Ecodesign for Sustainable Product Regulation & Related Standards

SUSTAIN-E Summer School on Sustainable Electronics 19th June 2025 - Grenoble, France

Presenter : Amandine LOUISE – Thanks to Pauline MOURLON, Martial PATRA, Thierry CORMENIER, Jean-Pierre SCHWEITWER

Life Is On Schneider Electric

Ecodesign for Sustainable Product Regulation & Related Standards

Amandine LOUISE

45 mins

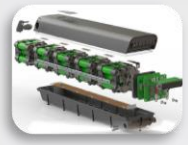
Amandine LOUISE

20 y of Experience
Industrial Risk Engineer

Electrifier Level II
Internal Expertise
on Repairability of Power Electronics
2025

RAMS Engineer
Various Studies
Hydrogen / Nuclear /
Medical Devices
Air Liquide Sector 2011-2015

RAMS Engineer
Lithium-ion Batteries
Prollion 2015-2016



RAMS Expert
Schneider Electric
2016-2020

EcoDesign Expert

EcoDesign Certification Manager

CE

Digital Product Passport

Ecodesign for Sustainable Product Regulation

RAMS Expert

Schneider Electric

Ecodesign Certification Manager
Schneider Electric
EM Innovation & Technology
2023

Safety Engineer
SITA FD Suez
2005-2006

Conformity Assessment Engineer Building Construction
ADP 2006-2008

QSE Engineer

Safety Environment Engineer New Energies
ENGIE 2008-2010

Green Premium™

IC&D EcoDesign & Green Premium Leader
Schneider Electric
2020-2023

EDISON Level I
Internal Expertise
on Repairability
2022

Engineer Master Degree
ENSI de BOURGES
2001-2004

INSA CENTRE VAL DE LOIRE

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Ecodesign Regulation Update

EU Ecodesign Regulation History

B2C Products

B2C & B2B Products

B2B Products

Not Related to Products

2005

Directive 2005/32/EC: First ecodesign directive for energy-using products.

- Household appliances, boilers, air conditioners, lighting.

2009

Directive 2009/125/EC: Extended scope to energy-related products.

- Electric motors, transformers, IT equipment.

2012

Directive 2012/27/EU: Energy Efficiency Directive.

- All sectors (buildings, transport, industry).

2017

Regulation (EU) 2017/1369: New energy labelling framework.

- Fridges, washing machines, TVs, dishwashers (A–G scale).

2019 to 2024

52 Ecodesign Regulations: New requirements for multiple product groups.

- Displays, refrigerators, washing machines, lighting, motors.

2023

Directive (EU) 2023/1791: Target: -11.7% final energy consumption by 2030.

- All sectors, focus on public buildings and large enterprises.

2024

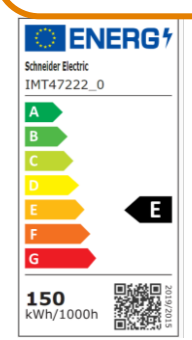
ESPR Regulation 2024/1781: Ecodesign for Sustainable Products Regulation.

- Nearly all physical goods (except food, medicine).

2025

Working Plan 2025–2030:. Focus on Durability, reparability, recyclability, circularity.

- Priority products: Textiles, furniture, ICT (smartphones, laptops), kitchen appliances, construction products, toys, sports goods



Overview of existing EU Ecodesign, Energy Labelling and Tyre Labelling measures (Jul 2024)

EPREL Registration DataBase 2017/1369

Product group[1]	Type(s) of measure[2]			Relevant acts/legislation
	ED	EL	VA	
Horizontal: framework legislation	X			Directive 2009/125/EC
Horizontal: framework legislation (Energy Labelling)		X		Regulation (EU) 2017/1369
Horizontal: EPREL implementing rules		X		Regulation (EU) 2024/994
Horizontal: Guidelines on self-regulation/VAs			X	Recommendation (EU) 2016/2125
Horizontal: Standby / off mode consumption	X			Regulation (EC) 1275 /2008[3] Regulation (EU) 2023/826 [4]
Welding equipment	X			Regulation (EU) 2019/1784
Power transformers	X			Regulation (EU) 548/2014
Electric motors + variable speed drives (VSDs)	X			Regulation (EU) 2019/1781
Water pumps	X			Regulation (EU) 547/2012
Circulators	X			Regulation (EC) 641/2009
Industrial fans	X			Regulation (EU) 327/2011 Regulation (EU) 2024/1834
Professional refrigeration equipment	X			Regulation (EU) 2015/1095
		X		Regulation (EU) 2015/1094
Air heating/cooling products	X			Regulation (EU) 2016/2281
External power supplies	X			Regulation (EU) 2019/1782
Computers	X			Regulation (EU) 617/2013
Servers and data storage products	X			Regulation (EU) 2019/424
Simple set-top boxes – REPEALED FROM 9 MAY 2025	X			Regulation (EU) 107/2009

Product group[1]	Type(s) of measure[2]			Relevant acts/legislation[3]
	ED	EL	VA	
Mobile phones and tablets	X			Regulation (EU) 2023/1670
		X		Regulation (EU) 2023/1669
TVs/Electronic displays	X			Regulation (EU) 2019/2021
		X		Regulation (EU) 2019/2013
Light sources and control gears	X			Regulation (EU) 2019/2020
		X		Regulation (EU) 2019/2015
Dishwashers	X			Regulation (EU) 2019/2022
		X		Regulation (EU) 2019/2017
Washing machines + washer-dryers	X			Regulation (EU) 2019/2023
		X		Regulation (EU) 2019/2014
Tumble driers	X			Regulation (EU) 932/2012 Regulation (EU) 2023/2533[5]
		X		Regulation (EU) 392/2012 Regulation (EU) 2023/2534[6]
Domestic cooking appliances: ovens, range hoods, hobs	X			Regulation (EU) 66/2014
(NB: no label for hobs)		X		Regulation (EU) 65/2014
Household fridges and freezers	X			Regulation (EU) 2019/2019
		X		Regulation (EU) 2019/2016
Refrigerating appliances with a sales function	X			Regulation (EU) 2019/2024
		X		Regulation (EU) 2019/2018
Ventilation units	X			Regulation (EU) 1253/2014
(labelling for residential only)		X		Regulation (EU) 1254/2014
Space and combination heaters	X			Regulation (EU) 813/2013 Council Directive 92/42/EEC
		X		Regulation (EU) 811/2013
Water heaters/storage tanks + solar devices	X			Regulation (EU) 814/2013
		X		Regulation (EU) 812/2013
Local Space Heaters	X			Regulation (EU) 2015/1188[4] Regulation (EU) 2024/1103[6]
(labelling in same regulation)		X		Regulation (EU) 2015/1186
Solid fuel space heaters	X			Regulation (EU) 2015/1185
Solid fuel boilers	X			Regulation (EU) 2015/1189
		X		Regulation (EU) 2015/1187
Air conditioners (incl. air-to-air heat pumps)	X			Regulation (EU) 206/2012
		X		Regulation (EU) 626/2011
Tyres (NB: Regulation adopted by Council and Parliament)		X		Regulation (EU) 2020/740
Imaging equipment (NB: preparation of regulatory measures ongoing)			X	COM (2013) 23
Game consoles			X	COM(2015) 178

Industrial products (14 Reg.)

Household products (38 Reg.)

