUNO

The Quaker United Nations Office (QUNO) works to promote peace and justice efforts at the international level, focusing on human rights and refugees, peacebuilding, climate change and sustainable and just economic systems. Through its engagement with rights-holders, United Nations agencies, governments, and non-governmental organizations, QUNO seeks to build collaborative, just, and ethical solutions to global challenges. Guided by Quaker principles, QUNO's Sustainable and Just Economic Systems programme addresses the systemic issues driving economic inequality and environmental degradation. QUNO's work on plastic subsidies is part of its broader commitment to fostering economic systems that are both sustainable and just.

Acknowledgements

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Any errors or omissions remain the sole responsibility of the report's authors.

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1.0 Introduction

Synthetic polymers are widely used due to their versatility and low cost. However, their lifecycle — from extraction to disposal — contributes significantly to climate change, pollution, and biodiversity loss. In 2019, global consumption of polymers was 460 million tonnes, with the majority of these polymers derived from virgin fossil-based sources.[1]

The Intergovernmental Negotiating Committee on Plastic Pollution (INC) is developing a UN-mandated Global Plastics Treaty to address plastic pollution, with a final agreed text of an international legally binding instrument expected by the end of its final negotiating session, in August 2025. The negotiators have been tasked with considering what measures could be pursued to contribute to that goal.

One such measure is ending subsidies for primary polymer production (PPP). These subsidies reduce production costs and incentivise investment in PPP, making virgin fossil-based polymers cheaper and more competitive than alternatives. This artificially inflates demand for such polymers and undermines efforts to transition to a circular economy. Eliminating these subsidies would therefore align with global efforts to reduce environmental harm.

Given what is known about the contribution of plastics to greenhouse gas emissions, air pollution, and the environmental harm caused by plastics in the environment, especially micro- and nano-plastics, it is reasonable to ask, why have governments and the international financial institutions continued to support the expansion of the primary polymer industry?

There are two main reasons. The first is the pursuit of increased value added. For middle-income economies, especially those that produce hydrocarbons or have high domestic demand for polymers for use in export-oriented products, investment in petrochemicals is seen as a pathway to greater economic sophistication, diversification, and complexity.[2] The petrochemicals industry produces "a vast range of products all with multiple supply chains that vary across the globe".[3] For these and other reasons, the United Nations Industrial Development Organization (UNIDO) in 2010 assigned the manufacture of chemicals and chemical products, including petrochemicals, to the group of medium-high and high-tech manufacturing industries[4] "capable of resisting external shocks and withstanding turbulent periods".[5]

The second reason, which is related to the quest for increasing value added, is the competition among immobile governments to attract investments by footloose multinational companies that face a multiplicity of choices in where they can invest. That investment competition helps loosen public

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[1] OECD (2022), *Global Plastics Outlook: Policy Scenarios to 2060*, OECD Publishing, Paris, https://doi.org/10.1787/aa1edf33-en.

[2] Imran Arif, "Productive knowledge, economic sophistication, and labor share", *World Development*, Vol. 139 (2021), https://doi.org/10.1016/j.worlddev.2020.105303.

[3] Ella T. Jennings, Penny J. Hamlin, Chris Hamlin, Jonathan M. Cullen, "Connected, complex, and carbonized: The country archetypes of the petrochemicals sector", *Energy Research & Social Science*, Vol. 118 (2024), https://doi.org/10.1016/j.erss.2024.103826.

[4] UNIDO, Industrial Statistics – Guidelines and Methodology (Vienna: UNIDO, 2010).

[5] Ahunbaev, A., Adakhayev, A., Chuyev, S., Ignatov, S., Prozorova, M. Pechenskaya-Polishchuk, M., Lukin, E., Polzikov, D., *Petrochemical Industry in Eurasia: Opportunities for Deeper Processing,* Reports and Working Papers 24/4 (Almaty: Eurasian Development Bank, 2024), p. 15.

purses, leading to a "subsidy war" among various jurisdictions to attract the large capital investments required to produce monomers and polymers at scale.

Examples of this dynamic abound. In the U.S. State of Texas, applicants for tax incentives under its 2023 Jobs, Energy, Technology and Innovation Act (JETI) provide evidence that other (non-Texas) locations are also competing to host the investment. This process has prompted some interesting revelations.

The Texas Comptroller of Public Accounts' final recommendation for approval of ExxonMobil's planned USD 8.5 billion steam cracker and polyethylene project in Calhoun County, for example, cites the applicant's assertion that "the project is in competition will several other locations and opportunities across the globe", noting "several locations in the Middle East and Asia as well as other locations in North America are being considered. Various levels [sic] of government support and tax relief are offered by the governments of the countries in competition for this project."[6]

To the north, in Canada, the chair of the Province of Alberta's Resource Diversification Council (RDC) has been quoted, in a commendation of the Alberta Petrochemicals Incentive Program (APIP), which offers grants equal to 12% of an approved project's capital investment:

> *Government support is critical to level the playing field with other economic competitors that are aggressively courting investment […]. Other jurisdictions are doing all that they can to attract investment and the RDC is encouraged to see Alberta sharpen its competitive focus to bring long-term benefit to Albertans.*[7]

Meanwhile, around the same time, countries in the Eurasian region were also looking at the global market and concluding that they, too, need to offer adequate incentives if they were to attain their goal of unlocking the production and export potential of their petrochemical industries.

