



189 Report by Catherine Marchewitz, Franziska Schütze, and Fernanda Ballesteros

Transitioning to net zero: Full potential of sustainable finance taxonomies not yet exhausted

- Taxonomies aim to create transparency and provide guidance in shifting capital flows to sustainable, environmentally-friendly activities
- More and more countries are developing taxonomies with different approaches
- Harmonizing taxonomies is important for international companies and investors

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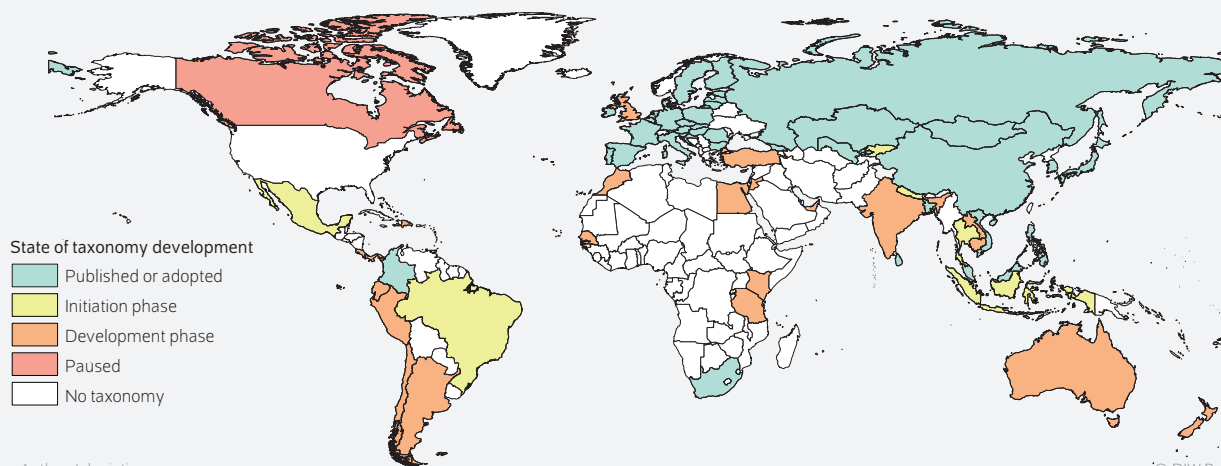
AT A GLANCE

Transitioning to net zero: Full potential of sustainable finance taxonomies not yet exhausted

By Catherine Marchewitz, Franziska Schütze, and Fernanda Ballesteros

- Taxonomies should create transparency and provide guidance in shifting capital flows to sustainable, environmentally-friendly activities
- More and more countries are developing taxonomies with different approaches
- Harmonizing taxonomies is important for companies and investors operating internationally
- Taxonomies should apply to all relevant market participants and include mandatory reporting requirements
- Selection criteria for sustainable activities should be in accordance with international climate targets

More and more countries worldwide are implementing taxonomies to shift capital flows to sustainable economic activities



Source: Authors' depiction.

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FROM THE AUTHORS

“Taxonomies are crucial for defining sustainable activities and therefore for financing the transition to climate neutrality. To increase their effectiveness and to avoid carbon leakage, taxonomies should be harmonized at the international level.”

— Catherine Marchewitz —

MEDIA



Audio Interview with Catherine Marchewitz (in German)
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Transitioning to net zero: Full potential of sustainable finance taxonomies not yet exhausted

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ABSTRACT

Sustainable finance taxonomies such as the European Union (EU) taxonomy can support the transition to a climate-neutral economy. As a classification system, these taxonomies serve to offer transparency and guidance as to how capital flows can be shifted to sustainable and environmentally-friendly activities. In this Weekly Report, we analyze 26 sustainable taxonomies from countries and regions around the world using five criteria. Our study shows that although many taxonomies follow a holistic sustainability approach, mandatory criteria have often yet to be developed. The share of a country or region's emissions that is covered by the taxonomy varies considerably, as the taxonomies follow different approaches for determining the activities that are aligned with them. Taxonomies often only apply to a limited group of market participants and are rarely linked to mandatory reporting obligations. The results emphasize that better coordination between the existing taxonomies worldwide is needed and that the criteria and thresholds for selecting activities in alignment with taxonomies should be in accordance with the Paris Agreement. This way, taxonomies can develop their full potential in guiding the transition.

The EU aims to become climate neutral by 2050 as announced in the 2019 Green Deal.¹ A classification system for sustainable economic activities, known as the EU taxonomy for sustainable activities, plays a crucial role in this transition. The taxonomy defines which activities are classified as sustainable for each economic sector.² The EU Sustainable Finance Action Plan links the EU taxonomy to further disclosure requirements. For example, large capital market-oriented companies³ in the EU have been required to disclose the share of their activities that are aligned with the taxonomy since the 2022 business year, and other companies will gradually follow.⁴ Banks must also disclose their share of activities aligned with the taxonomy, known as the green asset ratio.⁵ Financial providers that advertise products with environmental features must report their taxonomy alignment.⁶

This classification system is primarily an instrument for providing information and should increase transparency for private consumers as well as institutional financial market actors so that they can invest their capital more sustainably. This should also enable them to better assess the risk of stranded assets⁷ and take these findings into account when allocating their investments.

