



Communicating Circular Economy through Appliance Labeling

INTERNATIONAL CASE STUDIES AND RECOMMENDATIONS FOR THE ELECTRICITY GENERATING AUTHORITY OF THAILAND

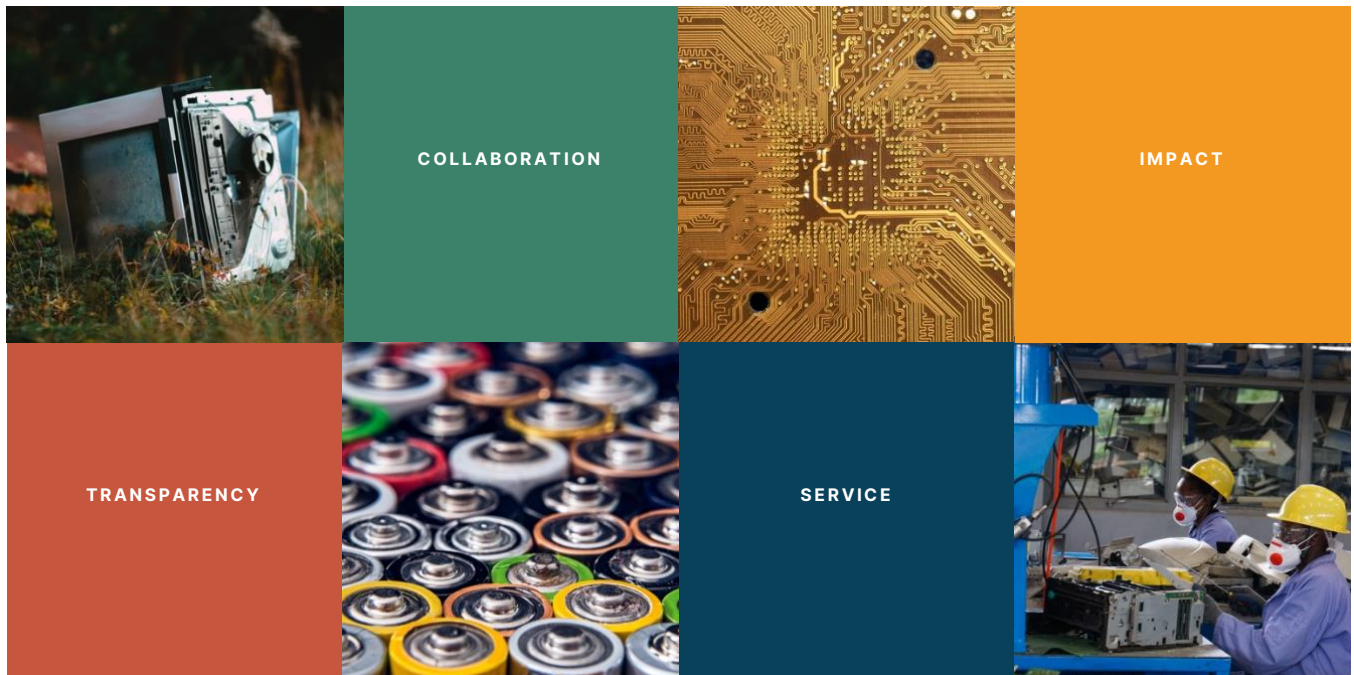
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1. INTRODUCTION AND BACKGROUND

The transition towards a circular economy (CE) is growing as a vibrant topic to promote environmental policy and sustainable growth and thereby address climate change. At first promoted by academics, in the last few years policymakers started to own the debate around circular economy, pushed by non-governmental organizations (NGOs). In the context of CLASP's mission to advance appliance energy efficiency and its key role in contributing to the wellbeing of people and the planet, this research reviews how circularity is being communicated through appliance labels.

This research was developed to respond to the request from the Electricity Generating Authority of Thailand (EGAT) to advance circularity through the EGAT No.5 label for air conditioners (ACs) within the larger objective of the country to support low-carbon and sustainable development through a circular economy. To this end, this work aims to **1)** provide a definition for appliance circular economy labels, **2)** analyze existing circular economy labeling efforts and their linkages with energy efficiency, and **3)** Consider factors for introducing appliance circular economy labeling. Finally, we provided recommendations for EGAT and policymakers in other countries to consider before and when developing an appliance circular economy labeling scheme.