ED: Ecodesign
EL: Energy Labelling
VA: Voluntary Agreement

Applicable for some SE products

ESPR 2024/1781 Timeline and Transition

Timeline for the Regulation: Publication 28th June 2024. Entry into force 18th July 2024 – regulation directly applicable to all Member States

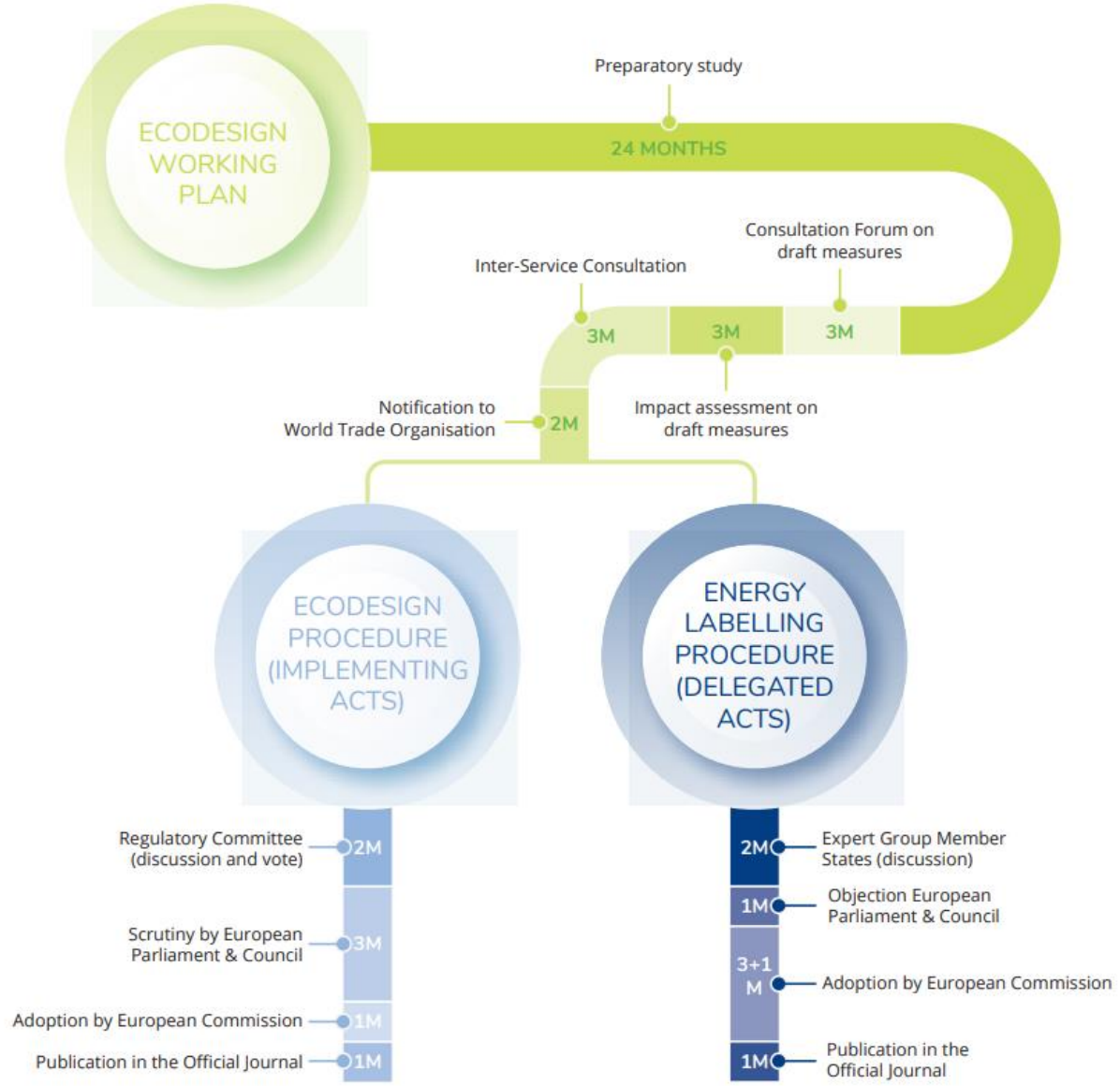
Publication of the working plan – 9 months after the entry into force of the ESPR (i.e. 18th April 2025) setting product priorities and indicative timelines. *Note – previous workplans faced considerable delays of up to 2 years.*

Timeline for the product specific requirements or horizontal measures – to be established on a rolling basis after the publication of each workplan. First measures expected mid-2027

Application of product requirements – minimum 18 months after the entry into force of the requirement (can be longer based on negotiations)

Transition between Directive and Regulation – transition between legislations will continue until the end of 2026 or even 2030 for some measures, including for power transformers. All existing regulations remain in force until they are repealed by an ESPR act.

Existing procedure in Ecodesign Directive takes roughly 3.5 years from preparatory study phase to adoption – EEB 2021



ESPR Framework and folks

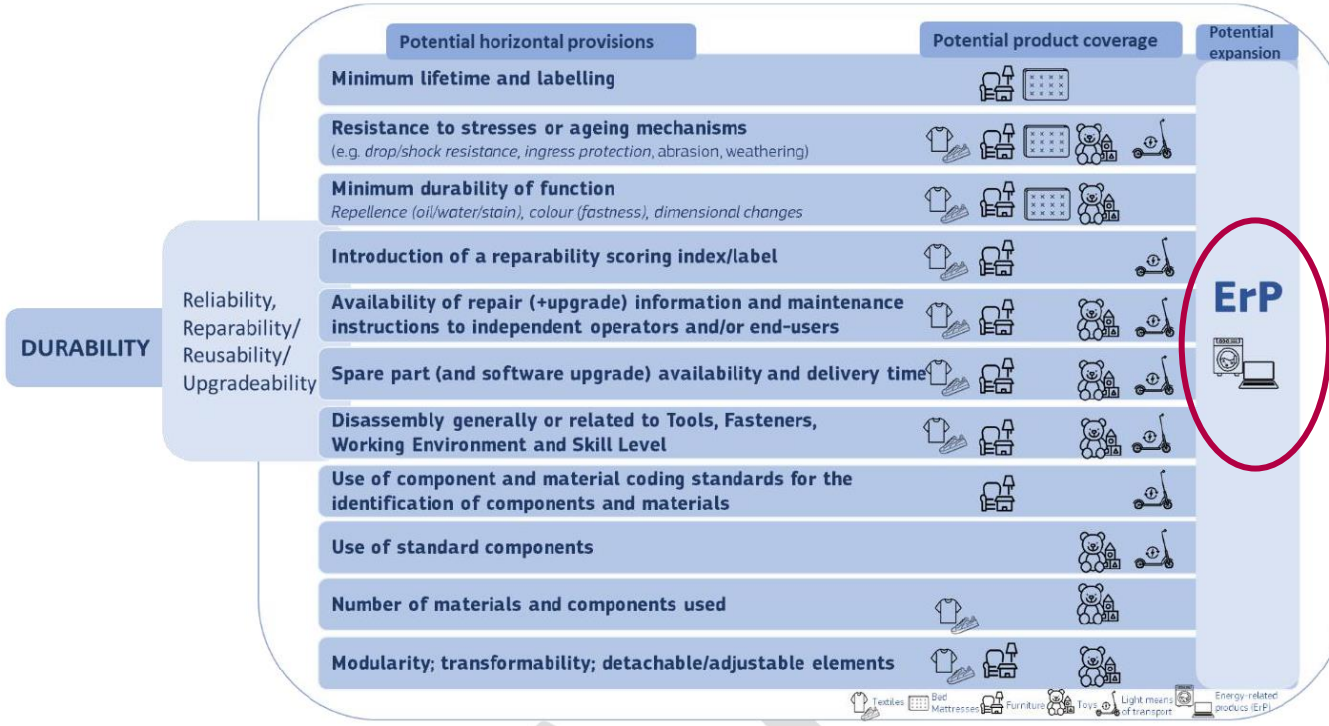
Openning on the 19 February 2025

https://commission.europa.eu/document/download/c5db3b9e-23ae-42c8-a50a-b549f20a377d_en?filename=2024_05_22_EC%20Presentation%20ESPR%20Webinar_final.pdf

Whats New in Ecodesign for Sustainable Product Regulation

Key product aspects under ESPR

- Durability
- Reliability
- Reusability
- Upgradability
- Repairability
- Possibility of maintenance and refurbishment
- Presence of substances of concern
- Energy use or energy efficiency
- Resource use or resource efficiency
- Recycled content
- Possibility of remanufacturing and recycling
- Possibility of recovery of materials
- Environmental impacts, including carbon and environmental footprint
- Expected generation of waste materials



EU ESPR Digital Product Passport

2. DPP main design features

Digital Product Passport

DPP-system ⟵ ⟶ DPP-data

*(the "**HOW**". To be developed horizontally for all product groups and legislations)*

*(the "**WHAT**". To be developed through **product-group specific** dedicated legislation)*

- **The DPP registry**
- **A searchable Web Portal**
- **All standards and protocols related to IT architecture:**
  1. Unique identifiers
  2. Data carriers and links between physical product and digital representation
  3. Access rights management, information security, and business confidentiality
  4. Interoperability (technical, semantic, organisation)
  5. Data processing , data exchange protocols, and data formats
  6. Data storage, archiving, and data persistence
  7. Data authentication, reliability, integrity
  8. APIs for the DPP lifecycle management and searchability

Information to be included in the DPP will be **product-group specific** and identified in delegated act process.