> *Taking into consideration the high added value generated by medium- and low-tonnage petrochemical facilities, these will need to be upgraded on a priority basis with state support. […] That will necessitate a reformatting of state development programmes, for example, by offering integrated indirect financial support in the form of feedstock price subsidies, interest rate subsidies, and soft lease terms. In some countries, governments are taking similar proactive measures to support […] feedstock-processing companies, including application of reduced VAT rates to feedstock procurement contracts and finished product export contracts, accelerated implementation of high-tech export programmes, and provision of various environmental and tax incentives.*[8]

In this context, the challenge of eliminating PPP subsidies becomes clearer. While their removal could significantly reduce environmental harm and support the transition to more sustainable patterns of production and consumption, entrenched economic and geopolitical incentives continue to drive their persistence. Understanding these dynamics and obtaining clarity on the level of subsidisation provided

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[6] Texas Comptroler of Public Accounts, "Recommendation Packet — J0014, Calhoun County ISD, Exxon Mobil Corporation", 04 April 2025, https://comptroller.texas.gov/economy/development/prop-tax/jeti/application-details.php?id=J0014, accessed 22 July 2024, p. 6.

[7] David Chappell, quoted in Government of Alberta, "New program to make Alberta a petrochemicals powerhouse", 9 July 2020, https://www.alberta.ca/release.cfm?xID=727800A2823BF-BE0A-E531-EB2324FEFA3D2B79, accessed 23 July 2024.

to the industry in different countries is essential for shaping effective international policy responses, such as those being negotiated under the Global Plastics Treaty.

This research aims to estimate the level of subsidisation enjoyed by the PPP industry and model the impacts of removing these subsidies on primary polymer production and on the consumers of plastic products. This report presents the preliminary findings from the third phase of the research, which supplements the findings of the earlier phases by examining a broader range of subsidy types.

2.0 Research Scope

The study focuses on standard ('commodity') polymers that constitute the bulk of global polymer production: polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC), polyethylene terephthalate (PET), and polystyrene (PS).

The research covers all 71 primary producing economies (though subsidy data is not comprehensive across all of them) and focuses primarily on subsidies received by producers of monomers and primary polymers. Subsidies to specific upstream infrastructure, such as for separating out ethane from natural gas-streams, pipelines for carrying ethane or naphtha, and storage facilities for ethane, were not investigated for this stage of the research but may be in future research.

2.1 Types of PPP Subsidies

The types of subsidies investigated in this study include:

Feedstocks subsidies

Government support to chemical feedstocks is typically provided via one of three mechanisms: (1) government intervention in the setting of prices for those feedstocks; (2) government policies, such as tax credits or rebates, that reduce the effective price paid by purchasers of those feedstocks; and (3) policies that reduce or exempt the feedstock chemicals from taxes normally applied to similar products. These subsidies were covered in phases 1 and 2 of the research.

Process energy subsidies

As with feedstocks, government support for energy used in the processes for producing monomers and polymers is typically provided via one of three mechanisms: (1) government intervention in the setting of prices charged for fuels or electricity; (2) government policies, such as tax credits or rebates, that reduce the effective price paid by purchasers of fuels or electricity; and (3) policies that reduce or exempt the fuels or electricity from taxes normally paid by other consumers of the same fuels or electricity. These subsidies were also covered in phases 1 and 2 of the research.

Grants

Direct financial contributions from the government to support specific activities or reduce production costs. Grants tied to investments in industrial plants are the most transparent forms of capital-related support, and on occasion can be significant. Those identified by this study across a subset of economies appear to be worth upwards of several billion dollars a year on average. A limited number of grant subsidies were covered in phases 1 and 2 of the research, however the research has been supplemented with additional data in this third phase.

In-kind subsidies

Non-cash benefits such as free or discounted land, water, or infrastructure provided to reduce operational expenses, often provided due to a plant's location in a designated Special Economic Zone. These subsidies were introduced in this third phase of the research.

Tax expenditure subsidies

Reductions in tax liability through credits, exemptions, deductions, holidays, or deferrals that lower producers' tax burdens (excluding any feedstock and energy subsidies covered above). A limited number of tax related subsidies were covered in phases 1 and 2 of the research, however the research has been supplemented with additional data in this third phase.

Below-market financing or other credit-related support

Financial assistance provided at interest rates or terms more favourable than those available in the market. These types of subsidies were mostly investigated in this third phase of the research and can be further broken down into:

- **Non-market loans**: Loans offered by governments or public entities at below-market interest rates or with lenient terms. These are loans, loan guaranties, investment insurance and similar instruments provided by national governments or multilateral financial institutions, and usually complement investments co-financed by private-sector banks and equity. Since the capital investments in new or expanded plants that manufacture polymers or their monomers, or both, nowadays often exceed USD 1 billion, and in some cases USD 10 billion, such projects often number among the largest investments in these institutions' portfolios.
- **Government loan guarantees**: Government assurances to repay a loan if the borrower defaults, reducing lender risk and borrowing costs.
- **Export credit insurance**: Government-backed insurance that protects exporters against non-payment by foreign buyers, encouraging international sales.
- **Loan forgiveness**: Cancellation of all or part of a loan obligation, effectively converting it into a grant.

2.2 Scenario Modelling

To assess the impacts of removing PPP subsidies, the following two scenarios were modelled in the study:

1) A **baseline scenario** in which it was assumed that subsidies for feedstock and process energy continue at the average rate from the period 2015-2020, while other subsidies continue at the average rate from the relevant period in which they were identified. Capital related subsidies or 'one-off' subsidies were annualised to enable the presentation of results in a consistent manner.
2) A **full subsidy removal scenario** in which it was assumed that all estimated subsidies are removed. The impact of full subsidy removal on monomer and polymer production volumes was assessed relative to the baseline scenario, for the years 2024 and 2050.

