

# TRANSFORMATION

*by design, not by disaster!*

*In December 2021, after 16 years of governments lead by the Christian Democrat Party, a coalition of Social Democrats (SPD), the Greens Party (Bündnis 90/ Die Grünen) and Liberal Democrats (FDP) entered into government in Germany. Their coalition agreement, which is the basis for the actions and decisions of the so-called “traffic light coalition”, gave hope for more progressive policies addressing the unsustainable consumption of resources, as it had some promising language. In particular, reduction of raw material use is mentioned as one goal.*

*One year on, more than 60 German NGOs united behind the present paper that stresses the urgent need for absolute reduction in four main material and production flows: Metal, fossil, mineral and biotic resources. The call “Transformation by design, not by disaster” showcases the need for immediate reduction and for changing to truly circular and sustainable production pattern.*

*The paper is directed at the German government and calls for concrete reduction targets and binding legislation in Germany. Its approach and the figures may inspire civil society actors in other countries to push their governments for more effective action for resource protection.*

# TRANSFORMATION

*by design, not by disaster!*

**For decades, we<sup>1</sup> have been living beyond our means and consuming many times the metal, fossil, mineral, and renewable resources that our planet can sustainably provide.<sup>2</sup> The costs are primarily paid for by people in countries that produce and export commodities in the Global South, as well as future generations of people who face the destruction of their habitats and threats to their livelihoods, for example through the pollution of drinking water. At the same time, Germany has committed to become climate-neutral by 2045, to preserve natural diversity, and to almost completely phase out the use of fossil fuels.**

According to a recent report by Zero Waste Europe and Eunomia, global plans for all resource extraction and processing are unlikely to be sufficient to achieve net-zero emissions and limit global heating to 1.5 degrees, at least not by 2050: if material production continues unabated, the carbon budget will be exceeded by a factor of five and global heating will increase by 2.5 degrees.<sup>3</sup> Today, extracting and processing renewable (biotic) and non-renewable (abiotic) resources already accounts for more than 90 percent of biodiversity loss and increasing water scarcity, as well as around half of greenhouse gas emissions.<sup>4</sup> Germany, one of the world's largest consumers of metal, fossil, mineral, and renewable resources, is significantly implicated in this process.

Despite this, the consumption of resources continues to increase worldwide, with Germany still considerably above the global average,<sup>5</sup> factors here including increasingly larger and heavier cars, the construction of buildings and infrastructure, digitisation, the creation of demand for new products and services, and a host of other things. Mining, processing, transportation, and consumption are associated with devastating environmental and climate damage, health risks, human rights violations, and social conflict. Colonial power relations are perpetuated in political and economic practice: while the majority of the profits from resource-intensive production go to the wealthy in the Global North, the Global South bears most of the risks and dangers. In addition, sustainably available resources are growing in scarcity and – even if some do grow back again – are only available in limited quantities if we are to remain within planetary boundaries.

Facing up to the ecological and social crises currently consuming the world requires us to make profound changes to the ways we produce and live. The authors of this paper are firmly convinced that the pursuit of sustained economic growth and the associated consumption of resources are further exacerbating existing crises. Current levels of consumption in our country are therefore not sustainable in the long term. This is why we

<sup>1</sup> This “we” does not mean that all people in the world are equally culpable. Both on a global and on a national level, income levels and living standards – and thus also resource consumption – are extremely unequal.

<sup>2</sup> This year, for example, Earth Overshoot Day was on 28 July for the world and as early as 4 May for Germany. [Klima ohne Grenzen \(20 April 2022\)](#). Country Over-shoot Day - Germany 4 May 2022. Retrieved on 21 November 2022.

<sup>3</sup> [Eunomia & Zero Waste Europe \(2022\). Is Net Zero Enough for the Material Sector?](#)

<sup>4</sup> [IRP \(2019\). Global Resources Outlook 2019: Natural Resources for the Future We Want.](#)

<sup>5</sup> Resource consumption in Germany has remained largely constant for years at around 16.1 tons per capita and year. The global average for 2019 was 12.6 tons per capita and year. UBA (2018). [Die Nutzung natürlicher Ressourcen. Bericht für Deutschland 2018.](#)

are calling for a transformation by design, not by disaster.