1.1. WHAT IS A CIRCULAR ECONOMY?

Circular economy is a [new economic model](#) that opposes the traditional unsustainable linear utilization of energy and resources. It is an economic system that is “[...] *restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption. It enables key policy objectives such as generating economic growth, creating jobs, and reducing environmental impacts, including carbon emissions*”.¹ Circular economy is an emerging and vibrant topic that is being explored across countries by policymakers as well as private stakeholders. According to the Ellen MacArthur Foundation, circular economy is a “value creation opportunity”.² Transitioning to circular economy requires resources and products to last longer, to be able to be repaired, upgraded, recycled, or recovered to generate less waste overall. The importance of circular economy derives from its potential to benefit economic and environmental resources alike and it is therefore an enabler of sustainable growth.

The transition towards a circular economy from the current linear economic model is still at its early stages and is very complex. Countries worldwide are in the process of developing their first circular economy action plans along with the criteria to measure circular economy. Circularity applies to

various sectors and topics, and in this brief, we focus on appliances and how circular economy can be communicated through appliance labeling.

1.2. WHAT IS APPLIANCE CIRCULAR ECONOMY LABELING?

No clear-cut definition nor long-standing best practices exist for appliance labels that communicate characteristics related to circular economy. In the context of this research, we defined appliance circular economy labels as:

Any mandatory or voluntary government or third-party labeling, which intends to inform the consumer about the performance of an appliance regarding one or more characteristics of the circular economy and thereby support consumer purchasing decisions.

Labels in particular can communicate different product characteristics in different ways.

1.2.1. CHARACTERISTICS

Circular economy characteristics that are communicated through labels can cover one or more phases of life of an appliance. Table 1 enumerates some circular economy characteristics by product life phase. Circular economy characteristics can be categorized in other ways, e.g., OECD conceptualizes it along three elements (Box 1).

TABLE 1: CHARACTERISTICS OF CIRCULAR ECONOMY COMMUNICATED THROUGH LABELS BY PRODUCT LIFE PHASE

PRODUCTION PHASE
Resource efficiency , i.e., using the Earth's limited resources in a sustainable manner while minimizing impacts on the environment. ³
Chemicals used and presence of hazardous chemicals in product , i.e., chemical content requirements.
Recycled content ratio , i.e., the presence of recycled content in products, while ensuring their performance and safety. ⁴
USE PHASE (EXTENDED PRODUCT VALUE)
Durability , i.e., minimum product lifetime.
Reparability , i.e., easiness to repair a product, easiness of availability of spare parts; accessible pricing of spare parts.
Upgradability , i.e., possibility for the product to be improved through additional or replaceable components.
Disassembly Depth , i.e., process whereby a product is taken apart in such a way that it could subsequently be reassembled and made operational. ⁵

Maintenance and service requirements, e.g., existence of manufacturer-supported repair service network, availability of guidance documents and proximity of services.^{6,7}

END OF LIFE PHASE

Reusability, i.e., the property of goods of being reusable for example through standardization of components, interfaces, and materials.⁸

Recyclability and contained substances declaration, i.e., indication of substances that can be recycled.

1.2.2. COMMUNICATING CIRCULAR ECONOMY CHARACTERISTICS ON THE LABEL

Circularity is communicated differently by different governments and third-party programs. Based on the examples in Chapter 1, these can include **1)** measuring circularity criteria through scores, which allow for comparison among different products, and **2)** having circularity characteristics integrated in the product criteria which must be met to be eligible for a label.

BOX 1: CATEGORIZATION OF CIRCULAR ECONOMY AND LABEL ATTRIBUTE ACCORDING TO OECD

CASE STUDY – OECD CIRCULAR ECONOMY LABELING CATEGORIZATION

According to an Organization for Economic Co-operation and Development (OECD) working paper published in 2021, circular economy labels are used to communicate circular economy and can be conceptualized along three elements:

1) “narrowing resource flows” to make a more efficient use of natural resources and materials; **2)** “slowing resource loops” to improve durability and lifetime of products; and **3)** “closing resource loops” to minimize waste through improved end-of-life sorting, treatment and recovery.

Although some of the attributes under the OECD’s categorization are not shared by appliance circularity (e.g., organic food production does not apply to our scope), these categorizations and attributes are still useful to provide background of the focus of current appliance circular economy label initiatives.

OECD CATEGORIZATION	LABEL ATTRIBUTE
Natural resource flows	Fuel efficiency
	Resource efficiency
	Toxicity labels
	Organic food production
Slowing down resource loops	Durability
	Reparability
	Reusability
	Ability to remanufacture
Closing resource loops	Recyclability
	Recycled content
	Renewable resource content

1.2.3. DIGITALIZATION AND SMART LABELING

Digitalization is considered a key enabler for the circular economy because it builds visibility and intelligence into products and assets, including their location, availability, and condition.⁹ If appliances are “smart,” they allow producers and users to monitor, control, analyze and optimize products’ performance and collect usage data. The knowledge of the condition of a product can also prompt maintenance support and create awareness of the availability of materials for future recycling or reuse potential.

