Stemming the Plastic-Climate Crisis

Paris Alignment for Plastics Requires at least 75% Reduction

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PACIFIC ENVIRONMENT

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PACIFIC ENVIRONMENT

PLASTIC SOLUTIONS FUND

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Executive summary

Plastic pollution is a global environmental, human health and climate crisis. Globally, plastic pollution has doubled in the past two decades, creating islands of plastic in our oceans and entering the food we eat and water we drink. Plastic production is toxic to communities and wildlife. And on top of these ills, **plastic is sourced from fossil fuels, and carbon dioxide and other greenhouse gases are emitted throughout the life cycle of plastics.**

Yet despite the widespread harms of plastic, global plastic production is still growing. Over the past 70 years, production of plastic has soared from 2 million tons in 1950 to 460 million tons in 2019. Unless something is done, current rates of plastic production could double again by 2040 (Pew 2020; OECD 2022). This kind of growth will result in the plastics industry exceeding its carbon budget by five times, resulting in a trajectory toward global warming of 3.5 degrees Celsius by 2050 (Zero Waste Europe 2022).

About 44% of plastic produced is for single-use plastic packaging: plastic that is used once and then disposed of. And this rise in single-use plastic is no accident. Oil and gas companies are actively working to expand plastic production to help sustain company profits. Petrochemicals are already the number one driver for global oil demand and are predicted to account for half of global oil consumption by 2050 (IEA 2018).

The positive news is that there is a key window of opportunity at hand to change these trends. With a new Global Plastics Treaty underway, national governments, civil society and concerned citizens have a critical opportunity to take action. A treaty that is designed to reduce the amount of plastic is possible, and this is the kind of treaty we need to put the brakes on plastic's runaway climate impacts.

This report presents new global modeling that shows the policy action needed to reduce emissions from the plastics and petrochemicals industries in time to defeat the climate crisis. Key findings are:

- The 2020 life cycle emissions amount of the global plastics sector is 1.3 Gt CO_2e (CO_2 equivalent). Under a business-as-usual scenario, the entire life cycle emissions of plastic are expected to nearly triple, from 1.3 Gt in 2020 to 3.2 Gt in 2050. **And the cumulative emissions between 2020 and 2050 could easily reach 65 Gt, comprising 16% of the planetary boundary of 400 Gt CO_2e.**

- **Getting the plastics industry to zero emissions means an integrated approach** that takes into account the life cycle emissions of plastic, from its fossil fuel source to its disposal.

To keep the industry within a 1.5 degree Celsius temperature change scenario, we must:

1. **Reduce plastic by at least 75%**, which can bring down business-as-usual plastics industry emissions by 71%. To achieve this large-scale reduction will require significant reduction of non-essential plastic; therefore, we suggest phasing out single-use plastic by 2040.

2. **Eliminate incineration and green remaining production:** A second set of solutions is needed to transform how we make and

dispose of any remaining plastic, to bring the industry to within a 1.5 degree Celsius temperature change scenario. These solutions include ending incineration of plastic (including chemical recycling and cement kilns), since incineration *doubles* the life cycle emissions of plastic. Applying greener production (clean energy and greener feedstocks, such as green hydrogen) can further reduce production emissions.

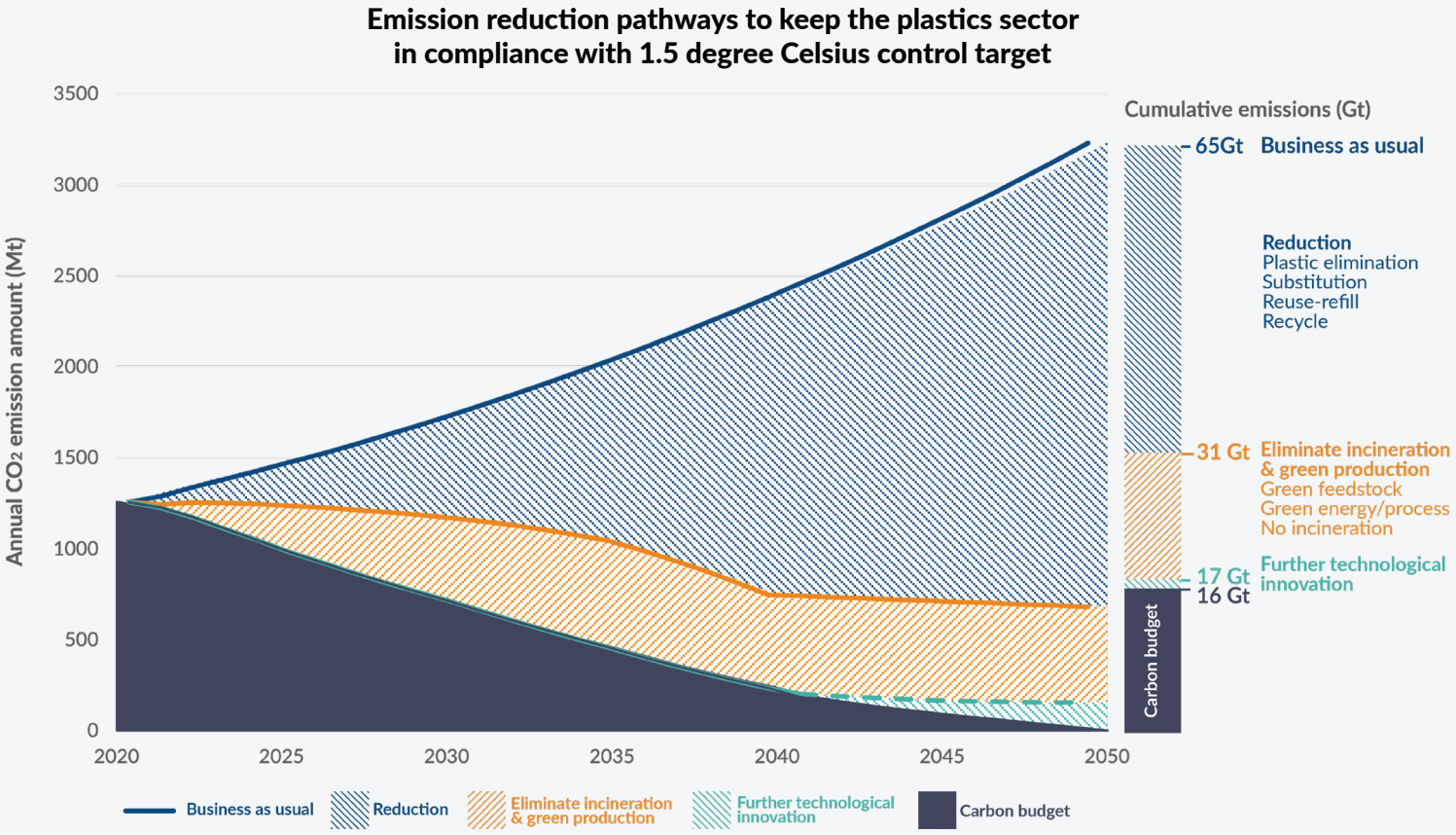

FIGURE I. *Emission reduction pathways to keep the plastics sector in compliance with a 1.5 degree Celsius control target. The carbon budget of cumulative emissions through 2050 for plastic is set at 16 Gt (1 Gt=1000 Mt).*

At the Fifth session of the United Nations Environment Assembly (UNEA-5.2 March 2022), U.N. Member States agreed that the treaty will take **a life cycle approach to plastic**, addressing the plastics industry and its impacts from extraction to disposal. To reach this goal, and to confront the climate crisis of plastic, we call for the Global Plastics Treaty to:

1. **Set science-based reduction targets for plastic within planetary limits:** Limit petrochemical expansion and cap the production and consumption of plastic, with binding targets on reduction that align with a 1.5 Celsius temperature change scenario. We further call on the treaty to include binding targets to phase out single-use plastic by 2040 or sooner.

2. **Measure all plastics emissions and hold the industry accountable:** Ensure full life cycle analysis of plastic's climate impacts — from the mining of fossil fuels to plastic disposal — to mitigate greenwashing and uncounted emissions.

