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From Green to Transition: How Do Sustainable Finance Taxonomies Address the Net-Zero Transition?

Franziska Schütze*, Fernanda Ballesteros, Karol Kempa, Catherine Marchewitz, Ulf Moslener, Karsten Neuhoff

At a glance

- Taxonomies have become a mainstream policy tool: Around 90 jurisdictions have published, implemented or initiated a sustainable finance taxonomy by now.
- Most frameworks focus on green economic activities, while transition activities in hard-to-abate sectors are either missing or lack clear pathways to net zero.
- If an explicit transition category is included, five different elements are used – often in combination: interim performance criteria, sunset dates and forward-looking pathways, traffic light systems and transition plans.
- To ensure alignment with climate targets, taxonomies should link transition activities to dynamic, science-based pathways that enable a credible transition while avoiding the risk of stranded assets and greenwashing.
- Regarding the interoperability of international frameworks, common principles and minimum standards should be used that still leave space for reflecting regional or national circumstances.

International policy relevance: As governments continue to develop sustainable finance frameworks, international cooperation can help improve the interoperability of taxonomies and reduce fragmentation. COP31 provides an opportunity to promote common principles for taxonomy design without seeking to establish a single global taxonomy.

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*Corresponding author

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Introduction

Achieving the goals of the Paris Agreement requires a fundamental reorientation of financial systems. Article 2.1(c) calls for making finance flows consistent with low-emission and climate-resilient development (United Nations, 2015). This requires financial systems to support both already sustainable activities and the transformation of emissions-intensive sectors. In this regard, sustainable finance taxonomies[1] have become an important policy instrument (Green & Reyes, 2023; Hale et al., 2022) that provides common definitions and criteria to guide capital towards environmental objectives (Ehlers et al., 2021; Spinaci, 2020).

As taxonomies have proliferated, an increasing number have introduced provisions for activities that are not yet sustainable or economically viable but with the potential to contribute to decarbonization (Caldecott, 2022; Migliorelli, 2021). These so-called "transition activities" typically comprise emission-intensive sectors like steel, cement, chemicals and other hard-to-abate industries. However, how they are included in taxonomy frameworks varies considerably. Some taxonomies establish dedicated transition categories, while others incorporate transition activities within broader technical screening criteria or use different approaches to define and assess them.

This policy brief focuses on this specific dimension of taxonomy design and asks: ***How are transition activities embedded in existing taxonomies and under what conditions are they considered taxonomy-aligned?*** Drawing on a comparative analysis of 45 taxonomies by Marchewitz et al. (2026), this policy brief answers this question by showing what eligibility criteria they apply and by understanding how they seek to ensure that transition finance supports the decarbonization rather than carbon lock-in or greenwashing (Schütze & Stede, 2021; Zetzsche & Bodellini, 2023). Importantly, we do not assess the climate ambition of these frameworks, that is, whether specific thresholds would be stringent enough to meet a specific climate