¹ In Europe alone, investments of up to 350 billion euros per year in low-carbon infrastructure, such as renewable energy plants or electricity grids and storage facilities, will be required by 2030. Cf. Lena Klaaßen and Bjarne Steffen, "Meta-analysis on necessary investment shifts to reach net zero pathways in Europe," *Nature Climate Change* 13 (2023): 58–66 (available online; accessed on July 1, 2024). This applies to all other online sources in this report unless stated otherwise.

² Franziska Schütze et al., "EU taxonomy is increasing the transparency of sustainable investments," *DIW Weekly Report* no. 51 (2020) (available online).

³ The first step will affect all companies that are already required to report under the Non-financial Reporting Directive (NFRD). This includes capital market-oriented companies with more than 500 employees.

⁴ As a part of the Corporate Sustainability Reporting Directive (CSRD EU Regulation 2022/2464 (available online)), the group of companies obligated to report will expand by non-capital market-oriented companies with over 250 employees or sales revenue greater than 50 million euros or a balance sheet total of over 24 million euros.

⁵ In accordance with Article 8 of the EU Taxonomy Regulation, cf. European Union, *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088* (2020) (available online).

⁶ As part of the Sustainable Finance Disclosure Regulation (SFDR), see European Commission, *Sustainability-related disclosure in the financial services sector* (2024) (available online).

⁷ Stranded assets are investments or assets that can no longer be used and which thus become unprofitable. For example, investments in a coal-fired power plant that can no longer be operated due to climate policy measures can massively lose value.

Box 1

Taxonomy development and terminology

A sustainable finance taxonomy¹ (referred to here as a "taxonomy") classifies sustainable activities and investments. The emergence of such taxonomies in various countries, regions, and international organizations was driven in particular by the Paris Agreement and the UN Sustainable Development Goals. However, the names of the taxonomies vary, including the words "sustainable," "green," "climate," "transition," and "social" in their titles, indicating different types of taxonomies. Sustainable taxonomies are by definition the most comprehensive, as the term "sustainable" has an ecological, economic, and social dimension.² Thus, a green taxonomy focuses on pure green activities or those that positively contribute to the

environmental goals covered by the taxonomy. However, the granularity, scope, criteria, and environmental objectives of the taxonomies can differ broadly. Social taxonomies focus mainly on the positive contribution to social objectives, such as decent work and adequate living standards.³ In contrast, transition taxonomies take a more dynamic approach, as they identify activities that are not currently in accordance with the Paris Agreement and have a lack of suitable "green" alternatives. If a taxonomy exclusively promotes green activities, it excludes important parts of the economy that still need to be transformed. A green or sustainable taxonomy can also contain elements of transition activities.

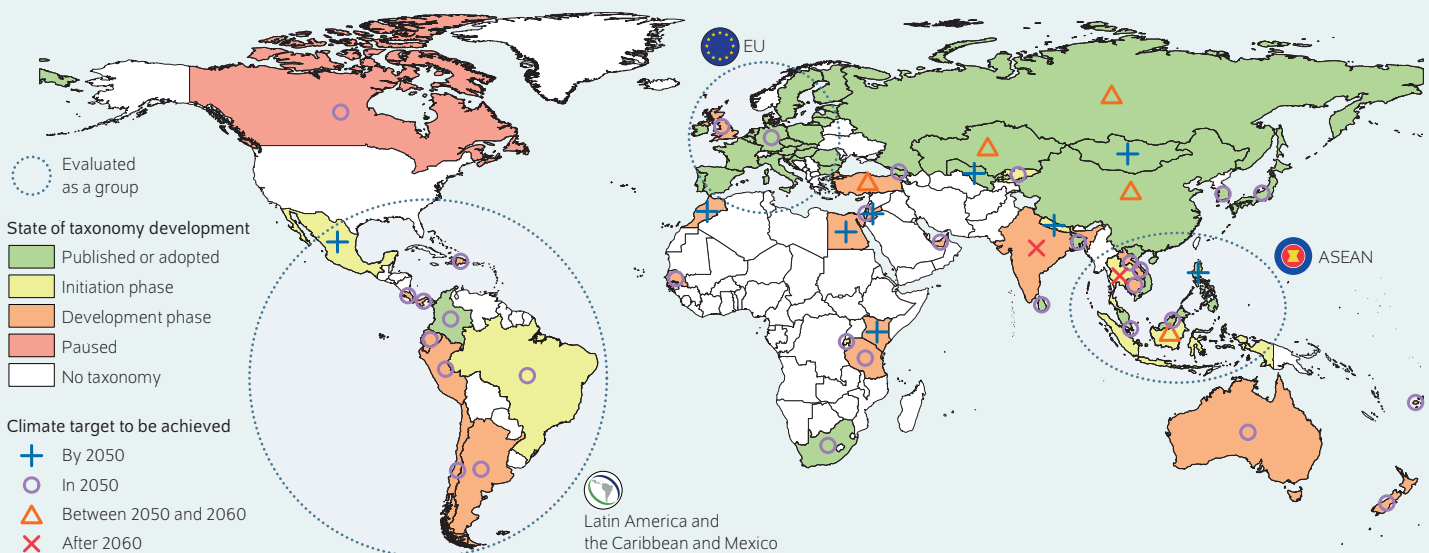
¹ In this Weekly Report, we use the general term "sustainable finance taxonomy" unless the taxonomy is classified specifically as a green finance taxonomy.

² Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung, *Nachhaltigkeit* (in German; available online).

³ EU Platform on Sustainable Finance, *Report on Social Taxonomy*, *Platform on Sustainable Finance* (2022) (available online).

Figure 1

State of sustainable finance taxonomy development worldwide



Note: For classification purposes, the figure also shows the year by which each country aims to become climate neutral.

Sources: Authors' depiction (state of taxonomy development), net zero tracker (climate targets).

As of the end of 2023, over 50 countries and regions have introduced their own taxonomies or have begun developing one.

Figure 2

Potential contribution of the taxonomies to the net-zero transition

Taxonomies	Policy embeddedness	Sectoral coverage	Screening approach	Target group	Reporting and disclosure	Overall score
ASEAN ¹	4	4	4	2	2	3.2
Bangladesh	4	3	2	2	3	2.8
Brazil*	4	4	2	2	2	2.8
China	3	4	2	2	3	2.8
Columbia	4	4	4	2	1	3
EU	4	4	3	4	3	3.6
Georgia	4	3	3	2	3	3
Hong Kong*	4	2	4	2	2	2.8
Indonesia*	4	3	2	2	2	2.6
Israel*	3	3	3	2	1	2.4
Japan	3	3	4	2	2	2.8
Kazakhstan	4	3	2	2	2	2.6
LAC ²	4	4	1	2	2	2.6
Malaysia	4	3	1	2	2	2.4
Mexico*	4	3	3	2	2	2.8
Mongolia	4	4	2	2	1	2.6
Philippines	4	4	2	2	2	2.8
Russia	3	3	2	2	2	2.4
Rwanda*	3	3	3	2	2	2.6
Singapore*	4	4	4	2	2	3.2
South Africa	3	2	2	2	2	2.2
South Korea	4	4	3	2	2	3
Sri Lanka	4	3	4	2	2	3
Thailand*	4	2	4	2	2	2.8
Uzbekistan	2	2	2	3	1	2
Vietnam	3	3	3	3	2	2.8
Average	3.7	3.2	2.7	2.2	2	2.8

Potential contribution to transition

■ No
 ■ Little
 ■ Moderate
 ■ High

1 Association of Southeast Asian Nations

2 Latin America and the Caribbean

Note: * Frameworks are still in the development phase. The assessment can therefore not be regarded as final. The cut-off date for the information considered in the analysis is 12/31/2023.

Source: Authors' depiction.

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The 26 taxonomies were analyzed using five criteria. The higher the score, the higher the transition potential.

Rising number of taxonomies worldwide

In recent years, a large number of sustainable finance taxonomies⁸ have emerged to promote the provision of capital for the transition to a climate-neutral economy. (Box 1). By the end of 2023, 26 countries and regions had introduced their own taxonomies or begun developing them (Figure 1). A further 25 countries have initiated the development of a taxonomy but have yet not published a draft.

To accelerate the transition to a climate-neutral economy, both the introduction of technologies, such as green hydrogen in emission-intensive sectors like steel or cement, as well as green projects and activities, such as expanding solar and

⁸ We use the words "taxonomy"/"taxonomies" in this Weekly Report to refer to sustainable finance taxonomies.

Box 2

Criteria for estimating the transition potential of taxonomies

The transition to climate neutrality is different in every country due to individual circumstances. A "transition score" (TS) has been developed as an objective scoring system to enable a comparable assessment of transformation potential. This score consists of five criteria that summarize the data on the taxonomies in a structured manner:¹ policy embeddedness, sectoral coverage, screening approach, target group, and reporting and disclosure (Table 1).

There are four stages of fulfillment for each criterion with assigned scores, here indicated in brackets:² no contribution [1], little contribution [2]; moderate contribution [3]; or high contribution [4].