It may include information/data on one or more of the following areas:

- Technical performance
- Environmental sustainability performance
- Circularity aspects (durability, repairability, etc)
- Legal compliance
- Product-related information (e.g., manuals, other labels)

30

ESPR Webinar, 22.05.24

European Commission

EU DPP Standardization and compliance workflow

ESPR
Primary legislation

Product 1
Delegated Act 1
(Secondary legislation)

...

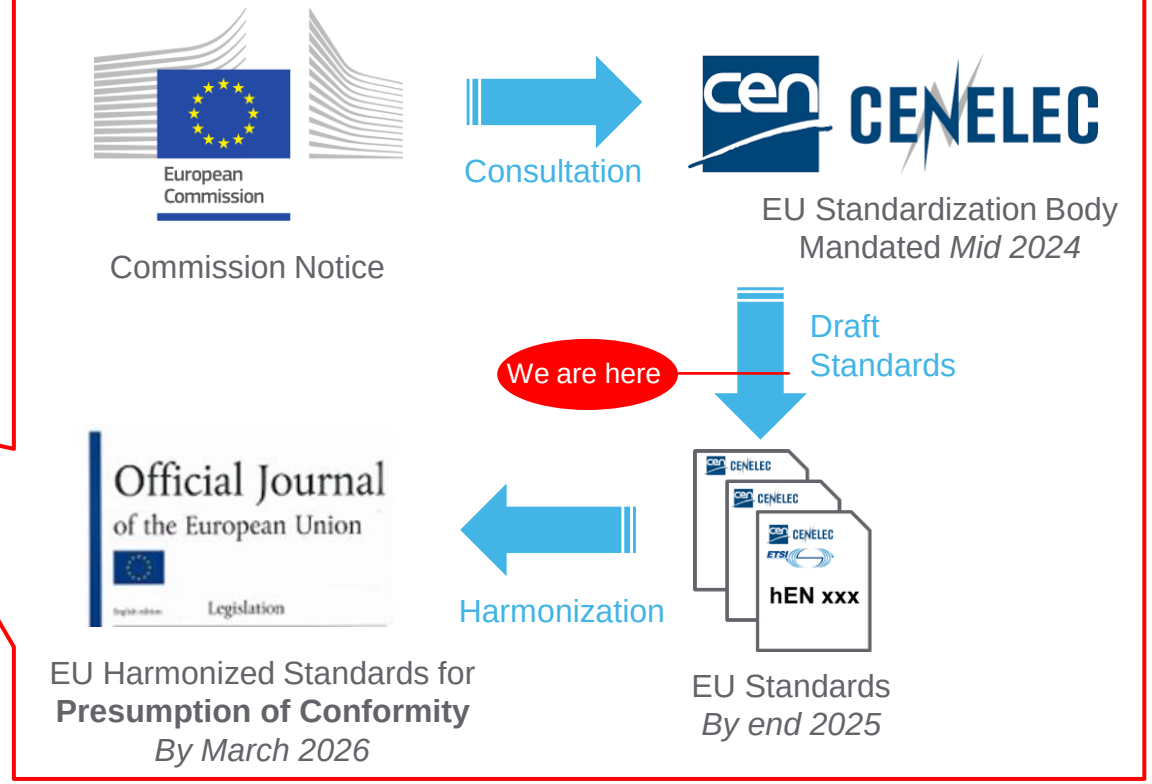
Product n
Delegated Act n

Digital Product Passport System & Framework

DPP Service Provider
Delegated Act

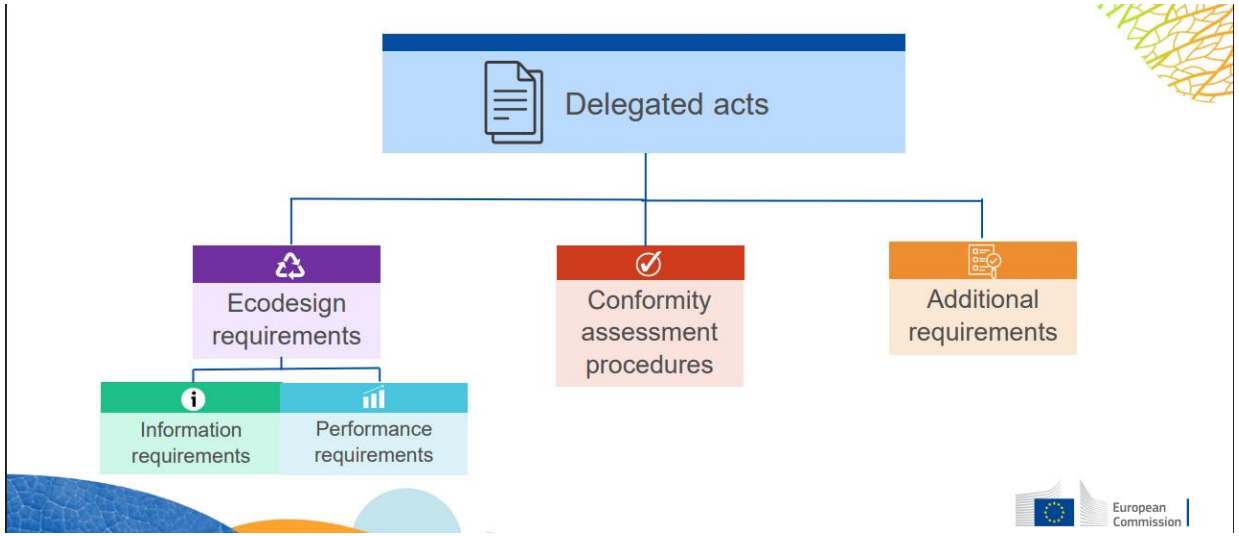
Progressive application by « product family » (end-user and Secondary products) until all products are covered

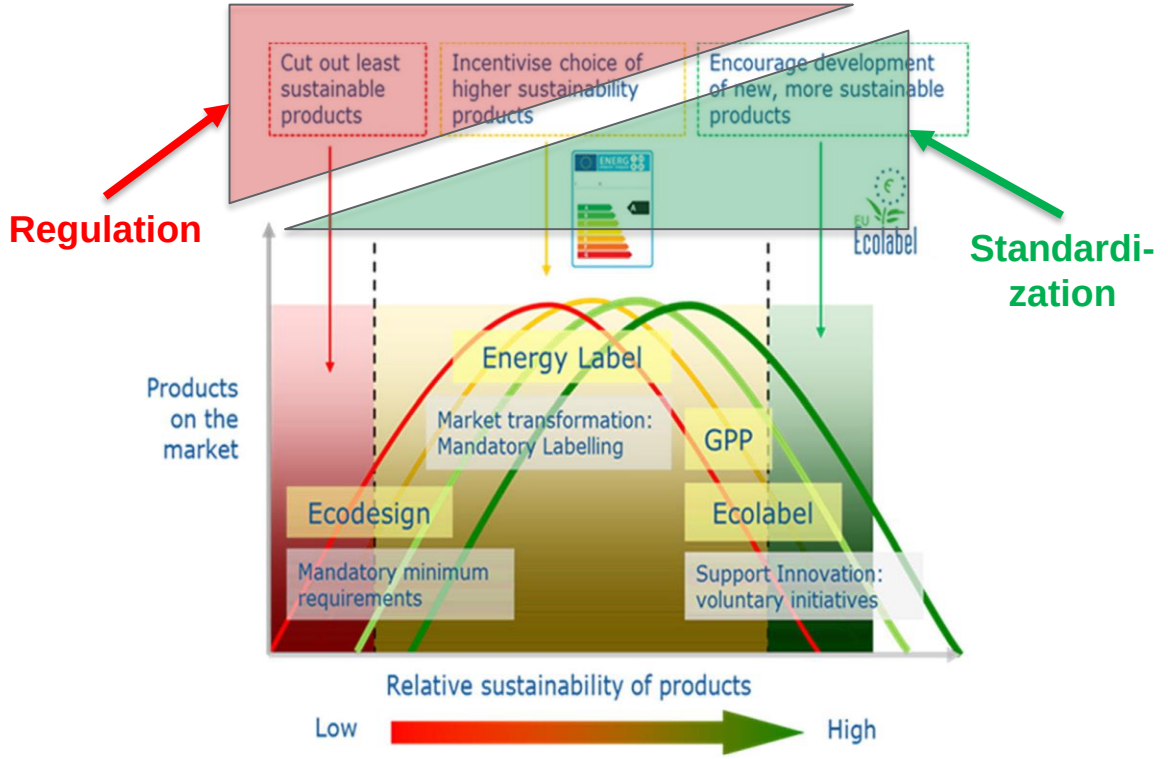
Unique system approach through Standards + DPP Service Provider Delegated Act in 2026



