Overview document

June 2022

Better batteries:
Malmö's roadmap toward ethical and climate-smart public procurement of e-vehicle batteries

EU CITIES FOR FAIR AND ETHICAL TRADE AWARD

City of Malmö

International Trade Centre

Funded by the European Union

TDi Sustainability

PROJECT BACKGROUND

This document was prepared by the International Trade Centre (ITC; UN/WTO) and the City of Malmö (Sweden) as a summary of the main recommendations developed under the 'Better Batteries: Malmö's roadmap toward ethical and climate-smart public procurement of e-vehicle batteries' project. The project was implemented by ITC and financially supported by the European Commission, Directorate-General for Trade, as a follow-up activity for the winner of EU Cities for Fair and Ethical Trade Award 2021, the City of Malmö.

Malmö received the award in recognition of its holistic approach to integrating fair and ethical trade into its multicultural community of consumers, businesses and civil society, its innovative policies, and its forward-looking strategy. The city is committed to being a net-zero carbon municipal organization by 2030. Re-thinking of transportation and related procurement policies plays one of the key roles in the process of climate transition. One of the solutions is vehicle fleet electrification. The e-vehicle (EV) battery supply chains are however often associated with several social, environmental and governance (ESG) risks, which are most pronounced in producer countries with weak enforcement of regulatory, industry and international frameworks and practices. These pertain not only to human rights issues and environmental degradation, but also to high levels of greenhouse gas (GHG) emissions related to the EV supply chains. Approaching the climate transition holistically therefore requires greater knowledge of both, the sustainability issues and the GHG emissions associated with the entire product lifecycle. Better informed procurement practices by cities – as large public procurers – can help address many of the ESG issues.

The project therefore aimed to scrutinize the risks associated specifically with the EV and e-bike (EB) batteries and to outline a public procurement roadmap with strategic focus areas in managing risks related to the lifecycle of batteries. This knowledge will feed into future possible adjustments in Malmö's procurement approach on batteries and related product groups. The document is available for anyone aiming to procure EVs and/or EBs. Ultimately, the city of Malmö aims to be able to procure e-vehicles with ethically certified batteries and GHG data, fully disclosed. In line with the fair trade principles and market dialogue, Malmö aims to collaborate with stakeholders to not only *avoid* risks, but also help the supply chain *adress* risks and develop to a point where e-vehicle procurers are not limited to only a select few suppliers meeting progressive criteria.

The research on the underlining project Risk Report as well as the Roadmap Report was led by TDi Sustainability, a consulting firm headquartered in Gloucestershire, United Kingdom, specializing in business strategy and risk management.

In what follows, ITC and Malmö aim to outline the larger risk groups considered for the development of the Roadmap, as well as the structural recommendations and strategic focus areas proposed to manage these risks.

- The Roadmap itself is a living document, subject to further peer-learning around the public procurement of EVs and EBs in the future.

Interested to learn more?
Email Olov Källgarn *olov.kallgarn@malmo.se*, or sign up to our newsletter here.

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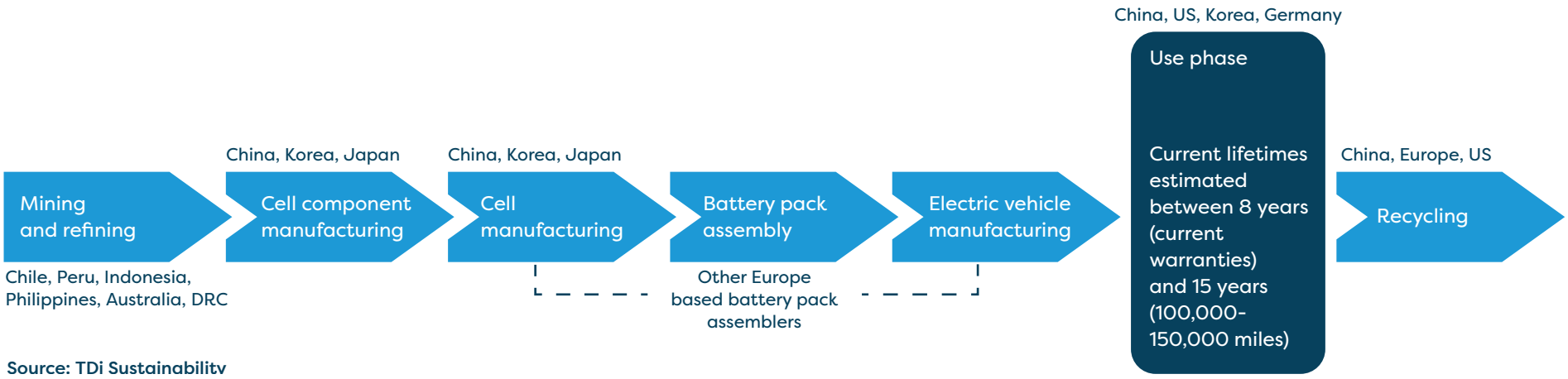
CHALLENGES IN ETHICAL PROCUREMENT

While e-vehicles (EVs) and e-bikes (EBs) have many benefits, particularly in improving urban air quality and reducing CO_2 emissions, surging global demand over the next decade is forecast to result in the need to extract greater volumes of some raw materials – notably cobalt, lithium, manganese, and nickel. The supply chains of these materials are associated with several ESG (environmental, social and governance) risks. Moreover, the extraction of raw materials and the manufacturing of battery cells results in high levels of CO_2 emissions. This reduces some of the benefits of EVs and EBs in cutting CO_2 emissions, although the impact differs depending on where the batteries are manufactured.