CLASP researched examples of initiatives that tried to integrate digitalization and Internet of things for circular economy energy labels (circular economy smart labeling was one of EGAT's requests). However, our research could not identify any relevant case studies at this point. It is possible that countries are currently still addressing the need to establish solid labeling frameworks that would support circular economy criteria. Nonetheless, in the coming years, as circular economy knowledge gets more consolidated, it could be worth exploring how energy labels could be enablers to access circular economy digitalized systems.

The next two chapters, we analyzed existing circular economy label initiatives and recommendations for Thailand. In particular:

- **Chapter 2** reviews appliance circular labeling case studies and extracts key information about characteristics and how circularity is communicated and measured to provide a comparable overview.
- **Chapter 3** outlines factors to consider for introducing circular economy criteria to labels as well as their relationship with energy efficiency labels and recommendations for Thailand.

2. APPLIANCE CIRCULAR ECONOMY: 5 CASE STUDIES

In this chapter we analyzed five case studies of schemes or initiatives that seek to communicate appliance circular economy through labels. Figure 2 summarizes the case studies based on label type, how circularity is communicated, approach, responsible agency, scope (i.e., focus of the appliances and applicability), and whether the label covers energy efficiency. Figure 3 summarizes circular economy characteristics covered by each labeling scheme.

TABLE 2: APPLIANCE CIRCULAR ECONOMY CASE STUDIES SUMMARY

CASE STUDY	LABEL TYPE	HOW CIRCULARITY IS COMMUNICATED	APPROACH	RESPONSIBLE AGENCY	SCOPE	INCLUDES ENERGY EFFICIENCY
Circular Economy Action Plan: Ecodesign and energy label	Comparative Energy Label	Measurement/coring of CE product-specific requirements	Mandatory	European Commission / Member States	Appliances covered by Ecodesign in European Union	Under consideration /Yes
French Reparability Index	Comparative Label	Through a product-specific score on the electronic device	Mandatory	French Ministry of the Environment	Electronic devices sold in France	No
Enel X Circularity Score	Comparative Label	Through a score on products and services	Voluntary	Private sector Enel X - energy producer, distributor, and supplier	Enel X products and services + their clients	Yes (energy flows)
German Blue Angel	Endorsement Label	Circularity is part of the criteria for product-specific label eligibility. No score.	Voluntary	Federal Ministry for the Environment	Appliances and other products sold in Germany and in other countries	Yes

Indian ECO Mark	Endorsement Label	Circularity is part of the criteria for product-specific label eligibility. No score.	Voluntary	Ministry of Environment, Forests and Climate Change	Household and consumer products sold in India	Yes
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TABLE 3: CIRCULAR ECONOMY CHARACTERISTICS OF CASE STUDIES BY PRODUCT LIFE-PHASE

CASE STUDY	PRODUCTION PHASE	USE PHASE	END-OF-LIFE
Circular Economy Action Plan: Ecodesign and energy label <i>Product-specific. It might include:</i>	Resource efficiency Chemical content requirements Recycled content ratio	Reparability	Reusability Recyclability
French Reparability Index	X	Reparability	X
Enel X Circularity Score	Resource efficiency	Maintenance service	
German Blue Angel	Plastic-specific requirements	Maintenance service Availability of spare parts	Recyclability Disassembly Disposal service
Indian ECO Mark	Resource efficiency Recycled content indication	X	Recyclability Reusability

2.1. MANDATORY REGIONAL-LEVEL FRAMEWORK: CIRCULAR ECONOMY IN THE EUROPEAN UNION

2.1.1. THE CIRCULAR ECONOMY ACTION PLAN (CEAP) AND APPLIANCES IN THE EU

The European Union (EU) demonstrated its intention to transition to a more circular economy with the adoption of the first Circular Economy Action Plan (CEAP) in 2015.¹⁰ The goal was to “*reshape the market economy and improve the competitiveness of the EU by being more resource efficient and reduce dependency on scarce raw materials*”.¹¹ When the actions of this first plan were

completed, a new Circular Economy Action Plan was published in 2020.¹² This new CEAP is a cornerstone of the EU Green Deal.¹³ The EU Green Deal aims at ensuring:

- no net emissions of greenhouse gases by 2050,
- economic growth decoupled from resource use and
- no person and no place left behind.