Digital Product Passport

How to anticipate Regulation Requirements





European Commission Webinar on ESPR online Session of the 22 May 2024

https://commission.europa.eu/document/download/c5db3b9e-23ae-42c8-a50a-b549f20a377d_en?filename=2024_05_22_EC%20Presentation%20ESPR%20Webinar_final.pdf

Regulatory context for Sustainability in the European market
Source : Mauro Cordella and EC/JRC team : European Commission, Circular Economy and Industrial Leadership Unit, Joint Research Centre (JRC), Seville, Spain
Improving material efficiency in the life cycle of products: a review of EU Ecolabel criteria | The International Journal of Life Cycle Assessment (springer.com)

Regulation Anticipation by Standardization

Sustainability standards at the core of future compliance

Sustainability standards will be decisive over the next five years, particularly to comply with regulations.

Standardization

- Ensures standards of performance, safety, and more.
- Tool for regulatory compliance on environmental aspects.

Horizontal standards

- Standard on the methodology for calculating the environmental footprint (EN 50693).
- Standards on material efficiency aspects (durability, recyclability) – EN 45XXX series.
- Standard on carbon footprint communication and GHG reduction (or avoidance) for electrical equipment.
- Standards on circular economy management (ISO 59XXX series).

Product sector standards

It is necessary to engage the industry to promote existing standards and define those that are missing.

Organization of the standardization framework on Technical Committees related to sustainability issues

ISO SECTOR		ELECTROTECHNICAL SECTOR		POWER ELECTRONICS PODUCTS
Technical Committees that develop corporate management standards on circularity aspects.		Technical Committees developing horizontal environmental standards applicable to EEE	Technical Committees that develop product-specific standards and transpose horizontal environmental standards to products.	
TC 323		TC 111	TC Products	TC 22
TC 473	JTC 10	TC 111 x	TC products	TC 22x (WG9)
X30M	GEJ 10	UF 111	TC products	UF 22

Technical Committees that develop material efficiency standards for both sectors.

TC = Technical Commitee

Other Technical Committees exist, such as ISO TC207 (Life Cycle Assessment - LCA).

Create internal position to nurture Standardization

Regulation anticipation in EU

Needs Identification ①

- **Ecodesign for Sustainable Product Regulation (ESPR)**: all products on EU market
- Customer request

2019 - 2025

Answer for compliance ②

2019

- **White paper** : How Standardization for Ecodesign and Circular Economy Contributes to Sustainability
- **EN 45554 :** Generic standard on repairability assessment

Experts & officers

Analysis, agreement on action plan

Internal Research ③

Analysis & application of standards

2021 to 2025

Decision & adaptation ④

2022

- Adaptation for industrial context
- Included in standardization strategy

Internal standard ⑤

2023

Deployment

Environmental Data

Internal Standards

External Standards

Influence as Advocacy ⑥

2025

- **EN 45554 + EN 50743 Pow.E. + EN 63058 SG/CG**

ISO IEC CENELEC cen

Material Efficiency requirements for Circular Economy

Today /Anticipated

draft Regulations & Standards

European Commission

Δ

cen CENELEC ISO IEC

Standards
for Ecodesin / Lifecycle Management
&
for Circular design

Power Electronic System & equipment

Company
Offer LifeCycle Management

Exercice on
Power Electronics' equipment

OLM + Δ

Future / Effective

ESPR / Green deal

CIR-ECO

New standards CENELEC

Company updated OLM

DPP
Digital Product Passport
- Interoperability &
- LC data Migration

VALUE & LC Management standards applicable to Organizations/Processes

EN 12973 ed.2 2020

Value Management

- **Scope:**
  Defines, describes and explains Value Management and provides stakeholders with guidance for the introduction of the basic concepts, approaches, essential principles, drivers (levers), methods and tools for effective Value Management.

$$\text{value} \propto \frac{satisfaction\ of\ the\ needs}{\text{consumption of resources}}$$

ISO/IEC/IEEE 24748-1 ed.1 2018

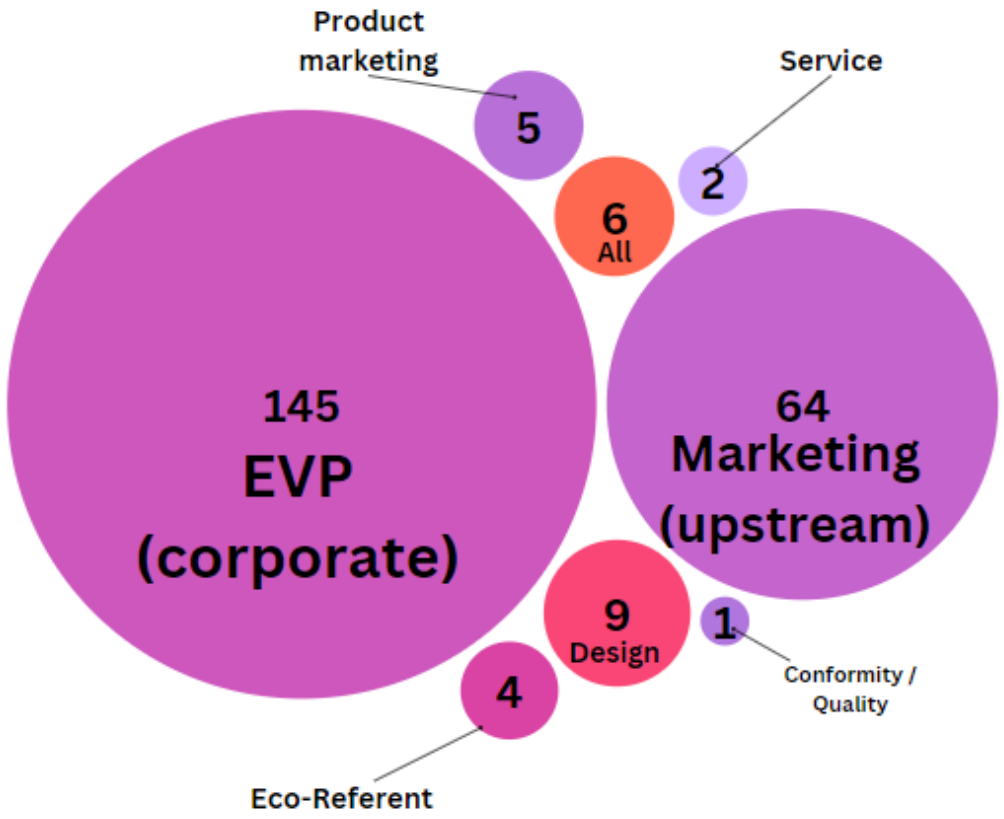
Systems and software engineering
Life cycle management / Part 1:
Guidelines for life cycle management

- **Scope:**
  Provides guidelines for the life cycle management of systems and software.