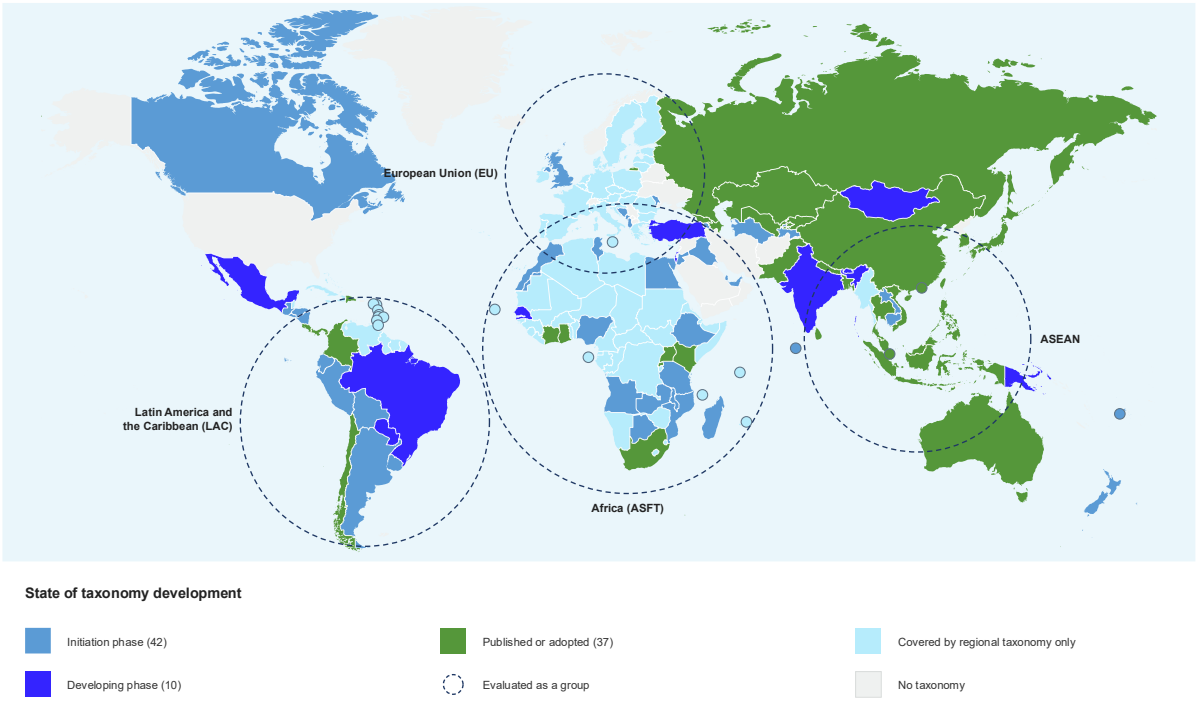
[1] We use the term "sustainable finance taxonomies" or simply "taxonomies" in a broad sense. Besides formal, legally anchored classification systems such as the EU Taxonomy, it includes voluntary guidance documents that are not taxonomies in the strict sense but serve a comparable function to guide financial flows for alignment with sustainability and climate objectives.

target. Instead, we focus on the structural rules by which transition activities are admitted into a taxonomy.

The global sustainable finance taxonomy landscape: From green to transition

Many sustainable finance taxonomies have been developed in recent years. China was among the first movers to adopt such a framework, releasing its Green Industry Guidance Catalogue in 2018 (Zhang et al., 2022), followed shortly by jurisdictions such as the EU and Malaysia. A particularly strong wave emerged between 2022 and 2025. In the meantime, around 90 countries or regions have published, are developing, or are initiating country/region-specific taxonomies to define sustainable activities and investments (**Figure 1**). This rapid proliferation of frameworks has, however, resulted in a broad range of how taxonomies are designed and implemented, raising questions about policy effectiveness, interoperability, and the evolution of sustainable finance governance.

Figure 1: Map of global sustainable finance taxonomies at different stages of development in September 2025 (based on Marchewitz et al (2026)



The graph was built with Claude (Model Opus 5.5) based on table 2 in Supplementary Material I of Marchewitz et al. (2026).

While many of the early sustainable finance taxonomies only focused on activities that were already environmentally sustainable like renewable energies, many taxonomies now recognize the need to finance economic activities that are still undergoing transformation.

Taxonomies have responded to this challenge in different ways. Some introduce dedicated categories for "transition" or "transitional" activities. Yet, taxonomies differ in which sectors they recognize, how they define eligibility and whether they require activities to follow a credible pathway towards net zero. This diversity across frameworks makes these provisions on transition activities an important area for comparative analysis. The following section examines how different taxonomies define and embed transition activities.

How do taxonomies define and incorporate transition activities?

Going beyond activities that are already considered green is important if taxonomies are intended to support the transformation of emission-intensive sectors. The comparison of Marchewitz et al (2026) shows that across the 45 taxonomies reviewed, transition is incorporated in very different ways. Some taxonomies, such as the EU and the ones from Turkey, Chile, Columbia and Mexico include transition activities within the green category but do not have an explicit transition category. Other taxonomies, such as the regional one for ASEAN and from countries such as Australia, Cote d'Ivoire, Indonesia, Pakistan, Singapore, and Thailand establish a specific transition category. Japan's transition finance framework focuses only on transitioning activities, not green activities, and lays out detailed sectoral technology roadmaps for carbon-intensive sectors (Japanese Financial Services Agency et al., 2021). In this policy brief, we identify several elements to define a transition category that are not mutually exclusive but are often combined with each other: *(1) interim performance criteria, (2) sunset dates, (3) forward-looking transition pathways, (4) traffic light system and (5) transition plans*. We identified which of the elements are included in which framework (**Table 1**).