The new CEAP includes actions in several policy areas, covering major sectors (e.g., textiles, construction, and electronics) and all aspects of the product lifecycle. It builds upon existing EU regulations on product design, waste management and recycling, chemicals, plastics, etc.

2.1.2. ECODSIGN AND ENERGY LABELING CRITERIA

Ecodesign and energy labeling are the policy tools through which minimum energy performance standards and mandatory energy labels have been implemented in the EU. Although the framework allows for requirements in other environmental aspects relevant to the circular economy to be set, until recently, the adopted measures focused only on energy efficiency in the product use phase. However, through the new CEAP, circular economy aspects have been increasingly integrated in the Ecodesign regulation, with emphasis on the reparability of products (like in the case of TVs below).

The focus for establishing requirements under Ecodesign continues to be the carbon emissions reductions from reduced energy consumption. However, some studies have quantified the potential greenhouse gas emissions reduction that could be expected from introducing circular economy principles to products covered by Ecodesign and energy labeling regulations.¹⁴

To support the definition and implementation of enforceable measures, the EU standardization body prepared harmonized definitions and methods.* For example, the ease of disassembly depends on the number of steps, the type of fasteners used, the type of tools needed, etc. The harmonized standards establish what counts as a step, what the types of fasteners are and the categories of tools in function of the impact they have on the ease of repair.

* EN 45552:2020 'General method for the assessment of the durability of energy-related products;
EN 45553:2020 'General method for the assessment of the ability to remanufacture energy-related products;
EN 45554:2020 'General methods for the assessment of the ability to repair, reuse and upgrade energy-related products;
EN 45555:2019 'General methods for assessing the recyclability and recoverability of energy-related products;
EN 45556:2019 'General method for assessing the proportion of reused components in energy-related products;
EN 45557:2020 'General method for assessing the proportion of recycled material content in energy-related products;
EN 45558:2019 'General method to declare the use of critical raw materials in energy-related products;
EN 45559:2019 'Methods for providing information relating to material efficiency aspects of energy-related products.

In the new CEAP, the first action on the list is for the European Commission to propose a sustainable product policy initiative “In order to make products fit for a climate-neutral, resource-efficient and circular economy, reduce waste and ensure that the performance of front-runners in sustainability progressively becomes the norm.” This Sustainable Product Initiative (SPI) largely consists of extending the Ecodesign framework to more aspects of the product lifecycle and to more sectors,¹⁵ like durability, reusability, repairability, energy efficiency as well as presence of harmful chemicals.

Examples of adopted and considered requirements

Ecodesign measures adopted in the 2019 package included requirements for energy efficiency and for facilitating EU’s transition to a more circular economy.* Two examples are:

- 1) Regulation 2019/2021 outlining Ecodesign requirements for electronic displays (televisions and computer monitors)¹⁶ includes requirements for:
 - design for dismantling, recycling, and recovery
 - marking of plastic components
 - cadmium logo (presence/absence)[†]
 - a ban of halogenated flame retardants[‡]
 - design for repair and reuse – including the availability of spare parts and repair and maintenance information.
- 2) A smartphones regulation that is currently being discussed.¹⁷ This regulation may combine circularity requirements with a repair score on the energy label. This is still under discussion but would be largely inspired by the French Repairability Index (explained below).

2.1.3. INTEGRATING CIRCULARITY CRITERIA WITHIN THE EU ENERGY LABEL

The EU recognizes that the Ecodesign and energy labels play a critical role in advancing climate goals by setting minimum requirements for products to improve their environmental performance. The requirements can be set for energy and water consumption and emission levels. However, the

* In 2019 the European Commission adopted 10 ecodesign implementing regulations and 6 energy labeling regulations as one “package” https://ec.europa.eu/commission/presscorner/detail/en/QANDA_19_5889

† According to COMMISSION REGULATION (EU) 2019/2021, the presence of cadmium, a highly toxic and carcinogenic substance in display panels is restricted by Directive 2011/65/EU. However, “use of cadmium in electronic displays is among the applications in Annex III exempted from the restriction for a limited time. A specific marking on displays that contain cadmium, to facilitate the correct and environmentally sound treatment at end of life, should therefore be provided by manufacturers”.

‡ Organohalogen flame retardants are persistent chemicals linked to a variety of health concerns such as thyroid disruption, cancers and learning deficits. These flame retardants are often used in the plastics of electronics, where they can leach out and contaminate homes and workplaces.