These scenarios were modelled for 71 economies and 7 primary polymers (HDPE, LDPE, LLDPE, PP, PET, PVC and PS).

3.0 Baseline Scenario

The baseline scenario projected forward the estimation of the current level of subsidies to the year 2050. Under this scenario, future economy and polymer specific production volumes were projected based on the projections of polymer demand in the OECD's Global Plastics Outlook: Policy Scenarios to 2060.[9]

For details on the estimation methodology for subsidies in the baseline scenario, see Appendix A.1.0.

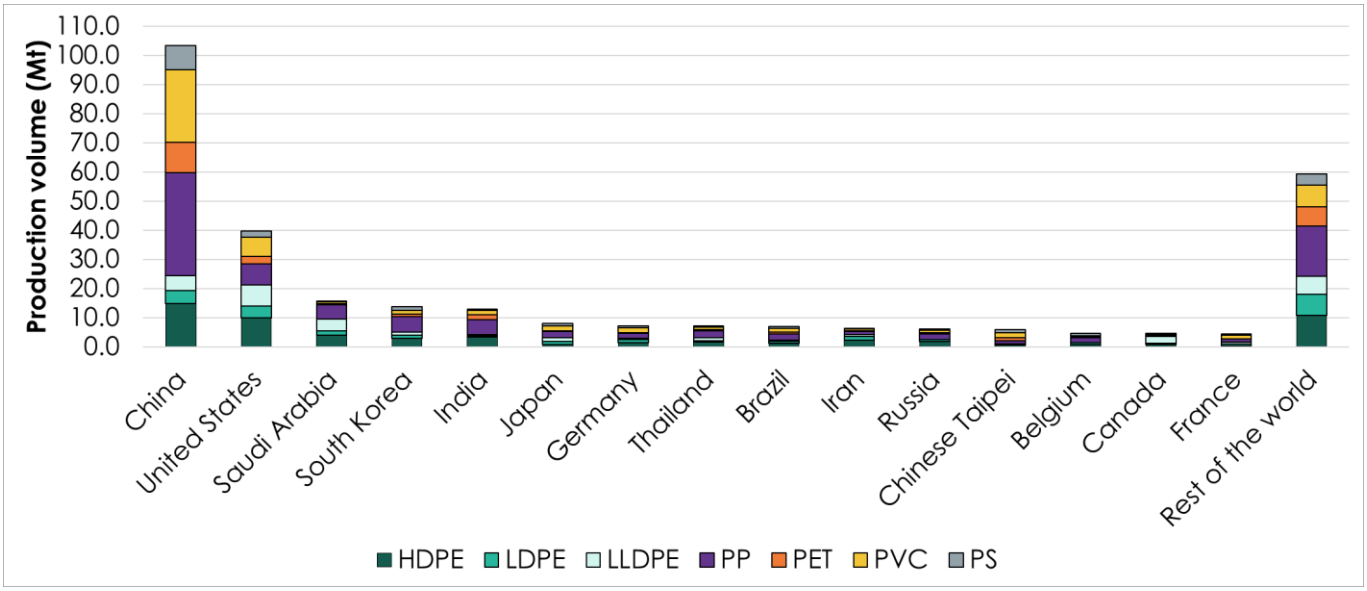
3.1 Polymer Production Volumes

In the baseline scenario, total production of commodity polymers is estimated at 305 million tonnes in 2024, rising to 590 million tonnes in 2050.

In 2024 and 2050, China is the largest polymer producer with estimated total polymer production of 103 million tonnes in 2024 (Figure), rising to 206 million tonnes in 2050 (Figure). China produces all seven of the main primary polymers (HDPE, LDPE, LLDPE, PP, PET, PVC and PS).

The United States is the second largest polymer producer in 2024 and 2050, accounting for 40 million tonnes of production in 2024 and 67 million tonnes of production in 2050. The majority of US production is various forms of PE; 21 million tonnes in 2024 and 38 million tonnes in 2050, respectively (Figure and Figure).

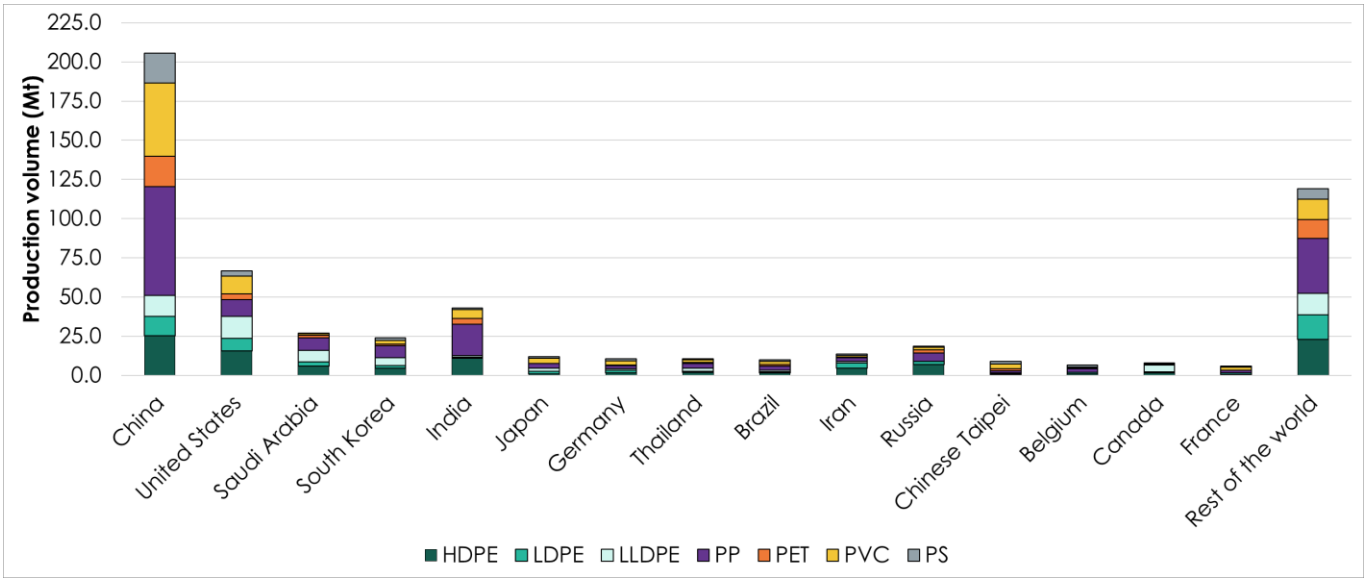
Figure 3-1: Polymer production volumes, baseline scenario, 2024



