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SUSTAINABLE PLASTIC RECYCLING IN MONGOLIA

FACT SHEETS AND KEY MESSAGES FOR TURNING MONGOLIA INTO A ZERO WASTE COUNTRY

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INTRODUCTION

Ecosoum[1] is a Mongolian association fighting for social and ecological justice through the strengthening of rural communities' autonomy. Since its foundation in 2018, Ecosoum has primarily been working on the waste issue. A pilot waste management system has been successfully set up in Khishig-Undur soum (Bulgan aimag) and replication activities are going on in other soums. Simultaneously, Ecosoum joined the global Zero Waste movement by becoming member of leading international organizations such as BFFP[2] and GAIA[3]. This quite distinctive position at the junction between local waste management activities and global advocacy actions enabled Ecosoum to develop a valuable expertise about waste-related issues in Mongolia and to produce relevant recommendations for local, regional, and national level.

To date, it seems that virtually all projects and actions undertaken in Mongolia to solve the waste crisis are still addressing downstream waste management practical problems (waste collection, landfills, recycling facilities, etc.) instead of focusing more on upstream core issues – although these core issues are the most essential to enable reducing waste and transitioning from our linear economy to a truly circular one. One of the main reasons of this unsatisfying situation lies in the fact that most people in the country (including policy-makers and organizations working on the waste issue) still seem to have biased understanding of waste-related issues and fail to identify where most efforts should be put in priority to enable sustainable resource/waste management.

Therefore, if we want Mongolia to turn into a Zero Waste country, it is paramount to initiate a shift in the dominant narrative about waste. It is crucial that all stakeholders, including media and the general population, abandon the idea that recycling alone can solve the waste crisis, and that we can keep consuming and producing so much waste as long as we sort our waste better, improve waste transportation schemes, introduce new high-technologies, and multiply landfills or incinerators. It is essential that everyone understands that, as countless scientific studies have clearly shown over the past years, waste – and plastic in particular – are a plague not only for the environment but also for human health.

This document is intended to summarize the key messages that should be clearly understood by everyone.* It also provides countless facts, arguments and sources to support and justify these messages. The document is organized by main topics (8 overall messages), with fact sheets (39 key messages) following a logical order to fully grasp the ins and outs of the waste issue. These fact sheets can also be considered as a supporting document to carry out Ecosoum's training entitled "*Монгол Улсаа Хогүй Орон Болгоё*", as the dedicated PowerPoint presentation (which can be freely downloaded from Ecosoum's website) is structured in the exact same way.

Our hope is that public authorities, NGOs and journalists will use this document to improve their policies, awareness-raising/advocacy campaigns and media coverage of the waste issue, so as to finally shift the narrative and give Mongolia a chance to progressively become a Zero Waste country.

* This document is primarily based on the findings and recommendations explained in Ecosoum's previous reports (available on its website: www.ecosoum.org), where readers can find further clarifications and details. Additional information can also be provided by Ecosoum upon request, by email (contact@ecosoum.org) or by phone (80142043).

SUMMARY OF OVERALL AND KEY MESSAGES

OVERALL MESSAGES	KEY MESSAGES
1. Plastics are everywhere and they have negative impacts all along their life-cycle, especially under the form of micro-plastics.	**1.1.** Plastics have negative impacts on human health and the environment not only as waste but through their entire life-cycle. **1.2.** Microplastics and nanoplastics pose a huge threat to human health, both inherently and as vectors for toxic chemicals and pathogens.
2. There is no magical high-technology (including recycling) capable of solving the waste crisis.	**2.1.** Although recycling has a role to play in waste management systems, it is largely insufficient and unsuitable in many cases. **2.2.** Chemical recycling is an immature, expensive and hazardous technology, which makes it irrelevant to solve the waste crisis. **2.3.** Plastic-to-fuel is a demonstrably risky technology that exacerbates environmental and social problems rather than solves them. **2.4.** Except in very limited cases, substituting conventional plastic with bio-plastics doesn't solve any problem. **2.5.** Plastic credits are conceptually flawed, difficult to implement, and create a level of complexity that threatens real solutions. **2.6.** Plastic-to-road and plastic-to-brick create health and environmental hazards while not contributing to a circular economy.
3. Introducing waste-to-energy in Mongolia would not solve the waste crisis, it would significantly worsen the problem.	**3.1.** Waste-to-energy is not a clean renewable energy: it is inefficient and terrible for the climate. **3.2.** Incineration is extremely toxic and hazardous for human health and the environment. **3.3.** Incineration is a disincentive to reducing, sorting, reusing and recycling waste. **3.4.** Incinerators are extremely expensive: they are a financial liability for states and cities. **3.5.** Incinerators do not replace landfills. **3.6.** Many countries and cities are moving away from WTE: it is a failed technology from the past, not a new technology for the future.
4. Zero Waste is not only the best option to solve the waste crisis, it also brings many socio-economic, health and environmental benefits.	**4.1.** Zero Waste is more than a slogan: it is a powerful strategy towards proper resource management and true circular economy. **4.2.** Zero Waste saves public money. **4.3.** Zero Waste creates jobs and stimulates economies. **4.4.** Zero Waste helps mitigate and adapt to climate change. **4.5.** Zero Waste protects human health and the environment. **4.6.** Zero Waste has already proved efficient and successful in countless countries and cities.

5. Efficient Zero Waste strategies include a handful of key policies and actions that ensure a quick and astonishing success.	**5.1.** Involving the people and laying solid foundations is the best way to get started and ensure quick success. **5.2.** Enabling separate waste collection and material recovery is the essential basis of any relevant Zero Waste system. **5.3.** Supporting and incentivizing local economies is a powerful lever towards Zero Waste. **5.4.** Enforcing a system that prevents food waste brings countless beneficial effects. **5.5.** Banning single-use plastics and disposable items is widely recognized as one of the paramount measures to fight against plastic pollution. **5.6.** Standardizing packaging and eliminating toxic additives in plastics would facilitate the development of reuse schemes and recycling processes. **5.7.** Reuse/refill systems and Deposit-Return Schemes are the cornerstone of efficient Zero Waste systems. **5.8.** Ensuring adequate processing and landfilling of residuals is key to reduce waste pollution.
6. Producers must be held accountable for the waste they generate directly and indirectly, otherwise they will never adopt eco-friendly practices.	**6.1.** The main polluting companies are perfectly identified and should be held responsible for their waste. **6.2.** Most of household waste is beverage and food single-use packaging from Mongolian companies. **6.3.** EPR policies and eco-taxes can be relevant but they are insufficient and difficult to implement efficiently. **6.4.** Companies must stop their greenwashing communication and start taking real actions to reduce their packaging waste. **6.5.** Companies must contribute financially to establish adequate resource management systems all over Mongolia.
7. We already have inspiring examples of successful Zero Waste achievements in Mongolia that should be replicated all over the country.	**7.1.** The well-functioning waste management system set up in Khishig-Undur soum could easily be replicated everywhere in Mongolia. **7.2.** Ecosoum developed a comprehensive 'waste management kit' that local authorities and NGOs can use to easily set up proper waste management. **7.3.** Mongolia offers many other inspiring examples of Zero Waste accomplishments that public authorities should support and promote.
8. The world needs an ambitious and binding global plastics treaty, and Mongolia has a role to play in international negotiations.	**8.1.** To end the global plastics crisis, we need a legally binding international treaty that addresses the full lifecycle of plastics and limits plastic production. **8.2.** Mongolia should join the 'High Ambition Coalition' and take meaningful actions at the International Negotiating Committee.

1. PLASTICS ARE EVERYWHERE AND THEY HAVE NEGATIVE IMPACTS ALL ALONG THEIR LIFE-CYCLE, ESPECIALLY UNDER THE FORM OF MICRO-PLASTICS.

Main resources to read:

⇒ CIEL, *Plastic & Health: The Hidden Costs of a Plastic Planet* (2019).

⇒ CIEL, *Breathing Plastic: The Health Impacts of Invisible Plastics in the Air* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
1.1. **PLASTICS HAVE NEGATIVE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT NOT ONLY AS WASTE BUT THROUGH THEIR ENTIRE LIFE-CYCLE** People may think: - *"There is no problem with plastic itself, only plastic waste";* - *"Plastic is a safe material";* - *"The impacts of plastic production don't really matter".* But actually: - **99% of plastics are made from fossil fuels, and the extraction of oil and gas has catastrophic impacts on human health.** - **Refining petroleum and producing plastic resins and additives also have great impacts on health and ecosystems.** - **Plastics also pose health risks at consumption stage, as use of plastic products leads to ingesting and/or inhaling large amounts of micro-plastics and toxic additives.** - **All plastic waste management techniques result in the release of hazardous substances that impact human health and other living organisms.** - **Plastics have cascading and ongoing health and ecological impacts once they reach the environment.**	- Understanding plastic risks (and making informed decisions to respond to these risks) requires a full lifecycle approach to assessing the entire scope of the impacts of plastic on human health. Indeed, at every stage of its lifecycle, plastic poses distinct risks to human health, arising from both exposure to plastic particles themselves and associated chemicals.[4] Most people worldwide are exposed at multiple stages of this lifecycle. - Over 99% of plastic is made from chemicals sourced from fossil fuels.[5] Therefore, if we want to grasp the full impact of plastics, we need to consider the damages caused by its raw material: petroleum. The extraction of oil and gas, particularly the use of hydraulic fracturing for natural gas, releases an array of toxic substances into the air and water, often in significant volumes. Over 170 fracking chemicals that are used to produce the main feedstocks for plastic have well-known human health impacts, including cancer, neurotoxicity, reproductive and developmental toxicity, impairment of the immune system, and more.[6] These toxins have direct and documented impacts on skin, eyes, and other sensory organs, the respiratory, nervous, and gastrointestinal systems, liver, and brain.[7] - Incidentally, we should emphasize that as the world is getting better at using less oil and gas to produce energy, plastic production has become the fossil fuel industry's lifeline.[8] In fact, oil and gas companies have been doubling down on plastic production, with plans to build or expand over 300 petrochemical plants in the US alone between 2018 and 2025.[9] If we want to keep fossil fuels in the ground, as it is essential to avoid climate disaster[10], limiting plastic production will be one of the paramount stakes. - Transforming fossil fuel into plastic resins and additives also releases carcinogenic and other highly toxic substances into the air (including 1,3-butadiene, benzene, styrene, toluene, ethane, PHAs, and others).[11] Documented effects of exposure to these substances notably include impairment of the immune system[12], reproductive and developmental problems[13], cancer[14], and leukemia[15] – among many other severe consequences. Industry workers and communities neighboring refining facilities are at greatest risk and face both chronic exposures and acute exposures due to uncontrolled releases during emergencies.[16] - Whether plastic is only used once (like a polystyrene coffee cup[17]) or is used for years (like the casing around a television[18]), use of plastics in consumer goods leads to ingestion and/or inhalation of large amounts of both micro-plastic particles and hundreds of toxic substances (see 7.2. for more details). These compounds are highly hazardous for human health as they notably cause carcinogenic, developmental, or endocrine disrupting impacts.[19]

	- All plastic waste management technologies (as described in section 2. and section 3.) result in the release of toxic metals (such as lead and mercury), organic substances (dioxins and furans), acid gases, and other toxic substances to the air, water, and soils.[20] As a consequence, workers and nearby communities are directly and indirectly exposed to toxic substances, including through inhalation of contaminated air, contact with contaminated soil or water, and ingestion of contaminated food – with all the above-mentioned catastrophic impacts it entails. - Most plastic additives are not bound to the polymer matrix and can easily leach out[21] into the surrounding environment, including air, water, food, or body tissues[22]. As plastic particles continue to degrade, new surface areas are exposed, allowing continued leaching of additives from the core to the surface of the particle[23] in the environment and the human body. Once plastic reaches the environment in the form of macro- or micro-plastics, it contaminates and accumulates in food chains[24] through agricultural soils, terrestrial and aquatic food chains, and the water supply. This environmental plastic can leach toxic additives or concentrate toxins already in the environment, making them bioavailable again for direct or indirect human exposure.[25]
1.2. **MICRO-PLASTICS AND NANO-PLASTICS POSE A HUGE THREAT TO HUMAN HEALTH, BOTH INHERENTLY AND AS VECTORS FOR TOXIC CHEMICALS AND PATHOGENS** People may think: - *"If we don't see plastics, they are not a problem";* - *"There are not so many micro-plastics around us";* - *"We don't know if micro-plastics are dangerous".* But actually: - **Although we can't see them, micro- and nano-plastics are everywhere around us and we constantly ingest/inhale them.** - **Small plastic particles can enter the lungs and move through the body, migrating to lymph nodes or other tissues and secondary organs via the bloodstream, where they induce severe health problems.** - **Micro-plastics are not only inherently toxic, they also have the ability to catch and transport other hazardous substances and pathogens into the most remote places of the human body.**	- Micro-plastics (plastic particles with a size inferior to 1 micro-meter) and nano-plastics (inferior to 1 nano-meter) are ubiquitous in our environment, although they are mainly invisible. They move through air and can travel quickly to cover great distances: they can move thousands of kilometers in a matter of days to weeks, affecting even remote populations. They can be found in both outdoor (in air, soil, water) and indoor (homes, schools, etc.) environments, from the inner city and industrial areas to the most remote locations on the planet – spanning the Arctic to the Antarctic.[26] - Micro- and nano-plastics can have two origins: • "*Primary micro-plastics*" are micro-plastics that are intentionally produced and used in personal care products[27], pharmaceuticals[28], agriculture fertilizers[29], printing ink[30], electronics[31], and so on; • "*Secondary micro-plastics*" result from the mechanical, chemical, and physical fragmentation of larger (macro-) plastics. For example, they can come from discarded plastic products deteriorating or opening of plastic packaging[32]; tire abrasion[33]; synthetic textiles like clothes, carpets, furniture, and household goods[34]; degradation of paint, wall-paper, flooring, and furniture; etc.. - Whether primary or secondary, micro- and nano-plastics can enter the human body via direct exposures through contact, ingestion, or inhalation (breathing). The estimated total amount of micro- and nano-plastics that average people unintentionally ingest/inhale may add up to 121,000 microparticles per year[35], the equivalent of 50 plastic bags per year[36] or one credit card per week[37] (estimations vary depending on calculation methods, but all scientists agree it is a frighteningly high amount). - Exposure to airborne microplastics can occur through inhalation, penetration through skin pores, and ingesting foods that contain them[38]. Micro-plastics' reach inside the human body depends on their properties, size, shape, and an individual's metabolism, susceptibility, and lung anatomy. They can enter the respiratory system through the nose or mouth before being deposited in the upper airways or deep in the lungs.[39] Once there, evidence shows that micro- and nano-plastics