Table 1

Analysis criteria for measuring a taxonomy's potential contribution to the economic transition

Criterion	Definition
Policy embeddedness	This criterion captures whether a taxonomy refers to the climate targets in international frameworks such as the Paris Agreement and the SDGs as well as national or regional climate targets. It also assesses whether it includes more comprehensive sustainability goals
Sectoral coverage	This criterion refers to the share of emissions explicitly covered in a taxonomy, i.e., the sectors or technologies explicitly mentioned in the respective taxonomy framework. ¹
Screening approach	This criterion captures whether taxonomies define (technical) selection criteria or thresholds for including economic activities and whether these follow a credible, science-based decarbonization pathway.
Target group	This criterion refers to which market players in the financial sector and the real economy and which financial instruments (e.g. bonds, loans, guarantees, funds) are affected by the taxonomy.
Reporting and disclosure	This criterion assesses whether a taxonomy is linked to reporting obligations for countries in the respective country.

¹ We used the World Emissions Clock (WEC) to evaluate the percentual coverage of the country-specific greenhouse gas emissions per sector (available online).

Source: Authors' depiction.

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¹ For a more detailed description of the criteria and scoring, cf. Marchewitz et al., "Sustainable Finance Taxonomies."

² The criteria were weighted equally, as all five criteria are necessary for the economic transition. A different weighting was also applied in the publication this Weekly Report is based on, but this did not fundamentally change the ranking.

wind energy, must be supported.⁹ A taxonomy that supports both can offer companies in these sectors better access to financing options. Building upon this classification system, this Weekly Report investigates the potential of the taxonomies developed worldwide to support the transition to a climate-neutral economy.¹⁰

Many taxonomies are not suitable for supporting the transition

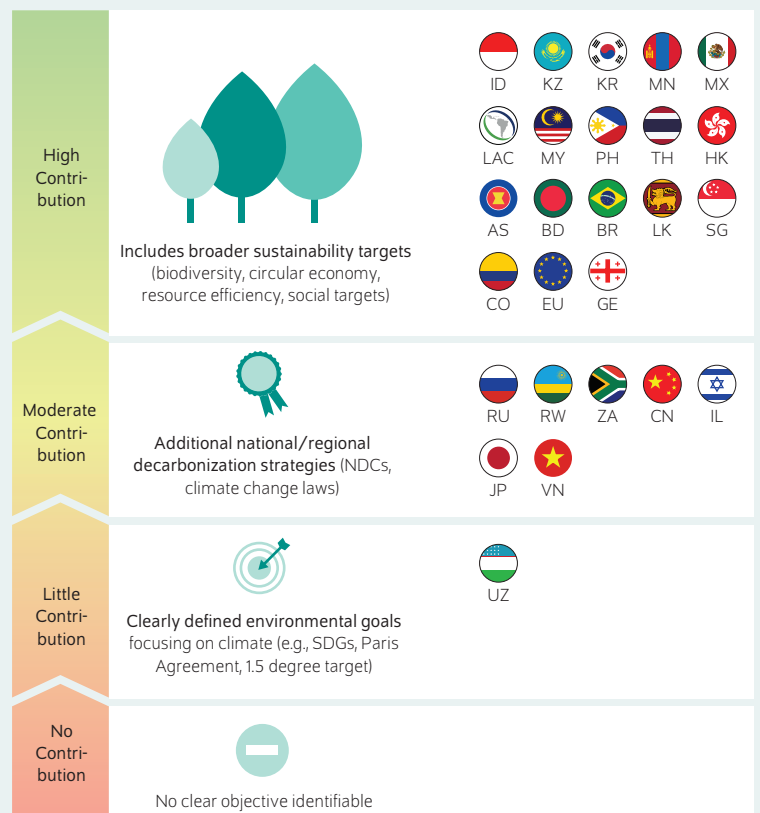
We used five criteria to analyze official documents of the 26 taxonomies already published and built a transition score (TS). The higher the TS, the higher the transition potential. The TS makes it possible to compare the taxonomies (Box 2), and the results of the comparison reveal a scattered picture (Figure 2).¹¹ The TS ranges from 2.0 to 3.6 points with an average score of 2.8. The taxonomies with the highest TS (three or more points, so a “moderate to high contribution”) are from the Association of Southeast Asian Nations (ASEAN), Columbia, EU, Georgia, Singapore, South Korea, and Sri Lanka. The taxonomies with the lowest scores (between two and 2.4 points, “little contribution”) are from Israel, Malaysia, Russia, South Africa, and Uzbekistan.

