

Vision and Roadmap for Thailand's Second-Life & Recycling Ecosystem

Excerpts from the Discussion Paper “Closing the Loop on Thailand’s Electric Vehicle Batteries”

Dr. Matthias Buchert, Head of the Resources and Transport Division, Oeko-Institut, Germany

EV Battery Workstream Event

Bangkok 8 October 2026

Briefly – the Development Timeline for a Roadmap towards an Electric Vehicle Battery Recycling Value Chain through 2040

- **September 2025:** Oeko-Institut was commissioned by Agora Verkehrswende to draw up a roadmap towards an electric vehicle battery recycling value chain through 2040 based on its relevant experience.
- The activities are part of the **Thai-German Cooperation on Energy, Mobility and Climate (TGC-EMC)**, implemented by GIZ Thailand and funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN).
- **September 2025 – June 2026:** In-depth analysis of the Oeko-Institut (incl. several online exchanges with GIZ, KMUTT, Testa, TDRI etc.) regarding the current state of recycling and second-life applications for traction batteries in Thailand – a comparison with experiences from the EU.
- **11 and 12 March 2026, Bangkok:** Stakeholder Workshop on EV Battery Recycling in Thailand.
- **April 2026 – September 2026:** Analysis of the comprehensive findings from the stakeholder workshop in Thailand; development and finalization of the roadmap document.
- **October 2026:** Publication of the roadmap document by Agora Verkehrswende (editors).

The Roadmap – Discussion Paper



PUBLISHED BY

Agora Verkehrswende

Agora Transport Transformation gGmbH
www.agora-verkehrswende.org
info@agora-verkehrswende.de

PROJECT MANAGEMENT

Yannick Thoma
yannick.thoma@agora-verkehrswende.de

Kerstin Meyer
kerstin.meyer@agora-verkehrswende.de

IMPLEMENTATION

Oeko-Institut Consult gGmbH
www.oeko-consult.de

Authors: Dr. Matthias Buchert, Dr. Johannes Klinge,
 Dr. Hartmut Stahl

Proofreading: Dialecta

Cover image: Fraunhofer IWKS

Version: 1.0
 Publication: October 2026
 147-2026-EN

This roadmap builds on the Bangkok workshop findings, further expert interviews and analytical work by Agora Verkehrswende and Oeko-Institut. We thank all contributors who provided feedback during the review phase. This publication does not necessarily reflect the views of all participants or project partners. Agora Verkehrswende assumes sole responsibility for its content.

On behalf of:



of the Federal Republic of Germany

This project is supported by the International Climate Initiative (IKI) of the Federal Government of Germany. Within the Federal Government, the IKI is anchored in the Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN). Selected individual projects are also the responsibility of the Federal Foreign Office (AA).



This publication was developed under the TGC EMC, a joint programme of eight organisations:



Oeko-Institut's Profile

Oeko-Institut is a leading European research and consultancy institute working for a sustainable future.



- A non-profit association founded in 1977.
- Offices in Freiburg, Darmstadt and Berlin.
- Clients: European Union, national and state-level ministries, companies, foundations and non-governmental organisations.