Life cycle stages	Purpose	Decision options
Concept	Identify stakeholders' needs Explore concepts Propose viable solutions	— Begin subsequent stage or stages — Continue this stage — Go to or restart a preceding stage — Hold project activity — Terminate project
Development	Refine system requirements Create solution description Build system Verify and validate system	
Production	Produce systems Inspect and test	
Utilization	Operate system to satisfy users' needs	
Support	Provide sustained system capability	
Retirement	Store, archive or dispose of system	

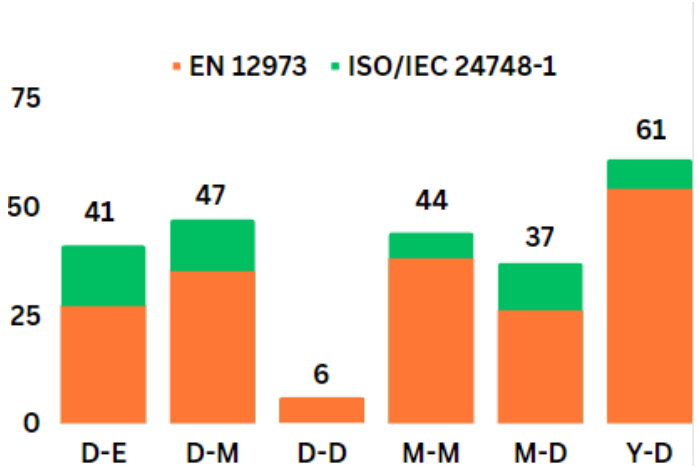
Analysis of Ecodesign standards and regulation

Total of 236 Requirements from Value & LC Management standards : EN 12973 & IEC/IEC/IEEE 24748-1



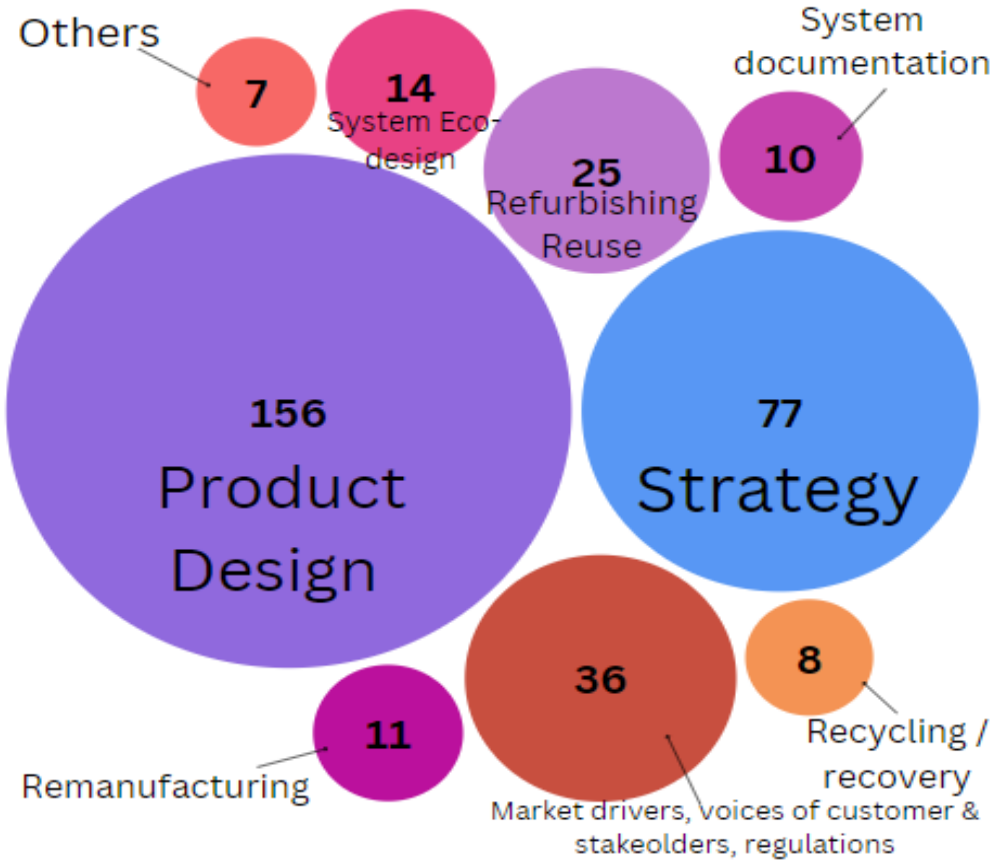
Difficulty & expected time needed for Management Standards integration in Organizations and processes

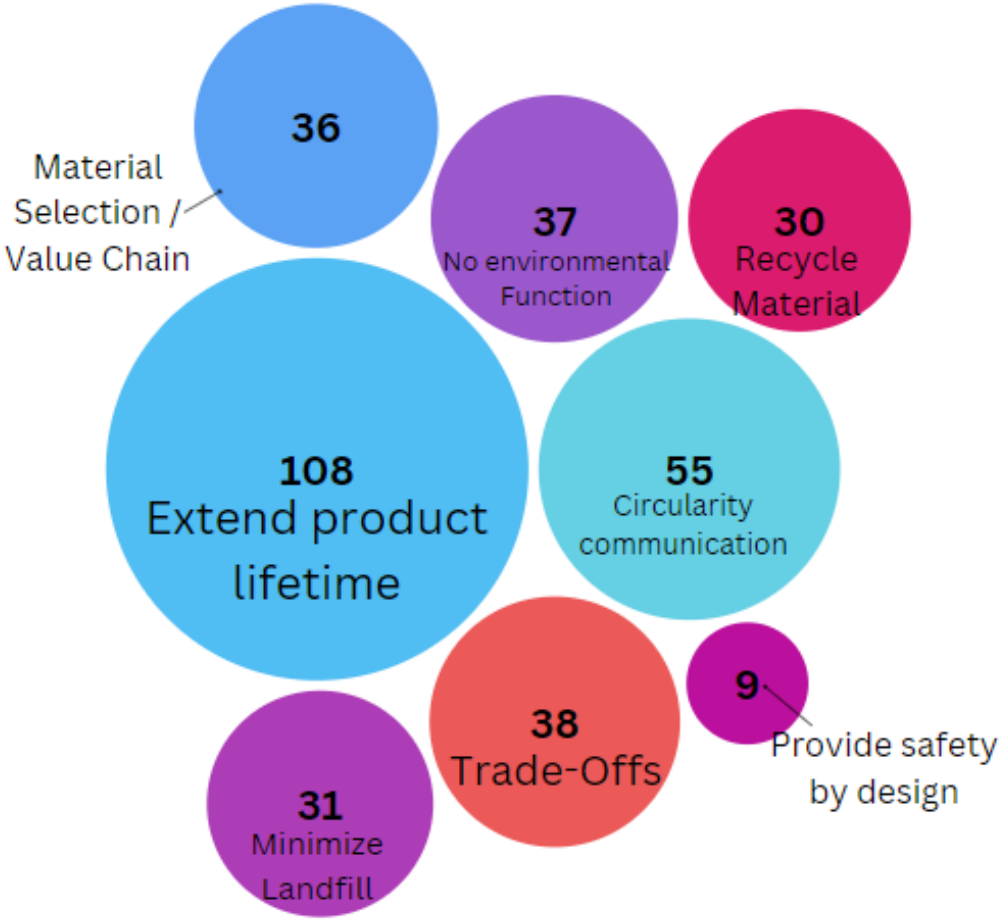
Time \ Difficulty	Easy to perform	Medium difficult to perform	Difficult to perform
Day(s)	D-E	D-M	D-D
Month(s)		M-M	M-D
Year			Y-D



Analysis of Ecodesign standards and regulation

Total of 354 Requirements from Circular Design standards : pr. ed.1 EN 45560 & IEC/TS 63428