Many taxonomies strive for a holistic sustainability approach

In terms of **policy embeddedness**, i.e., how the taxonomy refers to the goals in international frameworks such as the Paris Agreement, the analysis paints a predominantly positive picture (Figure 3). Eighteen of the 26 taxonomies received all four points for this criterion, while seven received three points and Uzbekistan’s taxonomy two points. Some taxonomies also refer specifically to the nationally determined contributions (NDCs).¹² In addition, the taxonomies frequently mention the Paris Agreement targets, the Sustainable Development Goals (SDGs), and the respective country’s national climate and energy policies. Several taxonomies aim to extend their scope to a broader range of environmental objectives, such as biodiversity and the transition to a circular economy. Thirteen taxonomies, including the Columbian, Mongolian, Russian, South African, and Rwandan taxonomies, include nature-related aspects or plan to do so. Others consider specific regional aspects, such as the Islamic financial system in Malaysia. Countries such as Georgia, Mongolia, and Mexico have already included social aspects, while countries such as Brazil plan to include them. This indicates that many taxonomies follow a holistic sustainability approach,

Figure 3

Policy embeddedness of the taxonomies



Source: Authors' depiction.

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Many taxonomies follow a comprehensive sustainability approach and refer to national and international targets.

even if the relationships between different environmental and social topics are not completely considered and the corresponding criteria have still not been developed.

Share of emissions covered in taxonomies varies considerably

The share of emissions from the economic sectors explicitly covered in the respective taxonomies¹³ varied greatly in 2022 (Figure 4). Explicitly covered means that criteria and threshold values have been developed for these economic activities. Six taxonomies cover less than 50 percent of emissions,¹⁴ while ten others cover more than 90 percent of emissions.¹⁵

⁹ Mritunjoy Mohanty and Runa Sarkar, *The Role of Coal in a Sustainable Energy Mix for India* (Routledge: 2024) (available online).

¹⁰ Catherine Marchewitz et al., "Sustainable Finance Taxonomies – Enabling the Transition towards Net Zero? A Transition Score for International Frameworks," *DIW Berlin Discussion Papers* 2083 (2024) (available online).

¹¹ Marchewitz et al., "Sustainable Finance Taxonomies." A detailed evaluation of the individual taxonomies can be found in the annex. The current evaluation is based on the documents as of December 31, 2023. The value can change for countries in the development phase as soon as the taxonomy has been finalized and published.

¹² Georgia, Indonesia, Columbia, Latin America and the Caribbean (LAC), Malaysia, Singapore, Sri Lanka.

¹³ Some of the taxonomies do not yet cover all sectors because they are still in development.

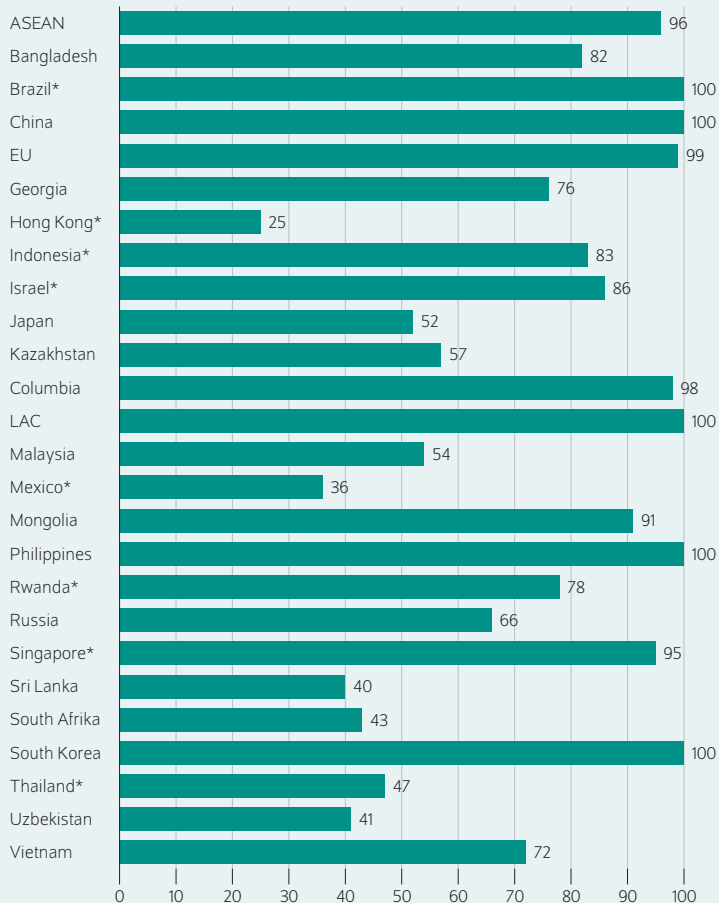
¹⁴ These values are preliminary. For example, Hong Kong and Thailand have announced that they want to include more sectors in the next revisions, as previously only drafts have been published.

¹⁵ Association of Southeast Asian Nations (ASEAN), Brazil, China, Columbia, South Korea, LAC, Mongolia, Philippines, Singapore. The Philippines are a special case here, as its taxonomy uses a sector-agnostic approach that does not classify specific activities.