How we work



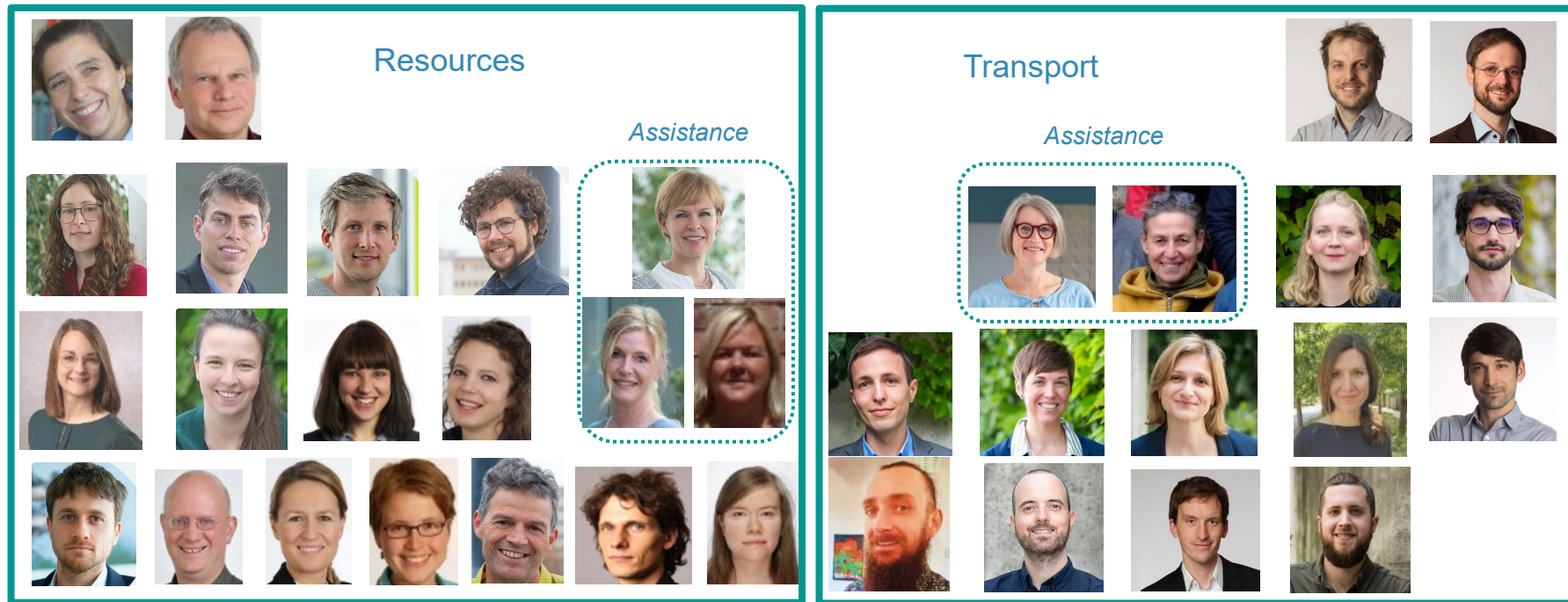
On the basis of interdisciplinary research, the institute

- conducts research-based projects and studies,
- develops key methodologies,
- advises decision-makers in politics, industry and civil society,
- completes some 500 national and international projects each year.

Oeko-Institut: Resources and Transport Division

35 Individuals:

20 Individuals Resources Team und 15 Individuals Transport Team



The Oeko-Institut's Work for the EC as Part of the Development of the new EU Battery Regulation: 2016 – 2026 and in the Future

Study in support
of evaluation of the
Directive 2006/66/EC
on batteries and
accumulators and
waste batteries and
accumulators

