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Table of contents

sweet swiss energy research for the energy transition

Summary

This report presents a comprehensive country risk indicator developed for reFuel.ch to assess risks affecting sustainable fuels and platform chemicals (SFPC) production and imports to Switzerland. The methodology employs a four-tiered approach encompassing institutional, political, economic, and legal risks that is applicable to any country globally.

Methodology

The country risk index combines four major risk components, each comprised of multiple indicators normalized on a 0-100 scale, where higher values indicate greater risk:

Institutional Risk (35% weight) captures the fundamental rules that shape actors' interactions in economic, political, and social matters, and includes indicators for property rights (30%), business freedom (20%), financial depth (20%), trade restrictiveness (20%), and intellectual property protection (10%). These elements are critical for investments in SFPC production, which requires strong property rights for land and materials, minimal regulatory barriers, adequate financial intermediation for capital-intensive investments, and commitment to free trade.

Political Risk (30% weight) focuses on political institutions, stability, and regulatory quality. This component includes executive constraints (25%), regulatory quality (15%), corruption (15%), fossil fuel subsidies (25%), political fractionalization (10%), inequality (5%), and geopolitical risk (5%). Given that political will rather than pure market forces drives the shift toward SFPC, this component receives substantial weighting. High fossil fuel subsidies, for instance, signal the political power of extractive industries and potential resistance to energy transition (Victor, 2009).

Economic Risk (20% weight) encompasses macroeconomic and financial volatility affecting the viability of long-term, capital-intensive energy projects. Components include exchange rate volatility (10%), interest rate levels and volatility (35% combined), infrastructure quality (20%), inflation (15%), and education levels (20%). These factors directly impact investment returns, project costs, and the availability of a skilled workforce necessary for SFPC development.

Legal Risk (15% weight) examines international treaties and bilateral agreements facilitating (or hindering) cross-border trade and investment. This includes Bilateral Investment Treaties (BITs) with Switzerland (20%), the total number of partner BITs (30%), free trade agreements (40%), and investment arbitration disputes (10%).

The methodology provides two weighting schemes: the primary approach uses the percentages above, reflecting the sequential nature of risk development from institutional breakdown through political instability to economic volatility. An alternative equal-weighting scheme (25% each component) increases emphasis on economic and legal factors.

Results and Validation

Analysis of 197 countries plus Hong Kong over 1984-2023 reveals that both weighting schemes produce highly consistent results, with the weighted version typically yielding slightly lower risk scores. The correlation between both versions exceeds 0.98, demonstrating robustness.

For the 2010-2019 period with the highest data coverage, low-risk countries (scores 0-25) can be found across nearly all world regions except Sub-Saharan Africa. Top performers include Canada (17.96), Chile (20.80), and the United States (23.96) in the Americas; Germany (20.44), Liechtenstein (21.71), and Finland (22.11) in Europe; Taiwan (19.31), Singapore (20.37), and Hong Kong (21.82) in Asia-Pacific; and Israel (23.38) in the Middle East/North Africa. These countries demonstrate very low

disruption risk due to strong institutions, stable politics, sound economic management, and supportive legal frameworks.

Conversely, the highest-risk countries (scores 51-75, "elevated risk") include South Sudan (72.83), Eritrea (70.25), Turkmenistan (66.78), and Somalia (65.67), reflecting severe institutional weaknesses, political instability, economic volatility, or combinations thereof.

Limitations and Robustness Testing

Data availability varies significantly across countries and time periods, with the 1980s-1990s having substantial missing values. The fossil fuel subsidy indicator only covers 2010 onwards. To address missing data, the methodology redistributes weights proportionally within each component, though the analysis focuses on 2010-2019 for optimal coverage.

The report validates results through multiple alternative specifications: replacing Swiss-specific disputes with global disputes, omitting a variable with high missing values (intellectual property), excluding fossil fuel subsidies, restricting analysis to observations with fewer missing data, and applying equal weights across all individual indicators. All nine alternative versions show high correlation (minimum 0.93) with the main specification, confirming robustness of the rankings and classifications.

Conclusion

This country risk index provides policymakers and investors with a systematic, transparent, and robust tool for evaluating risks to SFPC production and Swiss imports. The methodology's flexibility allows updates as data availability improves while maintaining standardization across countries. The strong consistency across alternative specifications and high correlation between weighting schemes enhance confidence in the results, making this a valuable instrument for strategic decision-making in sustainable energy transitions.