	can be transferred from the lung epithelial surface to lung tissue[40], to internal organs, blood, and brain.[41] - In addition to their own toxicity, micro- and nano-plastics also act as a "Trojan Horse" (meaning that they can hide other "enemies" to bring them inside the body). Due to their large specific surfaces and their predominantly hydrophobic nature, micro- and nano-plastics can catch and hide hazardous substances, and carry them inside bodies via inhalation, absorption, and ingestion.[42] These transported harmful substances include both toxics that were intentionally introduced in plastics (like plasticizers and flame retardants[43]) and chemicals accidentally caught from the environment (such as heavy metals, PHAs, POPs, etc.[44]). Similarly, micro- and nano-plastics can transport antibiotic-resistant genes[45] and bacterial and viral pathogens[46] when in water and soil. Thus, it cannot be excluded that air-borne microplastics may also be a carrier of microbial or viral infections, including Covid-19.[47] - Their capacity to move throughout the entire body explains that studies on the inhalation of micro- and nano-plastics have shown a series of adverse effects along the respiratory tract and beyond, ranging from irritation to the onset of cancer in cases of chronic exposure.[48] These adverse effects notably include[49]: immediate asthma-like reactions; inflammatory reactions and fibrotic changes, like chronic bronchitis; lung disorders such as extrinsic allergic alveolitis and chronic pneumonia; pulmonary emphysema; the development of interstitial lung diseases, resulting in coughing, difficulty breathing, and a reduction in lung capacity; oxidative stress and the formation of reactive oxygen species (ROS) and thus the ability to damage cells (cytotoxic effects); and autoimmune diseases. - In addition, we should keep in mind that these afflictions caused by micro-plastics (and the other toxics they carry) happen in bodies that are also exposed to multiple other pollutants and hazardous chemicals on a daily basis. Therefore, this mixed exposure to a cocktail of toxic substances may induce impacts even worse than those already proven by scientists for each specific substance. Regulators need to apply the precautionary principle to address the risks of combined exposure. - If no action is taken, the volume of airborne micro-plastic emissions will follow the expected rise in plastic production, resulting in a greater risk of toxic impacts and spreading potentially toxic chemicals.[50]

2. THERE IS NO MAGICAL HIGH-TECHNOLOGY (INCLUDING RECYCLING) CAPABLE OF SOLVING THE WASTE CRISIS.

Main resources to read:

⇒ Ecosoum, *Zero Waste and Circular Economy: the Way Forward* (2020).

⇒ Ecosoum, *Plastic Solutions Review* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
2.1. **ALTHOUGH RECYCLING HAS A ROLE TO PLAY IN WASTE MANAGEMENT SYSTEMS, IT IS LARGELY INSUFFICIENT AND UNSUITABLE IN MANY CASES** People may think: - *"Plastics can be recycled infinitely";* - *"If people sort their waste and municipalities collect it properly, we can recycle almost everything";* - *"We just need to acquire high-tech recycling technologies to solve the waste crisis".* But actually: - **Recycling can be relevant in some cases but it has many limits and issues that cannot be overcome. Thus, if we focus all efforts on developing recycling, we will never be able to solve the plastic crisis.** - **Infinite plastic recycling is a greenwashing myth that is instrumentalized by industries to keep society from reducing over-production and over-consumption.** - **Considering its limits, the sustainable future of recycling lies not in the mass-scale recycling of single-use plastics, but instead in the targeted high-quality recycling of truly useful plastics.**	- Recyclable in theory does not mean recycled in real life: globally, only 9% of plastic waste is recycled[51]. It is essential to assess recyclability not only on the technical level (in theory, or in other countries) but also on the operational level (in practice, in real life, in the local context). - Today, many products and packaging are still made of plastics that cannot be recycled[52] and/or with designs that make recycling practically impossible[53] (like multi-layer or multi-material packaging). All things considered, even with the best available recycling technologies in the world, the maximum rate of recycling we could reach for the current mix of plastics used globally is estimated to be between 36% and 53%[54]. Reaching 100% recycling is absolutely impossible. - Recycling processes degrade plastics, which means that matter is lost in the process[55]. Even Coca-Cola admitted in 2022 that their most advanced PET bottle recycling facility was losing 30% of the plastic[56] through the process (which mathematically means that 90% of the initial plastic have disappeared after three recycling rounds). Thus, it is necessary to always keep extracting new natural resources. - Plastic is inherently a non-circular material with limited recyclability[57]: plastic recycling only delays final disposal (it adds small loops inside the linear system), but it does not really reduce or prevent it. - Lots of additives and impurities inside materials significantly reduce their actual recyclability[58]. Recycling increases the potential for mixing and disseminating the thousands of toxic chemicals included in plastics[59], which creates significant health risks and makes it hard to find applications for recycled plastic that are both safe and high enough in volume[60] to meaningfully reduce primary plastic production. - Most plastic waste is usually "downcycled" into a lower quality non-recyclable product[61] rather than effectively recycled. Most often, plastics are recycled only once[62] before they become final (unrecyclable) waste to be dumped or incinerated. - Recycling requires a very precise level of sorting, which usually demands very expensive technology and/or exploitation of poor people's workforce[63] (otherwise, recycled plastic could not be competitive with new virgin plastic). - Recycling has its own impacts on the environment, especially in terms of water and energy consumption, waste water production, and toxins, CO_2 and micro-plastics emission. Recycling is more eco-friendly than landfilling or incineration, but it has more environmental impact than reusing[64] (and, of course, reducing). - The theoretical possibility of recycling (whether it is actually possible or people wrongfully assume it is) tends to make people over-consume[65]

	instead of trying to reduce their waste production. In that sense, overpromoting recycling is a disincentive to prevention. - All in all, as NGOs[66] and journalists[67] have widely demonstrated, infinite recycling is merely a myth. Even the Director of the UNEP recently said: "*the truth is we cannot recycle our way out of this mess*".[68] - The reason why recycling has such an over-positive perception among the public is that the plastic industry's lobbies have been leading greenwashing communication campaigns[69] for decades. Recycling is their alibi to keep unchanged our economic model based on single-use and over-consumption.
2.2. **CHEMICAL RECYCLING IS AN IMMATURE, EXPENSIVE AND HAZARDOUS TECHNOLOGY, WHICH MAKES IT IRRELEVANT TO SOLVE THE WASTE CRISIS** People may think: - *"Chemical recycling is a promising high-tech to solve the waste crisis";* - *"Chemical recycling has proved efficient in other countries".* But actually: - **Chemical recycling is technologically immature, economically infeasible, logistically challenging, has a significant carbon footprint, and results in toxic byproducts that threaten human and ecological health.** - **All in all, the material losses, energy inputs, and environmental hazards associated with chemical recycling make it an expensive and poor strategy for solving the plastics crisis.**	- In theory, chemical recycling (which aims to break plastic waste into its basic building blocks using heat, pressure, and/or chemical solvents) offers an interesting approach to managing plastics that are difficult to recycle mechanically. In practice, however, it comes with many problems that make this technology irrelevant or inapplicable. - Chemical recycling struggles to deliver its basic promise of turning plastic waste into new plastic: while it is theoretically possible to have minimal losses of plastic material in chemical recycling, in practice, each loop through the process results in significant losses of raw material[70], perpetuating the need for new plastic inputs. Data from a chemical recycling facility shows that as much as 35% of plastic input material can be lost in the recycling process.[71] - Chemical recycling requires large infrastructure and incredible amounts of energy to operate. This energy input contributes to carbon emissions (3.9 kg of CO_2 can be emitted for every 1 kg of new plastic produced) and raises production costs, so much so that chemically recycled plastic struggles to compete with low-cost virgin plastic.[72] - These technical and economic limitations are reflected most plainly by the fact that chemical recycling is almost non-existent in the real world. Data from the US shows that out of 37 proposed chemical recycling projects since 2000, only 3 were operational as of 2020, and none successfully produced new plastic at a commercial scale. - In the case of thermal cracking systems, the most widespread technology for chemical recycling, plants that are labeled as "chemical" or "advanced" recycling facilities in reality burn most or all of what they ultimately produce[73], making them in effect plastic-to-fuel plants rather than actual recycling facilities. - While there is very little transparency about emissions and byproducts from chemical recycling plants, these facilities likely operate similarly to others in the petrochemical industry, which produce large amounts of liquid effluent, solid waste, and toxic air pollutants such as bisphenol-A (BPA), cadmium, and benzene, among many others.[74] - The facilities themselves are often located in low-income communities already facing significant health burdens from existing industrial emissions. Investing in chemical recycling plants means increasing the pollution burden on these communities while providing no real contribution to solving the waste crisis.

2.3. **PLASTIC-TO-FUEL IS A DEMONSTRABLY RISKY TECHNOLOGY THAT EXACERBATES ENVIRONMENTAL AND SOCIAL PROBLEMS RATHER THAN SOLVES THEM** People may think: - *"Plastic-to-fuel is a promising high-tech to solve the waste crisis";* - *"Plastic-to-fuel has proved efficient in other countries".* But actually: - **Overall, plastic-to-fuel suffers from technical, economic, and environmental challenges that threaten its own viability as well as the climate and human health.** - **Plastic-to-fuel technologies are actually incineration technologies, contrary to what their promotors claim.** - **Despite decades of R&D, plastic-to-fuel has never sustainably operated nor proved effective at scale anywhere in the world.**	- By turning plastic waste into fuels to be burned, plastic-to-fuel (PTF) fundamentally does nothing to reduce plastic waste production or decrease the need for new plastic. - Contrary to what their supporters claim, PTF technologies are in fact waste-to-energy incineration. Proof is that the main PTF technologies (gasification, plasma arc and pyrolysis) are all classified as incineration in European legislation.[75] - PTF turns plastic waste into CO_2 and air pollutants, increasing the overall environmental impact associated with plastic production. Life cycle assessments and data from a US PTF company indicate that the CO_2 emissions associated with the fuel resulting from PTF processes are at least as carbon-intensive as conventional fossil fuels.[76] - Toxic emissions from PTF end-products are also worse than those resulting from burning conventional fuels[77]: diesels and waxes produced from PTF processes contain more highly toxic residues, dioxins, POPs, and PAHs than conventional diesel, and their burning produces more air pollutants like NOx, soot, and carbon monoxide than regular diesel. - As a highly complex process, PTF still faces many technical challenges[78] including: limitations on the types of plastics that can be processed; cleaning of contaminated plastic waste feedstock; temperature control during conversion processes; removal of impurities from end products; management of toxins present in resulting waste residues. These issues have led PTF facilities to fall short on projected energy and revenue generation, miss emission targets[79], sustain corrosive damage to building structures, and even suffer fires and explosions.[80] - All these technical problems and limits explain that, as of today, there is still no large-scale gasification facility in operation anywhere in the world.[81] An expert review[82] of the available evidence on the technology in 2020 concluded that PTF is technologically immature, unsustainable, and presents a risk to potential investors, a statement that is reflected by the fact that over $2 billion has been spent on failed or cancelled gasification or pyrolysis facilities in the US as of 2017. - To make up for these technical and economic barriers that hamper its development, PTF companies often seek government subsidies, and to date the US has spent over $450 million in taxpayer dollars to fund such projects.[83] In this way, PTF sinks much-needed resources that could be spent on the development of more viable solutions to the plastics crisis.

2.4. EXCEPT IN VERY LIMITED CASES, SUBSTITUTING CONVENTIONAL PLASTIC WITH BIO-PLASTICS DOESN'T SOLVE ANY PROBLEM

People may think:

- *"Bio-plastics are organic so they don't pollute or raise any environmental issue";*
- *"Bio-plastics are all totally biodegradable".*

But actually:

- **The term "bio-plastics" is problematic because it refers both to bio-based plastics and biodegradable/compostable plastics, which are two very different things.**
- **Most "bio-based plastics" behave exactly like conventional plastics in terms of toxicity and end-of-life. They also create other environmental problem, which means they are not a more sustainable alternative.**
- **"Biodegradable plastics" are usually biodegradable only in industrial conditions, not in nature or home composters – which means that most often they pollute exactly like conventional plastics.**
- **"Compostable plastics" can be relevant in very limited conditions, especially as collection bags for organic waste. But outside of this specific use, biodegradable plastics are clearly not a relevant alternative to conventional plastics.**

Bio-based plastics:

- "Bio-based" plastics can be made entirely of biological feedstock, but most of them also include fossil fuel-based plastics – up to 75%.[84]
- Even when fully based on organic feedstock, most bio-based plastics are chemically and functionally 100% identical to fossil fuel-based plastics.[85] Therefore, they don't help in any way to reduce plastic waste nor to improve plastic waste management, and they are similarly toxic, generate toxic byproducts during production, and/or contain toxic additives[86] just like conventional plastics.
- Even when fully based on organic feedstock, the environmental impacts and sustainability of bio-based plastics is highly dependent on the land-use and agricultural practices used in growing them (irrigation, pesticides, etc.). Some life cycle analyses show that bio-based plastics can be just as harmful or even worse than conventional plastics[87] when it comes to energy use, climate change, air pollution, and ecotoxicity.
- If bio-based plastics replaced conventional plastics completely, as much as 7% of global arable land would be necessary to produce the plastic we use today.[88] Competition for land between bio-based plastic feedstocks and food crops would probably drive food costs up and increase global hunger.[89] Similarly, bio-based plastics could further incentivize the conversion of forests to agricultural land (deforestation) around the world.