Source: Eunomia analysis

[9] OECD (2022), *Global Plastics Outlook: Policy Scenarios to 2060*, OECD Publishing, Paris, https://doi.org/10.1787/aa1edf33-en.

Figure 3-2: Polymer production volumes, baseline scenario, 2050



Source: Eunomia Analysis

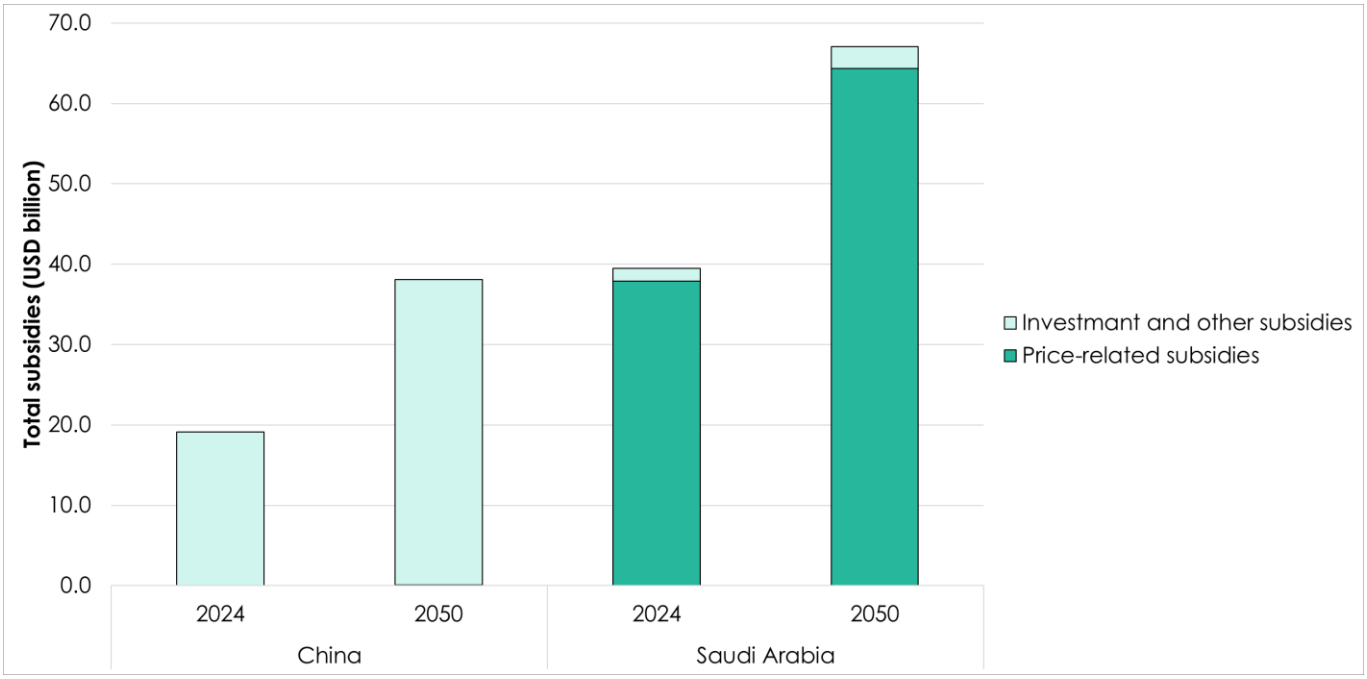
3.2 Total PPP Subsidies

In phases 1 & 2 of the research, total price-related subsidies to polymer production were calculated as the sum of process energy subsidies to monomer production, process energy subsidies to polymer production and feedstock subsidies. These are estimated to have been USD 43 billion in 2024 and to rise to USD 78 billion in 2050 (Figure & Figure). Saudi Arabia accounts for the majority of these subsidies; USD 38 billion in 2024 and USD 64 billion in 2050 (Figure).

In phase 3, estimates of investment and other subsidies to monomer and polymer production were added. These are estimated to have been USD 37 billion in 2024 and rising to USD 72 billion in 2050 (Figure & Figure). These additional subsidies are largest in China – USD 19 billion in 2024 and USD 38 billion in 2050 (Figure).