CEAP emphasizes the importance of Ecodesign measures and labeling programs to also support material efficiency.*

According to some, the addition of material efficiency to the energy label increases the expectations of the EU energy label impact and may be a barrier to its implementation because it would require effective communication.† Also, multiple icons on the label may clutter the label design, making it harder for consumers to understand the key information on it. Evaluations conducted by CLASP and partners through interviews with consumers and retailers found that simple, uncluttered label designs are the most effective for conveying information about energy efficiency¹⁸

On the other hand, energy efficiency labels in the EU have proven to be effective means to help consumers make informed sustainable choices and could therefore be the best means to integrate circular economy aspects. It is still under discussion how and if these issues will be integrated on labels. The Commission is considering combining circular economy criteria for smartphones with the energy label. However, the methodology for scoring the reparability of smartphones which is currently being developed will stay accessible to the public. According to a 2020 report by the European Court of Auditors¹⁹, the development of effective labels requires the development of a standardized method for assessing the impact on resource efficiency across products and a systematic in-depth analysis of circular economy potential through preparatory studies.²⁰ While harmonized European standards have been adopted since the preparation of this report, scaling up the adoption of ambitious circular economy requirements lacks official methodology for systematic in-depth analyses of circular economy potential during preparatory studies. For private sector stakeholders, circular economy information on the label would reward good practices by making them more visible. Also, it would make the sector more resilient to a potential increase of cost of materials (or to their lower availability) and stimulate innovation and competition among suppliers.²¹

2.2. MANDATORY NATIONAL FRAMEWORK: FRANCE'S REPARABILITY INDEX

In January 2021, the Ministry of Ecological Transition and the Agency for Ecological Transition (ADEME) introduced a new mandatory reparability index (Figure 1) for electrical and electronic

* According to UNEP, "**Material Efficiency** means using less materials to provide the same level of well-being. It is measured by the amount of service obtained per unit of material use. Materials include biomass, cement, fossil fuels, metals, non-metallic minerals, plastics, wood, among others."

† For example, see C. Dalhammar for ACEEE (2018). How can the Ecodesign Directive contribute to Circular Economy objectives? Lunds Universitet and International Institute for Industrial and Environmental Economics.

‡ **Resource Efficiency** encompasses material efficiency, but is a broader term which includes materials, water, energy, and land.

devices. The index is based on Law No. 2020-105 of 10 February 2020 which addresses waste and circular economy for electrical and electronic products.

FIGURE 1: REPARABILITY INDEX SCALE



The mandatory index aims to increase the repair rate of laptops, smartphones, washing machines, televisions, and mowers from 40% to 60% within five years. Manufacturers are responsible for including the index on the aforementioned products to inform consumers on the device reparability.

The index was developed by ADEME in collaboration with [Spareka](#), a company that promotes self-repair through (online) tutorials, diagnosis, and the provision of spare parts. Spareka also manages an online platform that provides criteria, offers support to suppliers for the implementation of the regulation, and makes databases of product information available for consumers.

Suppliers must evaluate their products and assign a score of 0 to 10 based on five criteria:

- Documentation availability
- Disassembly, access, and tools
- Availability of spare parts
- Spare parts prices
- Criterion specific to the category of equipment concerned

In 2022, the scheme should be extended to cover dishwashers, tablets, vacuum cleaners, and high-pressure cleaners. Moreover, in 2024, ADEME intends to transition the reparability index to a sustainability index by integrating aspects of robustness and product reliability.

2.3. VOLUNTARY ECOLABEL FRAMEWORKS

Ecolabels are a voluntary method of environmental performance certification. They can also be used to communicate circularity of products along with other environment-related parameters. Ecolabel does not include a circularity score or measure, but rather circular economy criteria and energy efficiency requirements are prerequisites for the appliance to be eligible for the ecolabels included

in this report. Below are two examples of ecolabel schemes: the German Blue Angel and The Indian ECO Mark Scheme.

2.3.1. GERMAN BLUE ANGEL

Germany introduced Blue Angel program in 1978. It is an independent label awarded to environmentally friendly products and services, managed by the German Federal Ministry of the Environment Nuclear Safety and Consumer Protection (BMU). BMU determines the guidelines for the label eligibility and appoints the members of the Environmental Label Jury. The Environmental Label Jury is an independent voluntary body that discusses new products to be added to the label and approves the product criteria defined by the German Environment Agency. Finally, RAL gGmbH,²² an independent nonprofit company, oversees compliance and contracts with companies.* The Blue Angel label aims to inform environmentally conscious consumer purchasing decisions. It measures the environmental impact of a product by calculating the fossil fuel consumption, greenhouse gas emissions, and depletion of other resources. To be eligible for the Blue Angel, air conditioners must meet these criteria:²³