3. **Promote and encourage reduce-reuse solutions:** Outline policies and incentives that will encourage companies and governments to scale up reduce-reuse systems, including financial instruments and financing mechanisms.

4. **End false solutions:** Put an end to false solutions, including waste to energy and plastic incineration. We call for no plastic incineration by 2050 or sooner (including chemical recycling and cement kilns). Include a ban on all transnational plastics waste trade, ending the global environmental injustice of this practice.

5. **Provide a just transition for waste workers:** Elevate concerns and expertise of waste pickers and informal recyclers and ensure high-quality, safe jobs through a just transition (including in the new reuse-refill-recycle economy).

A strong Global Plastics Treaty is critical, but the treaty will only be effective if national governments act. Today, even before the Global Plastics Treaty is finalized, more can be done by national governments to address the plastic-climate crisis. It is critical that plastic and petrochemical emissions reduction commitments and targets be included in national-to-global climate commitments, notably the Paris Agreement and Nationally Determined Contributions processes. National governments also must commit to ending fossil fuel extraction and reducing plastic production in their net-zero emissions plans (and follow up with industry enforcement). And critically, national governments must ensure strong transparency and accountability for the plastics industry across the entire plastics value chain.

1 A global crisis

CLIMATE, CONSERVATION & PUBLIC HEALTH

Over the past 70 years, global production of plastic has soared from 2 million tons in 1950 to 460 million tons in 2019. If we take no action to curb this trend, plastic production could double again by 2040 (Pew 2020 ; OECD 2022). This astounding increase in production and consumption of plastic threatens ecosystems and human health and is one of the fastest growing climate threats we face.

The plastic problem is hard to miss: we are surrounded by plastic pollution. About 60% of all plastic produced ends up leaked or dumped into the environment. Oceans are becoming a plastic soup; by 2025, there will be 250 million tons of plastic in the oceans, and by 2050, the number will reach 800 million tons, which exceeds the total weight of fishes in the oceans (Pew 2020). The latest comprehensive study of plastic trash shows that for every human on the planet, there are 21,000 pieces of plastic trash in the oceans (Eriksen et al. 2023).

Plastic has already contributed to biodiversity loss. More than 800 marine species are known to be impacted by marine plastic pollution, including all sea turtle species, 40% of cetacean species and 44% of marine bird species (Pew 2020). In 2018, the economic loss caused by plastic pollution to tourism, fisheries and aquaculture is estimated to be $6-19 billion (UNEP 2022).

Plastic is also a major threat to human health. Plastic releases toxins throughout its life cycle, including plastic production, waste management and microplastic leakage. We inhale toxins from plastic production processes, make contact with toxins in contaminated soil or water and ingest toxins in foods grown in areas polluted by the plastics industry (CIEL 2019). Microplastic accumulation in the human body through food chains is now well-documented (CIEL 2019). Plastic has even been found in human breast milk (Ragusa et al. 2022), alarming doctors and public health professionals about the grave health impacts of plastic to come.

The incineration of plastic waste may release highly toxic dioxins, which cause reproductive and developmental problems, damage the immune system, interfere with hormones and also cause cancer. Plastic production almost always occurs in low-income neighborhoods. The U.S. Gulf region, which accounts for about 25% of U.S. petrochemical production, is known as “Cancer Alley” (UNEP 2021).

Plastic is a climate change driver. If plastic production were a country, it would be the world’s fifth largest greenhouse gas emitter, beating out all but China, the U.S., India and Russia (Beyond Plastics, 2021). Carbon dioxide and other greenhouse gases are emitted throughout the life cycle of plastic. The petrochemicals industry — of which plastics comprises the largest subsector — currently accounts for 6.3% of global carbon emissions (WRI 2020). According to Zero Waste Europe, the plastics industry on a business-as-usual pathway will exceed its fair share of the carbon budget five times over and result in a trajectory toward warming of 3.5 degrees Celsius (Zero Waste Europe 2022). Another report foresees emissions from plastic production rising almost 400% from 2015-2050 (Zheng and Suh 2019).

2 Oil & gas
PLASTIC AS A LIFELINE

Everyone is familiar with plastic in our daily lives, but many don't know that plastic is made from fossil fuels. Plastic is made from polymers, and polymers are made from monomers (e.g., ethylene, propylene and benzene). To put it simply, plastics are giant molecules made from small molecules, also called high-value chemicals (HVCs). Crude oil (and sometimes natural gas and coal) is used to make HVCs, which are the primary chemicals in the petrochemicals industry. The global petrochemicals industry also produces products like fertilizers and pesticides, but plastics comprise the industry's single largest subsector (Figure 1). In fact, over 99% of plastic is made from fossil fuels (the remaining 1% is made from biofuels) (CIEL 2017).

Figure 2 provides a detailed overview of the production chain of plastic, from fossil fuel extraction to refineries, to chemical "crackers" which break naphtha into small molecules, and finally, polymerization. Most of the world's top petrochemical companies (such as Dow, ExxonMobil, Shell, Chevron, BP and Sinopec) are familiar names to us. These are all integrated companies that mine fossil fuels and also produce

The petrochemicals production chain

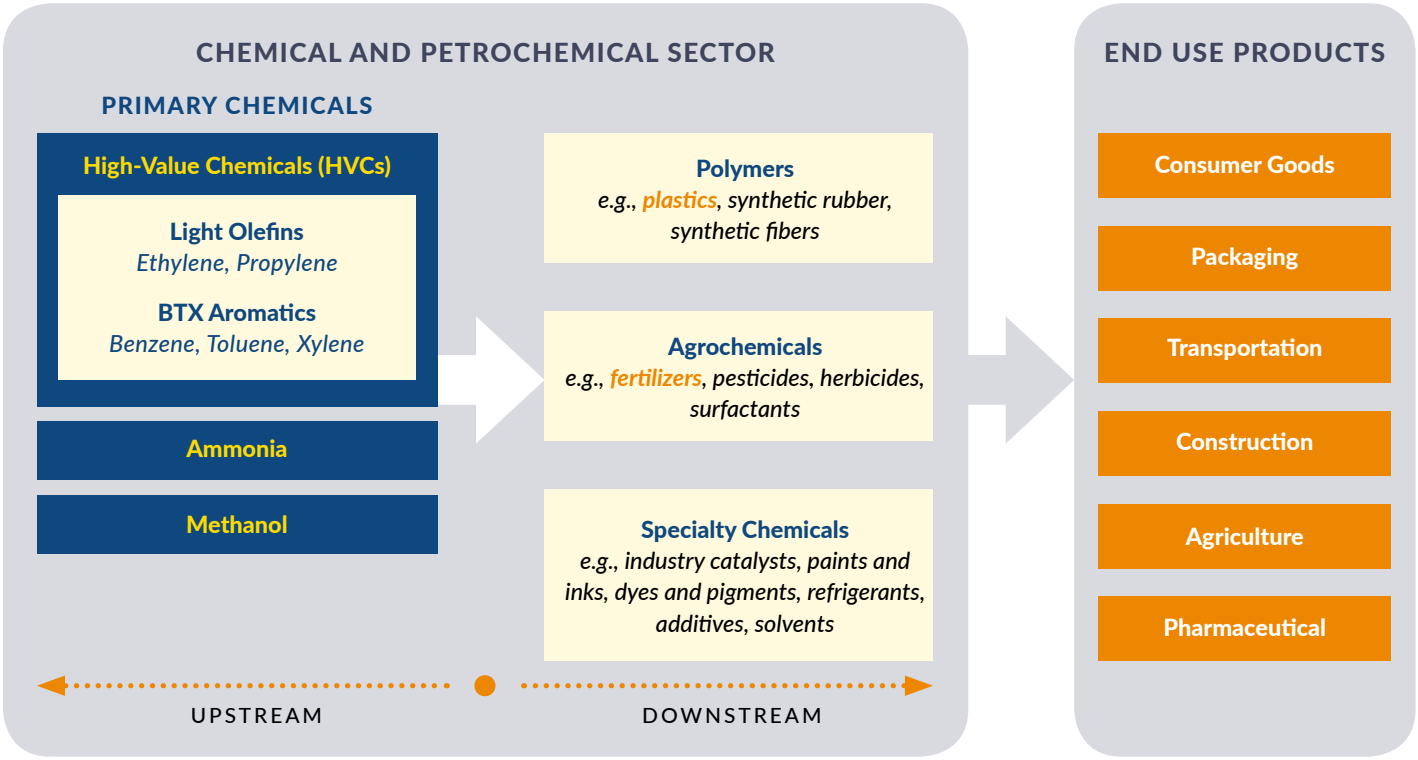

FIGURE 1. *The petrochemicals production chain.*

plastic. According to the 2021 *Plastic Waste Makers Index*, the top 5 polymer producer companies contributing to single-use plastic waste globally are ExxonMobil, Sinopec, Dow, Indorama Ventures and Saudi Aramco (Minderoo 2021).