The automotive sector's difficulties in addressing human rights issues are another cause of concern. In 2020, the automotive manufacturing sector was assessed according to the Corporate Human Rights Benchmark (CHRB) for the first time and averaged a score of 11.9 percent – the lowest ever score for a CHRB-benchmarked sector.

Source: *https://www.worldbenchmarkingalliance.org/publication/chrb/*



Source: TDi Sustainability

Public procurement of EV and e-bike batteries: what are the main considerations?

THE FOLLOWING FOUR KEY RISK AREAS WERE IDENTIFIED AND CONSIDERED:

Key risk 1

The mining and refining of battery materials, and the manufacturing of battery cells, is associated with **high GHG emissions**. The level of emissions varies depending on where raw materials are sourced and where the battery cells are manufactured.

Key risk 2

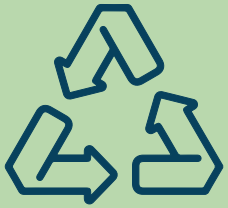
The mining and processing of raw materials used in common battery types is associated with several **ESG issues**, the most serious of which is child labour in cobalt mining.

Key risk 3

Transparency in battery value chains is generally limited, making it difficult for downstream users to ensure batteries and their raw material inputs are produced in accordance with international best practice.

Key risk 4

Some of the current **recycling methods**, such as hydrometallurgical and pyrometallurgical processes, are associated with negative environmental and social impacts.



Key risk 1: High carbon emissions in battery manufacturing

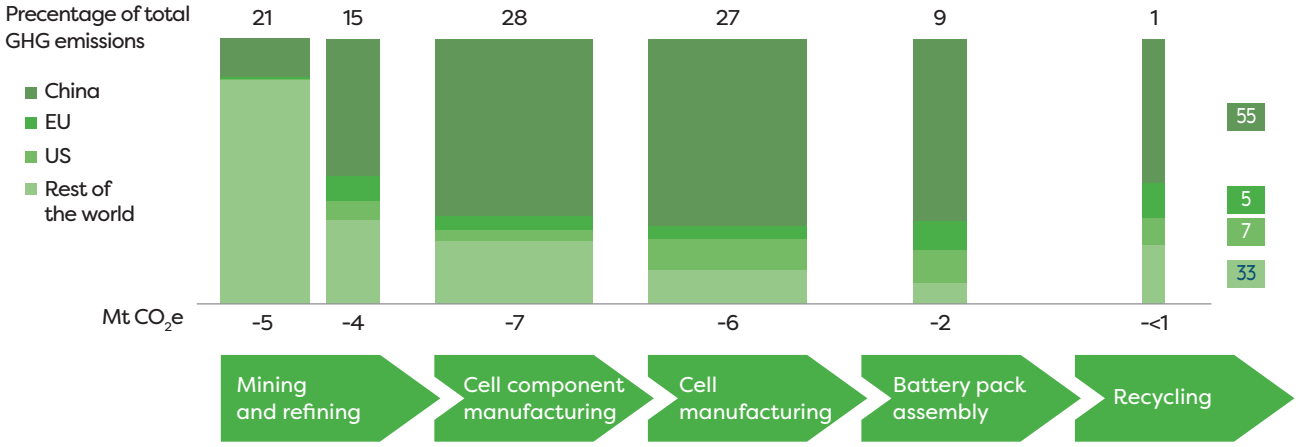
- The production of lithium-ion batteries is associated with **high levels of greenhouse gas (GHG) emissions, both at the mining and refining stages, as well as the battery cell manufacturing stages** of the battery value chain:
  - The manufacturing stages are the most GHG emission-intense phases. **The level of emissions associated with cell manufacturing depends largely on the location of the facility where the battery cell is manufactured.** 'Gigafactories' located in countries where the electricity grid is substantially reliant on coal have a far greater carbon footprint than, for example, the new Northvolt facility in Sweden, which is powered entirely by renewable energy (see Table below).
  - The carbon intensity of the mining stages exacerbates this situation: on average, producing one tonne of lithium carbonate and class 1 nickel generates emissions that are three and ten times higher, respectively, than those generated from producing one tonne of steel.
- **Sweden has one of the least carbon-intensive energy grids in Europe**, meaning that carbon emissions from **recharging electric batteries** are minimal. As a result, high emission intensity of the production phases of lithium-ion batteries **does not negate the advantages** of an economy based on clean energy technologies. The break-even mileage needed to compensate for production emissions vary between 97 000 km to just 11 500 km from worst to best case, with best case representing battery production and recharging in a country with a low emission energy mix such as Sweden. This means procurement decisions and energy mix can make a major difference. Transport & Environment has an online calculator for these different scenarios.

Levels of emissions in battery manufacturing vs. country energy mix

	SELECTED BATTERY MANUFACTURING LOCATIONS	CO_2 INTENSITY OF ENERGY MIX (CO_2/TES)
SWEDEN	Northvolt - Skellefteå	16.9 t CO_2/Tj
HUNGARY	SK Innovation - Komárom Samsung SDI- Göd	39.9 t CO_2/Tj
UNITED KINGDOM	Britishvolt - Blyth	46.8 t CO_2/Tj
SOUTH KOREA	Samsung SDI - Ulsan	49.4 t CO_2/Tj
GERMANY	Tesla - Grünheide CATL - Erfurt	50.4 t CO_2/Tj
UNITED STATES	Tesla- Reno	50.4 t CO_2/Tj
JAPAN	Panasonic - Himeji	61.4 t CO_2/Tj
POLAND	LG Chem - Wroclaw	65.2 t CO_2/Tj
CHINA	BYD - Xining CATL- Ningde	69.5 t CO_2/Tj