Renewable resources such as arable land and water are already in short supply, as are sustainable non-renewable resources. The extraction and provision of resources is associated with enormous environmental damage and often with human rights violations. Continued excessive consumption would lead to further environmental damage and social injustice, and exacerbate conflicts at both local and global levels – as we are already seeing in the present energy and food crisis. We therefore need to bring about a systematic transformation that results in an absolute reduction in the consumption of resources and is also designed with solidarity and social justice in mind. In the process, it should address both the current over-exploitation of our planet's resources and take account of historical responsibilities. In addition to the German Environment Agency (Umweltbundesamt – UBA)<sup>6</sup> and scientific institutions such as the Institut für Energie- und Umweltforschung (ifeu)<sup>7</sup>, organisations such as Eunomia and Zero Waste Europe also call for reductions in resource consumption in their recent report.

The present energy and economic crisis has more than ever sharpened society and industry's awareness of our immense dependency on resources and the need to reduce our consumption of energy and electricity. Mere reliance on diversifying resource imports or increasing domestic extraction is unlikely to have any more than a negligible impact on this dependency. Delaying the phase-out of coal and nuclear power, building new fossil fuel infrastructure, or even allowing high-

risk and resource-intensive fracking in Germany is also backward-looking and unsuitable for the future. Instead, we should now seize the historic opportunity to create a resource-friendly means of production and living within planetary boundaries that is geared towards sufficiency and the common good. Combined with the development of a true circular economy, this could put an end to the neocolonial exploitation mechanisms that accompany our enormous consumption of resources and thus achieve a good life for all.

Existing solutions, such as better recycling and efficiency, substituting fossil with renewable resources, compensation payments for environmental and climate damage or high-risk and unproven technological solutions such as CCU,<sup>8</sup> and chemical recycling, do not go far enough.

In many cases, displacement or rebound effects and the creation of new demand mean they actually increase the consumption of resources. One example is the current promise of hydrogen as the green energy of tomorrow. Green hydrogen could help to reduce CO<sub>2</sub> emissions, but its production is currently not only very expensive and energy-intensive, but, as with other material flows, also associated with global distribution and environmental justice problems. The switch to hydrogen in some sectors can therefore only be an important factor if it is linked to a drastic reduction in general energy consumption and if human rights are also considered.

The German government has already recognised the need for a radical change of course and has clearly defined a reduction in the consumption

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<sup>6</sup> UBA (2019). Wege in eine ressourcenschonende Treibhausgasneutralität. RESCUE-Studie.

<sup>7</sup> UBA (2020). Vorstudie zu Ansätzen und Konzepten zur Verknüpfung des 'Planetaren Grenzen' Konzepts mit der Inanspruchnahme von abiotischen Rohstoffen/Materialien.

<sup>8</sup> 'Carbon capture and utilisation' (CCU) covers technologies used to capture, transport, and subsequently use carbon compounds in which CO<sub>2</sub> is captured from the air with large quantities of electricity/heat or catalysts. See, for example, UBA (2021). Carbon Capture and Utilization (CCU).

of primary resources and the closure of material cycles as a government goal in its coalition agreement.<sup>9</sup> We welcome this. However, instead of using the current window of opportunity for change, the debate is currently still too focussed on ‘resource security first’ and is limiting the need for transformation to the terms of, at best, the energy transition.<sup>10</sup> What we urgently need, in fact, are reduction targets related to material flows and a strategy for the resource transition that is underpinned by specific measures.

With regard to the consumption of metal, fossil, mineral, and biotic resources, we set out the current state of affairs with reference to a number of application areas, and make the following point: despite statements to the contrary by industry and politics, we are still consuming far too many resources in all areas of society and economic sectors, thus reinforcing the globally unjust and ecologically unsustainable use of resources.