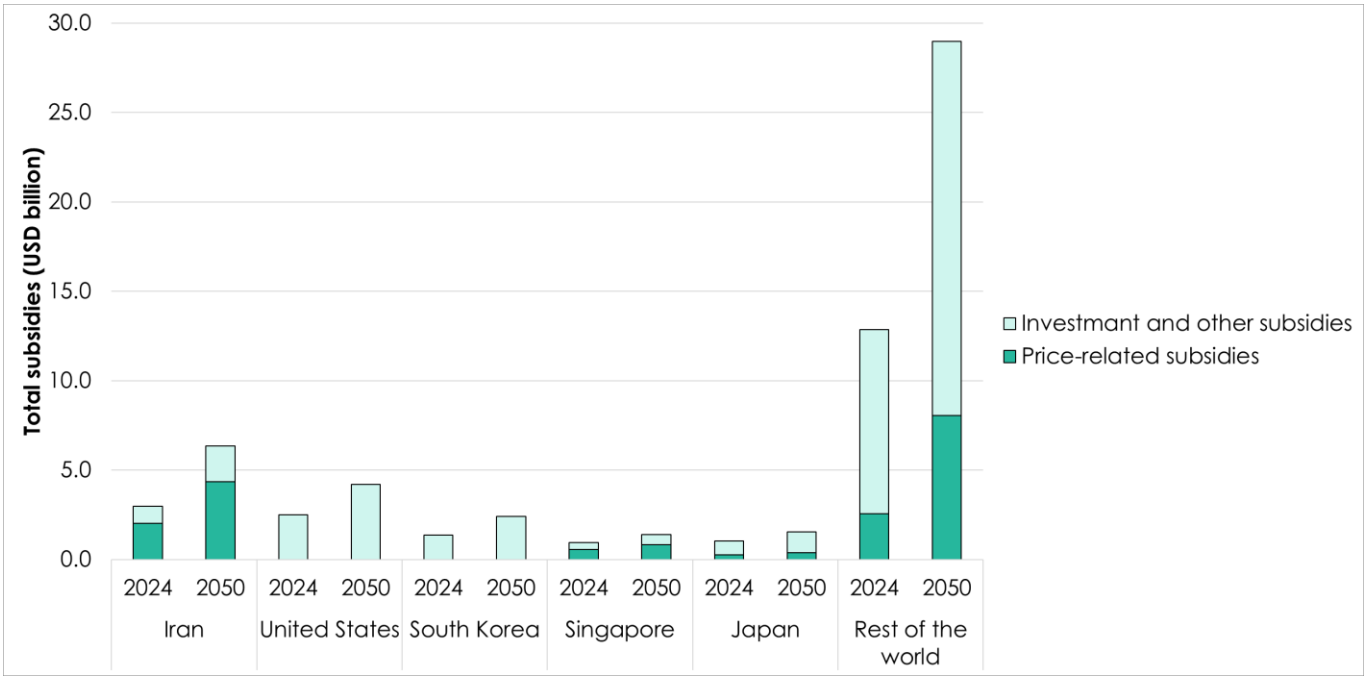
Therefore, total estimated subsidies to primary polymer production are USD 80 billion in 2024 and USD 150 billion in 2050.

Figure 3-3: Total subsidies to the PPP industry, baseline scenario, 2024 & 2050



Source: Eunomia Analysis

Figure 3-4: Total subsidies to the PPP industry (ex. Saudi Arabia and China), baseline scenario, 2024 & 2050



Source: Eunomia analysis

The level of subsidies received by the PPP industry (USD 80 billion in 2024) places it in the range of support received by other economic activities with major environmental significance identified recently by Koplow and Steenblik (2024), such as marine capture fisheries (USD 55 billion) and construction (150 billion), though it is of a lower order of magnitude than government support to agriculture (over

USD 600) and fossil fuels (over USD 1000) (Table).[10] When total subsidies to polymer production are combined with other environmentally harmful subsidies (EHS), the total EHS reaches an estimated USD 2.7 trillion.

Table 3-1: Estimated scale of environmentally harmful subsidies

Sector	Scale of subsidy (billions of 2023 USD per year, rounded)
Fossil fuels[1]	1,050
Agriculture	610
Water	390
Transport	180
Forestry	175
Construction	150
Fisheries	55
Non-energy mining	40

1. Primarily crude oil, petroleum products, and natural gas.

Source: Koplow & Steenblik, 2024.[11]

4.0 Impacts of Removing PPP Subsidies

The full subsidy removal scenario assessed the impacts of removing all estimated subsidies, both those estimated in phases 1 & 2 and those estimated in phase 3 of the research, relative to the baseline scenario, for the years 2024 and 2050.

It was assumed that when subsidies are removed, the polymer price increases by the total subsidy amount. The impacts on the demand for primary polymers from the price increase were then modelled using the price elasticity of demand for primary plastic. The price elasticity of demand was estimated as -0.15 using a panel data regression model with time-series data for six polymers in seven different regions, across the years 2015-2022.[12] Finally, the impacts of removing subsidies on final consumers were modelled based on price data for different types of plastic-containing consumer goods.