Final Report

**Study to identify and assess
the feasibility of measures
to enhance the impact of
Directive 2006/66/EC**

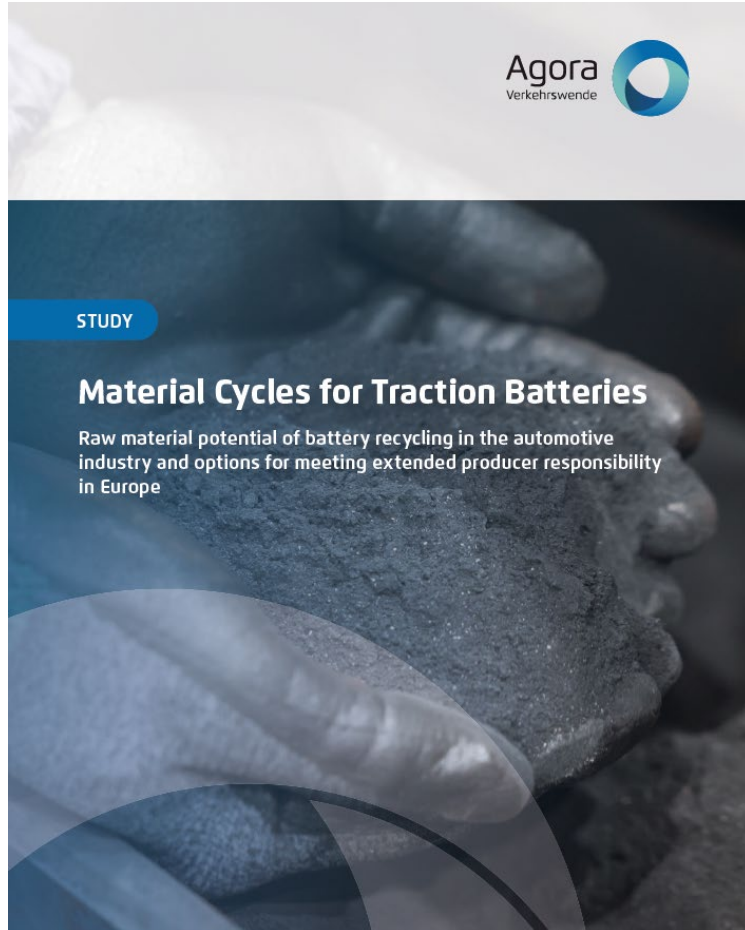
Final report

**ASSESSMENT OF OPTIONS
TO IMPROVE PARTICULAR
ASPECTS OF THE EU
REGULATORY FRAMEWORK
ON BATTERIES**

Final report

- Ongoing activities for the European Commission: Studies to prepare the ground for further delegated or implementing acts aimed at the further development and implementation of the EU Battery Regulation!

Current Situation and Developments of the EV Battery Value Chain in the EU



Comprehensive study on the situation and developments in the EU; published in September 2025!

<https://www.agora-verkehrswende.org/publications/material-cycles-for-traction-batteries>

Potential and Prospects for the medium-term Development of the Battery Recycling Value Chain in the EU

- Through the consistent expansion of the recycling infrastructure for LIBs in the EU—including hubs!—**it will be possible to cover around 25% of the EU's lithium demand by around 2040**, with an upward trend thereafter! Recycling facilities for LFP batteries will be necessary!
- For **nickel (up to 50% by 2040)**, the prospects for the secondary raw material share are even better to those for lithium – and even better for **cobalt (up to 60% by 2040)!**
- **The realization of several hubs for LIB recycling is crucial** for the entire battery recycling value chain in the EU!

The Situation in Thailand

- Thailand has embarked on a dynamic path toward electric mobility in the road transport sector in recent years!
- The surge in electric mobility for passenger cars will cause a sharp increase in the demand for traction batteries over the coming years.
- With a corresponding time lag, these traction batteries will reach the end-of-life (EoL) phase in ever-increasing numbers.
- Therefore, the view that Thailand needs a national strategy for the proper management of the growing volume of end-of-life lithium-ion batteries is widely shared among political, scientific and economic experts in the country.

The Objectives for the EV Battery Recycling Value Chain in Thailand

- Creating stable value chains for sustainable mobility in Thailand.
- Contributing to environmental and health protection.
- Preventing fire risks due to improper handling.
- Creating a significant number of well-qualified jobs in Thailand.
- Contributing to Thailand's strategic raw material resilience and reducing dependence on primary critical mineral imports through domestic secondary material recovery.
- The roadmap is intended to pave the way for the efficient achievement of the goals!

Prerequisites for a Roadmap towards an EV Battery Recycling Value Chain in Thailand I/II

- During the World Café sessions at the Bangkok workshop, participants identified clear political commitment as a key prerequisite for successfully Implementing a roadmap for a battery recycling value chain in Thailand.
- This requires a permanent governance structure and clearly designated competent agencies.

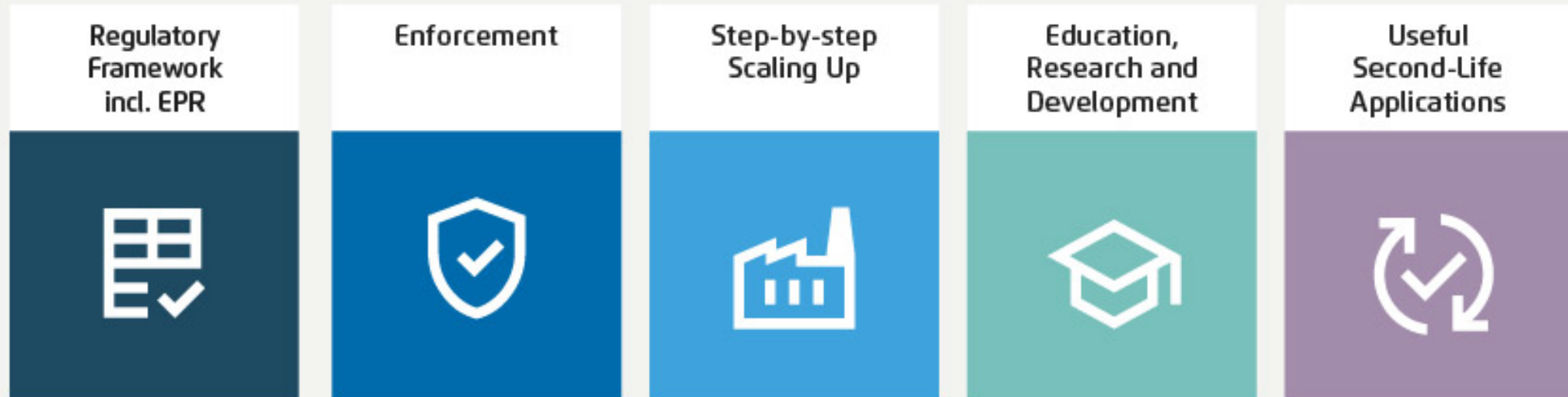
Prerequisites for a Roadmap towards an EV Battery Recycling Value Chain in Thailand I/II