- Energy efficiency requirements (EU SEER>7 equal to CSPF>7.3)
- Refrigerant requirements (halogen- and ammonia-free refrigerants)
- Easy-to-clean filters
- Noise emissions requirements
- Non-hazardous materials requirements
- Plastic-specific requirements
- Environmentally friendly product design (e.g., recyclability and disassembly)
- Service for installation, maintenance, and disposal requirements
- Availability of spare parts (for at least 10 years)

FIGURE 2: BLUE ANGEL LABEL



The Blue Angel label is a widespread ecolabel, with over 20,000 products and services from more than 1,600 companies bearing the label. According to a BMU Survey, 90% of the consumers are aware of the label and 23% of them use the label to guide their purchasing decisions.

2.3.2. INDIAN ECO MARK SCHEME

The ECO Mark Scheme is a voluntary ecolabel which was issued by the Government of India under the Ministry of Environment and Forests and Climate Change in 1991 and is currently administered

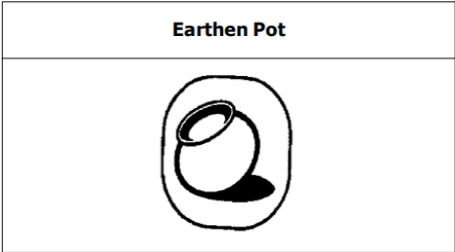
* In order to display the German Blue Angel Label, companies must enter in a contract agreement.

by The Bureau of Indian Standards (BIS). To operate the scheme, BIS has included additional requirements for ECO Mark in the relevant Indian Standards. To be eligible for the ECO Mark, products must meet certain environmental requirements, along with quality criteria of the respective Indian Standard. 17 product categories are currently covered by the ECO Mark, such as paints, paper, plastics, propellants and aerosols, food items, electrical and electronics goods, and packaging materials.²⁴

The scheme reflects circular economy principles, as it is based on a lifecycle assessment and analysis. The label provides information on the environmental footprint of a product, from the raw material extraction stage through the manufacturing and consumption stages and the disposal stage. The parameters for evaluation are product-specific and may include:²⁵

- Production process including source of raw material
- Natural resource consumption
- Likely impact on the environment
- Energy conservation in the production of the product
- Effect & extent of waste arising from the production process
- Disposal of the product and its container
- Utilization of "Waste" and recycled materials
- Suitability for recycling or packaging

FIGURE 3: INDIAN ECO MARK LABEL



According to an ECO Mark Scheme study,²⁶ the ECO Mark program is not very popular in India, and manufacturers are hesitant to apply for the ECO Mark label. Possible reasons for the limited success include, among others: a) manufacturers need to pay for the certification themselves, increasing the costs by 10% for each product; b) to be eligible for the ECO Mark, products need to comply with BIS' quality standards first, making the process more complicated; c) overall lack of awareness of the existence of the scheme.

2.4. VOLUNTARY PRIVATE SECTOR FRAMEWORK: ENEL X CIRCULAR ECONOMY SCORE

Enel X, part of the Italian energy multinational Enel Group*, developed a Circular Economy Score to measure the level of circularity in their own products and services as part of the Enel Circularity Boosting Program.²⁷ This is an example of a private sector initiative, which measures circularity

* Enel Group is responsible for the production, distribution, and supply of energy globally.

and communicates it on its own products and services. To validate the score, Enel X has its score certified by a third-party, RINA.²⁸

The Enel X Score is calculated by comparing five circular economy business models (sustainability of resources, product as a service, sharing platforms, product lifecycle extension, recovery, and recycling) with Enel X’s five key dimensions. These include²⁹:

- 1) “Commitment by suppliers to comply with circular economy principle during production
- 2) The presence of reusable elements which facilitate the circular consumption model, increasing the lifecycle of the product
- 3) Dissemination of best practices to boost the efficiency of use of resources
- 4) Product end of life management using innovative and sustainable methods that encourage the reuse of materials
- 5) Supporting the development of environmental awareness by involving suppliers in virtuous mechanisms”