Biodegradable and compostable plastics:

- Biodegradable plastics are plastics that can be broken down by microorganisms. They can be made from conventional fossil fuel feedstocks, biological feedstocks like potato starch, or both.
- Depending on environmental conditions, biodegradable plastics may or may not break down as intended, and evidence suggests that under many circumstances they fail to do so in a reasonable amount of time in the real world.[90] In most cases, such bioplastics biodegrade only in industrial temperatures (above 60°C) but not in nature or home composters. Therefore, they pollute essentially like conventional non-compostable plastic, which is particularly problematic if people think they can litter their "biodegradable" plastics without any problem.
- Substituting conventional plastics with biodegradable plastics would not help reduce plastic waste, and could even create new problems and hamper current waste recovery efforts. Biodegradable plastics are not well-suited for reuse, as they are designed to degrade more readily than conventional plastics. For this same reason, biodegradable plastics can reduce the quality of mixed recyclable materials[91] and are sometimes considered contaminants in recycling systems. In addition, when biodegradable plastics end up in landfills, they get buried in other waste, where they can form methane as they decompose.[92]
- On the other hand, we should mention that, certified compostable plastic bags can be useful as liners for food waste bins[93] to improve participation in food waste separation, make collection by waste management services easier, and increase the processing efficiency of composting facilities where bags no longer need to be split and sorted out from organic waste.

2.5. PLASTIC CREDITS ARE CONCEPTUALLY FLAWED, DIFFICULT TO IMPLEMENT, AND CREATE A LEVEL OF COMPLEXITY THAT THREATENS REAL SOLUTIONS

People may think:

- *"Plastic credits are a great way to achieve plastic neutrality";*
- *"Plastic credits are an efficient solution in a market economy";*
- *"The experience of carbon credits shows that plastics credits are a good idea".*

But actually:

- **Plastic credits do not contribute to reducing plastic production.**
- **Plastic 'neutrality' claims essentially serve greenwashing communication.**
- **Plastic credits projects face significant implementation challenges, including how to establish "additionality" and how to match the impact of offset projects to the impact of waste production by credit buyers.**
- **Plastic offset projects can have their own social or environmental impacts and can establish perverse incentives that discourage plastic reduction.**
- **Plastic credits markets are so complex and non-transparent that, as seen with carbon markets, they are prone to miscommunication and fraud.**

- A plastic credit is a tradable certificate that represents a certain amount of plastic waste that has been recycled, recovered, or prevented from entering the environment. Credits are generated by projects that physically recover or prevent plastic waste, and are bought (on unregulated, non-standardized, privately-run markets) by companies that want to offset the plastic waste that they generate to achieve an alleged 'plastic neutrality'.
- By essence, plastic credits do not reduce plastic production[94], and therefore do not contribute to a solution to the plastics crisis. At most, they are intended to balance out the plastic waste generated by credit buyers, allowing pollution in one location to continue as long as it is offset by allegedly 'equivalent' reductions somewhere else. In that sense, plastics credits tend to contribute much more to greenwashing communication than they actually help to stop unsustainable practices.
- Plastic credit markets face challenges in determining whether the outcomes of offsets are "additional" to what would have happened anyway, or whether they are simply a continuation of the status quo. In carbon credit markets, which have served as the model for plastic credit markets, the question of additionality remains highly controversial and was a major driver of the poor performance of the carbon market set up by the Kyoto Protocol's Clean Development Mechanism.[95]
- Plastic offset projects also fail to consider that there are many different types of plastic and plastic products, all with varied physical and chemical properties that have specific impacts in different environments. For example, the recovery of one ton of plastic water bottles from an unmanaged urban dumping site might not balance out the harms created by one ton of plastic soda rings littered in the ocean that has been justified by the purchase of a credit. An effective plastic credits market would thus require an extremely high level of analysis and verification to match the impacts of waste generation and waste recovery, making the system extremely complicated to implement.
- Moreover, there is no guarantee that plastic offset projects will not have other social or environmental impacts[96]. For example, credits can sometimes be generated for plastic waste that is recovered but then incinerated or even disposed of in open dumps, although such practices do not contribute in any way to solving the waste crisis. Plastic credits could even have further indirect impacts by establishing perverse incentives that discourage plastic waste reduction, as it has been observed in carbon offset markets.[97]
- Beyond implementation challenges, the plastic credits market as a whole presents logistical and financial issues. Already, dozens of actors are involved in the process of setting standards and definitions, developing and verifying offset projects, creating credit-tracking systems, marketing credits, and brokering deals with buyers. Every link in the chain adds complexity and reduces transparency, resulting in a crisscrossed, international system that, as seen with carbon markets, is ripe for miscommunications, misrepresentation, and even fraud.[98]
- This complexity and lack of transparency confuses and discourages consumers, reducing public pressure on companies to manage their plastic waste. To be functional plastics credit markets would require an incredible amount of regulatory oversight from both the private and public sectors, absorbing time and energy that could be spent on more effective solutions like actual plastic waste reduction.

2.6. **PLASTIC-TO-ROAD AND PLASTIC-TO-BRICK CREATE HEALTH AND ENVIRONMENTAL HAZARDS WHILE NOT CONTRIBUTING TO A CIRCULAR ECONOMY** People may think: - *"Making roads or bricks is a good way to recycle plastics";* - *"We need poles for fences, so making them with recycled plastics solves two problems at a time".* But actually: - **Making roads, bricks, tiles or poles with 'recycled' plastics is not real recycling, it is non-circular downcycling.** - **In outdoor conditions, such downcycled plastics are likely to quickly degrade, and thus pollute and impact human health.**	- Another "solution" that is sometimes promoted – especially by well-intentioned entrepreneurs at local levels – entails to downcycle plastics into construction materials, to make bricks, tiles, poles or roads. - However, such practices are not to be recommended[99], mainly because exposing low-grade plastics to harsh outdoor conditions (sun UVs, wind, rain, ice, etc.) and abrasion from vehicles is the best way to quickly release toxic substances and hazardous micro-plastics into the environment, which create tremendous risks for human health and ecosystems[100] (as explained in section 1.). In addition, these plastic-based construction materials are most often a significant fire hazard. - In any case, turning plastics into such low-grade materials means that further recycling is impossible: plastic-to-road or plastic-to-brick is a totally linear approach that does not get us any closer to a circular economy. - The only application that could be relevant for such downcycling is extrusion and molding of low-grade plastics recovered from Materials Recovery and Biological Treatment (MRBT) facilities, as a last resort solution for residual waste that cannot be prevented and would otherwise be landfilled (thus polluting anyway).

3. INTRODUCING WASTE-TO-ENERGY IN MONGOLIA WOULD NOT SOLVE THE WASTE CRISIS, IT WOULD SIGNIFICANTLY WORSEN THE PROBLEM.

Main resources to read:

⇒ Ecosoum, *Should we introduce waste-to-energy in Mongolia?* (2023).

⇒ Ecosoum, *A guide to assess waste-to-energy projects and proposals* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
3.1. **WASTE-TO-ENERGY IS NOT A CLEAN RENEWABLE ENERGY: IT IS INEFFICIENT AND TERRIBLE FOR THE CLIMATE** People may think: - *"Burning waste to generate energy is obviously a good idea";* - *"Waste-to-energy is a Renewable Energy";* - *"Incinerators make us avoid the use of fossil fuels and landfills".* But actually: - **Burning waste to produce energy is not renewable energy since most of our waste is made of non-renewable resources.** - **Incinerators do release carbon from burning waste, and thus contribute to climate change.** - **Waste-to-energy is a waste of energy: it wastes more energy than it produces.** - **Incineration is the most expensive and least efficient way of producing electricity.**	- First of all, burning waste to produce energy cannot reasonably be considered a renewable energy since most of the waste we incinerate is made of non-renewable resources. As such, incineration does not get us closer to a circular economy in any way. - Incinerators do release a lot of carbon from burning waste, and hence significantly contribute to climate change. Plastic waste incineration without energy recovery can generate 2.7 to 2.9 tons of CO_2.[101] - Even when electricity generation is taken into account, each ton of plastic burned in an incinerator results in the release of 0.9[102] to 1.4[103] ton of CO_2. - European incinerators generate two times more greenhouse gases emissions than the current EU average electricity grid.[104] In the end, incineration produces more greenhouse gas emissions per unit of energy produced than any other form of energy production.[105] - Waste-to-energy is actually one of the least efficient ways to produce energy: after taking into account the embedded energy in incinerated waste, analysis shows that WTE actually wastes more energy than it produces.[106] Reusing and recycling undoubtably save much more energy; therefore, considering that most of the waste currently burnt in incinerators are actually recyclable or compostable, waste-to-energy is highly counter-productive in terms of energy efficiency. - Incidentally, incineration is one of the most expensive ways to generate electricity, costing four times as much per unit of energy as solar or onshore wind, twice as much as natural gas, and 25% more than coal.[107] - Composting is a much better way to reduce landfill methane emission[108], as it mitigates methane emission while avoiding all CO_2 emissions and feeding our soils with good nutrients. Nutrients should go back to our soil, not to air.
3.2. **INCINERATION IS EXTREMELY TOXIC AND HAZARDOUS FOR HUMAN HEALTH AND THE ENVIRONMENT** People may think: - *"There is no toxic emission with WTE";* - *"We can catch all pollutants from incineration exhaust";*	- Environmental engineering is supposed to transform toxic substances into less or non-toxic ones, but incinerators do the opposite and essentially turn non-hazardous municipal waste into extremely toxic gases and ashes. Incinerators' emissions include highly hazardous substances such as dioxins, particulate matter, carbon monoxide, nitrogen oxides and other acidic gases, heavy metals, PCBs, and PAHS.[109] - Proven health impact of these substances notably includes increased rates of preterm births, increased wheezing, headaches, stomach aches, and fatigue in schoolchildren, increased risk of miscarriages from exposure to particulate matter, increased risk of lymphoma due to dioxin emissions, and excess deaths due to stomach, liver, colon, and other cancers.[110]

- *"It may have polluted in the past but now incinerators do not emit pollutants anymore".* But actually: - **Incinerators turn non-hazardous waste into extremely toxic ashes. By burning waste, we convert simple tangible problems into complex invisible problems. Invisible does not mean it is not there.** - **Burning waste pollutes our food chain, which harms our children's health and threatens the life of future generations.** - **The health impact of waste incineration is catastrophic, although it is often invisible at first because it is delayed and can happen away from the incineration facility.** - **Both old incinerators and modern incinerators emit the same toxic pollutants.** - **Incinerators are prone to malfunctioning and difficult and expensive to control, hence higher chance of releasing toxic chemicals.**	- Many of the health impacts of waste incineration are often delayed and happen in other places, outside and away from the incineration facility. There are no "safe limits" for persistent pollutants such as dioxins and furans emissions; these substances are bioaccumulative, which means they eventually enter and accumulate in our food chain, which harms our children's health and threatens the life of future generations. - Both old and modern incinerators produce the same pollutants. Even with the most modern technologies, smokeless does not mean clean emission: the toxic cocktails and particulates released by incinerators can be colorless, odorless, or just too small to be seen by naked eyes. Incidentally, incineration releases ultra-fine particles that are too small to be filtered by modern Air Pollution Control units and that are not regulated in any country. - In the case of dioxins, the periodic emission testing methods used in most countries do not capture episodes of high dioxin releases, which can only be found through continuous monitoring, a practice which many developing countries have no capacity to conduct. Regulation needs to cover both emission limit and monitoring standards, not only on stack but also in the neighboring communities.[111] - In any case, while modern air pollution control equipment can help reduce the amount of toxins in an incinerator's exhaust gas, it does so by concentrating some of the toxins in other byproducts like ash and wastewater. When toxic ash is disposed in landfills, it can easily be spread out by the wind and impact surrounding environments.[112] These toxic substances not only risk the well-being of workers and nearby residents that are directly exposed to emissions, but they also pose a larger risk when they are spread by the wind and waterways and deposited in the open environment. [113] - As it's been documented with many examples in Europe[114], incinerators are prone to malfunctioning, which means that chances of releasing above-mentioned toxic chemicals, with terrible consequences, are actually high despite the reassuring promises WTE promoters can make. - Considering that there are perfectly safe Zero Waste alternatives to incineration, there is no good reason to take any risk with WTE technologies.
3.3. **INCINERATION IS A DISINCENTIVE TO REDUCING, SORTING, REUSING AND RECYCLING WASTE** People may think: - *"WTE is part of the recycling system";* - *"Let's try WTE and we will see if it works or not.".* But actually: - **Calling waste "fuel" and burning it in incinerators certainly does not qualify as recycling.**	- First of all, it is worth reminding something obvious that WTE promoters seem to forget: recycling implies to recreate a comparable (and/or similar quality) item from an old one that reached the end of its life – recycling literally means "re-entering the cycle". As such, considering waste as fuel and burning it in incinerators certainly does not qualify as recycling, even if some energy is produced. In fact, the European Union's legislation specifically prohibits waste-to-energy to be considered as "recycling".[115] - As the example of Scandinavian countries has largely proved, incineration does not coexist well with sorting and (true) recycling[116]: if Nordic nations are not on track to meet the EU recycling targets, it clearly is because of their overreliance on incineration. The main reason is that not all types of waste easily burn, and mixed waste that include a significant share of organic waste are too wet to burn properly. Therefore, incinerators primarily require a lot of plastics to operate, because plastics are oil-based and burn very well. When there is not enough plastics, incinerators often add other fossil fuels to make sure