Figure 4

Sectors explicitly covered in the taxonomies

In percent of total emissions



Note: * Frameworks are still in the development phase. The assessment can therefore not be regarded as final. The cut-off date for the information considered in the analysis is 12/31/2023.

Source: Authors' depiction. Data source for emissions: World Emissions Clock.

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The share of emissions in the economic sectors explicitly covered in the taxonomies varies considerably.

Box 3

Approaches for screening economic activities in alignment with the taxonomy

Generally, three approaches are used to classify economic activities as aligned with a taxonomy. These approaches partially overlap and are independently used or used together in combination (G20 SFWG, 2022). One approach involves technical screening criteria (TSC design), which is used by many taxonomies, including the EU taxonomy.¹ According to the TSC design, an economic activity is aligned with the taxonomy if its expected contribution to an environmental objective defined in the taxonomy meets a series of criteria and threshold values for emission intensity. As the type of technology underlying an activity is not restricted, the TSC design is technology neutral. In contrast, the whitelist design (WL) used in the taxonomies of Bangladesh, China, Georgia, Russia, and Mongolia explicitly mentions the activities aligned with the taxonomy and is thus technology specific. A "whitelist" means that an activity is only in alignment if it (i) is specifically listed in the taxonomy and (ii) it meets the relevant national environmental performance standards. Finally, some taxonomies follow a principles-based approach. This approach defines a set of core principles and is open to the type of technology used, such as in the ASEAN, Malaysian, Filipino, and Singaporean taxonomies. Most taxonomies combine their chosen approach with additional screening criteria, such as social minimum safeguards and/or the "Do No Significant Harm" principle as well as specific exclusion criteria.

¹ For example, EU, Colombia, South Korea, South Africa, Indonesia and Vietnam, as well as partially Uzbekistan.

The rest of the taxonomies cover between 50 and 90 percent of emissions.

Different approaches to determining taxonomy-aligned activities

The results show considerable differences in the **screening approach**, meaning which selection criteria or thresholds are defined for covering economic activities (Box 3). The ASEAN, Colombian, Japanese, Hong Kong, Singaporean, and Thai taxonomies received the most points in this category (Figure 5), as they define dynamic and science-based thresholds that change over time. They also contain transitional activities, either by using a traffic light system or by requiring the threshold values to be adjusted regularly. The Malaysian and Latin American and the Caribbean (LAC)

taxonomies received the fewest points, as they generally only define principles and do not include measurable thresholds and criteria.

Taxonomies often only apply to a limited group of market participants and financial products

In regard to the **taxonomy's target group**, most taxonomies specify which market participants they apply to or can potentially apply to. However, they are usually only aimed at a limited group of actors or remain vague (Figure 6). The EU taxonomy scored four points here, as the target groups are very broad, as described above.¹⁶ The Vietnamese and Uzbekistani taxonomies received three points each, as they

¹⁶ Cf. European Union, *Regulation (EU) 2020/852*.

at least include mandatory obligations for a defined list of actors and products. The rest of the taxonomies only received two points each, as they either only define a limited target group or set out a voluntary specification. Furthermore, in some cases, such as Bangladesh, China, Kazakhstan, Russia, and Vietnam, the taxonomy only applies to specific financial instruments, such as green bonds.¹⁷

Taxonomies rarely linked to reporting obligations

Many taxonomies have not been directly linked to mandatory **disclosure and reporting obligations** (Figure 7). In most cases, companies are not required to disclose information or to report about their alignment with the taxonomy. As taxonomies are often voluntary frameworks, they are not linked to reporting obligations, even if some taxonomies refer to existing international standards and frameworks.¹⁸ The taxonomies of Bangladesh, China, Georgia, and the EU are some of the few that have mandatory regulations. All market participants who belong to the taxonomies' target group must disclose information and report about their taxonomy-related activities.

Thresholds help decarbonize activities in emission-intensive sectors

Most taxonomies classify not only economic activities that are already carbon neutral (such as solar and wind energy, electric vehicles, or similar) as sustainable, but also some activities in emission-intensive sectors. In these sectors, the exact criteria and thresholds are decisive for the question of to what extent they can potentially contribute to a climate-neutral economy. However, the thresholds are not regularly adjusted or are not dynamic in many taxonomies. This can mean that corresponding investments are not in accordance with the Paris Agreement or lead to stranded assets. To illustrate the importance of dynamic thresholds, the criteria and thresholds for the energy and transportation sectors used in the taxonomies of the EU, Thailand, and Indonesia are compared below (Table 2).