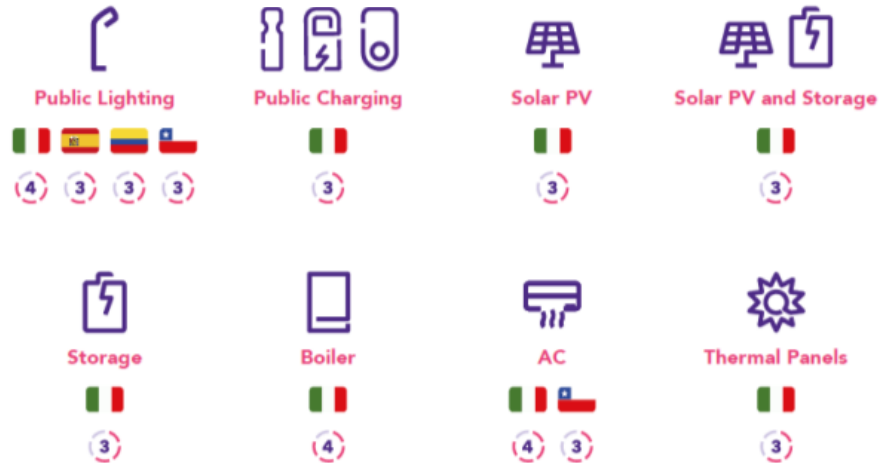
The score ranges from 1-100 and it is communicated through levels from 1 to 5³⁰ (Figure 4).

FIGURE 4: ENEL X’S CIRCULAR ECONOMY SCORE EXPLAINED

SCORE RANGE	LEVEL	DESCRIPTION
1-20	1	Limited incorporation of circular economy principles
20-40	2	Partial use of renewable materials and a partial incorporation of the principles of circular economy in the provision of services
40-60	3	The solution uses a more sustainable approach also in the processes of consumption and recovery. The circular economy characterizes partially the provision of services.
60-80	4	Raw materials are almost all renewable and circular economy is incorporated in the provision of services.
80-100	5	Product and services are characterized by circular economy

For example, smart air conditioning products are evaluated at Level 3, meaning circular economy principles could be better incorporated. This value is the starting point to improve the circularity of Enel X products and services.³¹ Figure 5 shows CE scores calculated to date which are displayed on Enel X website.³² Enel X intends to

FIGURE 5: ENEL X CE SCORES BY PRODUCT



extend the circularity assessment to its whole portfolio, including maintenance and repair services within Enel X's network. Given the complexity of companies and professionals within Enel X's network, and how the services are delivered, currently, the Circular Economy Score for services is mostly based on a qualitative scorecard. It evaluates the way Enel X's installers and technicians implement circular and sustainable procedures when delivering their home services.³³

3. FACTORS TO CONSIDER FOR INTRODUCING A CIRCULAR ECONOMY LABELING SCHEME & RECOMMENDATIONS FOR THAILAND

3.1. THE EXISTENCE OF A POLICY FRAMEWORK

A robust policy framework that supports and defines circular economy is a key driver for developing appliance circular economy labels. The initiatives we analyzed in this research, are supported by circular economy policies and policy frameworks, which have either been adopted or in the process of being developed. A framework helps to define a shared understanding of what circular economy means for the region or country, which is pivotal for determining what to communicate on labels and to define a coherent approach.

For example, the integration of circular economy principles into Ecodesign and Energy Labeling in Europe is supported and driven by the Green Deal and the CEAP and implemented through emerging product-specific standards – this overarching framework sets the direction for the EU policies. Also, the Reparability Index in France is supported by the 2020 Law 2020-105, relating to the fight against waste and the circular economy. This French law also transposes CEAP clauses and the EU Directive 2019/904 on plastic pollution. Similarly, the Blue Angel guidelines are defined by the BMU, and products must be compliant with relevant EU legal requirements. Finally, Enel X's Score is a private-sector initiative, but it still refers to EU's priorities, and it is based on the Circularity Boosting Program.³⁴

Recommendation for Thailand: Consider circular economy principles for labels only once an overarching national circular economy framework is in place or being developed.

- Thailand is currently developing the Bio Circular Green Economic Model,³⁵ which, even if not centered on energy efficiency, could be a good starting point to inform appliance circular economy.

3.2. INCREASING STAKEHOLDER AWARENESS ABOUT CIRCULAR ECONOMY

Since introducing appliance circular economy criteria to labels is a relatively recent topic, a general lack of awareness may exist across the same stakeholder groups that are required to take an active role for the potential introduction of circular economy labels. It is therefore of utmost importance for governments to build awareness among relevant agencies regarding circular economy.

Furthermore, with over 450 labels worldwide that claim the environmental friendliness of a product in general,³⁶ it is important that consumers are presented reliable information. This is also true for

labels that try to communicate circular economy criteria. For example, the EU Green Deal and the CEAP are being developed in close coordination with an initiative called “Empowering Consumers For The Green Transition”. According to this initiative, empowering consumers to make more sustainable choices could support the EU in achieving carbon neutrality by 2050. In particular, the Commission’s focus is on the communication of circular economy issues “such as durability, reparability, upgradeability, and recyclability, as well as regulatory and non-regulatory efforts on fighting 'green washing' (i.e., false green claims)”.³⁷

Recommendation for Thailand: Increase circular economy awareness among all stakeholders.