- The following strategic priorities should be addressed:
- The adoption and harmonization of the necessary regulatory framework in Thailand, including a robust Extended Producer Responsibility (EPR) system for batteries.
- Following an analysis of the current situation, the introduction of appropriate measures to ensure the efficient and consistent enforcement of the new regulatory framework for battery recycling value chains in practice.
- Ensuring favourable and appropriate financial conditions, including specific funding programmes, to support the achievement of the action areas set out in the roadmap.
- Adequate staffing, logistical and financial resources for universities and other institutions involved in education and training, with a view to optimizing battery recycling value chains.

Action Areas and Milestones towards an EV Battery Recycling Value Chain

Five action areas for establishing an effective battery recycling value chain in Thailand

Figure 1



Agora Verkehrswende (2026) | Source: author's figure.

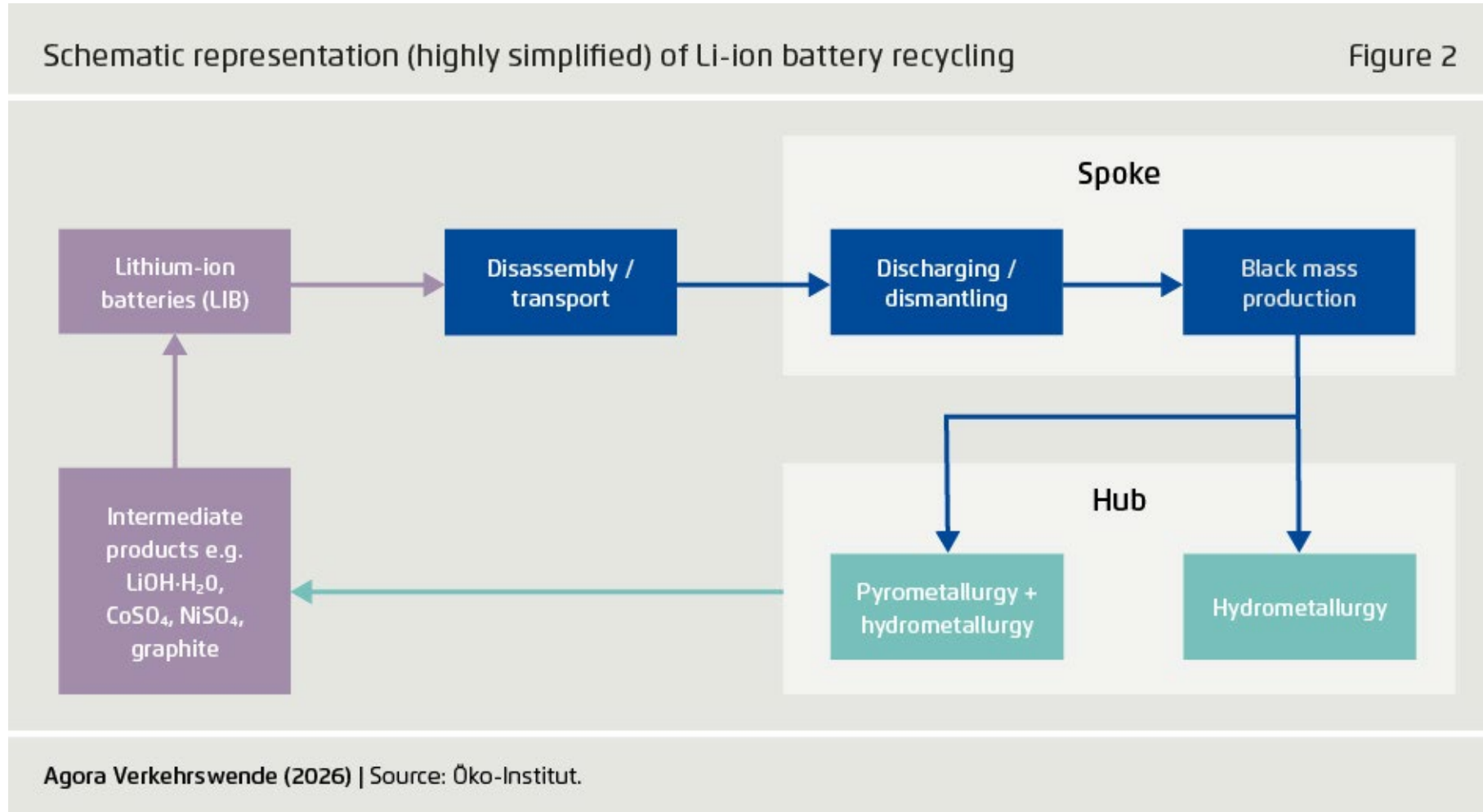
Action Area 1: Establishing a Regulatory Framework including Extended Producer Responsibility (EPR)