(1) Interim performance criteria

Under this approach, activities that do not yet meet the criteria for being considered green can qualify as "transition" if they achieve specified levels of environmental or interim performance criteria.

The ASEAN Taxonomy provides a prominent example (ASEAN Capital Markets Forum, 2023). For example, for power generation, it uses "tiered" lifecycle emission thresholds. Within the transition category, Tier 2 activities are allowed with emissions from 100 gCO_2e/kWh up to a ceiling that tightens from 425 (2024–2030) to 285 (2031–2035) and 185 (2036–2040), before being sunset in 2041. Tier 3 covers 425–510 gCO_2e/kWh only until 2030. This gives higher-emitting facilities a transition pathway that narrows gradually toward the green threshold. Some ASEAN members have implemented different interim performance targets for the amber/transition category in their national taxonomy.[2] This compares to the emission threshold of <100 gCO_2e/kWh for the green category, which is the same for the EU, Australia, Columbia, Sri Lanka, ASEAN, Singapore, Thailand and Indonesia.

Using a different sector example, Pakistan applies different thresholds for the textile industry, e.g. 15% of recycled materials for textiles in the transition category, compared to 30% in the green category (State Bank of Pakistan, 2025).

(2) Sunset dates

Another element to include transition activities are sunset dates, providing a clear endpoint for activities that are necessary during the transition but are not compatible with the target of a net-zero economy in the long-term. Eligibility is thus restricted to a defined period of time. This approach is often combined with interim performance criteria. For example, Thailand's taxonomy phases out the "amber" or transition category entirely after 2040 (Thailand Taxonomy Board, 2025). Moreover, Chile's taxonomy only allows specific busses until 2027 (Euro V buses) (Ministerio de Hacienda Chile, 2025). In the transition category in Pakistan, facilities

[2] Singapore uses <220 gCO_2e/kWh (Monetary Authority of Singapore, 2023), Thailand <381 gCO_2e/kWh (Thailand Taxonomy Board, 2025) and Indonesia <510 gCO_2e/kWh (Indonesia Financial Services Authority, 2025).

must meet the green criteria by 2030. In Singapore, two sunset dates apply for the energy sector, 2030 and 2035 (Monetary Authority of Singapore, 2023; State Bank of Pakistan, 2025).

(3) Forward-looking transition pathways

A third approach links taxonomy eligibility to a forward-looking decarbonization pathway, rather than assessing activities solely against a static (interim) performance threshold. These approaches define a trajectory towards lower emissions and/or net zero. Such pathways can take the form of quantitative thresholds (e.g., emission intensity) that tighten over time.

In the Australian taxonomy, for example, nickel ore mining can qualify as a green activity if its scope 1 and 2 emission intensity stays below 3.63 CO_2e per tonne of nickel equivalent in 2025, declining to 0.23 tCO_2e/t by 2050 (Australian Sustainable Finance Institute, 2025). Alternatively, the mining activity can reduce its emission intensity against a 2019 baseline by 56 percent by 2030 and 94 percent by 2050.

Moreover, pathways can also be defined based on a technology choice. Japan's sectoral technology roadmaps map out which technologies are expected to decarbonize an industry at which point in time (Japanese Financial Services Agency et al., 2021). For example, for iron and steel, in the late 2020s, carbon capture and on-site hydrogen use in blast furnaces are expected to cut emissions by 10-20 percent. From 2030 to the 2040s, direct hydrogen reduction with near-zero emissions is foreseen. In Indonesia, aviation is classified as transition if it complies with Indonesia's Sustainable Aviation Fuels (SAF) Roadmap: 2.5 percent of sustainable fuel use in 2030, 12.5 percent in 2040, 30 percent in 2050 and 50 percent in 2060.