Source: IEA, 2021 and TDi

GHG emissions per EV supply chain stage

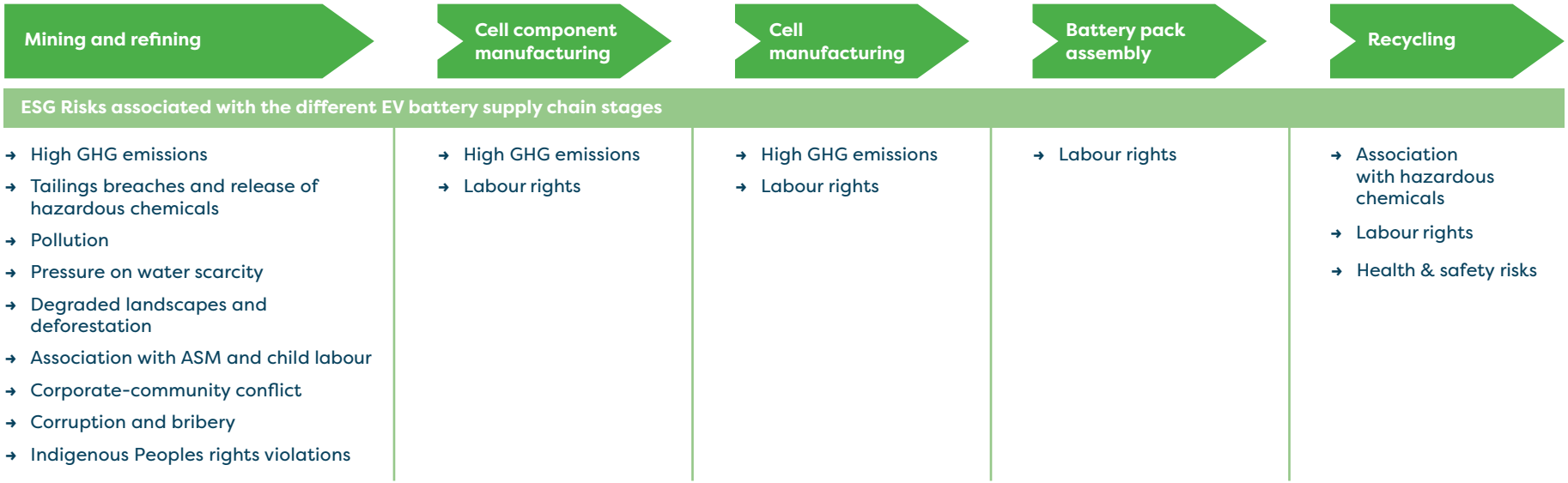


Source: WEF and TDi analysis

Key risk 2: Child labour, health and safety and other ESG issues in mining battery materials

- **Of the ESG issues associated with cobalt, child labour and health and safety are the most prominent.** Around 70% of cobalt is produced in the Democratic Republic of the Congo, of which up to 20% is produced by the artisanal and small-scale mining sector. Major downstream companies have faced considerable scrutiny and even legal action over their use of cobalt because of its association with child labour and safety risks to workers.
- Other significant ESG issues include:
  - **Extracting lithium from brine is highly water intensive.** This is an increasing cause of tension between mining companies and indigenous groups.
  - **Nickel mining is associated with threats to biodiversity in areas where the mining of nickel is increasing to meet the demand of battery manufacturers.** Processing of nickel is also highly carbon intensive.
- **There is emerging, yet still limited, evidence on potential and actual labour rights violations in battery manufacturing. These currently receive less attention, and manufacturers have rarely faced high-profile accusations. However, it should be noted that many countries where battery manufacturing is concentrated have been subject to allegations of poor labour working conditions.**

ESG risks per EV battery supply chain stage



Source: WEF and TDi Sustainability

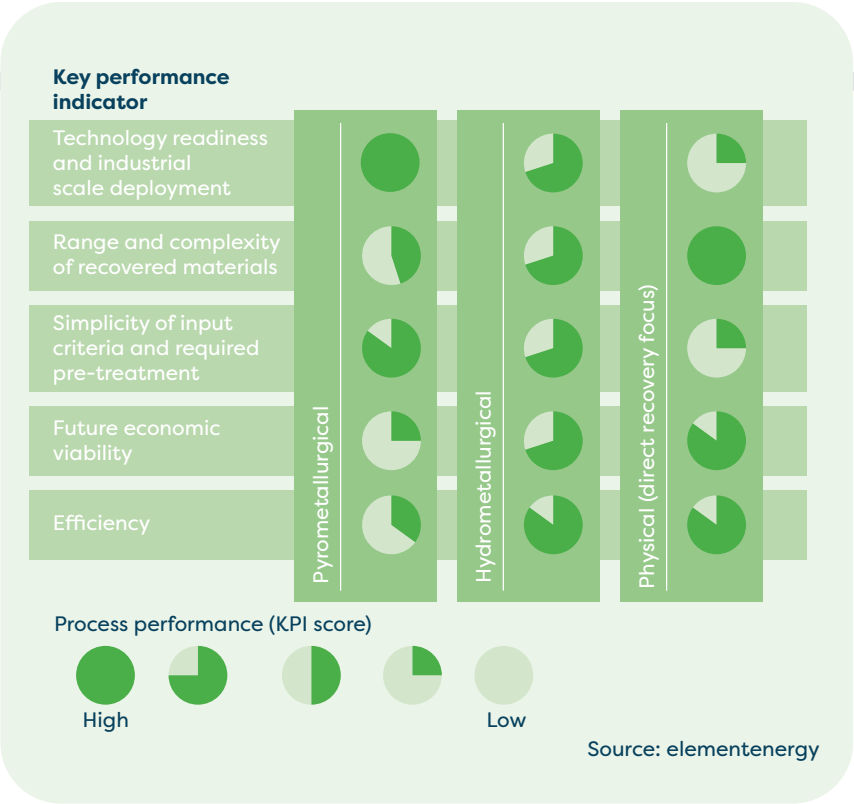
Key risk 3: Lack of transparency in battery supply chains