## A. METAL RESOURCES

The extraction and processing of resources is associated with numerous social, human rights, and ecological risks. The value chains of metal resources, such as iron, nickel, cobalt, or rare earths, are a drastic reflection of these problems. They range from labour rights violations, to the pollution and destruction of ecosystems in the affected mining regions, to enormous noise and air pollution for local populations. In addition, the consumption of metal resources is massively fuelling the climate crisis. More than ten per cent of global

CO<sub>2</sub> emissions are attributable to their extraction and, above all, the further processing of ores in energy-intensive processes.<sup>11</sup> The international trade in metals is also characterised by concentrations of power, corruption, and unfair trade structures. Although these problems are well known, the German government has not made any significant efforts to reduce the demand for metals. Instead, the expansion of mining is legitimised by pointing to the high demand for metals in ‘future technologies’ (e.g. renewable energies, e-mobility, digitisation). There is no attempt to differentiate the actual drivers of metal consumption. Also unmentioned is the fact that primary mining alone has grown threefold in the last 20 years, without a massive expansion of renewable energies. Of course, modern wind power or photovoltaic systems and expanding the grid and production facilities based on renewable energies also require large quantities of metals. At the same time, this additional demand is offset by large potential savings in metal resources, for example in the automotive or construction sectors.

In order to achieve climate policy goals and ensure the protection of people and the environment worldwide, it is necessary to reduce the consumption of metal (primary) resources, which has been increasing for decades, in absolute terms and to enforce human rights and strict environmental standards along metal supply chains. This is also the conclusion of scientific studies carried out by the German Environment Agency. The RESCUE study’s GreenSupreme scenario, for example, shows the possibility of reducing the use of primary metal ores by 30 percent by 2030, 50 per-

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<sup>9</sup> SPD, BÜNDNIS 90/DIE GRÜNEN, FDP (2021). Koalitionsvertrag 2021 – 2025 zwischen der Sozialdemokratischen Partei Deutschlands (SPD), BÜNDNIS 90 /DIE GRÜNEN und den Freien Demokraten (FDP).

<sup>10</sup> We would like to emphasise that the energy transition urgently needs to be expanded. This, however, should take place without the renewed overexploitation of resources, which is why energy should be used very sparingly overall and – because this will not be enough – the consumption of resources should first be reduced absolutely in the construction and mobility sectors.

<sup>11</sup> The processing of bauxite into aluminium and of iron into steel plays a particularly large role in this. See IEA (2022), Aluminium, IEA, Paris. Retrieved on 21 November 2022.

cent by 2040, and 70 percent by 2050.<sup>12</sup> Metals, in particular, can be used multiple times. The potential inherent in metal recycling is not yet being fully exploited in Germany. Accordingly, long-term demand for resources should be met primarily through circular use and strategies developed to reduce demand for primary metals in the future. Ultimately, policymakers need to set clear priorities for the use of scarce metals. Instead of playing off resources and the energy transition against each other, the additional consumption of metals associated with the expansion targets for renewable energies can be offset by savings targets in other sectors – e.g. mobility and construction. At the same time, many of the current, sometimes astonishing energy-saving measures should be maintained in the long term in order to keep the use of the installed metals within limits for the energy transition.

## B. FOSSIL RESOURCES<sup>13</sup>

While it is undisputed that we will have to make do with less gas, oil, and coal for energy production and transport in the short term and dispense with them fully in the medium to long term, it is deemed entirely plausible that demand for fossil resources for the products of the chemical industry will continue to rise. Forecasts suggest that the chemical industry – currently the largest consumer of fossil hydrocarbons in Germany – will double its global revenues by 2030 (compared to 2017).<sup>14</sup> In order to move towards climate neutrality despite the growing demand for hydrocarbons,

industry intends to make more use of renewable resources, other ‘renewable’ CO<sub>2</sub> sources, and recycled materials. Furthermore, it is claimed that efficiency gains and innovative recycling technologies will enable a green business-as-usual.<sup>15</sup> This alone, however, is not enough to counteract the ecological and social crises.

In the big picture, there are various reasons why these can only be considered partial solutions. First, recycling rates for chemical products, especially plastics, are currently so low that a circular economy is still a long way off. This is also due to the fact that harmful additives or by-products in materials and products contaminate recycled materials. The lack of transparency about these substances makes the safe circular use of materials even more difficult. Also, so-called ‘chemical recycling’ provides little in the way of remedy, since the usable output is minimal in relation to the energy input, and toxic by-products and harmful emissions are also produced.<sup>16</sup> Second, continuing growth works to nullify every increase in efficiency (rebound effect).<sup>17</sup> Third, the availability of renewable resources is also limited. In addition, new technologies that claim to be a ‘renewable’ source of carbon are themselves energy-intensive and expensive.<sup>18</sup>

An important point that is commonly forgotten in the debate about the future of the chemical industry is the fact that significant greenhouse gas emissions are produced not only during production, but also in the course of resource extraction, processing, use, and disposal.<sup>19</sup> Moreover, even

12 UBA (2019). Wege in eine ressourcenschonende Treibhausgasneutralität. RESCUE-Studie.

13 In the case of fossil resources, we focus on their material use in the production of chemical products.

14 United Nations Environment Programme (2019). Global Chemicals Outlook II – Part I: From Legacies to Innovative Solutions.