(4) Traffic light system

The before mentioned elements are often embedded in a "traffic light system". This approach groups activities into color-coded categories, typically *green, amber/yellow and red*. *Green* activities are usually already aligned with net zero or a low-carbon economy. *Amber/yellow* activities are not yet aligned but are moving towards it within a predefined timeframe or are phased out at specific date. *Red* activities are

not aligned. The taxonomies from ASEAN, Indonesia, Singapore, Thailand, and Pakistan follow this model. Côte d'Ivoire applies a comparable *green*, *transition* and *red* classification (Ministère des Finances et du Budget Côte d'Ivoire, 2025). The amber category is where the other transition elements come into play (interim performance criteria, sunset dates, transition pathways). Other taxonomies, such as the ones from Australia, Chile, Colombia, the EU, and Turkey recognize transition activities without an explicit traffic light system (Australian Sustainable Finance Institute, 2025; European Union, 2020; Ministerio de Hacienda Chile, 2025; Ministerio de Hacienda y Crédito Público Colombia, 2022; Ministry of Environment, Urbanisation and Climate Change of the Republic of Türkiye, 2025).

(5) Corporate transition plans

Some taxonomies require corporate transition plans as additional requirements for taxonomy alignment for some or all "transition" activities (Australia, Chile, Colombia, Cote d'Ivoire, Pakistan, Thailand, Singapore). These plans can provide additional information about how companies intend to reduce emissions over a specific time period and how they plan to align their activities with longer-term climate objectives and national pathways.

In Thailand, manufacturing activities can only qualify as amber if the entity has adopted a credible transition plan towards net zero (Thailand Taxonomy Board, 2025). Similarly, Singapore requires a 1.5-aligned transition plan for amber activities in sectors such as cement, steel and chemicals (Monetary Authority of Singapore, 2023). Chile requires entities in mining and manufacturing to have a decarbonization strategy in place to reach carbon neutrality by 2050 (Ministerio de Hacienda Chile, 2025). In Pakistan, a requirement for most transition categories is *"The facility has a transition plan aligned with the 1.5°C target of the Paris Agreement."* (State Bank of Pakistan, 2025). Indonesia requires transition plans only for coal fired power plants that: *"[...] operate until 2050 at the latest and have a transition plan"* (Indonesia Financial Services Authority, 2025). Other taxonomies go into a similar direction but take a "light" approach. Colombia for example requires certain industrial mitigation measures to be part of a 5- or 10-year investment plan (Ministerio de Hacienda y Crédito Público Colombia, 2022).

Table 1: Comparison of transition approaches in different jurisdictions (building on Marchewitz et al, 2026)

	Interim performance criteria	Sunset dates	Forward-looking pathways	Traffic light system	Transition plans
ASEAN (ASEAN Capital Markets Forum, 2023)	✓	✓	✓	✓	✗
Australia (Australian Sustainable Finance Institute, 2025)	✓	✓	✓	✗	(✓)
Chile (Ministerio de Hacienda Chile, 2025)	✓	✓	(✓)	✗	✓
Cote d'Ivoire (Ministère des Finances et du Budget Côte d'Ivoire, 2025)	✗	✗	✗	✓	(✓)
Indonesia (Indonesia Financial Services Authority, 2025)	✓	(✓)	(✓)	✓	(✓)
Japan (Japanese Financial Services Agency et al., 2021)	(✓)	✗	✓	✗	x
Pakistan (State Bank of Pakistan, 2025)	✓	✓	✗	✓	✓
Singapore (Monetary Authority of Singapore, 2023)	✓	✓	✓	✓	✓
Thailand (Thailand Taxonomy Board, 2025)	✓	✓	✓	✓	✓

The examples show a non-exhaustive list of jurisdictions that received 3 points for "screening approach" in the comparison of Marchewitz et al (2026) and show one of the five elements. ✓ means that the element is used for most activities, (✓) means that the element is used partially, for some activities, and ✗ means that the element is not used.

The EU taxonomy is an example where the criteria for transition activities are part of the green category and focus on incremental performance improvements without clearly linking eligibility to a pathway towards net zero.[3] The technical screening criteria are linked to the EU ETS emission intensity thresholds but does not define sunset dates or a pathway towards net zero (European Union, 2020; Schütze & Stede, 2021).