- **Car manufacturers** tend to disclose the manufacturer of the battery cells used in their vehicles. Several leading car manufacturers have engaged in various **initiatives designed to ensure that battery raw materials are sustainably and ethically sourced.** Such initiatives generally **focus on cobalt**, given the heightened ESG risks associated with this material.
- Some car manufacturers have **begun to commission audits of their battery material supply chains**, although limited information on the results of these audits has been published to date.
- **Battery manufacturers typically publish very limited information on the origin and supply chains of the raw materials used in their products.** At least two major manufacturers do share the list of cobalt smelters and refiners that they source from and require cobalt smelters and refiners to receive a third-party audit. No battery manufacturer is known to provide similar transparency on other battery materials.

The pending EU battery regulation proposes supply chain due diligence obligations for EV battery manufacturers; this would require manufacturers to disclose raw material suppliers and the country of origin of the raw materials. The draft provisions apply to "electric vehicle batteries with internal storage with a capacity above 2 kWh." EB batteries would be classified as "portable batteries" under the draft regulation, providing they weigh less than 5 kg, and would not be covered by the due diligence requirement.

Key risk 4: Some of the current recycling methods are associated with environmental and social impacts

- While beneficial over simple waste disposal, materials recovery from lithium-ion batteries in the recycling stage may also impact the environment and human health. Various studies have shown that each of the currently employed recovery processes, i.e., both hydrometallurgical and pyrometallurgical techniques, have an environmental impact due to the release of CO_2 and other toxic substances.
- **Currently, as little as 5% of lithium-ion batteries are recycled at the end of their use phase, according to some estimates.** The lack of recycling capacity can increase the possibility of contamination of soil, water, and air, and of harmful effects on human health. Also, the lack of recycling means that there are greater requirements to mine new supplies of raw materials, which in some cases is linked to negative ESG impacts.
- **The extent of battery recycling and re-use is likely to increase in the next 10 years,** both for economic and environmental reasons.
- However, **battery recycling is itself associated with potential negative impacts on the environment—including through air and water pollution—and human health.** This is particularly the case in countries outside of the EU, where standards of environmental regulatory enforcement are weaker.



Source: elementenergy

Sustainability standards and initiatives in the battery supply chains

While there are several Voluntary Sustainability Standard (VSS) schemes or certifications that are used to assure good performance at different points in the battery supply chain, such as mining and processing of minerals, currently there is **no VSS designed or applicable specifically to EV batteries that covers all phases of the value chain.**

The Global Battery Alliance (GBA) is developing the GBA Battery Passport, which is intended to cover the important sustainability issues in the supply chain. The GBA has not yet set a timeline for when the Battery Passport will come into effect. The proposed EU Battery Regulation mandates that an electronic record, which it refers to as a battery passport, should be required for EV batteries from 2026. However, the **EU Battery Regulation** does not specifically refer to the GBA Battery Passport, suggesting that other electronic records may be allowed.

At the mining and processing level, different types of VSS exist: (a) reporting frameworks, (b) operating frameworks, and (c) due diligence frameworks. These are used by different industry stakeholders (investors, rating agencies, Original Equipment Manufacturers) for different purposes. **Operating frameworks and due diligence frameworks are most relevant for cities and public procurers, as they can give assurance that the relevant actors in the supply chain are effectively managing any ESG risks that may be present.**

In the future, mandatory approaches will increasingly govern the ESG performance of value chains. In the EU, the applicable frameworks will be (1) the above-mentioned EU Battery Regulation, as well as the (2) EU Corporate Sustainability Due Diligence Directive (CSDDD, proposed in February 2022). The EU CSDD Directive would require all companies above a certain size to carry out due diligence 'with respect to potential or actual adverse impacts on human rights, the environment and good governance in their operations and business relationships'. This could translate into a set of requirements on companies, where the draft text of the directive refers to many international standards. In practice, the directive seeks to apply the framework set out in the UN Guiding Principles on Business and Human Rights (UNGPs). This gives companies a large degree of discretion in exactly how to carry out their due diligence.