Production chain of plastics

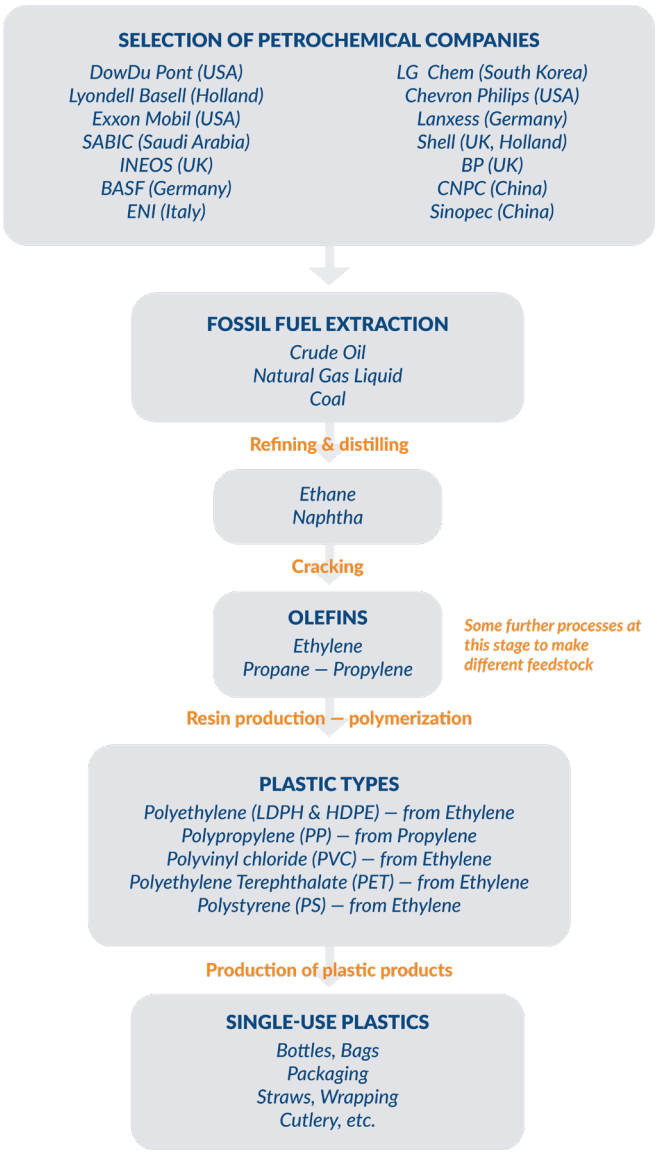

FIGURE 2. *The main chemical processes (indicated in orange) involved in the production of single-use plastic and its feedstocks (boxes) (David Marinelli 2018).*

While industries such as transportation and electricity are moving away from fossil fuels, the use of fossil fuels in the petrochemicals industry is increasing. Petrochemicals are rapidly becoming the number one driver of global oil demand. Global demand for ethylene (the main building block of plastic) is predicted by industry analysts to grow by 50% over the next decade (S&P Global). The International Energy Agency, or IEA, predicts that by 2030 the industry will consume one-third of global oil demand, and by 2050, this will rise to half of global oil demand (IEA 2018).

Petrochemical production is expanding fastest in China, the U.S. and India (Plastics Europe 2022). In the U.S. alone, at least 42 new plastic production facilities have come online since 2019. That's the equivalent of adding another 27 large coal-fired power plants (Beyond Plastics 2021). These new plastic plants could release an additional 55 million tons of CO_2e gases annually. India's petrochemicals sector is also expecting a significant investment boom, with a number of multibillion-dollar capital investments either already being implemented (11 projects) or expected (8 projects) within the next few years (India Chem 2021).

Globally, new petrochemical facilities are being built in low-income communities — in places like Appalachia in the U.S., the Amazon Basin and South Sudan: communities that have already been impacted by decades of environmental injustice (CNBC 2022). China is seeing the biggest growth, accounting for 32% of global plastic production (followed by North America at 18% and the rest of Asia at 17%) (Plastics Europe 2022). Ethylene demand is growing faster in China than the global average and is predicted to double in the coming decade.

Distribution of global plastic production

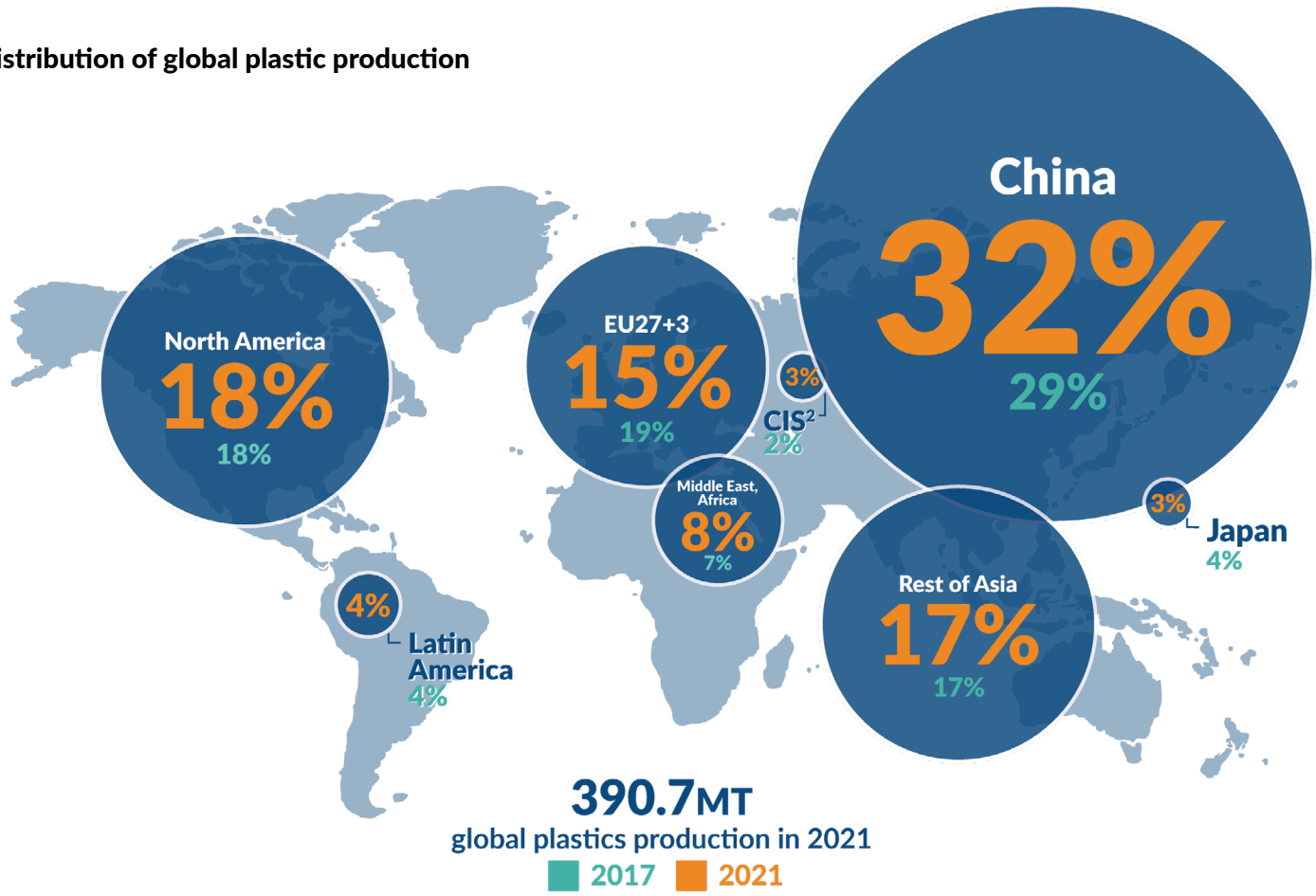

FIGURE 3. *Distribution of global plastic production per million metric tons (MMT) for 2021 & 2017, with China, North America and the rest of Asia ranked as top 3 production regions (Plastics Europe 2022).*