- **Incinerators need a lot of plastics to operate because they burn well, which is why they actually compete with waste reduction and recycling.** - **The existence of WTE facilities in a country is thus very counter-productive as they undermine more relevant actions.**	that mixed waste will burn well enough (for instance, in China, incinerator operators routinely add coal to the municipal waste to make it combustible).[117] - Thus, incineration is actually a very strong disincentive to both reducing waste (incinerators need a steady waste supply, even more so that they often are over-sized and have to operate under optimal capacity) and reusing/recycling (incinerators rely on plastics, single-use plastics being an essential feedstock for them). In the end, incineration is not a relevant complementary solution to recycling and does not contribute to solving the waste crisis; on the contrary, incinerators directly compete with waste reduction and recycling.[118] As such, they oppose the fundamental Zero Waste hierarchy (3R rule) and critically undermine Zero Waste goals and targets.
3.4. **INCINERATORS ARE EXTREMELY EXPENSIVE: THEY ARE A FINANCIAL LIABILITY FOR STATES AND CITIES** People may think: - *"Incinerators are a good investment";* - *"We can save money by producing energy with waste".* But actually: - **Incineration is one of the most expensive waste management technologies.** - **Incinerators are very expensive both in terms of investments and operation costs.** - **Incinerators bind countries and cities with a long-term debt (and high public subsidies for running costs) which burdens public funds and taxpayers.** - **Incinerators are a risky investment for governments and international financial institutions: many WTE facilities (sometimes even cities) have gone bankrupt.** - **Waste incineration is one of the most expensive ways to generate electricity.**	- Incineration is one of the most expensive ways to manage waste, compared to both other waste processing technologies and Zero Waste approaches.[119] They are very expensive both in terms of investments and running costs. - Capital investments for waste-to-energy facilities represent hundreds of billion tugriks (up to 500 million USD for Copenhagen's incinerator[120]), which usually leaves governments with an enormous long-term debt for at least for 20 or 30 years. This debt is a heavy burden on taxpayers and it undermines the ability of indebted countries to invest in other waste reduction and management solutions (or even in other kinds of public services). - Another problem is that this initial investment doesn't even pay off. According to the World Bank, operational costs are almost always substantially higher than investments[121], and often the most challenging to sustain. World Bank and GAIA data shows that WTE can cost as much as 190-1200 USD/ton of waste handled per year, compared to landfill's range of 5-50 USD/ton.[122] Therefore, because it is so expensive to operate, governments and municipalities (and thus their taxpayers) not only need to contract a large debt for investments; they also need to subsidize operational costs, which increases even more the burden on public budgets and households' living standards. - These financial constraints linked with incineration increase the above-mentioned disincentive to reducing and recycling: once governments have invested so much into a WTE facility and have to reimburse a high debt, they can't afford for the incinerator to be in deficit. This situation creates a lock-in effect, which traps countries and cities that invested in WTE. In that sense, governments cannot just say "let's try waste-to-energy and we'll see if it works or not". Once you invest, you are locked in for decades and all efforts to reduce waste generation and increase reusing/recycling rates are greatly compromised. - WTE facilities are so expensive and inefficient that they often have no option but to permanently shut down, which can end up costing municipalities considerable amounts of money to decommission and find waste management alternatives. For example, since 2000, at least 31 waste incinerators in the USA have closed.[123] There are also several examples of cities (e.g. Harrisburg in the USA[124]) that had to file for bankruptcy because of their investment in incinerators.

3.5. **INCINERATORS DO NOT REPLACE LANDFILLS** People may think: - *"With an incinerator, we don't need a landfill".* But actually: - **Incineration does not eliminate the need for landfills: ashes from burnt waste still represent 10 to 30% of the initial waste volume.** - **For WTE toxic ashes, cities need hazardous waste landfills instead of regular municipal waste landfills.** - **Zero Waste policies can reduce the need for landfills in a much cheaper and safer way.**	- Incineration can reduce initial waste by only 70 to 90%[125], which means that even after incineration, a landfill is still needed to dispose the remaining 10 to 30%. In other words, for every four tons of waste burnt, we get one ton of ash that needs to be disposed. This amount is not negligible, especially considering that incinerators jeopardize objectives to reduce waste generation at the source. Also, not all types of waste are allowed to be burnt anyway (e.g., halogenated products such as chlorinated plastic and fluorinated products), which means they require a secure storage space. - Even though this reduction ratio (70-90%) may appear high, if the goal is to reduce the volume of waste to burry in a landfill, Zero Waste policies can reduce waste to be landfilled at least in the same proportions[126], while being much cheaper and more relevant than incineration. - More importantly, ashes produced by waste incinerators are always extremely toxic. This means that while reducing waste volume, incinerators greatly increase its toxicity. Instead of requiring mainly regular landfills, cities that use WTE require additional hazardous waste landfills, which are more expensive and more difficult to build and properly operate. With such toxic ash landfills, the risks to pollute soils and water and to impact human health are much higher, especially if we consider that all landfills always end up leaking.[127]

3.6. **MANY COUNTRIES AND CITIES ARE MOVING AWAY FROM WTE: IT IS A FAILED TECHNOLOGY FROM THE PAST, NOT A NEW TECHNOLOGY FOR THE FUTURE**
 	
People may think:
- *"Incineration is a proven effective technology";*
- *"Waste-to-energy is a very promising new technology";*
- *"Many countries are successfully adopting waste-to-energy".*
 	
But actually:
- **The decades-long feedback we have on waste-to-energy shows it is not a well-functioning technology.**
- **Incineration is categorically harmful; wrapping it with modern and complicated technologies does not really change that.**
- **Many governments around the globe, starting with the European Union, are abandoning incinerators to adopt Zero Waste strategies instead.**
	- Europe and Japan have different contexts (different government systems and financing capabilities), which means that what allegedly "works" there is not necessarily good for Mongolia.
	- Anyway, all incinerators (including WTE) are globally challenged technologies, which have notoriously failed in the USA[128], where the significant number of shutdowns of WTE facilities shows that it fails often and declines by trend. There are countless other examples of WTE failures, including in Europe where it is supposed to be functioning best (see, for example, case studies[129] from the Netherlands[130], Denmark[131], France[132], Lithuania[133] or Spain[134] – among many others).
	- Realizing how incineration has been failing, the European Union has been moving away from WTE over the past 10 years[135], through successive policies and regulations that all tend to move towards Zero Waste alternatives:
	  • Roadmap to a Resource Efficient Europe (2011)[136]: "*incineration with energy recovery should be limited to non-recyclable materials*";
	  • Communication on the role of waste-to-energy in the circular economy (2017)[137]: recommendation to make WTE more expensive through taxation, reallocate public support to reusing/recycling, and put a moratorium on any new WTE facility while decommissioning old ones.
	  • Renewable Energy Directive (2018)[138]: phase-out of subsidies to waste-to-energy, especially if waste is not sorted.
	  • EU Cohesion Fund (2019)[139]: no more Fund money to WTE projects.
	  • Sustainable Finance - Taxonomy (2019)[140]: WTE is excluded from the EU list of economic activities considered as 'sustainable finance'.
	  • European Investment Bank (2020)[141]: fundings are stopped for WTE of plastics and mixed residual waste.
	- Some countries or cities have totally banned/stopped waste incinerators, including the Philippines[142] and US territories of Guam[143] and Finger Lakes region of New York State[144]. The Government of

	Denmark also announced a goal of 80% reduction of plastic waste[145] going to incinerators between now and 2030. Canberra (Australia) ban burning rubbish to create electricity[146] under a new ACT government energy policy. In 2001, Kamikatsu (Japan) banned the use of its incinerator[147] build 3 years earlier. There are many other examples in Europe and Asia.

4. ZERO WASTE IS NOT ONLY THE BEST OPTION TO SOLVE THE WASTE CRISIS, IT ALSO BRINGS MANY SOCIO-ECONOMIC, HEALTH AND ENVIRONMENTAL BENEFITS.

Main resources to read:

⇒ Ecosoum, *Turning Mongolia into a Zero Waste Country* (2023).

⇒ Ecosoum, *Should we introduce waste-to-energy in Mongolia?* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
4.1. **ZERO WASTE IS MORE THAN A SLOGAN: IT IS A POWERFUL STRATEGY TOWARDS PROPER RESOURCE MANAGEMENT AND TRUE CIRCULAR ECONOMY** People may think: - *"Zero Waste is just a slogan or a utopian goal";* - *"Zero Waste is a vague idea, not a clear strategy".* But actually: - **Zero Waste means managing resources efficiently, not just focusing on downstream waste management.** - **Zero Waste strategies are based on a strict hierarchy of priorities that must be respected to enable success.** - **Zero Waste includes various actions but they all share common features and key principles.** - **Zero Waste is essential to enable real circular economy and avoid greenwashing and false solutions.**	- Zero Waste means managing resources efficiently.[148] The Zero Waste approach invites us to change perspective when addressing the current waste crisis: we must go beyond the outdated model of "waste management" to embrace the more relevant concept of "resource management". Adopting a Zero Waste approach means addressing the entire life-cycle of these items to make sure none of them will actually become "waste". - Zero Waste strategies must strictly respect the Zero Waste hierarchy[149], which is an updated and improved version of the 3Rs principles: 1/ Refuse/Rethink/Redesign; 2/ Reduce; 3/ Reuse; 4/ Recycle/Compost/Digest; 5/ Material Recovery; 6/ Residuals Management; 7/ Unacceptable. Respecting this hierarchy is not an option: we should move to the next best solution, lower in the hierarchy, only if higher priority measures can really not be implemented. Unsatisfyingly, experience shows that most efforts are usually put on lower levels of the hierarchy (usually, from level 4 and below), which is why attempted actions have largely been failing. It is thus crucial to strictly respect this hierarchy when designing Zero Waste policies. - Successful Zero Waste strategies share a few transversal features and key principles[150], which primarily include: production of necessary data; at-source waste sorting and adequate separate collection; accountability of producers; people and communities at the center; decentralization of resource management; strong political will, leadership and communication. - Without Zero Waste at its core, "circular economy" is a concept that can easily be diverted and instrumentalized for conservative purposes that try to maintain the status quo of over-production and over-consumption. Policy-makers must be very cautious with alleged "circular" solutions[151] that are in fact mere greenwashing that can only lead the country towards a counterproductive increase of plastic production, use and disposal.[152]
4.2. **ZERO WASTE SAVES PUBLIC MONEY** People may think: - *"Zero Waste would be nice but it would cost too much";* - *"Public funding is insufficient to implement Zero Waste strategies".*	- Zero Waste systems are most often the cheapest way for cities to manage waste properly.[153] Strategies for saving money through Zero Waste can vary depending on the current state of waste management conditions, but existing World Bank data[154] show that opting for Zero Waste is always a cost-effective strategy – which is confirmed by various case studies. In a middle-income country like Mongolia, recycling costs for 1 ton of waste is estimated to 5-30 USD while landfilling and WTE incineration respectively cost 15-40 USD and 40-100 USD. - Waste collection is always relatively expensive (30-75 USD per ton in a country like Mongolia), which is why it is crucial to primarily focus on

But actually: - **Reducing waste is the best way to save money as collection costs are always high.** - **Material recovery strategies (reusing, recycling, composting) are always economically more interesting than disposal (landfilling or incineration).** - **Zero Waste actions tend to reinforce each other in a virtuous circle that saves more and more money.** - **Contrary to incinerators and landfills that create lock-in effects and long-term debts, Zero Waste investments pay off very quickly.**	waste reduction: the more waste a city reduces, the higher its cost savings. - A comprehensive Zero Waste system wisely implementing reducing, reusing and recycling tends to save more and more money: reduction of waste generation not only reduces collection costs but also enables enhanced collection, which in turn enables recovering more materials for reusing, recycling and composting – which eventually means a decrease in landfilling/incineration and associated costs. - Zero Waste investments can lead very fast to incredible reduction in waste management expenses. For instance, prior to Zero Waste program implementation, the City of San Fernando (Philippines) was spending 1.4 million USD annually on waste collection and disposal; with its Zero Waste program, the city has reduced its yearly spending for waste disposal to 677,404 USD in 2018 – a savings of over 50%.[155] Likewise, the city of Parma (Italy) has seen a 450,000 EUR reduction in overall annual costs for waste management after introducing a Zero Waste system.[156] These two examples are not exceptions: most cities that decided to implement a Zero Waste strategy experienced similar savings.
4.3. **ZERO WASTE CREATES JOBS AND STIMULATES ECONOMIES** People may think: - *"Landfills and incinerators create jobs and boost the economy";* - *"The number of jobs Zero Waste can create is not very high".* But actually: - **Zero Waste undoubtably creates much more jobs than landfills and incinerators.** - **Zero Waste creates jobs that are safer, greener and more interesting.** - **Zero Waste creates decentralized jobs all over the country, including in the countryside.** - **Zero Waste creates jobs and stimulates the economy way beyond the waste management sector itself.**	- Zero Waste strategies that entail to reduce waste generation and to sort/reuse/recycle create much more jobs – and jobs that are safer and greener. Reuse, recycling and remanufacturing create about 200, 70 and 30 times more jobs, respectively, than landfilling and incineration.[157] A study projected that Zero Waste policies that would lead to diverting 75% of waste from landfills and incinerators would generate over 2.3 million jobs in the United States alone.[158] - Another study explained that in developing countries, where informal workers play a significant role in the waste management chain, creation of incinerators actually leads to destroying more jobs than they create.[159] The same study showed that in the USA, recycling activities generated 10 to 20 times more jobs than incinerators. Another study also highlighted that in Europe, the increased policy focus on material recovery and recycling between 2000 and 2007 has seen the overall employment related to this activity increase from 177,000 to 301,000 – not including at-source waste separation and collection activities.[160] - In addition, it is important to stress that contrary to the few jobs created in WTE facilities, Zero Waste jobs can be decentralized and spread all over the country, especially in rural and peripheric areas where unemployment rates can be very high. All in all, Zero Waste policies stimulate local economies much more than landfilling and incineration could ever do. - The potential for job creation of Zero Waste systems goes way beyond the jobs created for waste management itself. Rethinking and redesigning our economies to follow Zero Waste principles and reconnect local producers and consumers would require to create countless small businesses to produce locally, all over the country and in various economic sectors, package-free goods to replace the over-wrapped ones that are currently transported on long distances. The list of goods that are useful to communities and could be produced locally without much packaging is endless.