- **The Challenge: Currently no EPR scheme for batteries in Thailand**
- **Milestone 1: A regulatory framework including an EPR system for batteries is in place in Thailand by 2030!**
- The main advantages are:
 - Clear responsibilities: only certified professional operators may handle the battery recycling value chain.
 - In the event of negative net proceeds from battery recycling (due to low raw material prices or low-value batteries), environmentally and socially responsible recycling can still be ensured.

Action Area 2: Closing the Enforcement Gap

- **The Challenge: Current enforcement gap**
- **Milestone 2: Robust enforcement of a comprehensive set of rules for battery recycling value chain by 2035!**
- Robust enforcement requires adequately staffed authorities, appropriately trained personnel and sufficient technical resources (see also Action Area 4).
- In terms of chronological order, milestone 2 must come after milestone 1 (a regulatory framework including an EPR system for batteries will be in place in Thailand by 2030).
- Effective enforcement of legal requirements in Thailand must also address the informal sector, which operates on a significant scale.
- In the future, the collection and storage of traction batteries in Thailand should only be permitted at local or regional take-back centres that are easily accessible to customers.

Li-ion Battery Recycling: the Spokes and Hubs System



Action Area 3: Step-by-step Scaling Up of Industrial Recycling

- **The Challenge: Lack of industrial-scale traction battery recycling in Thailand**
- **Milestone 3: First pilot plants for black mass production are operational in Thailand by 2030!**
- **Milestones 4 – 7: Step-by-step scaling up of black mass production and professional processing of black mass into battery-grade intermediate products by 2035 – 2040!**
- To establish an industrial recycling value chain for traction batteries in Thailand, recycling processes tailored to the specific conditions in Thailand (such as the types of batteries used: LFP batteries) must first be developed and optimized and then implemented on a trial basis at one or more pilot plants.

Action Area 4: Promoting Education and Research and Development

- **The Challenge: Lack of comprehensive training and continuing professional development for a wide range of stakeholders across the battery recycling value chain**
- **Milestone 8: Additional specialized study, practical training and continuing education courses at universities and non-university R&D centers are created to meet demand in Thailand by 2030!**
- **Milestone 9: Sufficient numbers of specially trained experts responsible for approval and monitoring available in Thailand by 2035, for example:**
 - Specialized Regulatory authorities, inspection authorities, customs authorities and enforcement agencies responsible for detecting safety and environmental violations in connection with the battery recycling value chain and taking enforcement action against them.