Growth in the petrochemicals industry is no accident. As renewable energy continues to develop, and as countries tighten regulations around these sectors' greenhouse gas emissions, the oil and gas industries are actively seeking to expand petrochemicals to help sustain profits (The Wall Street Journal 2019). But the plastics industry should not get a pass. Alongside the transportation and energy industries, it is critical that the plastics industry transitions to zero emissions within Paris agreement timelines to ensure it does its fair share to control emissions under a 1.5 degree temperature change target.

SINGLE-USE PLASTIC IS SEEING THE BIGGEST GROWTH

The expansion of the petrochemicals industry goes hand in hand with increased global consumption of single-use plastic (SUP). Single-use plastic accounts for 44% of total plastic consumption globally (Plastics Europe 2022). More than 60% of global ethylene production goes into production of high-density polyethylene (HDPE), low-density polyethylene (LDPE) and linear low-density polyethylene (LLDPE), which mainly end up as single-use plastic (S&P Global). The packaging sector is a key culprit in single-use plastic growth (Plastics Europe 2022, 2021).

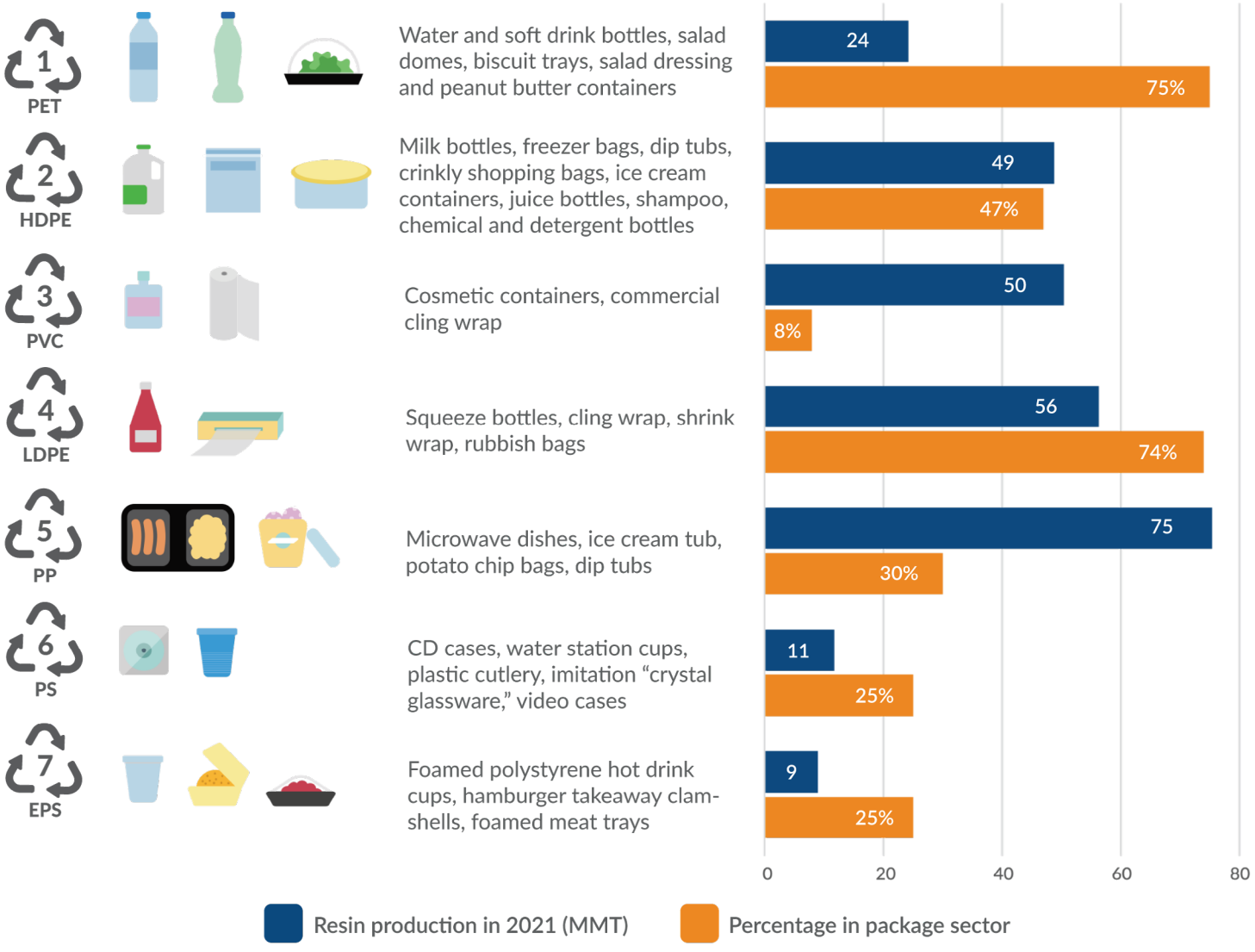

FIGURE 4. *Six main resin types used in the packaging sector and examples of single-use plastic and the proportion of plastic for packaging, in million metric tons per annum (MMT) (S&P Global). (In this report, S&P Global refers to data obtained through subscription at https://www.spglobal.com/en/. Not all data on this website is public.)*

3 Zero-emission pathways
FOR THE GLOBAL PLASTICS SECTOR

To prepare our model, we made the following calculations and assumptions:

- The whole life cycle emissions footprint of plastic is set at 5.2 ton CO_2e/ton plastic. This data is adapted from *Material Economics* and is modified by factoring in different fossil fuel sources. The plastic emission footprint we are using here does not include the emission of other greenhouse gases, notably: climate-warming super pollutant methane. This means that the findings of our model may be cautious in terms of what is truly needed for plastic 1.5 degree Celsius alignment.

- Using the year 2020 as the baseline scenario, plastic demand was predicted to grow by about 4% annually per the Organisation for Economic Co-Operation and Development, or OECD (OECD 2022). Single-use plastic accounts for 44% of plastic consumed, while durable plastic accounts for the remaining 56%.

- The emissions of the plastics sector under a business-as-usual scenario were calculated by predicting plastic demand, and then multiplying this by the whole plastic life cycle carbon footprint.

- Waste stream data on plastic was used to predict how much plastic is kept in use versus disposed of by incineration or other means. Thus, total plastic production process emissions and end-of-life emissions data are included in the model.

- The planetary boundary of CO_2 emissions aligns with the Intergovernmental Panel on Climate Change 1.5 degree Celsius temperature change scenario of 400 Gt total cumulative emissions in the atmosphere. Assuming the emissions share of plastics remains at 4%, the carbon budget for the plastics sector is set at 16 Gt (Zero Waste Europe 2022).

- Our model only considers climate change as a planetary boundary when determining how much we need to reduce plastic. Other planetary boundaries — for example, loss of biosphere integrity, chemical pollution and the release of novel entities — should also be considered. Again, this means that our findings are likely conservative in regards to what is truly needed to align the plastics industry with a livable future.

THE LIFE CYCLE EMISSIONS OF THE PLASTICS INDUSTRY

Plastic emits greenhouse gases throughout its whole life cycle, including through extracting fossil fuels, the plastic refining processes, cracking and polymerization and waste treatment. Approximately half of the production-side emissions from plastic come from fossil fuel extraction and chemical processes associated with manufacturing (Material Economics 2019). Life cycle plastic emissions depend on what type of fossil fuel feedstock is used as well as how the plastic is disposed of. The life cycle carbon footprint of oil-based plastic on average is 5.0 ton CO_2e/ton plastic. Process emissions for coal-derived plastic are double those of oil-derived plastic. Emissions of natural gas-derived plastic are 20% less than those from oil (CIEL 2019; CCETP 2022).