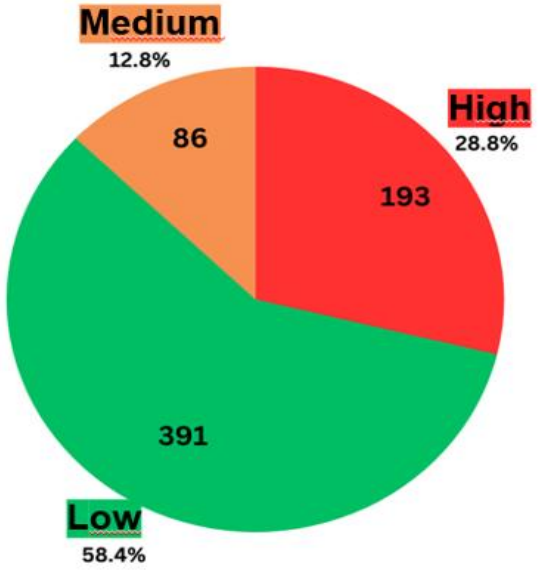


Analysis of Ecodesign standards and regulation

Total of 670 Requirements from draft ESPR (2022-03)

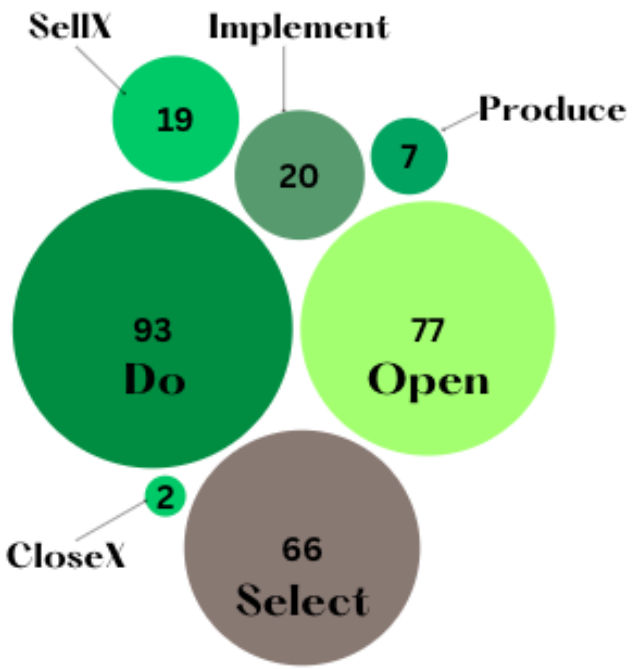
ECODESIGN FOR SUSTAINABLE PRODUCTS REGULATION

- High Level **193** ESPR Requirements
  - **Mandatory** to apply
  - Directly **applicable**
    to Power Electronics (ErP)
    Organization/Stakeholders
    Product/process systems

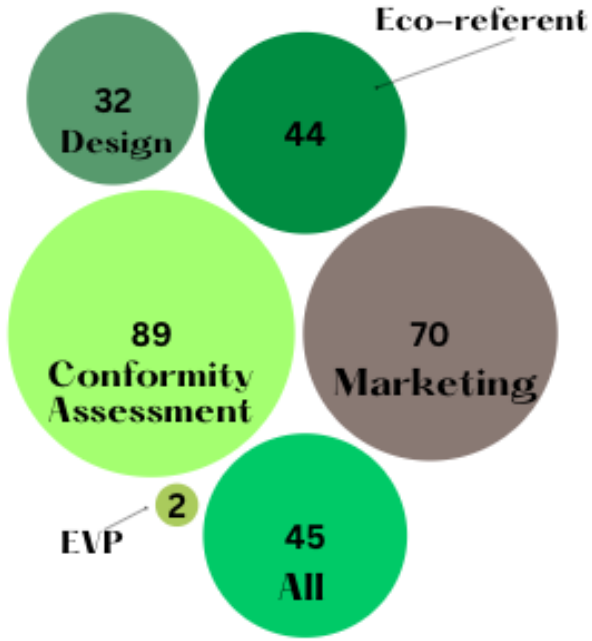


Total: 670 Requirements

Requirements applicable to Company Process & Stakeholders



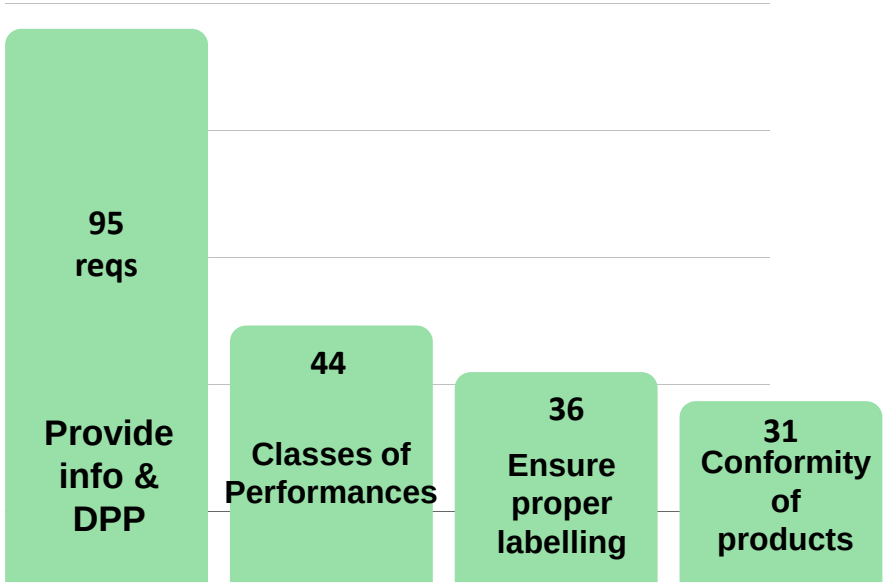
Phases of Company's Offer Life Cycle Management



Company stakeholders involved

Assess Effort to Comply to Ecodesign standards and regulations

ECODESIGN FOR SUSTAINABLE PRODUCTS REGULATION



Digital Product Passport (DPP)

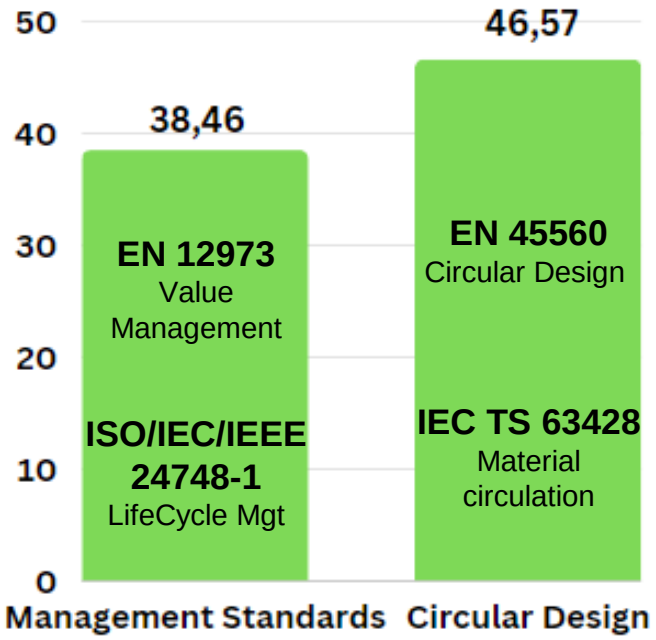
JTC24 Standardisation of interoperability DPP System

Value & LC Management versus Circular Design Standards

Weight allocation for requirements depending on difficulty & implementation time

Time& Difficulty	Weight
Days-Easy	1
Days-Medium	6
Days-Difficult	12
Months-Medium	25
Months-Difficult	40
Years-Difficult	100