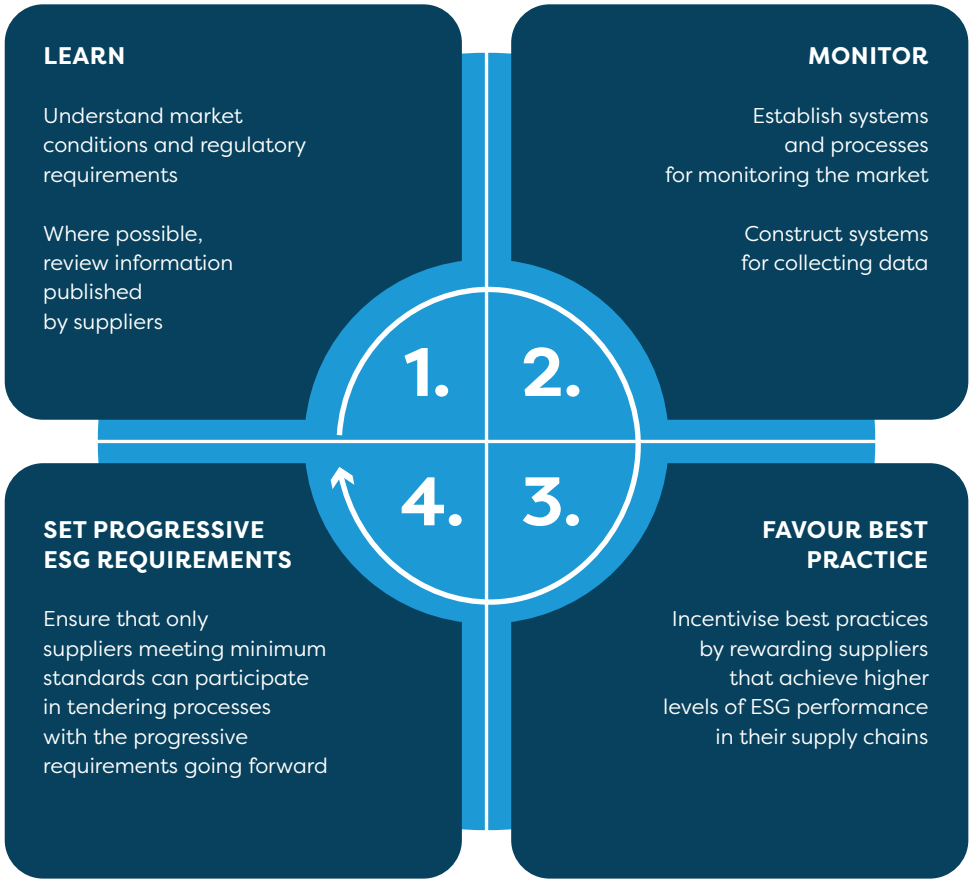
ITC's Standards Map will be a useful tool for:

- Selecting relevant standards and certification schemes that could support companies in ensuring they comply with the EU CSDD Directive
- Public buyers to make better-informed decisions in this context