Other life cycle emissions include processing resins into plastic products (through moulding, compress moulding and extrusion) and emissions from the plastic use phase (circulation and distribution). These emissions, though potentially significant, are not included in our model due to lack of data sources.

Disposal of plastic waste also adds to life cycle emissions of plastic. If plastic is incinerated, end-of-life treatment emissions account for over half of plastic's total carbon footprint (Figure 5). Plastic that is burned in the open also releases significant emissions, but there is little data compiled on these emissions.

Life cycle carbon emissions of plastic

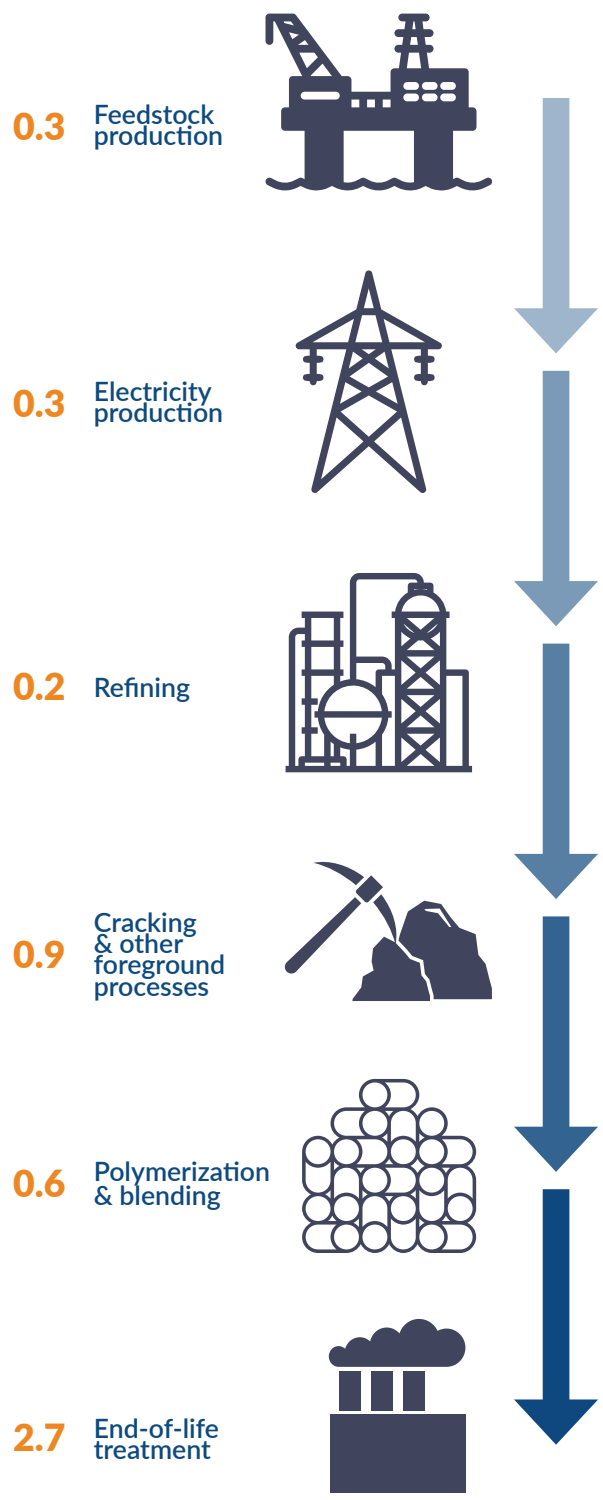

FIGURE 5. *Emissions amounts at each stage of the plastic life cycle, in tons of CO_2e per ton of plastic (Material Economics 2019).*

Single-use plastic is particularly notable for significant end-of-life carbon emissions compared to durable plastic, due to substantial use of incineration to get rid of it — rather than reuse or recycling (Material Economics 2019). According to the OECD's prediction of end-of-life management of plastic, plastic will increase from 360 MMT in 2020 to 800 MMT in 2050, while plastic disposed of through incineration will also double by 2050 (Figure 6).

Plastic end-of-life management

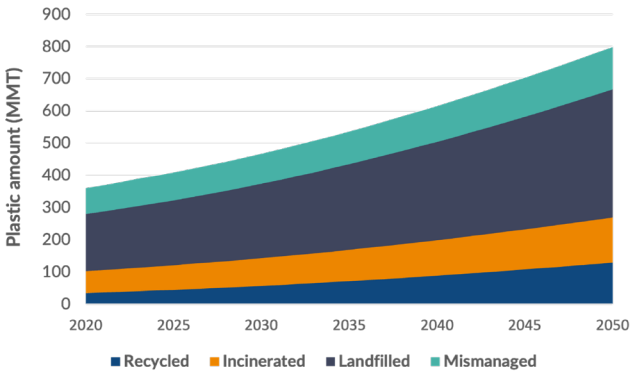

FIGURE 6. *Plastic end-of-life management, including recycled, incinerated, landfilled and mismanaged, 2020-2050 (OECD-library).*

Single-use plastic is used only once and then disposed of. Common uses include packaging and disposable tableware. Single-use plastic has a lifespan of 1-2 years.

Durable plastic is reused multiple times and is mostly composed of tougher and more impact-resistant resins. It is common in many sectors, including the construction and automobile industries. Durable plastic has a lifespan from around eight years (in electronics, for example) to more than 20 years (in construction materials and industrial machinery) (Geyer et al. 2017).

While reducing plastic production and incineration can significantly decrease emissions from plastic, plastic *production-side* emissions cannot be totally abated using existing technological solutions or a transition to clean energy production. Only the replacement of fossil fuel feedstocks with green hydrogen has the potential to substantially reduce these emissions, but this approach involves carbon capture, an immature technology unproven at scale (Hock 2021; Drugmand and Muffett 2021). Because of this, plastic is considered a **"hard-to-abate"** sector.

Easy-to-abate sectors: These include sectors with relatively lower abatement costs than harder-to-abate sectors, such as power, light-duty road transport, rail, pulp and paper, aluminum and other industries, building, agriculture, fishing and other sectors. They currently account for 23.9 Gt of CO_2 out of 34.3 Gt CO_2 of overall energy and industrial emissions (The Energy Transitions Commission 2018).

Hard-to-abate sectors: These include sectors with relatively higher abatement costs, including heavy industry sectors like cement, steel, plastics, chemicals, heavy-duty transport, shipping and aviation. They currently account for 10.3 Gt of CO_2 out of 34.3 Gt CO_2 of overall energy and industrial emissions (The Energy Transitions Commission 2018).

The 2020 annual life cycle emissions amount of the entire global plastics sector is 1.3 Gt. Under a business-as-usual scenario, annual emissions are expected to increase to 1.7 Gt in 2030 and to 3.2 Gt in 2050 (Figure 7). End-of-life emissions account for about 20% of these projected emissions. Our model predicts that under a business-as-usual scenario, the cumulative emissions from plastic from 2020-2050 will reach 65 Gt, which would exceed the carbon budget of the plastics sector at least three times and comprises 16% of the planetary boundary of 400 Gt.

Getting the plastics industry to zero emissions means an integrated, life cycle approach including reduction, greener production, no incineration and further technologies. The first priority is reduction.