	- In Europe, the packaging-free shop sector is growing rapidly, with an increasing number of shops, jobs, and sales turnover over the past ten years. Long-term forecasts present a mid-estimate EU market for bulk goods of 1.2 billion EUR in 2030, with a best-case potential reaching over 3.9 billion EUR.[161]
4.4. **ZERO WASTE HELPS MITIGATE AND ADAPT TO CLIMATE CHANGE** People may think: - *"Waste has nothing to do with climate change";* - *"Zero Waste cannot help to fight climate change".* But actually: - **Zero Waste can be a game changer in country strategies to mitigate climate change by eliminating GHG emissions from WTE and landfills.** - **Zero Waste systems also contribute to GHG reduction through enhanced carbon uptake and reduction of emissions associated with natural extraction and transport.** - **The mitigation potential of waste management is actually greater than the waste sector's own emissions.** - **Facing the climate emergency, Zero Waste solutions are much faster to implement than old-fashion waste disposal infrastructures.**	- Today, the waste sector is responsible for approximately 20% of global anthropogenic methane emissions[162] and, even when electricity generation is taken into account, each ton of plastic burned in a waste-to-energy incinerator results in the release up to 1.4 ton of CO_2.[163] - Zero Waste systems can contribute to GHG reduction in 3 main ways[164]: • At-source reduction, reusing/recycling and composting can avoid almost all landfill methane and WTE CO_2 emissions (and it reduces emissions associated with waste transportation). • Land application of compost or digestate enhances the carbon uptake of soils. • Source reduction and reusing/recycling of all municipal waste streams reduces "upstream" emissions from natural resource extraction, manufacturing, and transport. - The mitigation potential of waste management is actually greater than the waste sector's own emissions, as waste reduction and material recovery strategies enable cities to avoid emissions associated with natural resources extraction and production, as well as the end of life of material goods. Although it is usually recognized that the waste sector itself is responsible for 3.3% of global GHG emissions[165], a UNEP analysis concluded that the waste sector has the potential of achieving a 20% reduction in GHG emissions.[166] - Contrary to major landfills and incinerators, which can take many years to site, permit, build and launch, Zero Waste strategies can actually show amazing results within just a few months. For example, in Santa Juana (Chile), organic waste sent to landfill was reduced by 35% in the first four months of implementation of a Zero Waste program.[167] Likewise, Sălacea (Romania) went from almost zero recycling to 40% in the first three months of Zero Waste implementation.[168] In light of the emergency we are facing with the climate crisis, postponing proper resource management or relying on futuristic technologies is simply irresponsible. - Zero Waste practices are not only efficient measures for climate change mitigation, they are also considered adaptation strategies. For example, while flooding events are expected to multiply and worsen with climate change (as we have seen again in Mongolia in July 2023[169]), poor waste collection is recognized as an aggravating factor, especially when improperly managed waste ends up clogging drains and blocking streams.[170] Therefore, Zero Waste practices can help cope with and reduce impacts of floods.[171]

4.5. **ZERO WASTE PROTECTS HUMAN HEALTH AND THE ENVIRONMENT** People may think: - *"Waste doesn't have such a big impact on human health";* - *"Products and packaging impact human health and ecosystems only when they become waste".* But actually: - **Zero Waste strategies contribute to protecting nature and human health in many different ways, not only through better waste management but also upstream, all along the products' life-cycle.** - **Zero Waste is the only way to protect ourselves from extremely hazardous micro- and nano-plastics.** - **Zero Waste also directly contributes to saving natural resources and protecting the ecosystems they are extracted from.**	- At the waste management level, the Zero Waste approach makes incinerators totally useless, which enables avoiding the extremely toxic substances[172] such facilities routinely emit in the air and release into the environment through dispersion of hazardous ashes.[173] Likewise, Zero Waste leads to reducing the need for landfills and to adopting safer landfilling practices, which results in drastically reducing leakage of hazardous leachate that contaminates soils and groundwaters.[174] - The potential of Zero Waste for protecting human health and the environment goes way beyond the waste management level. We must keep in mind that what eventually becomes our waste has negative impacts all along its life-cycle[175], from extraction of natural resources and transportation to manufacture and consumption. - As explained in section 1., this is particularly true about plastics. Even – and most particularly – when we do not see them, small particles of plastics (micro- or nano-plastics) and the many chemicals they contain[176] penetrate our bodies and move through our lungs, blood, brain and many other vital organs, where they have terrible effects on our health (including cancers, endocrine disruption, reproductive disorders, etc.).[177] - Of course, these plastics affect not only humans, but also the rest of the biosphere, accumulating in marine[178] and terrestrial[179] food chains. By reducing waste at the source and better managing the waste that is unavoidably generated, Zero Waste protects us and other living things from this overwhelming toxicity. - Being inherently a "resource management" approach, Zero Waste also directly contributes to saving natural resources. By refusing single-use plastic and enabling reuse, refill and recycling, Zero Waste reduces demand for precious virgin materials. Doing so, high amounts of water and energy are saved, depletion of non-renewable resources is limited, and destruction of natural ecosystems is avoided.[180] Without a comprehensive Zero Waste strategy, it will be impossible to maintain ecosystems' health in the future.
4.6. **ZERO WASTE HAS ALREADY PROVED EFFICIENT AND SUCCESSFUL IN COUNTLESS COUNTRIES AND CITIES** People may think: - *"Zero Waste looks nice on paper but it has never been implemented in real life";* - *"Zero Waste is not as efficient as people think";* - *"Zero Waste may work in Western countries but it is not applicable in Asian countries like Mongolia".* But actually: - **Zero Waste have been proving successful and efficient in hundreds of cities all over the world.**	- The best way to convince ourselves of the relevance to implement a Zero Waste strategy is to have a look at some cities that successfully did in other countries. Ecosoum reviewed many case studies[181] from Europe and Asia, from both large cities and small villages – some of which are mentioned below: - Salacea (Romania): after only 3 months of Zero Waste program, total waste generated decreased by 55%, recycling rate increased from 0 to 40%, and separately collected waste rose from 1% to 61%.[182] - Bruges (Belgium): after only 2 years, 43% of food waste was prevented in the main hospital; for every euro invested in preventing food waste, the city saved 8 euros usually dedicated to food waste management.[183] - Besançon (France): within a few years, total waste generation reduced by 13%; residual waste was reduced by 77 kg/capita; in 2016, savings of around 800,000 euros of waste management costs.[184] - Roubaix (France): within 1 year, 70% of households reduced their waste generation by over 50%, and 25% of them by over 80% - which translated into important economic savings.[185] - Parma (Italy): in 4 years, total waste generation reduced by 15%; separate collection increase from 48% to 72%; residual waste rate decreased by 59%; 450,000 euros reduction in annual WM costs; increase in the number of jobs connected to waste management.[186]

- **Zero Waste works in both rich and developing countries.** - **Zero Waste works both in densely populated cities and remote rural areas.**	- Gipuzkoa (Spain): waste generation reduced by 7%; residual waste reduced by 32%; recycling rate raised from 32% to 51%; creation of 10 times more jobs in the treatment of waste; distribution of hundreds of tons of food to people in need.[187] - Ljubljana (Slovenia): in 10 years, while maintaining waste management costs among the lowest in Europe, total waste generation decreased by 15%; recycled/composted waste average went up to 61%; amount of waste sent to landfill decreased by 59%.[188] - Vrhnika (Slovenia): in 9 years, went from landfilling all waste to 76% separate collection of municipal solid waste (with generated waste decreased from 201 to 80 kg/capita).[189] - Argentona (Spain): within a few years, recycling rate doubled and number of jobs tripled; residual waste decreased by 15% and tens of thousands of euros saves from waste management costs.[190] - Capannori (Italy): in less than 10 years, waste generation reduced by 39%; separate collection rate increased to 82%; residual waste reduced by 57%; waste tariffs for residents reduced by 20%.[191] - Penang (Malaysia): in 1 year, waste generation per capita decreased by 25%; the next year, 43% recycling rate (while national average is only 21%).[192] - Kamikatsu (Japan): households themselves sort their waste into 45 categories and 81% of garbage is recycled, on top of what is reused and composted; 33% savings from former incineration costs.[193] - San Fernando (Philippines): waste diversion rate increased from 12 to 80% in 6 years; total ban on plastic bags with 85% compliance rate; savings from diverting waste from landfills of over 1.2 billion MNT.[194] - Tacloban City (Philippines): door-to-door waste collection system reaching 100% of households (compared to only 30% 4 years earlier) while reducing collection costs by 72%.[195]

5. EFFICIENT ZERO WASTE STRATEGIES INCLUDE A HANDFUL OF KEY POLICIES AND ACTIONS THAT ENSURE A QUICK AND ASTONISHING SUCCESS.

Main resources to read:

⇒ Ecosoum, *Turning Mongolia into a Zero Waste Country* (2023).

⇒ Ecosoum, *Zero Waste and Circular Economy: the Way Forward* (2020).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
5.1. **INVOLVING THE PEOPLE AND LAYING SOLID FOUNDATIONS IS THE BEST WAY TO GET STARTED AND ENSURE QUICK SUCCESS** People may think: - *"A top-down approach is the best way to enforce Zero Waste policies";* - *"We don't need to plan Zero Waste, we should just take action".* But actually: - **Formally committing to Zero Waste is the best way to get started.** - **Organizing participatory consultations is essential to involve and mobilize the people.** - **Establishing a clear baseline and developing a menu of Zero Waste options is crucial to design relevant policies.** - **Setting realistic goals and relevant monitoring indicators is the only way to relevantly monitor progresses.**	- To seriously start walking the path towards Zero Waste, the first thing to do is to make a formal commitment to it.[196] An official declaration from authorities is usually a powerful way to unite citizens around a joint and inspiring objective. More broadly, once committed to it, it is essential to consider Zero Waste as an overarching paradigm that should be explicitly reflected in all kinds of public policies. - It is crucial to genuinely get people on board for the Zero Waste journey by being inclusive and favoring a bottom-up strategy rather than a top-down approach. Despite what some people think, collective intelligence of the common people is usually the best way to make good decisions, which is why crowdsourcing policy-making is actually a rising trend worldwide.[197] National and local governments should thus organize people's consultations, assemblies and/or workshops from the beginning and all along the Zero Waste transition to ensure and maintain citizens' full involvement and support. - Public officers in charge of leading the transition towards Zero Waste need to gather all important facts and figures, while making sure that they are up-to-date and applicable to each context. Waste composition studies[198] and brand audits[199] need to be conducted at all relevant levels, along with gap analyses of policy/legislative framework, resources and infrastructure – in order to establish a clear baseline study[200]. All these analyses must be carried out with the Zero Waste hierarchy in mind, focusing primarily on the highest-level priorities. - Based on the baseline study findings, the next step is to develop a menu of all the potential Zero Waste strategies that could be implemented in a given context, and to conduct an economic analysis of each considered option to estimate the expected expenses and understand the potential cost-savings of each strategy. Community members can review the menu and provide feedback to help identify additional options for consideration, research, and analysis. - Zero Waste strategies must have clear and timebound goals and metrics to monitor progresses towards these objectives. Monitoring 'diversion rate' is a common practice[201], although it is absolutely not enough.[202] Considering the limits of each possible indicator, it is essential to have several of them that complement each other, in order to assess different goals and overcome the flaws of each metric.

5.2. **ENABLING SEPARATE WASTE COLLECTION AND MATERIAL RECOVERY IS THE ESSENTIAL BASIS OF ANY RELEVANT ZERO WASTE SYSTEM**
 	
People may think:
- *"We can properly manage waste even if it is not sorted at the source";*
- *"Our current waste management infrastructure is already suitable for Zero Waste";*
- *"Proper waste collection is too complicated to implement in a city like Ulaanbaatar".*
 	
But actually:
- **At-source waste sorting is paramount so it must be both legally mandatory and easy for people to carry out. PAYT schemes and different collection frequencies are proven efficient incentives.**
- **Resource/waste management infrastructure must be decentralized and adapted to the Zero Waste paradigm.**
- **Establishing a more enabling (legal, fiscal, logistical, etc.) environment and providing public support is necessary to develop this infrastructure.**
- **Waste collection services can be much more efficient if they are adequately reorganized, with a focus on organic waste in urban areas.**
	- Efficient resource/waste management systems cannot work without sorting and collecting each type of waste separately (with at least 3 categories: reusable/recyclable, organic/compostable, and residual/ultimate).
	- Therefore, all waste producers must be mandated to properly sort their waste at the source. There must be frequent controls and strict punishments for contraveners (for instance, in Korea violations of waste sorting rules can be fined up to 1,000 USD; in Germany, repeatedly not sorting your waste can lead to losing your apartment.[203])
	- This legal obligation to sort waste should be supported by a set of complementary measures, including: awareness-raising campaigns[204] to increase understanding and acceptance[205]; provision of user-friendly waste sorting equipment with clear guidelines[206]; standardization and clarification of the waste to be sorted; monetary and/or non-monetary incentives to reduce and sort waste. Experience shows that Pay-As-You-Throw (PAYT) schemes[207] (which charge people for the amount of waste they generate) usually show excellent results in terms of waste prevention, sorting and collection – with very good acceptance and satisfaction by the people.[208] Different collection frequency between recyclables/organics (collected often) and residual waste (collected less often) has also proved very effective in many cities.[209]
	- To allow Zero Waste policies to flourish and bear fruit, a dense network of adequate infrastructure must be set up.[210] This includes:
	  • *prevention infrastructure*: sharing centers, repair workshops and stores, second-hand stores, reuse facilities and services, refill shops, food waste salvaging systems, etc.;
	  • *recovery infrastructure*: decentralized Material Recovery Facilities and Zero Waste information centers to collect and sort waste; and
	  • *circular reprocessing infrastructure*: reuse and repair facilities, washing plants, recycling industries, composters and anaerobic digestors, etc.
	- Establishing a more enabling (legal, fiscal, logistical, etc.) environment and providing support is necessary to help attract investments, let businesses strive, multiply jobs, and grow national and local economies.[211] Such initial public investments can quickly be balanced by savings made on usual waste management expenses.
	- Enforcing at-source sorting creates virtuous circles that make waste collection processes much easier and faster for currently overwhelmed collection teams. For example, Ecosoum's study in Bulgan showed[212] that sorting and bagging waste at the source (instead of mixing all waste) would allow not only to carry out door-to-door waste collection three times more often (once a month instead of once every three months presently) but also to do it with only 10 staff instead of 17 as it is today.
	- Like in many countries and cities, waste that is not properly sorted and bagged should not be collected by waste collection teams. In Germany, for instance, waste collectors usually leave garbage bags on the curbside if they can see that waste is improperly sorted[213] (and contraveners can be fined on top of it).
	- Special attention must be given to organic waste collection to reduce expenses, prevent soiling recyclables and avoid disposing biodegradable matters in landfills. Provided that collection schemes are properly planned and that at-source waste sorting is effectively implemented, collecting organic waste is not necessarily more complicated than