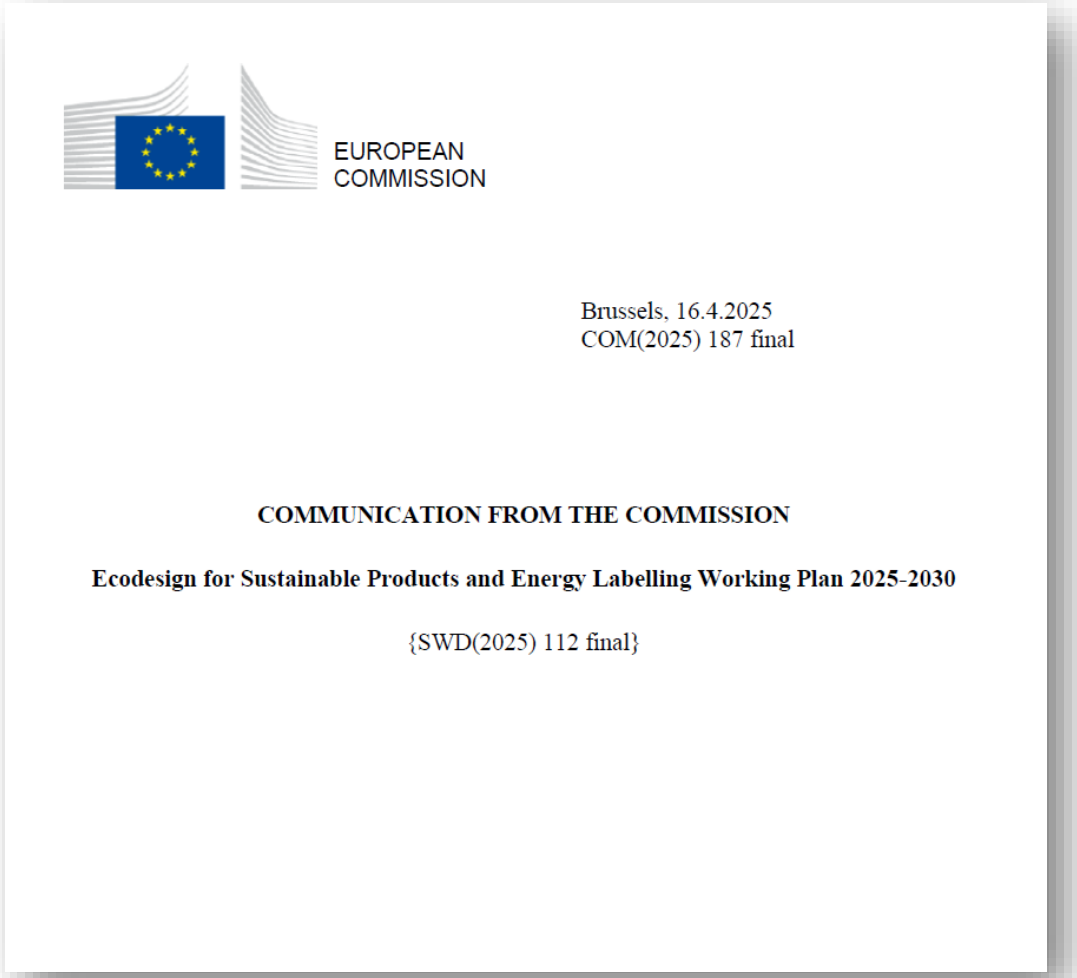
Comparative implementation time and difficulty of total weighted standards' requirements



Implementation of Standards' requirements in Company Product Process Dev. & organization is nearly equivalent for Management and Circular Design standards

Loop back to Regulation

EU Commission Working plan ESPR 2025 –2030



EUROPEAN
COMMISSION

Brussels, 16.4.2025
COM(2025) 187 final

COMMUNICATION FROM THE COMMISSION

Ecodesign for Sustainable Products and Energy Labelling Working Plan 2025-2030

{SWD(2025) 112 final}

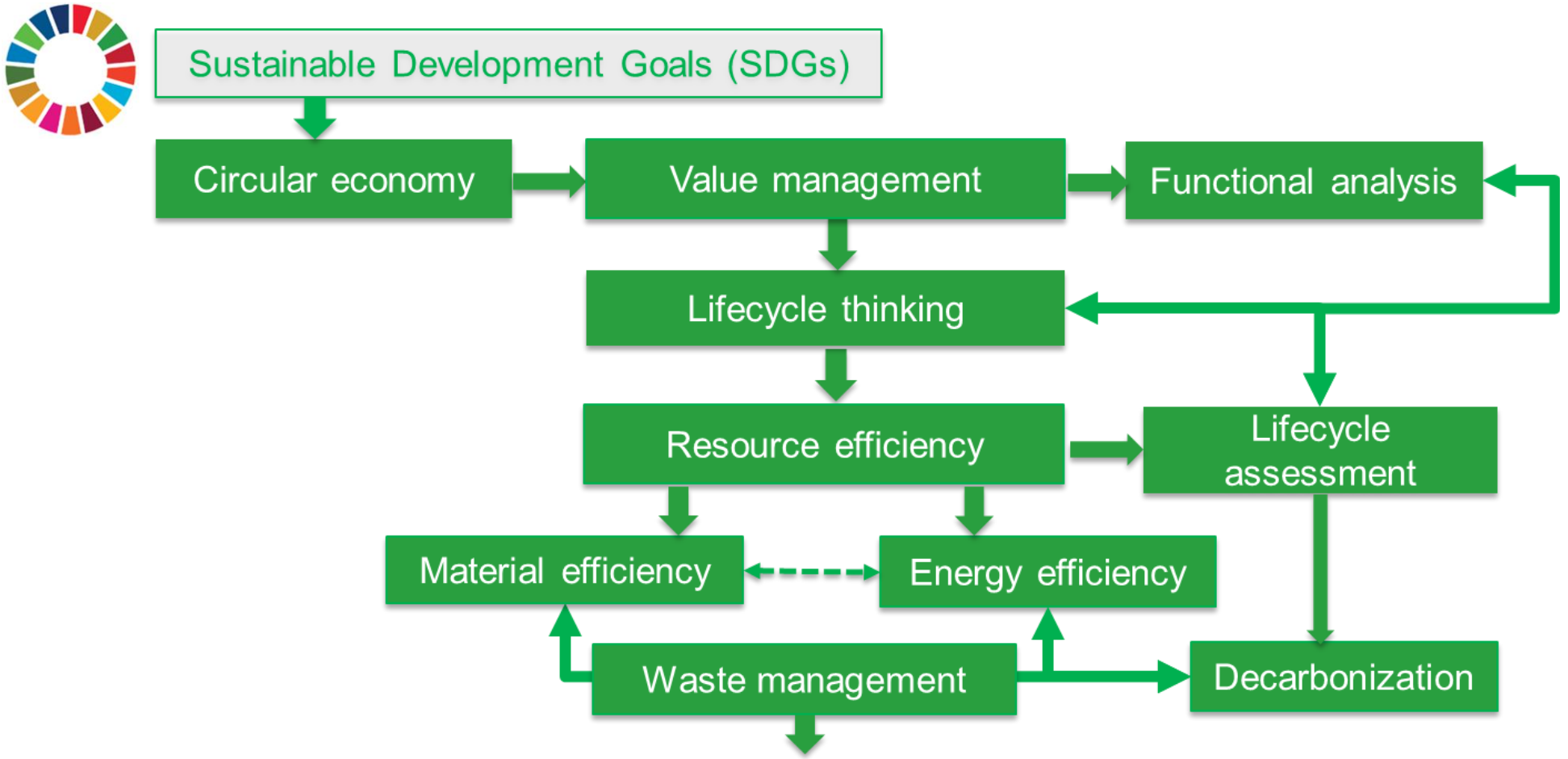
To ensure **medium-term visibility** for economic operators, the Commission is proposing a **five-year working plan (2025–2030)**, which includes:

- a **list of final products**,
- **two intermediate products**, and
- **two legal acts** establishing **horizontal requirements**.