Emissions under BAU scenario

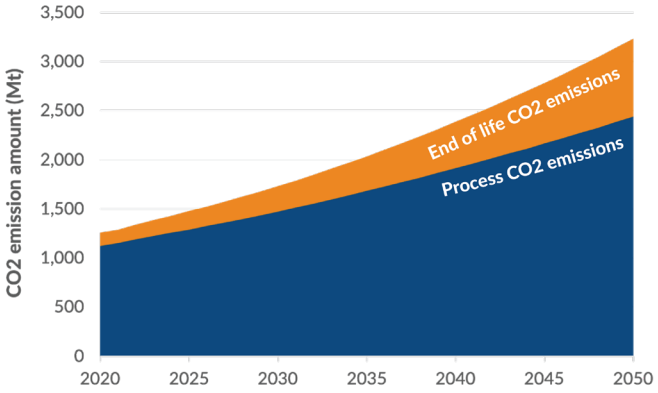

FIGURE 7. *Life cycle carbon emissions of the plastics industry under a business-as-usual (BAU) scenario, assuming a 4% annual increase in plastic production and consumption.*

PATHWAY 1: REDUCE PLASTIC BY AT LEAST 75%

Our first recommendation is to dramatically reduce plastic — by phasing out single-use plastic by 2040 and curbing durable plastic as well, cutting at least 75% of the plastic projected to be in circulation by 2050 under a business-as-usual (BAU) scenario.

Solutions for phasing out single-use plastic include: eliminating excessive and unnecessary plastic and plastic packaging; designing for reduced materials use and incorporating recycled content; substitution with durable, reusable materials (coated cloth, glass, steel, paper); consumer reuse; new delivery models; and innovations in product design and material choice to accelerate efficient and high-quality mechanical recycling.

Solutions for curbing increased demand for durable plastic includes better product design, developing sharing economies and in some cases, improving recycling. We note that the biggest emissions

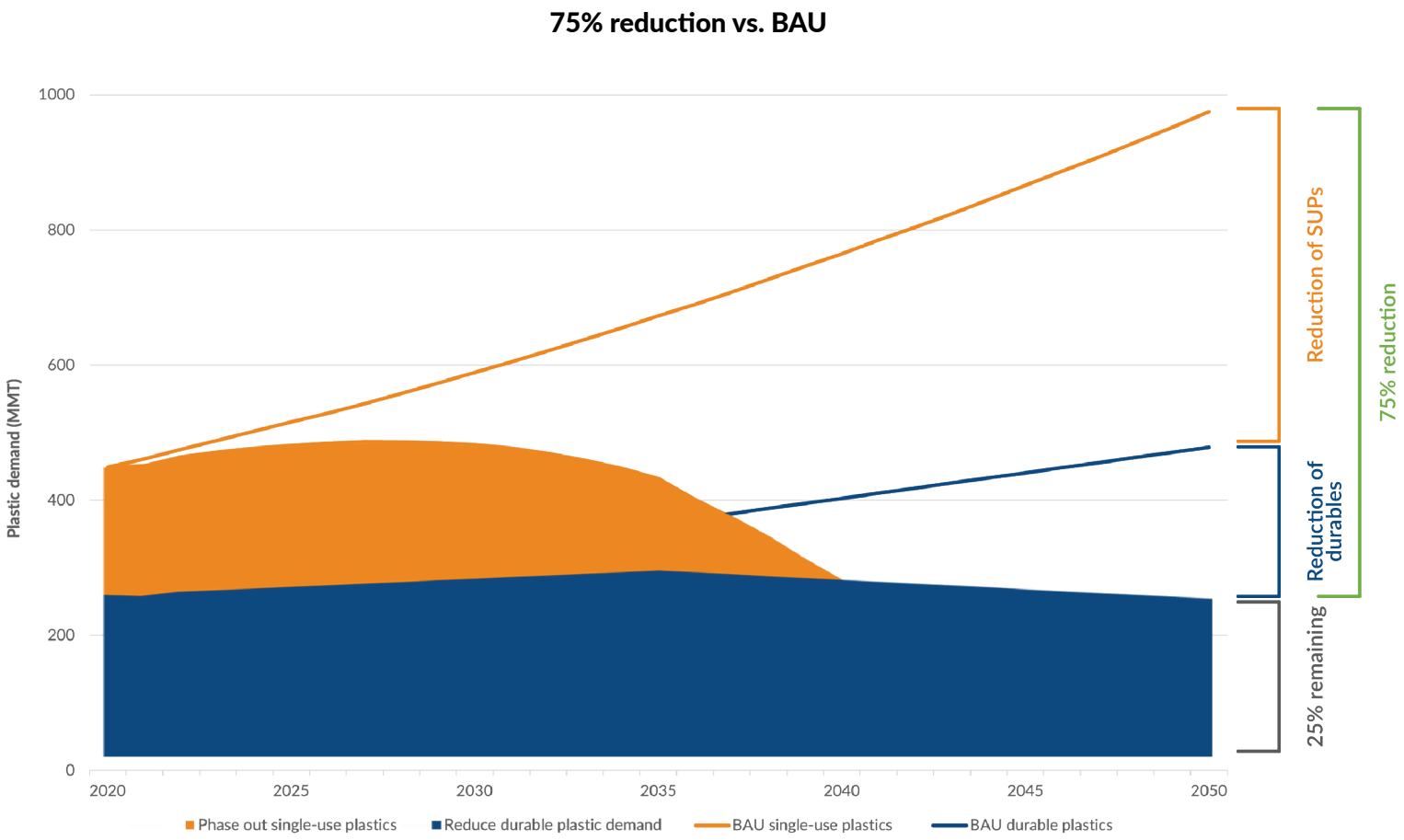

FIGURE 8. *Plastic demand under BAU and demand-side reduction scenario.*

reductions, however, come from the first two steps in the waste hierarchy: reduce and reuse. Mechanical recycling of durable plastic may only be a viable strategy for certain kinds of plastic in some markets.

Starting now, by phasing out single-use plastic by 2040 and curbing durable plastic, total plastic production can be reduced by 75%, from 976 MMT to 246 MMT compared to BAU. The pathway also includes capping **virgin plastic production before 2030**. Translating this into carbon emissions, a 75% reduction in plastic production would result in a 71% reduction in cumulative emissions (35 Gt). Similar global scale research also shows that plastic needs to be reduced by 3% each year to halve annual consumption by 2050 to keep emissions from plastic close to budget (Zero Waste Europe 2022).

PATHWAY 2: END INCINERATION AND GREEN (REMAINING) PRODUCTION

Pathway 2 is an integrated approach to reduce the emissions of remaining plastic by phasing out plastic incineration entirely by 2050 and then using greener production processes for any plastic that can't otherwise be addressed through Pathway 1 applications.

1. **Phasing out plastic incineration entirely by 2050:** Due to the predicted growing rates of incineration under a BAU scenario, incineration could account for 20% of life cycle emissions from plastic by 2050 (Figure 7). Assuming single-use plastic (and single-use plastic waste) is phased out between 2021 and 2040, the need for new incinerators would be significantly reduced. Pathway 2 simulates the further phase out of plastic incineration from 2030 to 2050, including entirely eliminating incineration of single-use plastic (including cement kilns, waste to energy, chemical recycling or any burning of plastic) and sharply curbing incineration of durable plastic (which would instead be reduced, reused or mechanically recycled instead of burned).

2. **Using greener production processes for any plastic that can't otherwise be addressed through Pathway 1 applications.** This means:

    - Using **greener feedstocks,** including raw materials from recycled plastic and potentially bio-feedstocks in the form of biogas and bio-naphtha, etc. (Material Economics 2019).

    - Using **greener and more efficient processes and greener energy** (renewable energy, not including bio-mass energy), inducing electrification of steam crackers and electrification of polymerization. Utilizing greener energy and greener processes can solve the problem of carbon emissions in some chemical processes in production, but existing technologies cannot yet bring emissions all the way down to zero.

If incineration is phased out and 100% greener production is applied, cumulative carbon emissions can be reduced by 14 Gt, accounting for a further 27% of emissions reduction as compared to the business-as-usual scenario. This pathway has the added benefit of better protecting the health and safety of nearby communities and workers. Strictly-regulated greener production plants have the potential to be much cleaner than traditional plastic/polymer production plants, which are harmful to humans and the environment due to toxic emissions.

After ending incineration of remaining plastic and adding greener production and green energy, a carbon footprint of 0.7 ton CO_2e/ton plastic remains. This is comprised of hard-to-abate emissions from the chemical process of plastic production. The model applies technological innovation — such as green hydrogen — if sufficiently mature and available, starting in 2040. By 2050, technological innovation could *potentially* reduce cumulative carbon emissions by 1 Gt to bring annual industry emissions to zero.