www.standardsmap.org

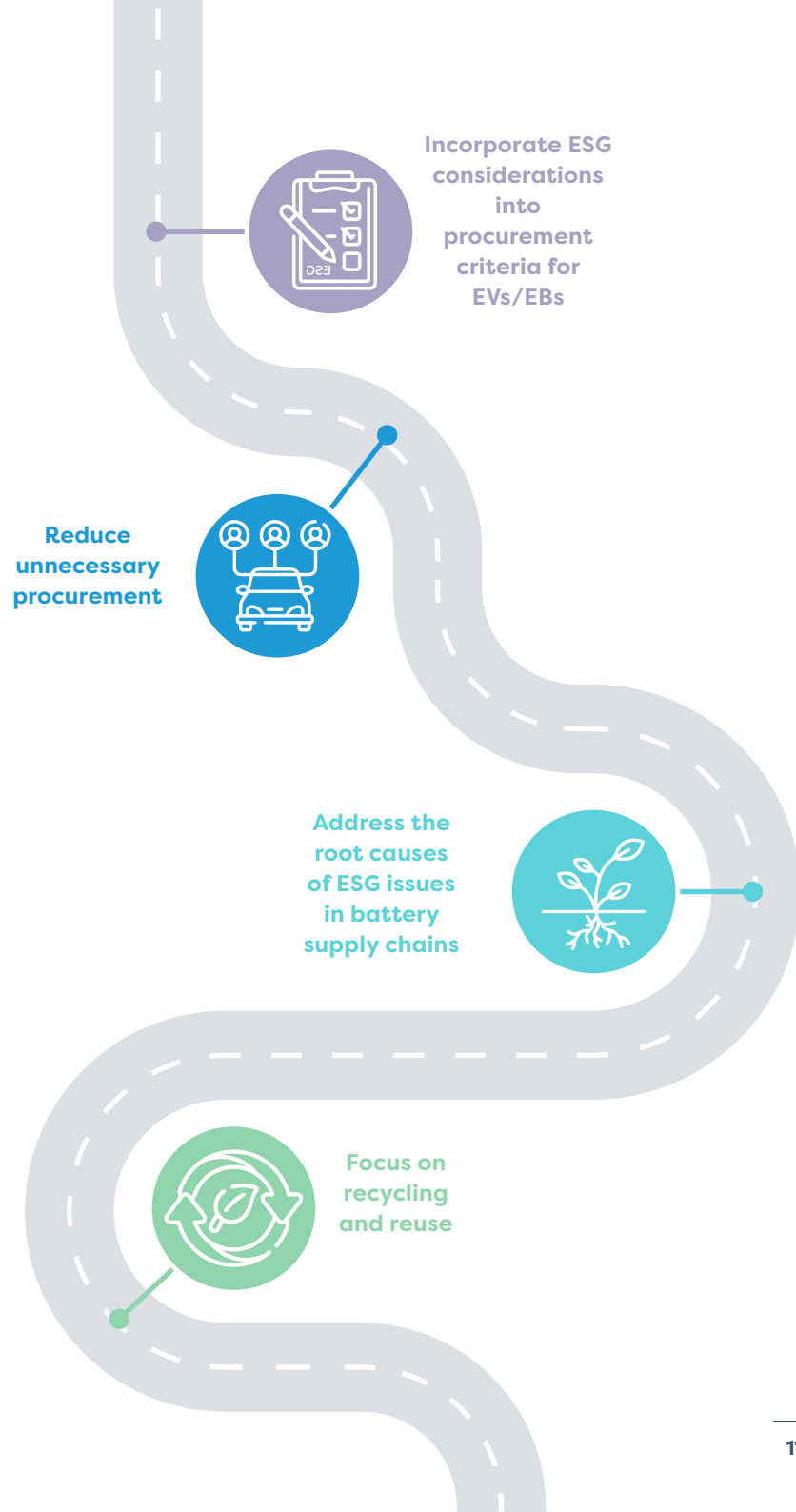
The Roadmap: A continuous process

- EVs and EBs are both still relatively new technologies. The market is developing at a very rapid pace as consumer demand accelerates and as new actors enter the supply chain. The regulations that govern the sector are still under-developed in Europe but are set to become considerably more sophisticated in the next five years.
- As a smaller buyer, with just over 1,000 vehicles in its fleet, the City of Malmö has a relatively lower leverage to independently influence EV or EB manufacturers or other key players in the battery supply chain. Instead, the recommendations in the Roadmap are designed to help Malmö make use of published information and data to strengthen its ethical and sustainable procurement, and to exert influence by working with partner organizations.
- Addressing the risks and issues through and in public procurement policies will inevitably include a gradual, learning approach. The Roadmap aims to steer the City of Malmö towards the point where it can ultimately construct a framework for favouring suppliers that ensure ethical and sustainable production, or setting minimum standards that the public buyer can enforce for all EV and EB suppliers.



MALMÖ'S ROADMAP TOWARD ETHICAL AND CLIMATE-SMART PUBLIC PROCUREMENT OF E-VEHICLE BATTERIES

- The specific recommendations in the Roadmap are based around a set of four **strategic focus areas.** Each of these strategic focus areas identifies the broad areas on which Malmö, and other procurers, could focus in order to address the key risks in battery procurement.
- Each of the four strategic focus areas is accompanied by one or more **risk management measures (RMM)**. These RMMs identify more specific steps that Malmö could consider in order to manage risks and help achieve the strategic priorities. Some of the steps outlined in each RMM could be implemented immediately or in the near future, whereas others will be more relevant over the medium or long term, as the battery market develops and the regulatory framework for EV and EB procurement evolves.
- In addition, the Roadmap presents several **structural recommendations.** These outline the changes that may be needed within the structure of the Malmö municipality if it is to fully implement the RMMs.



Structural recommendations

1. Find the right balance between purchasing and leasing

- The current practice of leasing vehicles through Malmö Leasing, while offering certain benefits, may restrict Malmö's ability to implement its commitments towards sustainable and ethical procurement of EVs.
- Purchasing EVs would increase the scope for action in the implementation of the Strategic Focus Areas, described below.
- Malmö would also potentially have more options to increase the sharing of vehicles between departments.
- An alternative to leasing vehicles – which may become a widespread practice in the future – is leasing batteries. This arrangement minimizes reliance on critical materials and further enhances the development of the battery circular economy.

2. Systematically monitor the battery market

- The City of Malmö will need to update its policies regularly to take regulatory requirements into account.
- An internal team could be assigned to this, with responsibility for monitoring the battery market and reporting to key internal stakeholders every six months.
- The team would monitor, among other things:
    - Developments in the regulatory frameworks, including the EU battery regulation, which is currently in draft form.
    - Changes in the information that EV manufacturers disclose regarding their supply chains.
    - Developments with the Battery Passport, which could become the leading tool for measuring the ESG performance of batteries.
    - New options for the recycling or reuse of batteries.

3. Strengthen procuring bodies to implement responsible sourcing commitments

- The responsibilities of the central procurement unit and other procuring bodies will need to be defined.
- Partnerships with other municipalities, national agencies, non-governmental organizations or procuring bodies, or with external consultancies, could also be employed to help develop criteria and frameworks.

4. Focus on follow-up with suppliers to ensure sustainability requirements are enforced

- The follow up may involve:
    - Using the "sustainability check" service of Adda, a national support organization for public buyers in Sweden, to ensure that suppliers are meeting commitments, particularly with regards to social criteria.
    - Regularly reviewing the status of the suppliers' certification, which typically provide verification mechanisms, to ensure it remains valid.
    - Continuing to be informed about the activities of relevant working groups and alliances. Venturing outside the local setting: e-vehicle and e-bike manufacturers supply to many different buyers and having a common follow-up is helpful to both sides.

Roadmap Strategic Focus Areas

Strategic focus area	Risk management measures	Prioritization timeline	High carbon emissions	Lack of transparency	ESG issues in mining	Recycling methods
Incorporate ESG considerations into procurement criteria for EVs/EBs	**RMM1:** Establish procurement criteria to favour suppliers of EVs and EBs that minimize emissions in the battery manufacturing process.	Short- to long-term				
	RMM2: Require suppliers of EVs and EBs to disclose information on their raw material supply chains.					
	RMM3: Establish procurement criteria that favour suppliers sourcing battery raw materials from sub-suppliers certified as compliant with international best practice.					
Reduce unnecessary procurement	**RMM4:** Establish mechanisms for departments within the Malmö municipality to share EVs and EBs – thereby reducing the total number of vehicles needed.	Short- to medium-term				
Address the root causes of ESG issues in battery supply chains	**RMM5:** Support initiatives that aim to address the causes of environmental and social problems in battery supply chains.	Short-term				
Focus on recycling and reuse	**RMM6:** Lease/purchase vehicles from EV and EB manufacturers who already have recycling/re-use schemes in place.	Medium- to long-term				
	RMM7: Investigate second-life options to prolong EV battery life.					
	RMM8: Consider leasing batteries, separately from vehicles.					

1. Incorporate ESG Considerations into Procurement Criteria for EVs and EBs

Incorporate ESG considerations into procurement criteria for EVs/EBs

RMM1:

Establish procurement criteria to favour suppliers of EVs and EBs that minimise emissions in the battery manufacturing process.

- ST Seek a declaration of the EV battery's carbon footprint from suppliers, or review information made public by the EV manufacturer.
- MT In preparation for the EU's proposed battery regulation, seek to develop a system for ranking the carbon footprint of EVs.
- LT Source only from suppliers that comply with eventual maximum lifecyle carbon footprint thresholds.