[10] Doug Koplow and Ronald Steenblik (2024), *Protecting Nature by Reforming Environmentally Harmful Subsidies: An Update*, Earth Track. https://www.earthtrack.net/sites/default/files/documents/ehs_report_september-2024-update_final.pdf

[11] *Ibid.*

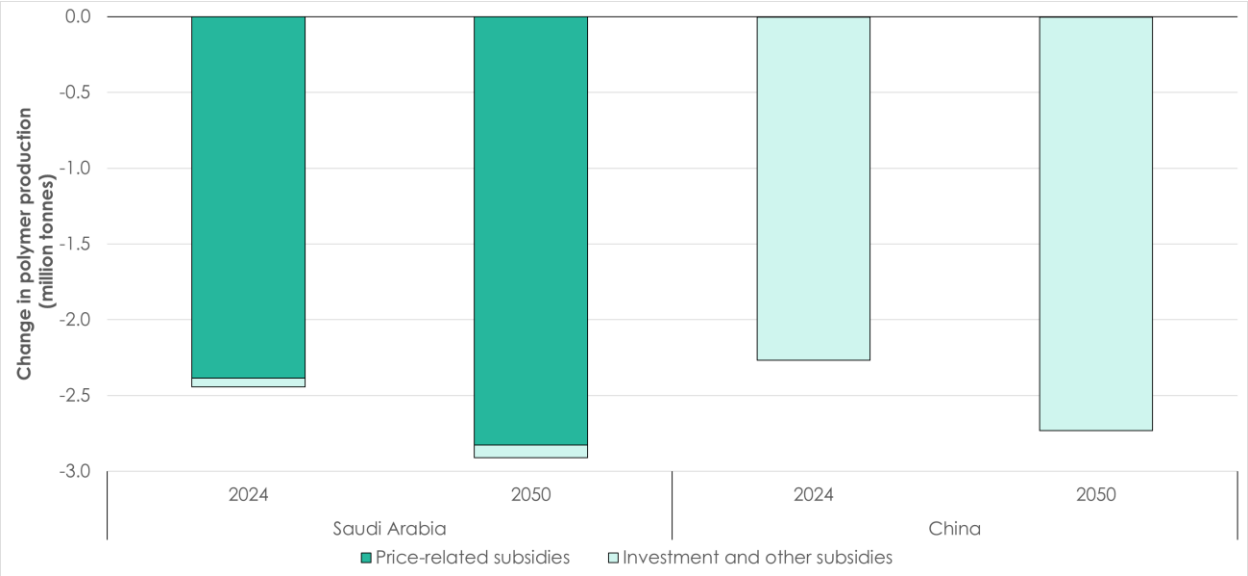
[12] Data provided by Wood Mackenzie.

4.1 Impacts on Polymer Production

The results presented here are for any of the top 10 ranked economies according to total subsidies in 2024.

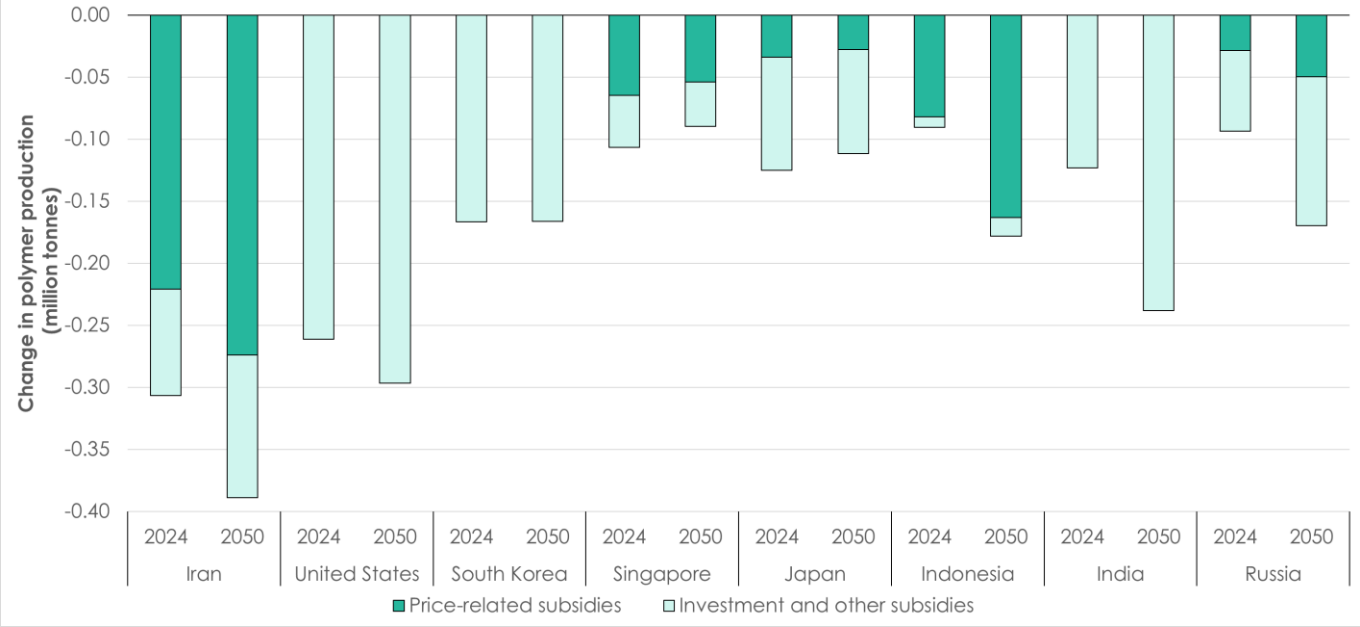
Under the full subsidy removal scenario, polymer production decreases by the largest amount, relative to the baseline scenario, in Saudi Arabia, where polymer production decreases by 2.4 million tonnes in 2024 and 2.9 million tonnes in 2050 (Figure). The second largest decrease in production is for China, where polymer production decreases from the baseline scenario by 2.3 million tonnes in 2024 and 2.7 million tonnes in 2050 (Figure). Changes in polymer production volumes are much smaller for other economies (Figure).