	collecting other types of waste. For example, the Italian city of Milan (1.4 million inhabitants) is collecting organics from 100% of its population with an 88% separation rate and a contamination/impurity rate lower than 5%.[214]
5.3. **SUPPORTING AND INCENTIVIZING LOCAL ECONOMIES IS A POWERFUL LEVER TOWARDS ZERO WASTE** People may think: - *"Zero Waste and local economies have nothing to do with one another";* - *"Focusing on waste management is enough to move towards Zero Waste".* But actually: - **Supporting small businesses that locally produce packaging-free goods and services is a very effective way to move towards Zero Waste.** - **Public authorities should develop and/or update and clarify lists of businesses and activities that shall be systematically supported.**	- Zero Waste is a powerful tool to boost local economies and create sustainable green jobs. At all (national, provincial, local) levels, public policies should incentivize and support local businesses that tend to get us closer to our Zero Waste objective one way or another. That means supporting not only Zero Waste infrastructures (repair shops, reuse services, etc.) but more broadly all economic activities and social practices that tend to reconnecting local producers and local consumers while reducing waste generation (especially through reducing the need for packaging). - Governments – if possible, at the national level; but, if necessary/relevant, also at local levels – should develop and/or update and clarify lists of businesses and activities that shall be systematically supported in line with the Zero Waste paradigm. Eligibility criteria (economic sectors, products and services, best practices, etc.) and planned supporting measures (subsidies, tax breaks, zero-interest loans, public procurement priority, etc.) should be transparently established so that everyone clearly understands what activities are promoted and in what way they are incentivized. - Supporting measures must be designed taking into account the results of baseline studies, especially initial waste audits and gap analyses, so as to best match real needs. Policy-makers should always keep in mind that the devil hides in the details: best policies on paper are useless if hidden loopholes make them impossible to effectively implement in real life. That is why it is crucial to take into account the feedback of field-based stakeholders who know first-hand what actual constraints they are facing and what systemic changes are necessary to enable developing their activities.
5.4. **ENFORCING A SYSTEM THAT PREVENTS FOOD WASTE BRINGS COUNTLESS BENEFICIAL EFFECTS** People may think: - *"Food waste is not a priority";* - *"Food waste is organic so there is no problem with it";* - *"We don't produce so much food waste".* But actually: - **Waste prevention/reduction is particularly important when it comes to food waste, which is one of the main components of household waste.** - **There are various measures that can be taken to prevent food waste.**	- Considering that one third of the food produced for human consumption is wasted[215] every year throughout the world, preventing food waste at the source is essential. Food waste usually represents one of the largest components of household waste.[216] - Incidentally, food waste prevention brings countless beneficial side effects[217] (in terms of nutrition and food security, GHG emissions, financial savings for businesses, customers and municipalities, etc.). - In line with the 'hierarchy to reduce food waste'[218], specific measures can be taken, including[219]: • *Raising awareness and providing* restaurants, school cafeterias, hotels and other food service establishments with the technical assistance to identify wasteful practices and improve inventory management. • *Connecting growers and manufacturers to secondary resellers* that sell unwanted products and processed food at discounted prices to avoid waste and support food security. • *Encouraging retailers, food service providers, and consumers to purchase "ugly" products* in order to prevent edible products from being wasted because of irregularities in size, shape, or color. • *Eliminating all-you-can-eat practices* in food-serving establishments, or even menus that include unwanted courses and dishes that customers do not intend to eat.

- **Food waste that cannot be prevented should be systematically composted, as locally as possible.**	• *Supporting community education programs to help save money and reduce wasted food*, such as by distributing toolkits for households and businesses to calculate the costs of their food waste. • *Encouraging businesses to participate in voluntary food waste reduction programs* with the promise of cost savings (as it has been shown that investing in food prevention leads to saving much more money than what was invested).[220] • *Standardizing and clarifying food labeling*, as misinterpretation of date labels on food is often a leading contributor to food waste. • *Food that is not consumed for its primary purpose should be redistributed to people in need*, so as to reduce food waste and malnutrition at the same time (as an estimated 1 in 4 Mongolians experience moderate or severe food insecurity).[221] • When food waste cannot be rescued for human consumption, *leftovers and peels can be given to pet dogs and livestock*, as it is already largely done in rural Mongolia (and, to some extent, in ger districts). - Food waste that can't be prevented or recovered for human or animal consumption should be composted. Home-composting and community-composting should be favored whenever possible (by providing trainings[222] and equipment to residents) to reduce the need for transportation and the pressure on municipal infrastructure; but small- or medium-size, decentralized composting facilities are also needed (especially in cities) to enable composting all organic waste.[223]
5.5. **BANNING SINGLE-USE PLASTICS AND DISPOSABLE ITEMS IS WIDELY RECOGNIZED AS ONE OF THE PARAMOUNT MEASURES TO FIGHT AGAINST PLASTIC POLLUTION** People may think: - *"We don't need strict bans if we provide the right market incentives";* - *"We can recycle all single-use plastics";* - *"Single-use plastics bans are impossible to implement".* But actually: - **Banning single-use plastics (and other disposable items) is widely recognized as one of the paramount measures to fight against plastic pollution.** - **Single-use plastics bans are very popular measures all around the world.** - **Single-use plastics bans can be difficult to enforce effectively, but lessons learnt from other countries can help.**	- Single-use plastics bans can be a very powerful tool to fight against plastic pollution and it is also a very popular measure as a global survey showed that 75% of people want single-use plastics to be banned.[224] - However, such bans have not always led to tangible results, including in Mongolia. There are several reasons why such bans are not always effective, including:[225] • *Failure to embrace plastics' entire life-cycle* (for instance, it is impossible to fully ban plastics in shops if we do not impose restrictions in manufacturing, production, imports). • *Bans are rarely comprehensive*: they target only specific items (such as plastic bags) and/or are based on limited features (such as thickness). • *Lack of details and/or too many exemptions* (not applied in all economic sectors), which create loopholes that undermine or totally annihilate bans' effectiveness. • *Inconsistent and conflicting policies* which make bans ineffective (for instance, ban on single-use plastics on one side, but industrial/importation policies that encourage plastic use). • *Lack of political will, resistance and follow-up* to actually implement bans after voting and announcing them (after a few weeks, nobody talks about it anymore, so bans are not really implemented). • *Poor transition planning, unrealistic timelines, and/or too little public investment* to enable transition from single-use plastic towards alternative substances/products. • *Lack of clear targets, monitoring and transparency* about data and effective implementation, which creates doubts for consumers/citizens. - In light of these common pitfalls, we can conclude that for a single-use plastics ban to be successful, there must be: • clear purpose and timebound targets; • comprehensive and detailed regulation to avoid loopholes and gaps;

- **Banning intentionally-added micro-plastics is also vital to protect human health and support eco-friendly companies.**	• coordination and integration of plastics ban into overall policy/legal framework; • sufficient public investment and support during a relevant transition phase; • clear indicators and monitoring mechanism; • real political will and enforcement with sufficient follow-up and strict controls; • transparent and consistent communication to ensure public's understanding and acceptance. - Different types of single-use plastics can be banned progressively, starting with the most problematic and/or easiest to phase out. Banning single-use plastic bags can be relatively easy if the regulation is strict enough and alternatives (reusable bags[226]) are relevantly promoted. - Intentionally-added micro-plastics (such as the micro-beads used in personal care products and various other applications[227]) should also be banned to protect human health and ecosystems. Forbidding products and substances that use such harmful micro-plastics (which are often imported) could provide a strong incentive to develop safe alternatives in Mongolia.
5.6. **STANDARDIZING PACKAGING AND ELIMINATING TOXIC ADDITIVES IN PLASTICS WOULD FACILITATE THE DEVELOPMENT OF REUSE SCHEMES AND RECYCLING PROCESSES** People may think: - *"Standardizing packaging would not solve any problem";* - *"Plastics are not hazardous materials".* But actually: - **Standardizing packaging would not only help people sort their waste, it would also facilitate the development of reuse schemes and recycling processes.** - **Policy-makers should progressively introduce clear standards for all types of products, applicable to all companies and brands, starting with the most problematic and/or easy to implement.** - **Standards should also lead to eliminating toxic additives from plastics.**	- Waste management could become so much easier if all drink bottles, all yogurt pots, all shampoo containers, had the same standardized dimensions. They would be much faster and convenient to sort, clean, refill and recycle. Marketing issues should be considered secondary and should always come after ecological and sustainability considerations. - Standardization should be done in priority for food packaging and beverage containers (which constitute the bulk of household waste[228]): they should all be made reusable and systematically integrated into DRS schemes or other forms of reuse systems. - When products truly cannot be made reusable, regulatory standards should impose priority use of effectively recyclable materials (non-recyclable materials should be strictly banned when a recyclable alternative exists) and should prevent designs that make effective recycling impossible, even when theoretically-recyclable materials are used. Likewise, standardization measures should be used to push packaging industry to reduce the range and number of materials they use (especially in terms of plastic types) and stop making multi-material packaging that cannot be effectively recycled.[229] - Standardization of packaging material, shapes and dimensions should go along with the elimination of toxic additives that are used[230] throughout feedstock extraction and plastics production, manufacture, use, and disposal, as these hazardous chemicals represent a major obstacle to any kind of 'circularity'. Strictly applying the precautionary principle is the only way to avoid substituting additives under regulatory or consumer pressure with a 'chemical cousin' demonstrating similar (or sometimes even worse) risk profiles.[231] - Eliminating toxic additives is necessary to enable harmless usage and sound waste management processes (plastic recyclers being particularly exposed to these hazardous substances, which are routinely released during recycling operations).[232] As long as our plastics will include proven or potentially toxic chemicals, especially with such lack of transparency, it will be impossible to enable a safe circular economy.

- **Standardization of packaging could also have positive side effects on totally different fronts, such as fighting against alcoholism.**	- If we consider the positive effects that standardizing cigarette packages had in some countries such as Belgium or France[233], standardizing alcoholic beverages' bottles to make them more neutral could contribute to reducing alcohol consumption (which would be beneficial in a country that has one of the world's highest alcoholism rates[234], including among adolescents and youth[235]).
5.7. **REUSE/REFILL SYSTEMS AND DEPOSIT-RETURN SCHEMES ARE THE CORNERSTONE OF EFFICIENT ZERO WASTE SYSTEMS** People may think: - *"We don't need reuse systems when we can recycle";* - *"People will never make the effort to bring back reusable packaging".* But actually: - **A Zero Waste economy should always be based on reuse and refill systems, especially for its packaging, because it has lower ecological impact than recycling.** - **Returnable packaging systems with deposit (DRS) have proven to be the most effective and sustainable way to reuse materials and prevent pollution.** - **Reuse systems are usually preferable to refill because they are more systematic and they put the responsibility on producers rather than consumers.** - **For beverage containers, DRS is fairly easy to implement and is already operating with great results in dozens of regions worldwide.**	- Replacing single-use plastic by other single-use materials would not bring any circularity to the system; it would just replace one problem with another. For instance, massifying single-use paper bags to replace single-use plastic bags would raise other sustainability issues, starting with deforestation.[236] Likewise, increasing single-use metal (like aluminum cans) would come at a huge price for the environment.[237] - Even when using effectively recyclable materials such as aluminum or glass, recycling always brings more ecological impacts than reusing (although of course, the environmental relevance of reusing versus recycling is directly linked with the number of cycles a reusable item undergoes, which must counterbalance the initial environmental impact of its production).[238] That is why a Zero Waste economy should always be based on reuse and refill systems, especially for its packaging. - Reuse and refill systems can take several forms, including: refillable by bulk dispenser; parent packaging and concentrate refill; transit packaging; returnable packaging.[239] - The difference we usually make between 'reuse' and 'refill' systems is about who owns the packaging and have the responsibility: in reuse schemes, producers own and are responsible for their packaging while in refill systems consumers use and refill their own containers. Reuse systems are usually preferable, although it depends on the products and contexts.[240] - Returnable packaging systems with deposit – usually referred to as DRS ('Deposit Return Schemes') – have proven to be the most effective and sustainable way to reuse materials and prevent environmental pollution.[241] DRS is a system whereby consumers buying an item pay an additional amount of money (a deposit) that will be reimbursed upon the return of the packaging or product to a collection point. - Arguments in favor of DRS include: • DRS achieves the highest rates of separate collection – around 90% in Europe.[242] • DRS unarguably results in net savings for municipalities[243]; it does not imply extra costs for public institutions as it can finance itself. • DRS is a tool that is supported by many Fast-Moving Consumer Goods companies[244] because introducing a DRS scheme has no negative impact on sales trends.[245] • DRS is usually very well appreciated as people's support rates for DRS are always above 80%, often even much more.[246] • DRS is one of the most efficient instruments to tackle plastic leakage into the environment. For instance, DRS is reported to reduce drink containers in the ocean by up to 40%.[247] • DRS tends to create local jobs and to support a thriving local economy.[248] • DRS can promote eco-design for better recycling.[249] It is the best system to allow for bottle-to-bottle recycling and provides higher quality recyclates, which have a much higher market price.