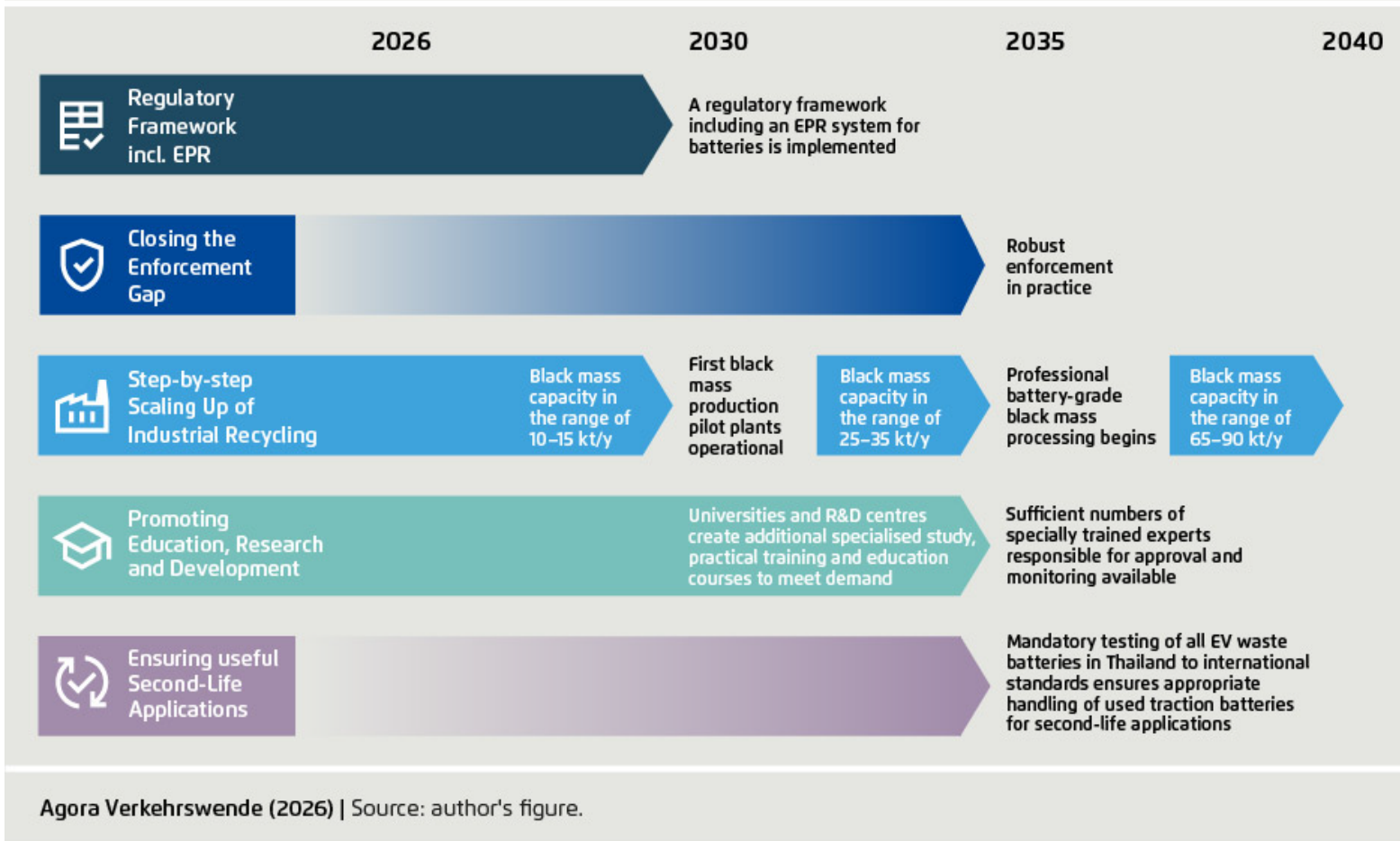
Action Area 5: Ensuring useful Second-life Applications

- **The Challenge: Used traction batteries are not yet systematically tested, sorted and made available for suitable second-life applications**
- **Milestone 10: Mandatory testing of all EV waste batteries in Thailand, in accordance with international standards, is in place by 2035 at the latest to ensure the appropriate testing and handling of used traction batteries for second-life applications.**
- The handling of traction batteries for testing and preparation for second-life use must take place exclusively at certified collection centres. To ensure effective enforcement (see Action Area 2), the necessary legislative framework should first be put in place (see Action Area 1). This includes addressing the issue of liability.

Timeline of Milestones from 2026 to 2040

Timeline of milestones for the scaling up of a battery recycling value chain in Thailand

Figure 3



Outlook

- Driven in large part by national targets, electric mobility in Thailand is expected to continue growing significantly in the coming years!
- Optimized battery recycling value chains have the potential to make significant contributions to strengthening Thailand's domestic economy in the future, providing impetus for research, development and innovation, creating additional jobs across a range of skill levels, bolstering Thailand's resilience and making important contributions to environmental and climate action!
- **It is therefore strongly recommended that, as a first step, the interministerial committee, chaired by a government representative, be established as soon as possible!**

Thank you very much for your attention!



Dr. Matthias Buchert: m.buchert@oeko.de,
www.oeko.de