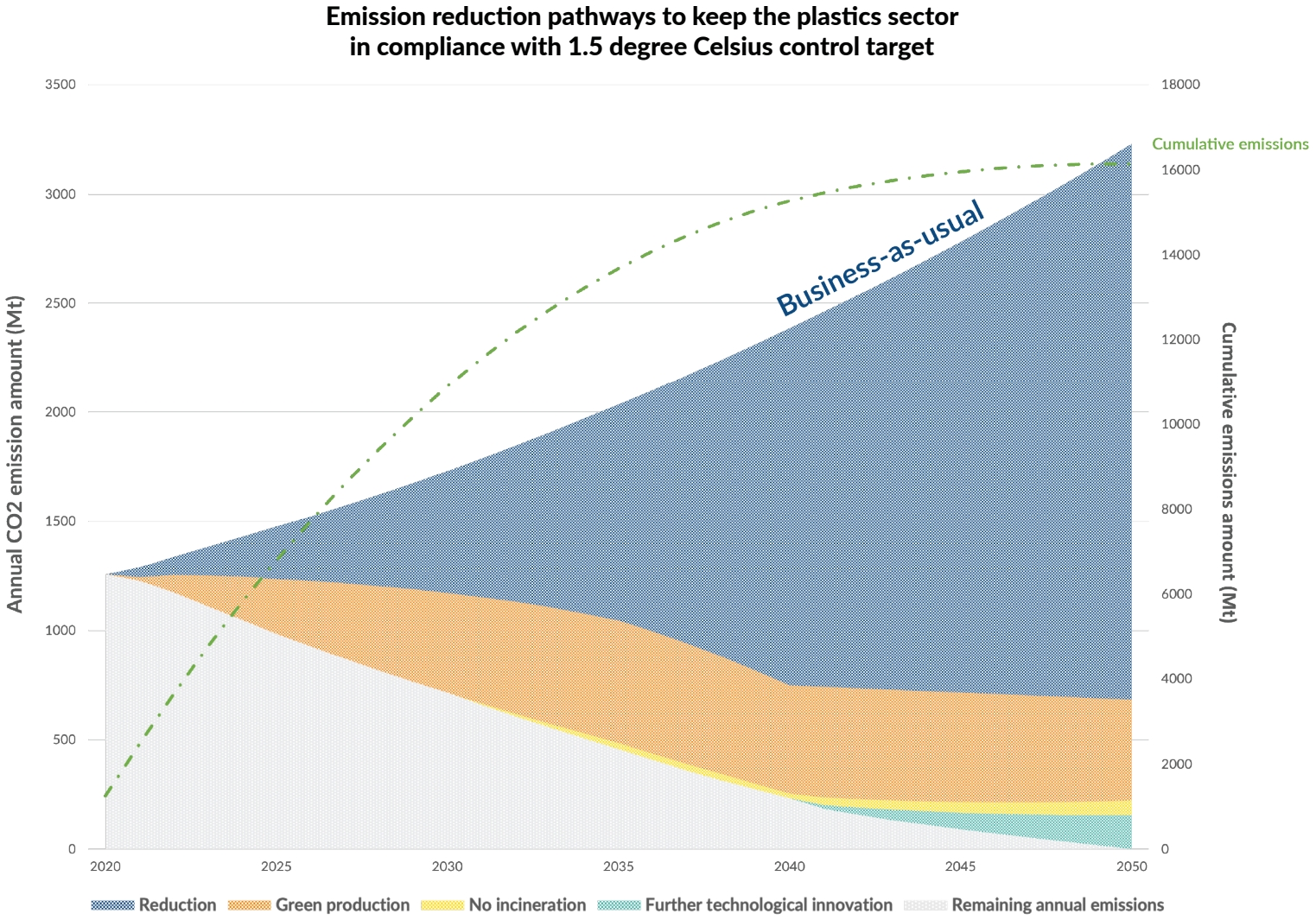

FIGURE 9. *Emission reduction pathways for the global plastics industry under a 1.5 degree C temperature control target.*

By implementing these two key pathways, the cumulative emissions of the plastics industry could be limited to 16 Gt, aligning with global temperature rise control of 1.5 degree Celsius. Compared to the business-as-usual scenario, by 2050, 35 Gt of carbon emissions can be reduced from supply-side reduction (71%), and an additional 15 Gt can be reduced from combined greener production and no incineration, and potential technological innovation.

Emissions reduction steps for the plastics industry to meet its carbon budget

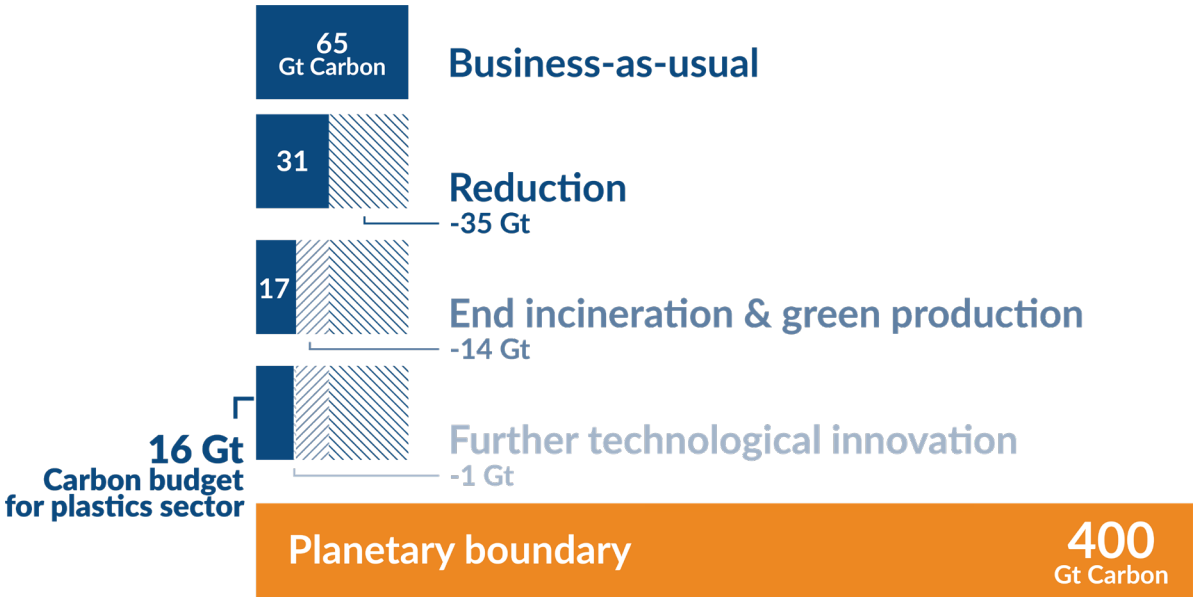

FIGURE 10.

4 Recommendations

FOR DOMESTIC PLASTICS POLICY & THE GLOBAL PLASTICS TREATY

While globally we have made many important strides toward addressing plastic pollution in recent years, the connection between plastic, petrochemicals and climate change has not been well-addressed in national and global policy. Although different countries have set different timelines for "net-zero," the Paris Agreement unites the world toward a 1.5 degree Celsius temperature change goal. Anchored in climate science and with a window of opportunity for global collaboration opened by the Global Plastics Treaty process, this is the right time for national governments to act.

To take advantage of this window to address plastic pollution and climate emissions, *fundamentally, we must acknowledge — in policy, law and society — that plastic is a form of fossil fuel* and that plastic contributes significant greenhouse gas emissions in every stage of its lifespan.

NATIONAL POLICY RECOMMENDATIONS

To end plastic pollution in a timeline commensurate with the climate crisis, we recommend the following priority policy actions for national governments:

- **Include plastics and petrochemicals emissions reduction commitments and targets in national-to-global climate commitments**, notably the Paris Agreement and Nationally Determined Contributions processes. Climate commitments made by governments, investors and industry regarding fossil fuel phase out and energy transition must include significant reductions in virgin plastic production and use.