	• DRS does not need a centralized organization to operate the system; once set up, it can manage itself through a decentralized combination of self-interest from each stakeholder involved.[250] • DRS for single-use items can be a stepping stone towards more refill and reuse, as the collection infrastructure is often the same. In addition, DRS of reusables can be perfectly combined with the recycling industry, which can handle the defect reusable containers.[251] - In some sectors, reuse systems seem to be implemented even more effectively with other types of incentives (rather than deposits). More specifically, fee-based systems – in which customers are charged a daily fee after a set time, until they return the reusable item or until the full cost of the packaging has been paid – are preferred to DRS in some cases.[252]
5.8. **ENSURING ADEQUATE PROCESSING AND LANDFILLING OF RESIDUALS IS KEY TO REDUCE WASTE POLLUTION** People may think: - *"State-of-the-art modern landfills don't pollute";* - *"There is no need to pre-treat waste that is landfilled".* But actually: - **All landfills leak, which is why residual waste must be adequately processed to limit pollution.** - **Material Recovery and Biological Treatment (MRBT) is the current best practice.** - **MRBT must never be used *instead of* functioning programs to reduce and source-separate waste, but *in addition to* and *as part of* a comprehensive Zero Waste system.** - **Landfills must not be oversized, to avoid lock-in effects and misuse of financial resources.**	- Considering that even state-of-the-art modern sanitary landfills leak pollutants[253] and emit methane[254], it is essential to ensure pre-treatment of residuals prior to landfilling. The current best practice for pre-treating residuals is usually referred to as "Materials Recovery and Biological Treatment" (MRBT).[255] - MRBT facilities essentially include three sections:[256] • a section to separate dry materials from organics (with primary screens after bag openers); • a mechanical sorting section (to recover recyclable materials); • a biological stabilization section (to reduce the fermentability of residual organics through a process essentially similar to composting). - In the end, such MRBT processes lead to reducing the volume/weight of waste disposed in landfills and to significantly decreasing landfill methane generation (by 80-90% or more).[257] But MRBT can recover only up to 30-35% of residual waste[258], which is why implementing MRBT cannot be used instead of at-source waste sorting/processing but in addition to it, as part of a comprehensive Zero Waste system. - In addition to MRBT, a final mitigation step that can be useful for landfills that continue to receive a large dirty organic fraction (or for older landfills with organic waste in place) is to use a biologically active landfill cover (biocover), which can reduce fugitive methane emissions by an average of 63%.[259] - Through its inherent recovery approach, MRBT further supports high diversion rates in communities with successful source separation programs. MRBT systems can handle both mixed waste and source-separated waste, meaning that the system can be adjusted to a declining tonnage of residuals as cities reduce waste and improve source separated collection. MRBT is much less expensive than waste-to-energy, and takes less time to be built and operational.[260] - Beyond its direct benefits, MRBT is also essential to produce paramount data. Analyzing the types of waste that make their way to the gates of landfills, through the Zero Waste system, is a crucial step to ongoingly improve resource management schemes. - Finally, although a landfill is unquestionably necessary to dispose biologically-stabilized residual waste, planners should beware of not overbuilding landfills, so as to avoid sinking all available resource/waste management financial resources into disposal infrastructure and prevent counterproductive lock-in effects that would undermine relevant Zero Waste policies.

6. PRODUCERS MUST BE HELD ACCOUNTABLE FOR THE WASTE THEY GENERATE DIRECTLY AND INDIRECTLY, OTHERWISE THEY WILL NEVER ADOPT ECO-FRIENDLY PRACTICES.

Main resources to read:

⇒ Ecosoum, *Who produces our waste? Brand audit report* (2022).

⇒ Ecosoum, *Turning Mongolia into a Zero Waste Country* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
6.1. **THE MAIN POLLUTING COMPANIES ARE PERFECTLY IDENTIFIED AND SHOULD BE HELD RESPONSIBLE FOR THEIR WASTE** People may think: - *"We don't really know which companies produce most waste";* - *"Main polluters are global corporations against which we can't do anything".* But actually: - **At global level, Coca-Cola, PepsiCo, Nestlé, Mondelez, Unilever and Procter & Gamble are the main waste producers.** - **But in Mongolia, 5 well-identified Mongolian companies (APU, MCS, Vitafit, GEM and GN Beverages) are producing over half of household waste.** - **Mongolian import/distribution corporations are also responsible for a significant share of our waste.**	- Worldwide, the main corporations that produce most of the waste have been repeatedly identified through countless brand audits.[261] Every year, the exact same Fast Moving Consumer Goods companies dominate the list, with The Coca-Cola Company clearly popping up as the number one polluter – followed by PepsiCo, Nestlé, Mondelez International, Unilever, Procter & Gamble, Mars Inc., Philip Morris International, Danone, and Colgate-Palmolive. - In Mongolia, the main waste producers have also been clearly identified thanks to Ecosoum's brand audit[262]: APU, MCS, Vitafit, GEM and GN Beverages are responsible for over 50% of all analyzed waste (if we count by weight, these 5 companies even add up to 69% of all waste). More precisely, we find that: • MCS (43%), APU (17%) and Vitafit (16%) are responsible for 75% of all PET bottles. Even if we include other kinds of plastics, these 3 companies remain by far the top plastic polluters in Mongolia. • APU alone is responsible for 66% of all glass bottles (mostly vodka), followed by GEM (19%). • APU alone is responsible for 88% of all aluminum cans, followed by MCS (3%). • APU (30%), Vitafit (27%) and Vitsamo (10%) are the main TetraPak producers. - In addition to these Mongolian producers, major Mongolian importing companies also appear as significant polluters (often by importing products from the main global polluters listed above). These main Mongolian importers notably include (but not limited to): Nomin, Altan Joloo, Tavan Bogd, E-mart, Orgil, Bayasakh Trade or Maximum Distribution.
6.2. **MOST OF HOUSEHOLD WASTE IS BEVERAGE AND FOOD SINGLE-USE PACKAGING FROM MONGOLIAN COMPANIES** People may think: - *"Food and drink packaging is only a small part of waste";* - *"Most waste comes from imported products so we can't do anything".*	- According to Ecosoum's audit, direct and indirect packaging of food and drink products represents over 90% of household waste (excluding organic waste and stove ash). By weight, drink containers alone account for 79% of all waste, while food packaging adds up to 19%. This massive predominance of drink/food packaging in household waste is consistent with the fact that 42% of all non-fiber plastics ever made have been used for packaging (and since food and drinks are the goods we buy and consume most frequently, it is logical that their packaging represents most of our waste).[263] - By number of items, sodas (19%), beer (14%), vodka (13%), juices (8%) and water (3%) represent more than half of all audited waste. Various food packaging (21%) and food/drink wholesales wrappings (10%) are also among the main types of waste we found in our audit.

But actually: - **90% of household waste is beverage and food packaging.** - **The majority of household waste is packaging of products manufactured in Mongolia, not imported from abroad.**	- Contrary to what many people think, 58% of all audited waste came from products manufactured in Mongolia, while only 25% were imported products (17% were not clearly identified). If we count by weight, Mongolian products account for 74% (due to heavy vodka bottles) while imported goods represent only 21% (5% unidentified). - It is thus clear that Mongolian drink/food companies altogether are the main waste producers in Mongolia and must thus play an active and central role in finding and effectively implementing adequate solutions to the current waste crisis.
6.3. **EPR POLICIES AND ECO-TAXES CAN BE RELEVANT BUT THEY ARE INSUFFICIENT AND DIFFICULT TO IMPLEMENT EFFICIENTLY** People may think: - *"Eco-taxes are easy to implement";* - *"Eco-taxes are sufficient incentives for companies";* - *"If companies pay eco-taxes, we can't ask them additional efforts".* But actually: - **EPR policies are important to put the financial and logistical accountability back on producers.** - **However, eco-taxes often have many limits and counter-productive effects, which is why policy-makers must be very cautious when designing EPR policies and eco-taxes.** - **Eco-taxes should not be designed and perceived as a "right to pollute" but as a real incentive for companies to adopt eco-friendly practices.** - **Incentives provided by EPR and eco-taxes should not be intended as an alternative to legal obligations/interdictions (such as single-use plastics bans or DRS schemes) but as an additional measure.**	- Extended Producer Responsibility (EPR) is theoretically defined as a policy principle aiming at "*extending the responsibilities of the manufacturer of the product to various parts of the entire life cycle of the product, and especially to the take-back, recycling and final disposal of the product.*"[264] In other words, EPR policies primarily aim at shifting the physical and/or economical responsibility of the product/waste towards the producer and away from municipality, while providing incentives to producers to design more eco-friendly products.[265] In practice, this responsibility is often reduced to a financial accountability based on the "Polluter Pays" principle, under the form of modulated eco-taxes.[266] - Although in theory EPR seems perfectly aligned with Zero Waste principles, real-life experience shows that EPR policies usually come with significant constraints, pitfalls and even counter-productive effects, which should not be underestimated. It is thus essential that Mongolian policy-makers take into account the lessons learnt from other countries when designing eco-taxes.[267] - In France, which is considered one of the most advanced countries regarding EPR for packaging (which started over 30 years ago), eco-taxes have many problems[268], including: companies receive mainly bonuses but almost no maluses; most maluses are not applied on plastics (but essentially on mineral inks in papers/cartons); most bonuses are given for basic actions (such as sorting instruction) but almost nothing if focused on more relevant actions (such as reuse systems). - All things considered, eco-taxes are essentially considered by companies as a "right to pollute", but they don't provide a real incentive to adopt more eco-friendly industrial practices, such as eliminating single-use plastics or setting up reuse systems. In that sense, EPR as we experience it is actually not consistent with Zero Waste principles, on the contrary. - The main reason why EPR has been failing has to do with the structure and governance of the "eco-organisms" that operate the system, which have clear conflicts of interests.[269] The board of these eco-organisms is composed of the companies that they are supposed to control and tax, which is why in the end eco-organisms often act as lobbying entities aligning on corporations' conservative positions, opposing their own fundamental mission to prevent waste.[270] - For EPR policies to be relevant and effective, policies must be designed in a way that: • prevents conflicts of interest and enables transparent governance; • respects the Zero Waste hierarchy and includes ambitious waste prevention targets; • drives a large part of eco-tax fundings toward developing reuse systems; • uses bonuses and maluses in a balanced and relevant manner;

	• raises enough money to cover actual waste prevention and management expenses rather than insufficient theoretical amounts; • includes sufficient details and comprehensive mechanisms to prevent loopholes that would make EPR inapplicable or ineffective.
6.4. **COMPANIES MUST STOP THEIR GREENWASHING COMMUNICATION AND START TAKING REAL ACTIONS TO REDUCE THEIR PACKAGING WASTE** People may think: - *"If companies offer a buy-back price for their bottles, it is enough";* - *"If companies say they reuse or recycle their packaging, it must be true".* But actually: - **Despite APU's claims, the company often finds various excuses to refuse buying back its used glass bottles.** - **So far, PET bottles are not really recycled in Mongolia, only downcycled into lower-quality products.** - **Companies must set up systematic take-back schemes to enable effective reuse and recycling systems.**	- The fact that APU officially/theoretically offers purchasing prices for its bottles does not mean that the company actually accepts to buy them back in reality. In fact, experience from Ecosoum and other local actors shows that most often APU finds many excuses (scratches, altered color, etc.) to refuse taking back their bottles. For example, early 2022, Bulgan soum's waste management staff spent countless hours sorting 4 million MNT worth of glass bottles that they considered in good condition; but APU refused to buy back most of it and paid only 89,000 MNT (app. 2% of the alleged value). The same thing happened to Ecosoum and others. In such conditions, no one can afford to spend time and money sorting and transporting glass bottles to Ulaanbaatar if there is no guaranty that APU will effectively buy them back. - Therefore, **companies should systematically buy back all of their packaging, whether it is reusable or recyclable and regardless of the condition.** Purchasing prices can be reduced if the bottles are damaged, though, in order to provide incentives to local waste workers to keep reusable/recyclable waste in the best possible condition. - In any case, companies should **stop using single-use containers and favor bottles that are actually designed for reuse**. In fact, if so many glass bottles are damaged before they are returned to beverage companies, it is because these companies choose to use (cheaper) fragile bottles intended for single-use. Therefore, it is actually APU's and other companies' fault if many bottles are scratched or broken. - After buying all their containers back, **companies should have the legal responsibility to carry out (or subcontract) effective reusing or recycling.** Indeed, if companies purchased back their packaging only to dump most of it in a landfill, it would not solve the waste crisis in any way. Companies like APU must develop not only efficient reuse schemes for their bottles, but also glass recycling infrastructure to make new bottles out of the broken ones. Incidentally, reuse/recycling facilities should be developed at aimag-level as much as possible to reduce the need for transportation to Ulaanbaatar. - Likewise, **MCS and other top plastic waste producers should transition to using reusable containers instead of single-use plastics**. When reusing is really impossible, they should take all necessary actions to **make sure that their plastic is effectively recycled into new bottles** and not downcycled into lower-grade items that are not recyclable anymore. Misleading use of the word "recyclable" should be forbidden, otherwise there will never be any real circularity in their packaging system. - Hoping that companies will voluntarily implement the above recommendations would be careless: **authorities must enforce an adequate legal framework to make companies mandated** to take action, at their own expense. Incidentally, if companies were really made legally accountable for taking care of their waste, they would quickly implement reuse systems to get rid of all this unmanageable single-use waste that would be too expensive for them to recover and process.

6.5. **COMPANIES MUST CONTRIBUTE FINANCIALLY TO ESTABLISH ADEQUATE RESOURCE MANAGEMENT SYSTEMS ALL OVER MONGOLIA** People may think: - *"If companies buy-back their packaging, local actors can cover waste management expenses";* - *"Soum administrations can balance waste management budgets on their own".* But actually: - **Selling back glass bottles or single-use plastics to companies at a low price does not provide local actors with sufficient fundings to implement proper waste management.** - **Companies should provide waste management operators with significant financial resources and/or logistical support to sustainably balance waste management budgets.**	- As Ecosoum clearly demonstrated with the example of Khishig-Undur soum, it is currently impossible for soums to sustainably balance budgets for comprehensive waste management.[271] Indeed, the money that can be raised from soum budgets, local waste taxes and selling of recyclables is always insufficient to sustainably cover all waste management expenses. - Therefore, **companies must provide local administrations with sufficient financial resources to manage their waste**. This financial support is particularly important for remote soums that currently have to spend a lot of money on transportation costs to ship sorted recyclables to Ulaanbaatar. Financial subsidies from companies should thus be indexed on the distance between soums and Ulaanbaatar. - **Companies should actually be mandated to organize by themselves and/or facilitate collection/transportation of their reusable/recyclable waste.** They could for instance use their trucks to take back waste to their factory after supplying local shops with fresh goods. They should also provide waste management operators with suitable containers (boxes, bags, etc.) to ensure proper transportation of reusable bottles (and thus limit damages). - If companies were obligated to provide financial and/or logistical support to local waste management operators (in other words, if waste management costs that companies have externalized on municipalities were re-internalized by companies), **they would be incentivized to improve their industrial/packaging practices to reduce the waste management costs that they would now have to pay**. In such conditions, companies would quickly implement reuse systems to get rid of all this single-use waste that is so expensive to manage today. - In addition, we should stress that the **State should also make introduction of local waste management taxes easier for soums**, in order to allow local administrations to dedicate more money to proper waste management. Current calculation methodologies are too strict and lead to establishing insufficient waste management taxes. The State should allow more decentralization on this matter and let soums decide by themselves how much taxes they want collect to solve their local waste problems in the way they see fit.