Figure 4-1: Change in polymer production volumes, subsidy removal scenario, 2024 & 2050



Source: Eunomia analysis

Figure 4-2: Change in polymer production volumes, subsidy removal scenario, 2024 & 2050



Source: Eunomia analysis

4.2 Impacts on Consumers

Table presents the impact of full subsidy removal on the prices of selected consumer products. The impact is minimal across a range of plastic-containing products.

In the case of fast-moving consumer goods such as a bottle of water, a bottle of soft drink, or a juice box, the plastic content of the product is contained in the packaging, and accounts for a small share of the overall product weight and price. For these products, the average price increase resulting from the removal of subsidies to polymer production ranges from 0.14% to 0.90%.

For products like plastic mulch film and vinyl flooring, which are predominantly composed of plastic, the cost of the raw material makes up a larger portion of the overall product price. As a result, any increase in polymer prices, such as those that may result from the removal of subsidies, could cause a more marked increase in the price of the product. However, these products are typically sold between businesses as inputs for further production, so the effect on the price of the final product that the consumer purchases is significantly diluted. For instance, plastic mulch film is used in agriculture where the cost of the final agricultural product is shaped by a wide range of other factors that have a disproportionately large impact on the price of the final product including labour, fertilizers, fuel, pesticides, machinery maintenance, water, land, insurance, and retailing costs and markups. In this context, a small increase in the price of mulch film has a minimal impact on the price of the agricultural goods sold to consumers. Similarly, in the case of vinyl flooring, the final price to the end consumer is determined by various other cost components, such as the labour and additional materials required to install the flooring, which significantly outweigh any changes in the cost of the flooring itself.

Table 4-1: Impact on consumer product prices from removing subsidies to plastic production

Product sector	Product label	No. of economies covered	Average product price - original (USD)	Average product price - new (USD)	Average price increase (USD)	Average price increase (%)
Packaging	Bottle of water	16	0.683	0.687	0.0044	0.90%
Packaging	Bottle of soft drink	15	0.915	0.919	0.0038	0.54%
Packaging	Juice box	17	2.411	2.414	0.0027	0.14%
Clothing	Dress	17	38.56	38.66	0.0960	0.23%
Flooring	Vinyl flooring (per kg)	17	5.12	5.31	0.19	5.22%
Agriculture	Agricultural mulch film (per kg)	17	52.05	52.41	0.36	5.71%

Source: Eunomia analysis.

5.0 Concluding Remarks

The findings of the study reveal that the PPP industry receives substantial subsidy support across the world of potentially over USD 80 billion in 2024. The level of PPP subsidies could be potentially higher than those provided to non-energy mining and marine capture fisheries subsidies, and if the demand for plastic products that contain these primary polymers continues to increase over time in accordance with historical trends, the level of PPP subsidies could continue to rise (to over USD 150 billion in 2050).

The results of the modelling exercise show that the complete removal of the PPP subsidies would lead to a significant reduction in primary plastic polymer production, with a larger reduction observed in economies with higher levels of subsidies. The potential consequences of such a reduction include meaningful benefits for both human health and environmental sustainability. In terms of the impact on prices of plastic products, the overall potential increase in the price across the majority of the plastic product groups is minimal, implying a negligible impact on the end consumer.

The study could benefit from additional phases to further supplement and refine the estimates of subsidies received by the PPP industry and enrich the findings of the modelling exercise presented in this report. More specifically, in the next phase, this study would aim to:

- Model additional scenarios of partial removal of subsidies as well as the potential for some exemptions for specific processes or energy sources (e.g. renewable energy sources).
- Model a few positive environmental impacts of these scenarios, such as reduction in GHG emissions and reduction in plastic pollution.
- Examine possible relationships between the level of PPP subsidies and polymer prices at global and/or regional levels.
- Update and expand the economy profiles included in the Phase 1 Report of this research and produce some additional economies' profiles.
- Supplement and refine the subsidy values estimated, particularly in relation to below-market financing and other credit-related support, where there is a lack of transparency and so targeted research and stakeholder engagement would be required to enhance the current estimates.

APPENDIX

A.1.0 Methodology

This section sets out the methodological approach used in Phase 3 of this research to identify and estimate additional subsidies for monomer and polymer production. It builds on and is consistent with the analytical framework used in Phases 1 and 2, which estimated total price-related subsidies to polymer production, comprised of process energy subsidies to monomer production, process energy subsidies to polymer production and feedstock subsidies. For details on the estimation of subsidies in earlier phases of the research, please refer to the relevant previous reports.

A.1.1 Types of subsidies considered

The analysis in Phase 3 covered four additional types of government support that were not included in the previous phases of the research:

- **Grants**: Direct financial contributions from the government to support specific activities or reduce production costs.
- **In-kind subsidies**: Non-cash benefits such as free or discounted land, water, or infrastructure provided to reduce operational expenses, often provided due to a plant's location in a designated Special Economic Zone.
- **Tax expenditure subsidies**: Reductions in tax liability through credits, exemptions, deductions, holidays, or deferrals that lower producers' tax burdens.
- **Below-market financing or other credit-related support**: Financial assistance provided at interest rates or terms more favourable than those available in the market.

A.1.2 Data gathering

To allow for the identification and estimation of Phase 3 subsidies, data were collected from multiple sources at the plant, company and country level, as well as from international public databases.