Ensure all stakeholders (e.g., manufacturers, retailers, consumers, disposal and recycling centers, civil society, government representatives) are informed about circular economy. This might include developing an understanding of what circular economy is and the role of each stakeholder in the transition towards a circular economy model.

CASE STUDY: CONSUMER AWARENESS & VALUES-WHAT IS THE CONSUMER WILLINGNESS TO PAY FOR CIRCULARITY?

As more initiatives are being developed worldwide to advance circular economy, it is also important to mention the influence of consumer perception of circularity and how it impacts their willingness to pay for it.

A recent study conducted in the United Kingdom investigated whether consumers would be willing to pay more for a product bearing a circular economy label.³⁸ In the case covered by the study, circularity only referred to the percentage of reused/refurbished content in a product. The study showed that consumers always preferred more circular products to other products with less circular attributes and that consumers were willing to pay more for products with more circular content. However, the research found that the willingness to pay was inversely proportional to the circular content in a product. In other words, consumers were willing to pay more for products where 25% to 50% of the product was made of refurbished parts, but their willingness decreased with higher shares of refurbished parts. According to the authors, the reason was that a higher circularity was associated with the consumers’ perception that they were buying reused products and therefore their willingness to pay decreased.³⁹

3.3. ASSESS IF AND HOW TO DEVELOP CIRCULAR ECONOMY LABELING

Governments should assess if and how to communicate appliance circular economy criteria through labeling. This assessment should be inclusive and evidence-based:

- **Inclusive stakeholder consultations:** Since circular economy involves multiple product life stages (production, use, and end-of-life phases), multiple stakeholders should be involved

when defining a comprehensive set of circular economy labeling criteria. Stakeholder engagement and collaboration among stakeholders that would normally not interact (e.g., manufacturers and dismantling entities) are necessary to ensure a comprehensive overview of product lifecycle. This might include the creation of a new circular economy network among manufacturers, policymakers, retailers, collectors and disposal entities and any other stakeholders relevant to the specific product or context.

- **Develop studies and follow a product-specific methodology:** If stakeholders agree on communicating circular economy through labeling, they should also develop a methodology to define and to measure circular economy criteria for each product. For example, the EU has been exploring ways to integrate products' circular economy criteria within the Ecodesign and energy labeling schemes and holds separate studies and assessments for each product.*

Recommendation for Thailand: Assess the value of circular economy labeling for the country and develop a product-specific methodology. In particular:

- Create an appliance circular economy stakeholder network to ensure consultations on the circular economy label are carried out through a participatory approach. This network should allow for capillarity in the engagement of various parties and be representative of more Thai provinces.
- Consult with stakeholders on whether integrating circular economy into EGAT No.5 label is what Thailand needs (e.g., introducing minimum circularity criteria aspects for product eligibility). Also, focused studies could be commissioned to help determine if the EGAT No.5 could be expanded in scope to include circular economy or if other venues should be considered.
- If an agreement about circular economy labeling is reached, prepare a study to gather further insights regarding each product. This might include product-specific measurement criteria.

3.4. BUILDING STAKEHOLDER CAPACITY FOR IMPLEMENTATION

Assessing the capacity needs and building stakeholder capacity to implement circular economy is critical to ensuring that they can integrate new practices and use these to support a possible

* For each product, the European Commission carries out a preparatory study, including a public stakeholder consultation. The European Commission then drafts a regulatory proposal that is presented to the Consultation Forum (representatives of all member states and pre-selected set of stakeholders from each category). The proposed regulation then must still undergo an internal Commission review and a vote by member states. For more information: the EU regulatory process is explained on this page: https://ec.europa.eu/commission/presscorner/detail/en/QANDA_19_5889

labeling scheme. For instance, manufacturers need to be provided with the knowledge to integrate circularity in their production lines, choose specific materials, etc. Government representatives should understand circular economy criteria to fulfil their responsibilities in terms of product registration and others.

Recommendation for Thailand: Assess the circular economy capacity needs within the government and appliance sector engaged throughout the product lifecycle and support capacity building among the stakeholders.

- Identify key stakeholders (such as manufacturers, retailers, consumers, dismantling entities, civil society, and government representatives) and determine their roles and specific capacity building needs to organize targeted training.
- Government stakeholders should participate in regional and international networking opportunities to increase their knowledge about circular economy.

Endnotes

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