The methodology purposefully focuses on general institutional, political, economic, and legal variables with statistical data available for a large country sample and a long time series. The next step includes a more detailed assessment of resources and conditions necessary for biomass-based and synthetic fuel and chemicals production, such as renewable energy and water availability, or sustainable waste biomass feedstocks. This step will focus on a subset of countries with promising risk scores across various world regions.

1 Introduction

This deliverable details the construction of a country risk indicator for the refuel.ch project, focusing on the risks that are likely to be most prominent in disrupting projects – and by extension, imports to Switzerland – related to sustainable fuels and platform chemicals (SFPC) production around the world.

Like many country risk analyses (for example, those utilized by BMI Fitch Solutions, Moody's Analytics, the Economist Intelligence Unit, or S&P Global), this methodology utilizes a multi-tiered risk approach to cover the broad panoply of risks facing producers of sustainable fuels globally. In particular, we focus on four specific arenas:

- *Institutional risk,* detailing the overarching "rules of the game" and the fundamental building blocks of a market economy;
- *Political risk,* focusing on the political orderings, institutions, and stability of political processes;
- *Economic risk*, related to the macroeconomic and financial conditions in a country; and
- *Legal risk,* pertaining to international treaties and enabling legislation necessary for the proliferation of SFPC.

These categories are comprised of several indicators, which are described in detail below and which are taken from (for the most part) publicly available sources or are constructed from these sources. The particular indicators have been chosen for their special relevance in contributing to or mitigating the risk of Swiss imports of SFPC. Most importantly, we looked for indicators with data available for a large set of countries and a long time series, and we sought to standardize those indicators to a comparable scale, so that we have a risk assessment that is comparable across all countries around the world as well as across risk dimensions. Nonetheless, the same approach used here to construct comparable risk indicators across these four dimensions could be used for more specific indicators – or for further risk dimensions – that may be applicable to subsets of countries.

Within each category, the disparate measures are normalized to a number between 0 and 100, with higher numbers representing higher risk (for ease of interpretation). Once each indicator is standardized on this scale, these four categories are then combined into one holistic indicator through one of two weighting methods. In the first method, each category is weighted differently to return a final measure of risk, which is also on a scale of 0 to 100 (with the same interpretation):

$$RISK_{it} = 0.35 * INSTITUTIONAL_{it} + 0.30 * POLITICAL_{it} + 0.20 * ECONOMIC_{it} + 0.15 * LEGAL_{it} \quad (1)$$

This weighting reflects our assertion that political risk is instrumental in influencing the establishment of a sustainable fuels and platform chemicals industry (Sung & Song, 2021; Liu & Lin, 2025), as political will (rather than pure market forces) has been the driving factor behind the shift towards SFPC (Hess, 2014). However, a capital-intensive, long-term project such as energy production requires a basis of a functioning market economy to become economically viable and not just a drain on taxpayers of that particular country (and a threat to the fiscal health of the country as well). Additionally, as a commodity, like all energy production and distribution, SFPC is also beholden to shifting economic conditions, making exploration and production more or less profitable depending upon the prevailing market dynamics. Finally, the enabling environment also includes several important international treaties and legal instruments which can either increase or decrease the risk for a firm operating in a specific country, and thus the legal agreements that a country has entered into also form a small yet important part of overall country risk. Thus, the weighting shown in Equation 1 also reflects the sequence of events via which risk can increase, from the breakdown of institutional norms and (to a lesser extent) political will towards more "regular" economic fluctuations and one-off legal accessions (and longer-term implementation).

However, as this weighting is inherently subjective, even though informed by expert assessment, we have also provided a risk measure which spreads the risk equally across all categories, to not unduly favor/disadvantage any country due to poor scores in one area alone:

$$RISK_{it} = 0.25 * INSTITUTIONAL_{it} + 0.25 * POLITICAL_{it} + 0.25 * ECONOMIC_{it} + 0.25 * LEGAL_{it} \quad (2)$$

The equal weighting shown in Equation 2 correspondingly increases the weight afforded to economic and legal risk while reducing institutional and political risk, making the issues related to legislation and international disputes more salient. As noted, both the uneven weighting and equal weighting schemes are provided for purposes of transparency; which one is more appropriate may depend on who is using the assessment. For example, while an investor may care strongly about institutional quality and political stability, making the uneven weighting scheme more appropriate, a buyer or offtaker of sustainable fuels may be more focused on economic or legal aspects such as exchange rates, export infrastructure, or the existence of bilateral trade agreements. Generally, it appears that the weighted scheme returns, on average, slightly lower risk ratings than the equal weighting (a discussion of this finding can be found in the results section).