15 Carus, M. & vom Berg, C. (2021). Scenario for the Plastic Industry 2050.

16 See Break Free From Plastic (18 July 2022). Chemical Recycling. Plastic Solutions Review. Retrieved on 21 November 2022.

17 BUND (2021). Hintergrund Nachhaltige Stoffpolitik zum Schutz von Klima und Biodiversität.

18 e.g. CCU technologies

19 CIEL (2019): Plastic and Climate.

a supposed climate neutrality of the chemical industry does not reduce the toxic risks of many chemical products and their waste.

Instead of indulging in further illusions of growth, the chemical industry must reduce its production volumes and limit chemical production to products that are compatible with the environment, health, and the climate. Innovation must therefore mean focusing on non-chemical products and aiming for less resource and energy consumption. Specifically, the systematic expansion of reuse systems, for example, may help to massively reduce the use of fossil resources.<sup>20</sup> In the long term, political decision-makers need to be aware of the problem that the industry cannot continue growing.

## C. MINERAL RESOURCES<sup>21</sup>

Contrary to claims by the industry that the extraction of minerals and sand contributes to an increase in biodiversity, mineral mining in Germany causes considerable environmental damage. Quarries, gravel pits, and clay pits regularly lead to the lowering of drinking water levels, the destruction of habitats, the draining of wetlands, high levels of dust, fine dust, noise pollution, and ground vibrations.<sup>22</sup> In addition, valuable farmland or forest areas that need to be protected repeatedly fall victim to mineral quarrying. The recultivation promised by the companies and corporations is seldom fully implemented in Germany, and the

state mining authorities often only insufficiently fulfil their control duties.<sup>23</sup>

In concrete terms, resources companies in Germany, for example, are taking advantage of the planned coal phase-out and the associated elimination of FGD gypsum – a by-product of lignite extraction – to secure the ecologically equally problematic extraction of natural gypsum on existing or new mining areas.

From a global perspective, the construction boom is fuelling worldwide demand for sand and coarse-grained gravel, in particular, and is increasing the profit motive in quarrying far beyond what is acceptable. If global growth in new construction continues, emissions from mineral building materials could account for one fifth of the CO<sub>2</sub> emissions budget by 2050.<sup>24</sup> In the building sector, however, resource conservation above all involves preserving the existing stock, systematically recording it, building as little as possible with mineral raw materials, and exploiting the potential for re-use and recycling. In terms of the latter, recycling solutions in which the building materials are separable and free of pollutants are required. Instead of reducing mineral extraction in Germany and boosting recycling and the use of secondary resources or alternative building materials, the state's pricing policy actually promotes the extraction of mineral resources. It is still much cheaper to mine primary minerals in Germany than to recycle and engage in urban mining. In addition, primary resource extraction is virtually subsidised

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20 Fourteen percent of fossil oil and gas consumption in Germany is used in the production of petrochemicals, 10 percent of fossil gas consumption and 9 percent of oil consumption is used in plastics production. [Break Free From Plastic & Centre for International Environmental Law \(2022\). Winter is Coming: Plastic Has To Go.](#)

21 In the case of mineral resources, for reasons of space, we focus on the minerals extracted in Germany that are important for the construction industry (gravel, sand, gypsum).