[3] Although Article 10(2) of the Taxonomy Regulation defines the criteria for transition activities, including alignment with 1.5°C, the performance thresholds in the EU ETS sectors are static, and updates are subject to improvements in the EU ETS benchmark.

Summary and Policy Recommendations

The comparative analysis shows considerable differences regarding the definition of transition activities and in how taxonomies include the transformation of emission-intensive sectors into the framework. Based on the analysis, three recommendations stand out for national/regional policymakers developing new taxonomies or revising existing ones:

(1) Embed credible, sector-specific transition pathways

Transition activities should be assessed against clear sector-specific pathways towards net zero. Where possible, technical screening criteria should incorporate a window of declining emissions thresholds, defined milestones, sunset dates, or other forward-looking pathways. This can also provide a common reference point for corporate transition plans.

(2) Regular updates

Transition criteria need to evolve as technologies, sectoral pathways and climate objectives change. Regularly revising thresholds, defining sunset dates as well as establishing explicit transition pathways for energy-intensive sectors can help maintain alignment with international climate goals and avoid locking in activities that may become incompatible with a net-zero economy. Many frameworks already recognize this while with different levels of institutionalization (e.g., an own Taxonomy Board that is mandated to regularly review thresholds).

(3) Strengthen interoperability

While a certain level of diversity is necessary to account for different regional or national challenges and policy commitments towards climate neutrality, it also creates challenges for cross-border investment. Differences in definitions for what constitutes green, transition or red, such as varying technical thresholds for the same economic activity, can increase administrative burdens and can make it difficult for investors to assess taxonomy alignment across jurisdictions. Greater interoperability would therefore be beneficial. As described, some level of convergence can already be observed for emission intensity thresholds for the green category.

There is already substantial convergence as many newly developed frameworks draw on existing taxonomies, particularly the ones from the EU and ASEAN, and adapt similar design elements and selection criteria to their own national circumstances. This provides a basis for developing common minimum principles and methodological standards also for transition categories while allowing jurisdictions to retain flexibility in their national approaches (IPSF, 2021; Meattle et al., 2025; Schoenmaker & Volz, 2022).

For international policy makers

International cooperation should focus on greater alignment of methodologies, technical criteria, sectoral scope and screening approaches, as well as mechanisms for recognizing taxonomy alignment across jurisdictions. This is especially important for transition activities and categories. Such convergence would reduce duplication and facilitate cross-border financing of the transition without requiring countries to adopt identical taxonomies.

Authors

Dr. Franziska Schütze is Senior Researcher and Deputy Head of the Climate Policy Department at DIW Berlin | fschuetze@diw.de

Fernanda Ballesteros is a PhD Student in the Climate Policy Department at DIW Berlin | fballesteros@diw.de

Dr. Karol Kempa is Researcher and Director in the FS-UNEP Collaborating Centre for Climate and Sustainable Energy Finance at the Frankfurt School of Finance & Management| K.Kempa@fs.de

Dr. Catherine Marchewitz is member of cricTANK, corporate responsibility interface center (cric) e.V.| marchewitz@cric-ethik.finance

Prof. Dr. Ulf Moslener is professor for sustainable energy finance at the Frankfurt School and Head of Research of the FS-UNEP Collaborating Centre for Climate and Sustainable Energy Finance | U.Moslener@fs.de

Prof. Karsten Neuhoff (PhD) is Head of the Climate Policy Department at DIW Berlin and Professor at TU Berlin |kneuhoff@diw.de

About the project

The Sustainable Finance Research Platform is a joint project between five German research institutions conducting research on different aspects of Sustainable Finance, e.g., sustainable investments, sustainability risks and chances, and sustainability reporting. With their independent research, the project partners aim to support stakeholders in politics, the financial sector, and the real economy in understanding and shaping the central role of capital markets in achieving a net-zero economy. The researchers involved answer social, political, and business-related questions, provide established and new research findings, and participate in political and public debate. They also want to establish sustainable finance as a topic in the German research landscape and secure connections with international institutes and processes. More information can be found on the project's website wpsf.de/en/

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