RMM2:

Require suppliers of EVs and EBs to disclose information on their raw material supply chains.

- ST Monitor the legislative progress of the EU battery regulation and prepare criteria that could be applied once it takes effect.
- MT Develop criteria for comparing the supply chain disclosure of suppliers for the minerals covered under the draft EU regulation.
- MT Exclude from consideration suppliers that do not meet the minimum legal requirements in the regulation.

RMM3:

Establish procurement criteria that favour suppliers sourcing battery raw materials from sub-suppliers certified as compliant with international best practice.

- MT Require suppliers to comfirm their battery cell manufacturers source cobalt from smelters and refiners that have been audited by independent third-parties.
- MT LT Require suppliers to confirm if raw materials used in their vehicle batteries have been procured from mine sites certified as complying with specific standards.
- MT LT Monitor the success of the Battery Passport scheme.
- LT Battery Passport becomes widely adopted, compare suppliers of EVs on how effectively they manage ESG risks.

ST Short term MT Medium term LT Long term

Structural changes required?

RMM1-3: no major changes needed

Partnerships, Resources

- Assign responsibility and allocate human resources for monitoring the carbon footprint information, the manufacturers' transparency policies vis-à-vis new regulations, or reviewing the ESG performance of batteries
- Seek partnerships (public/private) at the local or even international level to develop methods for ranking and comparing the EV/EB carbon footprint or the overall ESG performance, and to agree on common position on information that EV and EB manufacturers are expected to disclose

RISK MANAGEMENT MEASURE 1: KPIs

- The carbon footprint of each battery used in the EVs in its fleet (beginning with EVs manufactured after 2024).
- The overall carbon footprint of its fleet (depending on the availability of data).
- A comparison of the carbon footprint across the lifecycle of the EVs in its fleet, compared to the vehicles with ICEs.

RISK MANAGEMENT MEASURE 2: KPIs

- Malmö will need to define the information that it:

  a. will require EV or EB manufacturers to disclose as a condition for being considered in the procurement process;

  b. will consider in assessing the transparency of EV and EB manufacturers – with more transparent suppliers at an advantage in the procurement process.

- Over time, the requirements in list (a) would expand, particularly for EV manufacturers, as the EU battery regulation and other regulatory requirements take effect. It is also very likely that the extent of voluntary disclosure of supply chain information will improve over the next five years, making it more realistic to add items to both list (a) and list (b).

RISK MANAGEMENT MEASURE 3: KPIs

- The number of EVs and EBs that contain material procured from certified mine sites or from smelters audited by an independent third-party.
- If using the GBA Battery Passport, Malmö municipality may be able to use more detailed benchmarks to assess which EV batteries (a) meet the minimum standards for sustainable and responsible sourcing, and (b) are best in class according to the Battery Passport's ESG benchmarks.

RMM3 DEEP-DIVE:

Malmö could, *in conjunction with others*, develop a system for ranking its suppliers according to their management of ESG risks in the supply chain. This could feed into the procurement criteria, meaning that EVs would be assessed according to their ESG performance, alongside other cost, and quality criteria. Vehicles with a stronger ESG performance would thus be given an advantage in the procurement process.

The following are some of the characteristics that the city should consider when determining which standards it would prefer the relevant actors to have:

- **Supply chain coverage:** The standard should cover as much of the supply chain as possible, from mining through to refining/processing or even to manufacturing.
- **Aspects coverage:** Companies are expected to provide evidence of good practices across a wide range of sustainability topics. It is important that the selected standard embraces a wide range of sustainability topics.
- **Credibility:** Generally, credibility can be achieved through the participation of stakeholders in the development of the standard/criteria/requirements and in decision-making.
- **Governance:** Industry-controlled schemes are not seen as being 'independent', so multi-stakeholder initiatives or involvement in consultation in VSS governance is preferred.
- **Credible assurance:** self-assessment or second party reports are insufficient. The industry has steadily been moving toward demanding assurance by independent verifiers or auditors.

2.Reduce unnecessary procurement

Reduce unnecessary procurement

RMM4:

Establish mechanisms for departments within Malmö municipality to share EVs and EBs - thereby reducing the total number of vehicles needed.

- **ST** Create an inventory of which municipal EVs and EBs can be shared between departments.
- **ST** Utilise a simple vehicle booking system, in which users could reserve a vehicle that is shared between departments or held in a central pool.
- **MT** Invest in a more advanced booking system that allows for users to access vehicles based on 'real-time' availability data.
- **MT** Consider participating in commercial vehicle-sharing services, in which Malmö municipality employees hire vehicles on a 'by the minute' basis as required.

ST Short term **MT** Medium term **LT** Long term

RISK MANAGEMENT MEASURE 4: KPIs

- Malmö would need to monitor the total number of ICE vehicles, EV vehicles and EBs in its fleet, and to set targets for reducing the overall number of vehicles that it procures.

Structural changes required?

RMM4: The city is not currently permitted to share vehicles between departments. A number of documents would need to be revised in the future to allow for vehicle-sharing to take place, including insurance coverage obligations.

Partnerships, Resources

- A central department may be needed to manage a vehicle booking system, to coordinate the sharing of vehicles between departments.
- Related investments into more advanced booking systems might be needed.
- Specific arrangements may be needed with operator(s) of commercial vehicle-sharing services.

3.Address the root causes of ESG issues in battery supply chains

Address the root causes of ESG issues in battery supply chains

RMM5:

Support initiatives that aim to address the causes of environmental and social problems in battery supply chains.

- ST Take a public advocacy position and help to raise awareness through municipal communication channels.
- ST Work jointly with other actors to incentivise change in supply chains through multi-stakeholder initiatives.
- ST Due to prevalence of risk associated with cobalt, focus on initiatives in the cobalt supply chain.