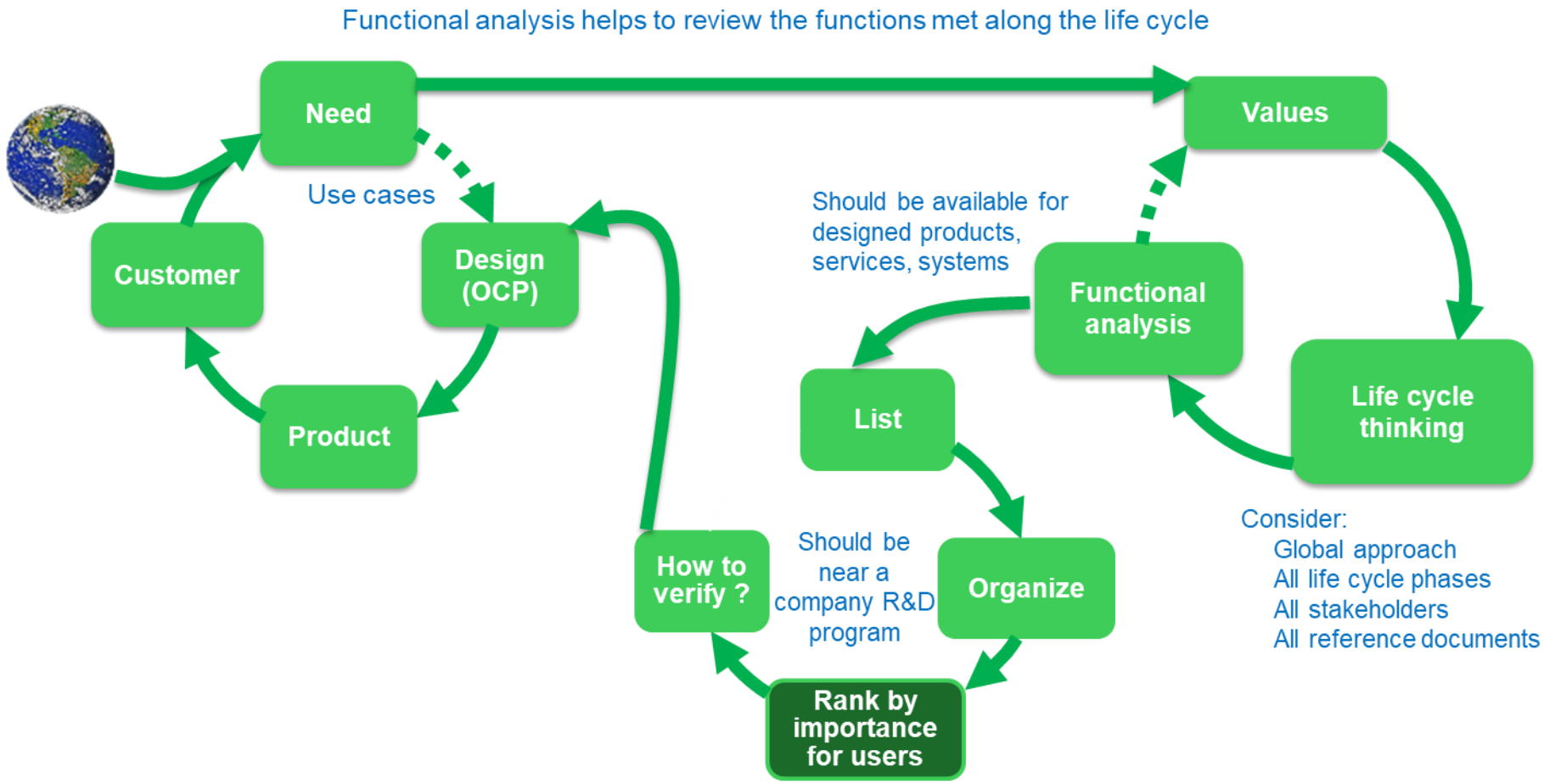
The definition of horizontal requirements for environmental performance covers:

- **Repairability,**
- **Recycled content.**

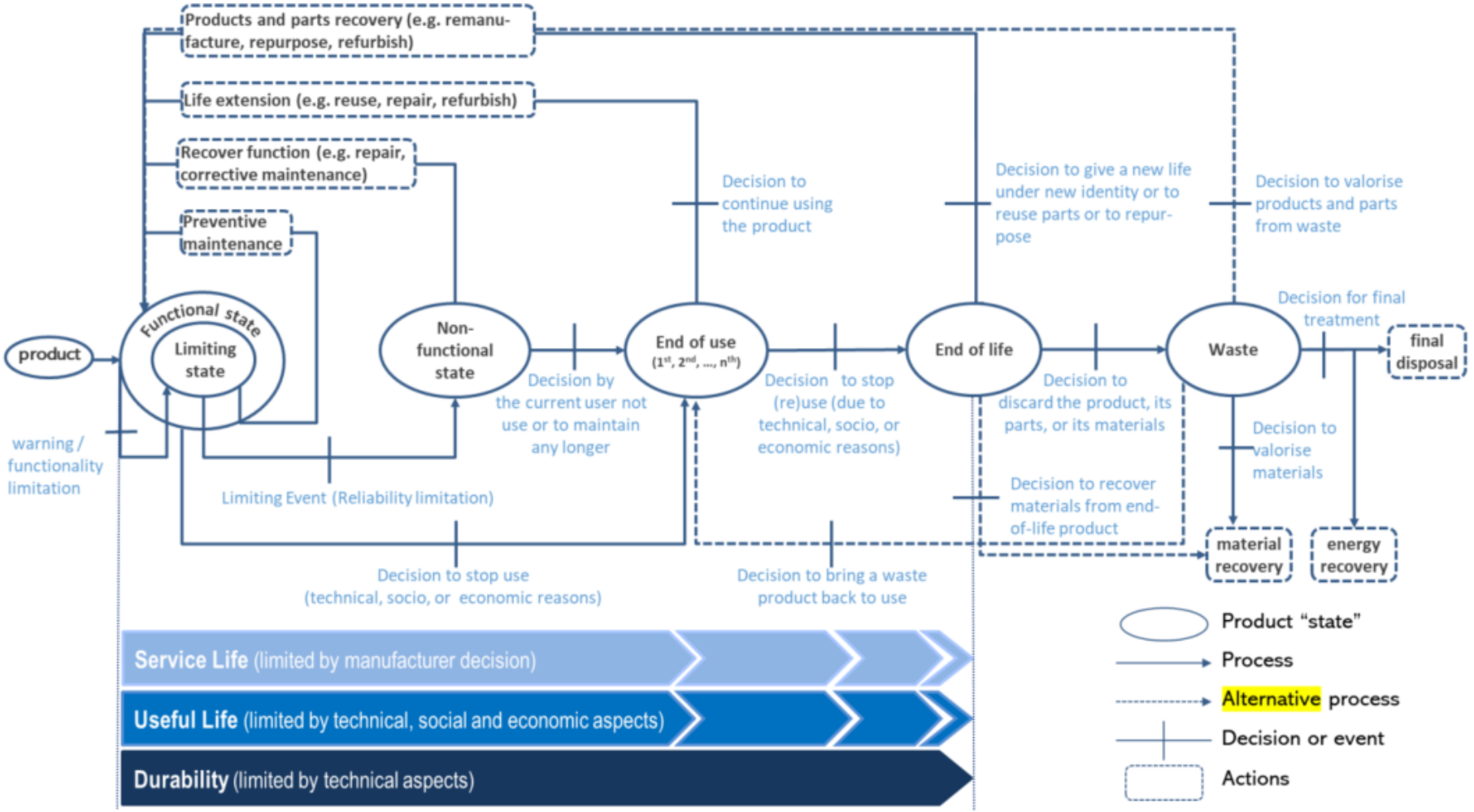
Main items necessary to consider with interactions for environmentally conscious design (ECD): Ecodesign



Main items necessary to consider with interactions during the environmentally conscious design (ECD)



Life Cycle of Products for Standardization



Thanks for your Attention and Please Ask Questions

Amandine LOUISE
EcoDesign Certification Manager – Repairability Subject Matter Expert

Martial PATRA
Standardisation Drives

Pauline MOURLON
Standardisation Environment Industrial Automation

Benjamin MARTINEZ
Standardisation Smart Manufacturing

Thierry CORMENIER
Standardisation & Durability Subject Matter Expert

Jean-Pierre SCHWEITZER
Sustainable Materials Program Leader

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