22 Personal communication from Ulrich Wieland, Chairman of the 'Mineral Mining' Federal Contact Point of the GRÜNE LIGA e.V., October 2022

23 [Grüne Liga et al. \(2020\): Erfurter Erklärung](#)

24 [Potsdam Institut für Klimafolgenforschung \(2020\). Gebäude können zu einer globalen CO<sub>2</sub>-Senke werden – mit dem Baustoff Holz statt Zement und Stahl.](#)

by the waiver of extraction taxes, low water extraction fees, and low energy and electricity taxes. There is also insufficient legal protection against mining-related environmental damage. A first step to reducing mineral resource consumption would be the introduction of a primary building materials tax on sand, gravel, and gypsum.<sup>25</sup> In addition, environmental and nature conservation concerns should be integrated more strongly into the granting of mining permits and this should become part of the 'modernisation of mining law' planned according to the coalition agreement.<sup>26</sup>

## D. BIOTIC RESOURCES

At present, the bioeconomy is essentially focussed on greatly increasing the production of biomass for energy and material use as well as expanding industrial, high-tech agriculture. The key criteria considered for success are the further intensification of agriculture and agro-genetic engineering.

In addition to agriculture, forestry and thus forests are increasingly under pressure to provide wood as a renewable resource to substitute for fossil resources and other materials. However, forests must not be managed for timber production alone.

Neither a simple substitution of the fossil resource base nor a purely technically-oriented modernisation policy can decouple economic growth from the consumption of natural resources<sup>27</sup> – but this is exactly what the bioeconomy promises.

While wars further exacerbate the food price and distribution crisis, and with it the hunger crisis, it is once again evident that the bioeconomy does not offer any lasting solutions. It is not quantitatively possible to cover current and future demand for fossil resources with biomass without further exacerbating the ecological and social crises. Likewise, further intensifying agriculture and forestry is likely to lead to increased greenhouse gas emissions, further loss of soil fertility, disruption of the water balance, weakening of ecosystems, and massive declines in biodiversity.<sup>28</sup> However, a bioeconomy that focusses on biotic resources must also ensure the preservation of natural areas.

Instead of converting agriculture to agro-ecology, the technology-fixated agricultural industry is being expanded with massive use of fossil resources. Valuable arable land is also used for energy and fuel production instead of being devoted to food production. At the same time, one third of food is still going to waste.<sup>29</sup> To date, it has mainly been new psuedo-ecological business models that have been promoted to maximise the profits of companies, such as non-durable disposable drinks cartons, produced using large quantities of water and energy, containing 'organic' plastic made from sugar cane in Brazil.<sup>30</sup> Binding reduction targets for the consumption of resources such as biomass are completely absent. Clear policies are therefore needed to achieve climate, nature, and resource protection, as well as global food sovereignty. This, for example, means that the consumption of fossil

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25 UBA (2019). Position paper on a primary building materials tax.

26 BMUV (2018). Instrument zur umweltverträglichen Steuerung der Rohstoffgewinnung - INSTRO.

27 EEB (2019). Decoupling Debunked

28 e.g. Spangenberg/Kuhlmann (2020). Bioökonomie im Lichte der planetaren Grenzen und des Schutzes der biologischen Vielfalt

29 In Germany, more than 18 million tons of food end up in the bin every year. This equates to almost one third of current food consumption of 54.5 million tonnes. WWF Germany (2015). Das große Wegschmeißen. Vom Acker bis zum Verbraucher: Ausmaß und Umwelt- effekte der Lebensmittelverschwendug in Deutschland.

30 Biogas, for example, is also produced from maize fertilised with nitrate-containing slurry, which has an enormous impact on the environment and more than compensates for the lack of CO<sub>2</sub> emissions from biogas on balance.

fuels in Germany should not be primarily replaced by primary biomass such as wood and that food waste should be reduced. Natural areas must never be regarded as a mere source of resources. For example, only three billion cubic metres of wood with bark can still be harvested sustainably worldwide. Current consumption is 4.3 to 5 and is expected to rise to 6.6 billion cubic metres by 2050.<sup>31</sup> Global wood consumption must therefore be significantly reduced. In order to reduce all land requirements to a globally ecological and socially sustainable level, the bioeconomy needs to be embedded in a socio-ecological transformation and consumption needs to be distributed equitably worldwide.