- **Ensure the plastics industry includes plastic reduction in their zero emissions vision**. While greener production and further technological innovation may have a role to play to reduce emissions, *by far the largest and most immediate emissions reductions will come from reducing plastic production.*

- **Mandate transparency and accountability for the climate impacts of plastic across the plastics value chain**, such as through carbon footprint tracking and labeling systems, carbon intensity targets, mandatory disclosure of plastic production (particularly single-use plastic) and Scope 1, 2 and 3 emissions reporting and transparency.

Scope 1, Scope 2 and Scope 3 emissions: **Scope 1** indicates direct greenhouse gas (GHG) emissions that are from sources owned or controlled by the reporting entity. **Scope 2** indicates indirect GHG emissions associated with the production of electricity, heat or steam purchased by the reporting entity. **Scope 3** indicates all other indirect emissions, i.e., emissions associated with the extraction and production of purchased materials, fuels and services, including transport in vehicles not owned or controlled by the reporting entity, outsourced activities, waste disposal, etc. (IPCC 2018).

GLOBAL PLASTICS TREATY RECOMMENDATIONS

> ***Plastics are fossil fuels in another form and pose a serious threat to human rights, the climate and biodiversity. As negotiations towards an agreement to #BeatPlasticPollution continue, I call on countries to look beyond waste and turn off the tap on plastic.***
>
> — **António Guterres,**
> Secretary-General of the United Nations

Thanks in large part to global political leadership of Chile, Rwanda, Peru and Norway, nations are negotiating a Global Plastics Treaty to end plastic pollution and stem the plastic-climate-public health crisis. In March 2022, U.N. Member States agreed on a mandate to negotiate a legally binding global instrument to end plastic pollution — **a Global Plastics Treaty** — based on a comprehensive approach that addresses the full life cycle of plastic. This historic decision provides an opportunity to mobilize necessary global consensus and resources to unlock systemic change to reduce plastic and hold the industry accountable to planetary boundaries.

Based on our global model for controlling the climate emissions of plastic, we urge that the Global Plastics Treaty prioritize the following five elements:

First, the Global Plastics Treaty must reduce plastic by:

- Setting science-based reduction targets for plastic that align with a 1.5 degree Celsius temperature change scenario;
- Capping the production and consumption of plastic;
- Including binding targets to phase out non-essential plastic and single-use plastic by 2040 or sooner;
- Limiting petrochemical expansion; and
- Ending government subsidies for petrochemicals.

As our model shows, upstream solutions have the potential to deliver the most emissions reductions. Thus, we recommend the Global Plastics Treaty focus first on controlling plastic production as the most effective way to address both the climate, pollution and human health impacts of plastic. The treaty should cap plastic production and set a timeline to reach this cap, based on solid, baseline data on global plastic production. And further, it should level the playing field for climate-friendly alternatives to plastic. The treaty should include an agreement to end government subsidies for petrochemicals and fossil fuels and to end funding from multilateral development banks and international financial institutions.

Second, the treaty should ensure transparency and accountability in the plastics industry and hold the industry accountable for its climate and pollution impacts. Specifically, the treaty should:

- Measure and analyze full life cycle plastic emissions — from the mining of fossil fuels to plastic disposal — to mitigate against greenwashing and uncounted emissions;
- Include stringent environmental requirements for petrochemical facilities (to clean up

production and protect workers and surrounding communities); and

- Enshrine the "polluter pays" principle (Extended Producer Responsibility or EPR) to ensure polymer producers, plastic manufacturers and those who sell the plastic are held accountable for pollution and emissions impacts across the plastic life cycle.

Third, the treaty should follow the waste management hierarchy and put "reduction, redesign and reuse" at the forefront, with recycling as a last resort. The treaty should:

- Advance reduce-reuse solutions through setting targets for adoption of robust and convenient reuse systems, such as requiring that reuse systems replace 40% of single-use plastic by 2040;

- Advance policies and incentives that will encourage companies and governments to scale reduce-reuse systems;

- Ban non-recycled plastic or toxic plastic such as thermosets;

- Set financial policies to catalyze reuse, including requiring EPR fees be invested into reuse research, development, innovation and implementation; and

- Develop mechanisms to track progress and adjust targets for plastic phase outs and reuse growth at least every five years.

Fourth, the treaty must end false solutions for waste management, including waste to energy and plastic incineration. The treaty should:

- Achieve no incineration of non-recyclables by 2040, and a ban on all incineration by 2050 or sooner (including cement kilns, chemical recycling and plastic to fuel);

- Include a ban on all transnational plastics waste trade, ending the global environmental injustice of this practice;

- End subsidies for incineration of plastic waste in waste-to-energy projects and cement kilns; and

- De-recognize incineration as a source of renewable energy (as plastic is a form of fossil fuel) and take incineration out of carbon trading schemes.

Fifth, the treaty should elevate concerns and expertise of waste pickers and informal recyclers and ensure high-quality, safe jobs for recyclers (including in the new reuse-refill-recycle economy).

Conclusion

The Global Plastics Treaty presents a historic opportunity to address the plastic crisis that is engulfing our planet and warming our climate. We need a Global Plastics Treaty that commits to plastic reduction in line with a 1.5 degree Celsius temperature change scenario, first and foremost through reducing plastic. And we need our national governments to better regulate the petrochemicals and plastics industries under climate commitments.

Our report shows that two key pathways are needed to put the industry on a 1.5 degree Celsius compatible pathway:

- Plastic must be reduced **by at least 75% by 2050**. This includes phasing out single-use plastic **by 2040** and curbing durable plastic.

- We must end plastic incineration (and any plastic burning, including in cement kilns and chemical recycling) and require remaining plastic products be produced with greener feedstocks (such as green hydrogen) and 100% renewable energy.

Photo credit: GAIA: Global Alliance for Incinerator Alternatives. *Observers and delegates show their commitment to an ambitious Global Plastic Treaty at the first Intergovernmental Negotiating Committee meeting in Uruguay in November, 2022 (INC1).*

With these findings, we are calling on Global Plastics Treaty negotiators to:

1. **Set science-based reduction targets for plastic within planetary limits:** Limit petrochemical expansion and cap the production and consumption of plastic, with binding targets on reduction that align with a 1.5 Celsius temperature change scenario. We further call on the treaty to include binding targets to phase out single-use plastic by 2040 or sooner.

2. **Measure all plastics emissions and hold the industry accountable:** Ensure full life cycle analysis of plastic's climate impacts — from the mining of fossil fuels to plastic disposal — to mitigate greenwashing and uncounted emissions.

3. **Promote and encourage reduce-reuse solutions:** Outline policies and incentives that will encourage companies and governments to scale up reduce-reuse systems, including financial instruments and financing mechanisms.

4. **End false solutions:** Put an end to false solutions, including waste to energy and plastic incineration. We call for no plastic incineration by 2050 or sooner (including chemical recycling and cement kilns). Include a ban on all transnational plastics waste trade, ending the global environmental injustice of this practice.

5. **Provide a just transition for waste workers:** Elevate concerns and expertise of waste pickers and informal recyclers and ensure high-quality, safe jobs through a just transition (including in the new reuse-refill-recycle economy).

We are used to plastic in our lives, and the petrochemicals and plastics industries wants to keep growing. Breaking free from plastic won't be easy. But the alternative — business-as-usual — is far worse. Business-as-usual means a future of continued dumping of plastic into our oceans, environments and bodies, depletion of biodiversity, burdening poor and marginalized communities with toxic exposure and other impacts, and steadily and disastrously warming our planet. A better way forward is possible. We have the solutions, and now is the time to act.

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ABOUT PACIFIC ENVIRONMENT

Pacific Environment is a 501(c)(3) public-benefit corporation, headquartered in San Francisco, with regional offices in Anchorage, Alaska, and Chongqing, China.

In our work on plastics, we are building solutions for pollution reduction, supporting zero-waste models, improving plastics policy at national and local levels, improving transparency and accountability and supporting environmental leaders and civil society organizations. We are an accredited U.N. organization and are deeply engaged in the Global Plastics Treaty process.

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