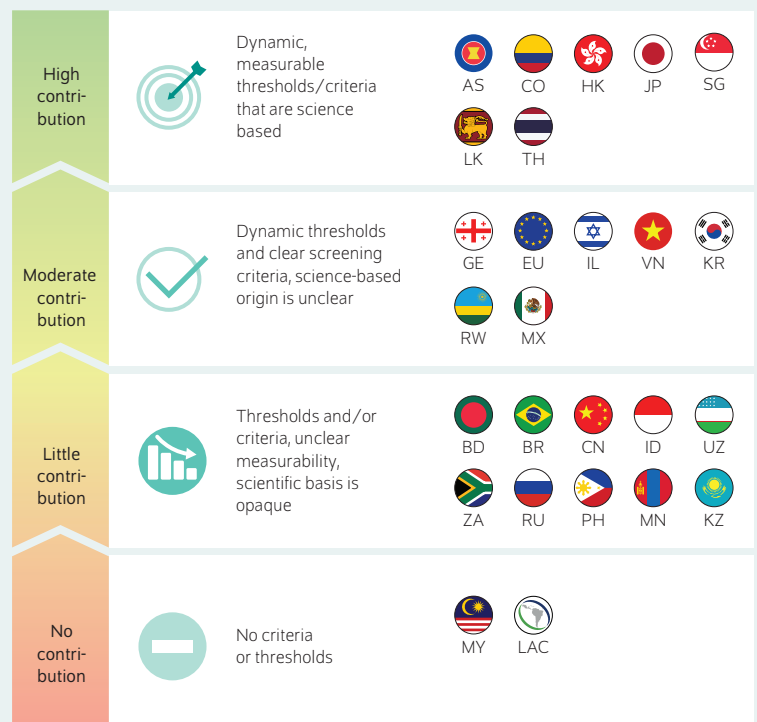
The path to carbon neutrality in the energy sector as well as in most industrial sectors has not yet been defined in the EU taxonomy. For example, a binary threshold was determined for the CO₂ intensity of electricity generation (for example for electricity from hydropower plants, biomass, heat cogeneration, or gas-fired power plants). The taxonomy in Thailand, in contrast, has a traffic light system and contains two thresholds for the energy sector that decrease over time. The traffic light system in the Indonesian taxonomy is also based on

¹⁷ While bonds continue to be an important component of project financing, other financial products such as loans, funds, insurance products, and blended financing also play an important role. In many cases, loans remain the predominant form of project financing, which is indicative of the diversity and complexity of the financial landscape. Cf. Frédéric Holm-Hadulla et al., "Firm debt financing structures and the transmission of shocks in the euro area," *Economic Bulletin Articles* 4 (2022) (available online).

¹⁸ The study only examined whether the taxonomy refers to disclosure and reporting obligations. It did not examine whether there are reporting obligations in the respective country that in turn refer to the taxonomy.

Figure 5

Screening approach for taxonomy-aligned economic activities



Source: Authors' depiction.

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The screening approaches for selecting economic activities in alignment with the taxonomy differ considerably.

international benchmarks in the strictest category but does not require any threshold reductions.¹⁹

In the transport sector, the EU taxonomy defines a dynamic threshold for passenger and light commercial vehicles that declines over the years. In the Thai taxonomy, however, there is already a threshold of zero emissions for passenger and light commercial vehicles.

The examples illustrate that different countries and regions adjust thresholds differently, which can affect the speed of the transition.

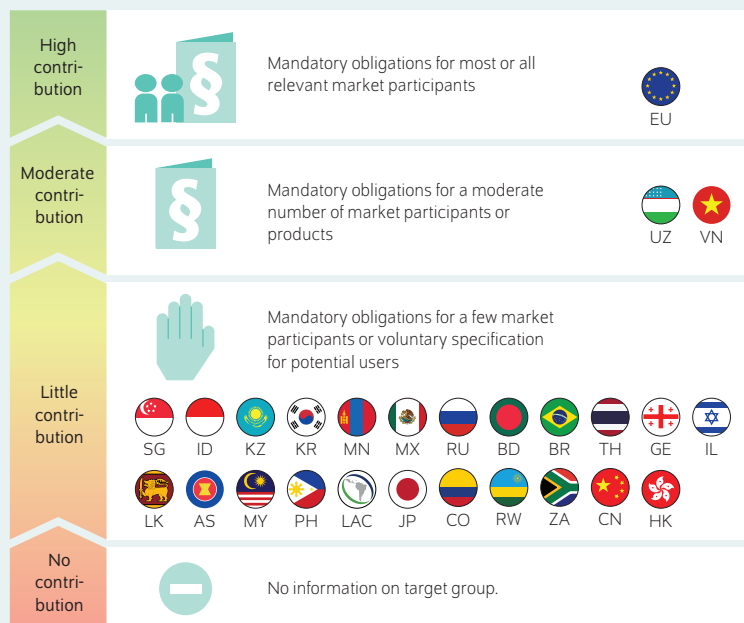
Conclusion: Global standards for taxonomies are essential

Taxonomies are important for defining sustainable activities and thus for financing the transition to a climate-neutral economy. With clear criteria and standards, taxonomies can contribute to creating a robust market for investments in climate-friendly activities.