## CONCLUSIONS

**The examples of the four material flows clearly illustrate that we are consuming too many resources in all economic sectors and thus still not moving in the right direction. The political regulations that still dominate at present partly promote this profligacy. Also, some of the solutions adopted for the energy supply crisis still largely ignore the environmental damage and human rights violations associated with resource extraction, exacerbate the climate and biodiversity crises, and continue to reproduce and consolidate (neo)colonial patterns. To live within planetary boundaries, we must therefore massively save resources in all economic sectors.**

**Based on these findings, we as a broad civil society alliance set out the following urgent recommendations:**

- Legal framework for general **resource protection targets**: According to current knowledge, for Germany this means reducing the consumption of abiotic primary resources to up to six tons per person and the consumption of biotic primary resources to up to two tons per person and year (measured by total material consumption – TMC<sup>32</sup>) by 2050.<sup>33</sup> In the long term, precise, sector-specific reduction targets are also necessary for all major material flows.<sup>34</sup> The legal framework for this should be resource protection legislation, in which these resource protection targets are laid down in law.<sup>35</sup> In the future, security of supply must be increasingly ensured through secondary resources. The first important step in this direction would be to strategically record available raw materials in the anthropogenic stockpile<sup>36</sup> and to set appropriate financial and fiscal incentives for the use of secondary instead of primary resources.
- This goes hand in hand with the introduction of a **comprehensive and pollutant-free circular economy**: in the medium term, high-quality recycled materials must replace primary resources. Research and funding for eco-design and recycling must be prioritised and expanded. This requires the creation of economic incentives and the promotion of innovative

31 WWF Germany (2022). Alles aus Holz – Rohstoff der Zukunft oder kommende Krise; Ansätze zu einer ausgewogenen Bioökonomie.

32 The TMC is a measure of the total quantity of primary material withdrawals (including unused withdrawals) domestically and abroad required for domestic consumption.

33 See, for example, UBA (2019). Wege in eine ressourcenschonende Treibhausgasneutralität. RESCUE-Studie and Bringezu, S. (2019). Toward Science-Based and Knowledge-Based Targets for Global Sustainable Resource Use; and Bringezu, S (2022). Das Weltbudget - Sichere und faire Ressourcennutzung als globale Überlebensstrategie

34 The German Environment Agency also advocates limiting the use of resources, and in a preliminary study it presents the outlines of a scientific method for determining limit values. UBA (2019). Wege in eine ressourcenschonende Treibhausgasneutralität. RESCUE-Studie.

35 UBA (2016). Rechtliche Elemente des allgemeinen Ressourcenschutzes.

36 Stocks of materials converted from resources from used or unused infrastructure, buildings, and goods. See also UBA definition.

business models to make recycled materials and sustainable product design the basis of our economy.

- Since Germany will not be able to manage entirely without primary resources in the future and these (especially metals) will still have to be imported for the most part, it is essential that binding human rights, environmental, and climate-related **due diligence obligations**, as well as effective grievance mechanisms, along the entire value chain of such (unavoidable) primary resources are established as the basis for their supply at all levels. The German government must therefore advocate at EU level for strong, **comprehensive supply chain legislation** that obliges manufacturers and resources suppliers to comply with environmental, climate, and human rights standards throughout the resources supply chain.
- Furthermore, there is a need to harmonise the amendment to the **resources strategy** with the upcoming **circular economy and biomass strategy** with regard to the reduction targets for all four material flow groups and a resource transition. All these and other relevant strategies of the German government must be based on the above recommendations if they are to establish the necessary policy coherence. In addition, the energy requirements of the circular economy must be measured and made efficient as quickly as possible and placed on a renewable basis.

- Finally, there is a need to promote a society-wide **debate on sufficiency**, with democratic, open, and transparent negotiations on how a sufficient society can increase the common good and social cohesion. It is also important to enable countries in the Global South to diversify their economies and thus reduce their dependence on exports of resources – both renewable and non-renewable.

We call on the German government to fulfil the promise in the coalition agreement and take all necessary steps to implement the recommendations set out above and abandon the current growth-driven production and consumption path of resource use in all economic sectors. Sooner or later, unresolved resource dependencies will lead to resource rationing that is socially difficult to absorb and politically incalculable. In order to achieve a systematic, organised, and solidarity-based reduction of resource consumption instead, a concrete roadmap is needed now.

This appeal was initiated by a broad civil society alliance that is ready to work together on all steps towards the socio-ecologically sustainable use of resources. It is supported by numerous other civil society organisations and initiatives.



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