7. WE ALREADY HAVE INSPIRING EXAMPLES OF SUCCESSFUL ZERO WASTE ACHIEVEMENTS IN MONGOLIA THAT SHOULD BE REPLICATED ALL OVER THE COUNTRY.

Main resources to read:

⇒ Ecosoum, *How to set up waste management at the soum level - Guidebook* (2021).

⇒ Ecosoum, *Waste Management Master Plan template for soum level* (2023).

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
7.1. **THE WELL-FUNCTIONING WASTE MANAGEMENT SYSTEM SET UP IN KHISHIG-UNDUR SOUM COULD EASILY BE REPLICATED EVERYWHERE IN MONGOLIA** People may think: - *"Organizing waste management in soums is too complicated";* - *"Nobody ever succeeded in managing waste properly in Mongolia";* - *"It works in Khishig-Undur only because there were foreign investments".* But actually: - **Although it will still take time until all residents perfectly sort their waste, the waste management system set up by Ecosoum in Khishig-Undur soum is functioning very well.** - **This system is essentially relying on at-source waste sorting, pressing of recyclables, and selling to reuse/recycling operators in Ulaanbaatar.** - **The same system could easily be set up in any soum, most aimag-centers and even ger districts of Ulaanbaatar.**	- Despite all the systemic issues that need to be fixed to make resource management really sustainable and turn Mongolia into a Zero Waste country (elimination of single-use plastics, development of reuse systems, accountability of producers, etc.), setting up proper waste management at local level is actually not very complicated. Ecosoum has developed a guidebook that explains in detail how to set up proper waste management in soums[272] and how to estimate and plan a relevant budget[273]. - The main features of Khishig-Undur's system are: • Households, institutions and businesses are requested to sort their waste into several categories[274] (plastics, glass, organic, etc.). A waste sorting bin was provided to everyone. • Everyone is initially required to bring their sorted waste by their own means to the waste management facility. Then, people dispose their waste by category into carts though holes in a sorting bench.[275] When households have proven they can sort their waste properly, sorted waste is collected from their home by Ecosoum (the prospect of eventually having their waste collected from home acts as a non-monetary incentive for people to sort their waste). • Ecosoum team then further sorts and processes each category of waste in the facility. Reusable glass bottles are sorted by brand and broken glass is shredded to make aggregate for concrete. Plastics are sorted and pressed by type (PET, HDPE, etc.). Aluminum cans and paper/carton are also pressed. Finally, when we have enough to load a truck, reusable glass bottles are shipped back to producers and pressed recyclables are sold to recyclers in Ulaanbaatar. • People who sort their waste can also safely dispose their residual waste at the facility. Then, Ecosoum team disposes this ultimate waste in the nearby landfill, making sure to pile and cover disposed waste to prevent wind scattering. - Ecosoum does not purchases recyclables from people (to avoid increasing financial deficit[276]). Instead, we organize awareness-raising events and campaigns to explain people why waste should be sorted and why we do not purchase recyclables. Now, residents bring sorted waste to the waste management facility not with the hope to gain money but because they understand that it is the right thing to do, as responsible citizens, to prevent pollution. - Although all citizens don't perfectly sort their waste yet, the number of households sorting and bringing their waste to Ecosoum keeps increasing. The system is very well accepted and provides full satisfaction to users.[277]

	- Khishig-Undur context has nothing specific; it is a very average Mongolian soum. As such, there is absolutely no reason local accomplishments could not be replicated in any other soum. Ecosoum even showed that a similar approach can be relevantly implemented in aimag-centers[278], and it seems that most of this system could also be suited for Ulaanbaatar's ger districts. - To make necessary investments to set up this pilot waste management system, Ecosoum benefited from fundings from the European Union (through the SPRIM project[279]). However, the sustainability of the system is now ensured by local administration providing sufficient yearly budget to cover operational costs. In any case, soums can easily adapt Khishig-Undur's system to their own context, existing infrastructure/equipment and financial resources to make it work even without foreign initial investment.
7.2. **ECOSOUM DEVELOPED A COMPREHENSIVE 'WASTE MANAGEMENT KIT' THAT LOCAL AUTHORITIES AND NGOS CAN USE TO EASILY SET UP PROPER WASTE MANAGEMENT** People may think: - *"We don't know what to do to improve waste management";* - *"We don't know where we can find information and guidebooks".* But actually: - **Ecosoum gathered all the reports, guidebooks and videos produced over the years into a 'waste management kit' available (for free) on its website.** - **This kit provides all the necessary information to get started and quickly set up a proper waste management system.**	- All reports, guidebooks, videos and other important information are publicly available for free, in English and in Mongolian, on Ecosoum's website: www.ecosoum.org - All documents were also gathered in a downloadable 'waste management kit' that is frequently updated with the latest reports and other relevant materials. - Ecosoum always remains available to answer questions and provide guidance to anyone who wishes to improve waste management in their community.
7.3. **MONGOLIA OFFERS MANY OTHER INSPIRING EXAMPLES OF ZERO WASTE ACCOMPLISHMENTS THAT PUBLIC AUTHORITIES SHOULD SUPPORT AND PROMOTE** People may think: - *"Khishig-Undur is an exception, it doesn't work anywhere else";* - *"There is no example of good Zero Waste initiative in Mongolia".*	- In Mongolia, Khishig-Undur is not the only soum that has made efforts and progress towards proper waste management. There are many other examples of inspiring initiatives that are aligned with the Zero Waste principles and policy recommendations described in the previous sections. Among these Zero Waste initiatives that should be promoted, supported and replicated, we can particularly highlight the following: • **Khantai bag in Khutag-Undur soum (Bulgan aimag)**: the dynamic local community is making up for the lack of financial resources. They adapted Ecosoum's system in Khishig-Undur to set up a small waste collection station (with just a few million tugriks) and households are taking turns every week-end to process the collected waste (sorting, pressing, etc.). Under the supervision and guidance of voluntary rangers, the community is looking to implement additional Zero Waste

But actually: - **There are many initiatives in Mongolia that contribute one way or another to getting our country closer to becoming Zero Waste.** - **Zero Waste initiatives that are not immediately successful are not proofs that they are irrelevant, they just demonstrate that they need more support from public authorities.**	actions at local level, such as replacing some single-use plastics by reusable bags and containers. • **Single-use plastic ban by decree of Government of Mongolia**: as of March, 2019, Mongolia banned the import, production, and use of single-use plastic bags thinner than 0.035 mm.[280] Despite difficulties to fully and effectively enforce the decree (due to some of the issues mentioned in section 5.5.), this ban was a good start. It did send the right message and contributed to reducing plastic waste generation (for example, many kindergartens replaced single-use plastic shoe covers by reusable ones made of cotton). While this law could be updated and strengthened to be even more effective at the national level, authorities at aimag or soum level should also be proactive and enforce their own local bans on single-use plastics. • **'End Waste' Charter**: in 2023, Ecosoum and other NGOs launched the 'End Waste' Charter of principles[281] intended to set a Zero Waste horizon and bring a united framework to all actions for solving the waste crisis in Mongolia. This Charter is already signed by many organizations, including local NGOs, international organizations, public institutions, recycling companies and private businesses. • **Refill system at Green Gate International LLC**: the company set up a refill system for one of their brands ("Purenn" household cleaning products)[282] in Ulaanbaatar and offers 40% discount to customers who bring their used bottles. This system not only benefits the customers (by providing cost savings) but also contributes to reducing plastic waste. • **Reusable baby diapers**: several Mongolian brands – such as Goodbum[283], Serious Fox[284] and Erkh Tsagaan[285] – produce and sell washable and reusable diapers that are a perfect alternative to the single-use diapers that can't be recycled and dramatically pollute the environment. • **Zero Waste shops**: some stores in Ulaanbaatar – e.g. Tsomhon eco shop[286], Green stock[287] or Eco Life Mongolia[288] – have embraced the Zero Waste principles to sell various types of eco-friendly and packaging-free goods. Some Mongolian brands like Aruna organic[289] and Дулаан Сэтгэл[290] are making special efforts to reduce packaging for most of their products. • **Promotion of repair services for electric appliances**: the SPRIM project promoted the work of electric appliances repairers in Bulgan soum.[291] Repairing instead of purchasing new items is one of the best ways to avoid generating waste, which is why this practice should be systematized. • **Uudam Mongol Secondary School:** like other establishments, this school is actively adopting environmentally friendly practices and successfully implementing waste reduction, sorting and recycling programs. In cooperation with Mongolian Sustainable Development Bridge, the school is promoting environmental awareness and responsible consumption among students and educators, through organization of various events and training sessions. - Many other examples could be added to this non-exhaustive list.

8. THE WORLD NEEDS AN AMBITIOUS AND BINDING GLOBAL PLASTICS TREATY, AND MONGOLIA HAS A ROLE TO PLAY IN INTERNATIONAL NEGOTIATIONS.

Main resources to read:

⇒ GAIA, BFFP, CIEL and EIA, *Global plastics treaty* (2022).

⇒ Updates of international negotiation process from leading organizations GAIA and BFFP.

KEY MESSAGES (What people need to understand)	**MAIN ARGUMENTS AND FACTS** (What arguments, facts and sources support the key messages)
8.1. **TO END THE GLOBAL PLASTICS CRISIS, WE NEED A LEGALLY BINDING INTERNATIONAL TREATY THAT ADDRESSES THE FULL LIFECYCLE OF PLASTICS AND LIMITS PLASTIC PRODUCTION** People may think: - *"Each country can solve its plastic problem on its own";* - *"Such international treaties are usually not effective";* - *"The treaty does not need to be legally binding".* But actually: - **Plastic pollution does not respect borders, so we need to tackle the plastic crisis with an international framework.** - **A legally binding treaty is the only way to ensure that all countries take relevant actions.** - **Pressure from the civil society is crucial to ensure that negotiations are not diverted by oil and plastic lobbies.**	- Plastic pollution does not respect boundaries. Therefore, beyond what each country can do on its own, the response to the global plastics crisis necessarily requires a global response within an international framework.[292] Fossil oil and gas (plastic's feedstock materials), plastic polymers and additives, plastic products and packaging, and plastic waste are all traded internationally, which is why national policies are insufficient. In particular, limitations on global plastic production necessarily require international cooperation. - Currently, plastic is largely unregulated under international law: only a few aspects are patchily addressed by treaties such as the Basel, Stockholm, and London Conventions.[293] A new legal instrument, covering the entire lifecycle of plastic, thus appears essential to tackle this planetary crisis. - With a historic resolution on March 2nd, 2022, the United Nations approved a landmark agreement to create the world's first-ever global plastics pollution treaty, adopted upon the conclusion of the resumed fifth session of the United Nations Environment Assembly (UNEA 5.2).[294] - The mandate, titled "End plastic pollution: Towards an international legally binding instrument"[295], sets the stage for governments to negotiate a comprehensive and legally binding treaty that is supposed to cover measures along the entire lifecycle of plastic. In addition, the mandate serves to guide the development of the treaty itself, which an International Negotiating Committee (INC) has been tasked with drafting by the end of 2024.[296] - As countries have entered the negotiation phase towards this Global Plastics Treaty (GPT), which is supposed to be ready by the end of 2024 after at least five rounds of negotiations, the pressure from civil society is crucial[297] to ensure that: • the negotiation process includes not only lobbies from oil and plastic industries that aim to weaken the treaty[298] but also meaningful and diverse public participation; • the resulting treaty addresses the entire lifecycle of plastics (not just their end-of-life) and is effectively made legally binding (not only based on voluntary EPR and offsetting plastics-credits schemes); • the treaty includes targets and deadlines to globally reduce the total quantity of plastic produced worldwide[299] (because currently there is simply too much plastic to be managed); • the treaty advances environmental justice (by prioritizing the health, livelihoods and expertise of communities and workers all along the plastic supply chain), clearly rejects false solutions (such as the ones described in section 2. and section 3.), and enforces measures to improve plastics circularity by eliminating toxic additives and avoiding

	the most problematic plastic polymers (and more broadly by enabling other Zero Waste recommendations from section 5.).
8.2. **MONGOLIA SHOULD JOIN THE 'HIGH AMBITION COALITION' AND TAKE MEANINGFUL ACTIONS AT THE INTERNATIONAL NEGOTIATION COMMITTEE** People may think: - *"Mongolia doesn't need to get really involved in the process";* - *"Mongolia is not powerful enough to influence the treaty anyway";* - *"We don't need an international treaty to tell Mongolia what to do".* But actually: - **So far, Mongolia doesn't seem to take the GPT issue seriously and has been very inactive at INC.** - **The official statement of Mongolia at INC-1 was very concerning as it essentially promoted waste-to-energy and did not suggest any ambitious Zero Waste-oriented solution.** - **Mongolia must join the 'High Ambition Coalition', reject all false solutions, and start opting for Zero Waste measures.**	- While some countries linked with oil and plastic industries (USA, Saudi Arabia, etc.) are trying to slow things down and weaken the treaty[300], other nations are fighting for a bold and binding treaty. This group of countries – which is led by nations like Rwanda, Ecuador, Norway and Peru, among others – is known as the "High Ambition Coalition" (which also includes the European Union).[301] - As of 2023, Mongolia has not been active at INC[302] and doesn't seem to take the Global Plastics Treaty seriously. Therefore, we need the Mongolian people, NGOs and media to demand that Mongolia joins the "High Ambition Coalition" and adopt relevant positions to enable a Zero Waste future. - Mongolia's official position at the beginning of the INC process was very concerning as it essentially went against the Zero Waste principles. More specifically, Mongolia's statement at INC-1[303] focused primarily on introducing waste-to-energy in the country, which would not solve the waste crisis and would increase health and environmental impacts (as explained in section 3.). - In addition, as Ecosoum highlighted in an analysis note[304], it is problematic that Mongolia's only quantitative objective mentioned in the statement concerns *recycling*, while there is no mention at all of *reducing* nor *reusing*. Likewise, there is no evidence in the statement that Mongolia supports the idea of a Zero Waste and lifecycle-based approach, although it should be paramount for all the reasons explained in this document. - It is thus vital that Mongolia reconsiders its approach at the INC and reorientates its strategy towards Zero Waste objectives. - If this specific treaty eventually turns out insufficient or unsatisfying, Mongolia should remain at the forefront of international negotiations until a suitable Zero Waste-oriented global treaty is finally signed and enforced.

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