- Plant and company level research:
    - Data on support received by individual companies was sourced from company annual reports (e.g., stated grants, tax exemptions and concessions or preferential tax rates). For multi-division companies, subsidies were apportioned based on the revenue share of the polymer-producing arm. For example, if a company had multiple business arms and the polymer producing arm of the business made up only 20% of the revenues of the company, it was assumed that the polymer producing arm would benefit from 20% of the subsidies received by the company.
    - Additional information was collected from news articles.
- Country level research:
    - Policy incentives: where countries provide benefits such as tax incentives for companies that meet certain criteria (e.g., investment or employment thresholds), and such criteria are likely to be met by monomer and polymer producing companies, it was assumed that

monomer and polymer producers in that country would benefit from such policies. Where possible, this was cross-referenced with plant and company level research.

    - Special economic zones (SEZs): where specific, quantifiable benefits were identified (e.g., tax exemptions) these were quantified directly. In cases where it was not possible to readily quantify the financial benefits of SEZs, SEZ benefits were approximated by assuming that they reduced the capital cost requirements of plants by 10%.

- International public databases:
    - Sources such as the Oil Change International Public Finance for Energy Database were used to identify subsidised projects relating to monomer and polymer production.

In Phase 3 of the research, focused country and plant-level data gathering was conducted for Belgium, Canada, China, Hungary, India, Indonesia, Iran, Oman, Kuwait, Saudi Arabia, UAE, Thailand, Singapore, Malaysia, USA, and Viet Nam. Three additional countries were covered by the data collected from international datasets: Mexico, Russia, and Uzbekistan. These countries are referred to as 'focus countries' in the remainder of this section.

For the remaining 52 countries included in Phases 1 and 2 of the research, detailed country or plant-level research was not performed (i.e. 'non-focus countries'). Instead, estimation of Phase 3 subsidies in these countries relied on the extrapolation of data collected for the focus countries.

A.1.3 Estimation of subsidy values for focus countries

Subsidy values for each of the four types of subsidies considered in Phase 3 were estimated for the focus countries as follows:

- **Grants:** where grant values were obtained from company annual reports, the grant value of the latest year was used and assumed to apply in subsequent years. Where grant values were identified as part of upfront capital support, the grant value was annualised by assuming a 25-year plant lifetime and a flat 7.5% loan interest rate.
- **In-kind subsidies**: benefits were approximated by assuming that they equal 10% of the plant CAPEX. The CAPEX of each plant was estimated by multiplying the plant production capacity by an assumed CAPEX rate (in USD per tonne of output – for polymer producing plants this was assumed to be approximately 385 USD/t, for monomer producing plants this was assumed to be 1500 USD/t based on different sources). The assumed subsidy value over the lifetime of the plant was then estimated by multiplying the CAPEX of the plant with the 10% subsidy rate. The subsidy value was annualised by assuming a 25-year plant lifetime and a flat 7.5% loan interest rate.
- **Tax expenditure subsidies**: income tax related benefits were estimated by first calculating each plant or company's revenue. This was done by multiplying their polymer production volume by the market price of the specific polymers produced, using regional Wood Mackenzie pricing data. An assumed earnings-before-tax (EBT) margin of 25% was then applied to estimate their taxable earnings. Finally, the difference between the subsidised and standard tax rates was used to calculate the value of the tax benefit—representing the subsidy received by each plant or company.
- **Below-market financing or other credit-related support**: the loan amount provided to a particular project was obtained (e.g., through Oil Change International's Public Finance for Energy Database). Market interest rates (i.e. the loan interest rate in the absence of the

subsidised financing) were assumed to be 7.5%, to reflect corporate borrowing interest rates available in the international market. The subsidised interest rate for the loan provided to a particular project was assumed to be 50% lower than the international market interest rate. The annual subsidy amount was then calculated as the difference between the annualised loan value applying the market interest rate and an assumed 25-year investment lifetime and the annualised loan value applying the subsidised interest rate and an assumed 25-year investment lifetime.

For China, where detailed loan-level data were not available, the subsidy value was estimated using an alternative approach. The CAPEX for monomer and polymer plants was first estimated by multiplying the production capacity of each plant by an assumed CAPEX rate (as detailed under the in-kind subsidies methodology). It was then assumed that plants benefited from below market financing, with the subsidised interest rate assumed to be 3.6 percentage points below the global market rate on average (based on an assumed 7.5% global interest rate and the 5 year Loan Prime Rate in China in 2024 of 3.9%. The resulting subsidy value was annualised over a 25-year investment lifetime.

For each plant with detailed data available on any of these four subsidy types (i.e. tax-related, grants, in-kind, below-market financing), subsidy values were summed across the subsidy types to calculate total annual subsidies for monomer and polymer production at the plant level.

Then, country-level weighted average subsidy rates (USD/t) were calculated for both monomer and polymer production, based on the plant-level subsidy amounts. These rates were weighted by each plant's production capacity.

For each of the focus countries, the country-specific average subsidy rates were then applied to all monomer and polymer plants in that country, scaled by each plant's production volume. This yielded national totals for annual Phase 3 subsidies in focus countries.

A.1.4 Extrapolation of subsidy estimates to other countries

To estimate the total scale of investment subsidies across all 71 countries included in Phases 1 and 2 of the research and over time, the following extrapolation process was followed to cover the 52 non-focus countries:

- Average Phase 3 subsidy rates for monomer and polymer production were calculated across the country-specific rates estimated for focus countries. These average rates were applied to monomer and polymer production volumes for 2024 in non-focus countries, to estimate national totals for Phase 3 subsidies in 2024.
- Country-level Phase 3 subsidy rates for 2024 were then applied to projected production volumes in 2050, to estimate Phase 3 subsidies in 2050 across all 71 considered countries.

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