¹⁹ The ASEAN Taxonomy traffic light system contains similar thresholds for the energy sector: For "green" (level 1), the threshold is below 100 g CO₂e/kWh. The "yellow" category is divided into "level 2" and "level 3" with the thresholds of 100 to 425 and 425 to 520 g of CO₂e/kWh.

Figure 6

Taxonomy target group



Source: Authors' depiction.

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Taxonomies often only apply to a limited group of market participants and financial products.

Table 2

Threshold examples in the energy and transport sectors for the EU, Thailand, and Indonesia

	EU	Thailand	Indonesia
Energy sector*	Threshold for green: < 100 gCO ₂ e/kWh, previously no reduction path	Threshold for green in traffic light system: < 100 gCO ₂ e/kWh Reduction to < 50 gCO ₂ e/kWh by 2040	Threshold for green in traffic light system: < 100 gCO ₂ e/KWh
	No traffic light system, hence no yellow category	Yellow in traffic light system: will be reduced from < 382 to < 148 gCO ₂ e/kWh in five-year steps to zero by 2040	Yellow in traffic light system: < 510 gCO ₂ /KWh (based on the IEA Sustainable Development Scenario (SDS))
Transportation (Passenger vehicles and light commercial vehicles)	Threshold: < 50 g CO ₂ pro kilometer driven (g CO ₂ /km) Emissions must be reduced to zero by 2026	No transition period (meaning threshold is zero emissions)	Not explicitly contained in the taxonomy/thresholds have not yet been defined

Notes: * (Life cycle emissions in electricity generation). gCO₂e/kWh = grams of CO₂ equivalent per kilowatt hour.

Sources: Authors' depiction; EU, Thai, and Indonesian taxonomies.

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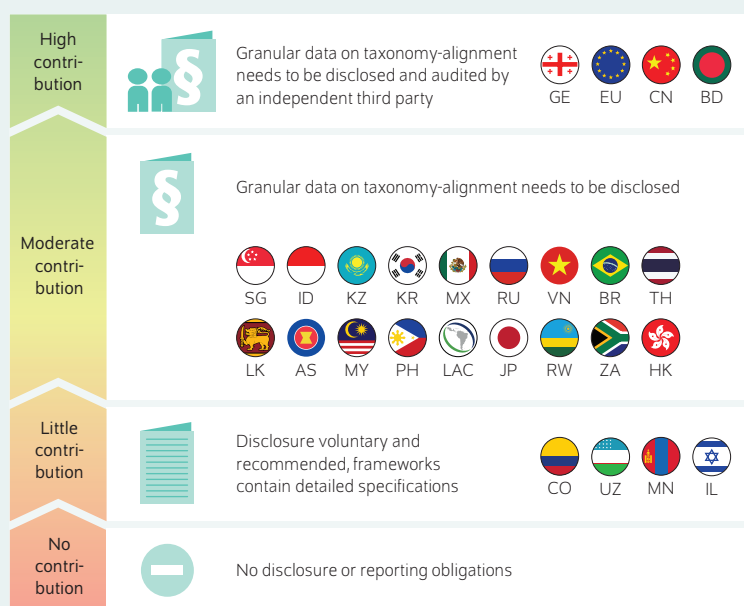
In conclusion, we find that the potential of the taxonomies analyzed here to shift capital flows in accordance with the Paris Agreement has not yet been exhausted. To realize the full potential of taxonomies, they should contain environmental and social standards that are scientifically sound and provide a clear path to climate neutrality. Moreover, an adjustment to international climate targets for all sectors must be ensured. This requires a dynamic approach, meaning the taxonomy must continually be revised and adjusted based on new scientific findings. In addition, a taxonomy should be applied to all relevant financial instruments and actors in the financial sector and in the real economy and be a part of corporate reporting.

Despite efforts to achieve international harmonization, there are major differences and divergent definitions of what is “green” or “sustainable” around the world. Many firms and investors are active in multiple countries. To increase the effectiveness of the taxonomies and to avoid shifting emissions abroad (carbon leakage), taxonomies should be harmonized at the international level.

Taxonomies worldwide should be better coordinated so that sustainability policies and programs across countries and regions can be evaluated coherently and carbon leakage and capital market fragmentation can be avoided.²⁰

Figure 7

Taxonomy disclosure and reporting obligations



Source: Authors' depiction.

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Taxonomies are rarely linked to disclosure and reporting obligations.

²⁰ WWF and Climate & Company, *When Finance talks Nature*, WWF France in cooperation with Climate & Company (2022) (available online).

SUSTAINABLE FINANCE TAXONOMIES

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