ST Short term MT Medium term LT Long term

RISK MANAGEMENT MEASURE 5: KPIs

- In selecting initiatives to support, Malmö should consider the initiative's objectives and its framework for reporting its progress towards achieving these objectives. This will ensure that Malmö selects initiatives that would offer value for money.

Structural changes required?

RMM5: no major changes needed

Partnerships, Resources

- Consider existing multistakeholder initiatives focused on mining, including mining of specific materials (cobalt)
- Consider affiliation to organizations that link public procurers and civil society organizations active in the relevant value chains
- Internal (human, financial) resources would need to be mobilized to drive these types of activities

4.Focus on Recycling and Reuse

Focus on recycling and reuse

RMM6:

Lease/purchase vehicles from EV and EB manufacturers who already have recycling/re-use schemes in place.

- MT Include the presence of recycling scheme as one of the criteria for the procuring body to select suppliers.
- MT Develop a framework to determine the likehood of environmental and social best practice being respected in those countries where manufacturers carry out their recycling.
- LT Consider purchasing cars directly and having recycling schemes as a condition of the purchase.
- LT Favour manufacturers that have recycling schemes that have higher rate of recovered materials.
- LT Select manufacturers that actively contribute towards the achievement of the objectives set out by the proposed EU Regulation.

RMM7:

Investigate second-life options to prolong EV battery life.

- MT LT Monitor the development of second-life projects in the local area.
- LT Consider including the presence of second-life projects as one of the criteria used in its procurement process.
- LT Investigate local initiatives for second-life. If leading the initiative, become a facilitator. If purchasing, kick-start a local project.

RMM8:

Consider leasing batteries, separately from vehicles.

- LT Consider leasing batteries, separately form the vehicles.

ST Short term MT Medium term LT Long term

Structural changes required?

RMM6: None identified to date

RMM7: None identified to date

RMM8: Introduction of battery leasing would require a change in the EV procurement structure to enable an approach for procuring e-vehicles by leasing the battery or leasing both a vehicle and a battery

Partnerships, Resources

- Explore partnerships with other municipalities to kick-start local second-life projects utilising EV batteries coming from different municipal fleets.
- Consider partnering with other municipalities to implement national-level responsible EV procurement practices.
- Assign human resources to monitor information published by EV/EB manufacturers, information on second-life projects and battery-leasing options, and to carry out due diligence.
- Consider partnerships at the local level for advocacy on the importance of these issues or to kick-start joint projects on the second life of batteries.

RISK MANAGEMENT MEASURE 6: KPIs

- The percentage of EVs in Malmö's fleet from manufacturers that have a recycling scheme.
- The percentage of EVs in Malmö's fleet from manufacturers that implement closed-loop recycling schemes or other innovative recycling schemes.
- The percentage of EVs in Malmö's fleet from manufacturers that have recycling schemes in those countries deemed to be more likely to be compliant with social and environmental best practices.

RISK MANAGEMENT MEASURE 7: KPIs

- Once second-life options reach a maturity level where it is feasible for Malmö to start implementing some of the long-term options, Malmö could seek to measure:
    - The percentage of EV manufacturers in Malmö's fleet that have active second-life projects.
    - The percentage of batteries from Malmö municipality's fleet utilized in local second-life applications.

RISK MANAGEMENT MEASURE 8: KPIs

- As battery leasing is not currently well-developed, it is premature to set KPIs.

CONCLUSION & WAY FORWARD

Like other cities in Sweden and the rest of the world, Malmö is faced with the challenge of contributing to the limitation of global warming to less than 1.5 degrees. At the same time, Malmö wants to achieve the Sustainable Development Goals as set out in the UN 2030 Agenda for Sustainable Development, to ensure the increase of the quality of life for citizens and strengthen society's resilience and competitiveness. **Cities have been identified as key actors** in this work.

Malmö is also Sweden's first Fairtrade City. Since 2006, the city has worked to increase its share of ethically certified products such as coffee, tea, and bananas.

As electrification of the car and bike fleet takes on an increasing importance in Malmö, in order to reach the environmental goals, the city wants to take a pioneering position not only to look at electrification, but to look at how to **maximize the sustainability benefits of this transformation.**

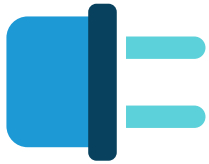
While e-vehicles and e-bikes have many benefits in conjunction with transition to net zero emissions, surging global demand over the next decade is forecast to result in the need to extract greater volumes of certain raw materials. The supply chains of these materials are associated with several ESG risks and importantly, the extraction of raw materials and the manufacturing of battery cells results in high levels of GHG (and particularly CO_2) emissions. Depending on where the batteries are produced, this may reduce the positive impact of EVs.

One of the primary objectives of this **Roadmap** is to provide a solid understanding of ways of managing risks in relation to the lifecycle of batteries. This knowledge will feed into future possible adjustments in Malmö's procurement approach on batteries and related product groups.

The Roadmap will help Malmö - and hopefully other procurers - to ensure that, with the appropriate policies, resources and partnerships, the **batteries used in its fleet of e-vehicles and e-bikes meet expectations** relating to environmental, social and governance (ESG) performance.

...NEXT STEPS?

- Review structural recommendations and RMMs prioritization timelines
- Pilot-test first recommendations in upcoming tenders
- Continue outreach and partnership-seeking with like-minded municipalities and entities



Interested to learn more?
Email Olov Källgarn *olov.kallgarn@malmo.se*,
or sign up to our newsletter *here.*

City of Malmö

International Trade Centre

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