The rest of this report describes the specific indicators under each of the four categories, their theoretical basis for inclusion, how they are constructed (or need to be constructed by the team), and where they can be obtained from. These descriptions form the basis for gathering a time-series of data covering the period 1984 – 2023, validating the approach, and constructing the index so that it is policy-ready. We then display and discuss the resulting Total Risk Score for a sample country/year pair. Given the art of country risk analysis, we also describe data limitations and present alternative versions of the score with different component weightings and some additional indicators; included in this is a discussion of the robustness of the results to these alternative specifications. Attached to this report, and a key part of the deliverable, is the overall dataset of country risk scores as well as an overview of data descriptions, sources, and descriptive statistics.

2 The Components of the Country Risk Rating

2.1 Institutional Risk

According to Hartwell (2013: 17), “Institutions are a set of rules, constraints, and behavioral guidelines, enforced by either formal or informal means external to the individual, which are designed or arise to shape the behavior of individual actors.” Often referred to as the “rules of the game,” institutions are the boundaries within society, delineating how individuals, firms, and organizations relate to one another across a variety of spaces (economic, political, and social). Their semi-permanence is what makes them “institutions” instead of policies, as they tend to change either very slowly (evolution) or incredibly abruptly (revolution) if acted on by an external force. Institutions also interact with each other in a country’s institutional web, making it crucial to examine the majority of pieces of an institutional matrix in specific areas in order to understand country risk in that area.

With regard to SFPC, the key institutions surrounding their production and distribution come down to freedom of commerce and the beliefs and preferences of a society towards such commerce. To this end, the Institutional Risk category is also aggregated from a number of indicators:

$$INSTITUTIONAL_{it} = 0.30 * PROPERTY_{it} + 0.20 * BIZFREEDOM_{it} + 0.20 * FINMARKET_{it} + 0.20 * TRADERESTRICT_{it} + 0.10 * INTPROP_{it} \quad (3)$$

The constituent indicators and their weighting within the category are described below.

Property Rights (PROPERTY): No market economy can exist without a strong foundation of property rights, and no business will take the risk that comes with commerce without knowing that its rights are protected. Beyond this broad institutional need, the SFPC industry also relies on specific attributes of a strong property rights regime, including land (for processing and distribution), acquiring materials such as biomass and waste biomass as raw materials, and contract enforcement for commercial transactions. Countries with higher levels of property rights can be expected to see more investment flowing to the SFPC industry and a more “sustainable” SPFC industry in general, meaning that it functions well within

a market economy instead of a political market. The importance of property rights in general and specifically for SFPC results in a 30% weighting for it in the category summation shown in Equation 3.

Measured by: The International Country Risk Guide (ICRG) measure of "investor protection" (PRS Group 2025). A large literature in institutional economics debates the proper way to measure property rights, especially as they encompass many attributes (including land ownership, contract enforcement, judicial effectiveness, and freedom from expropriation). In order to capture the broadest possible measure of property rights for a country, we use the ICRG measure, a commonly accepted standard for property rights, consisting of three sub-components: contract viability/expropriation, profit repatriation, and payment delays. These sub-components are scored from 0-4, giving a total continuous scale of 0-12 for the investor protection measure, with higher numbers equaling better property rights. To keep in line with our "higher numbers/higher risk" approach here, we normalize the data from 0 to 100 and then mirror it so that lower numbers are more desirable. This data was available from ICRG on a subscription basis only and so cannot be transferred as raw data; however, we provide the transformed data as part of the database.

Business Freedom (BIZFREEDOM): The law may say that property rights are protected and that businesses may engage in commerce, but this is only a first step in ensuring that businesses of any stripe may actually operate within a country. In particular, large bureaucratic hurdles, red tape, regulations, and government interference may make business very difficult, even if there is a legal right to own and operate a business. In the energy sector, where investments take a long time to pay off and where the industry is capital-intensive, there is a great sensitivity to regulation – it is thus important that disruptive or costly regulations are kept to a minimum and, where they are applied, are enforced evenly and predictably. This metric comprises 20% of the overall institutional country risk as shown in Equation 3, reflecting its importance but also its status as requiring property rights before it can come into play in a risk analysis.

Measured by: The Heritage Foundation "Business Freedom" indicator, available as part of the "Index of Economic Freedom." It measures "the extent to which a country's regulatory and infrastructure environments constrain the efficient operation of businesses" and encompasses four factors: access to electricity, business environment risk, regulatory quality, and women's economic inclusion (Heritage Foundation, 2025). The Business Freedom indicator already has a continuous scale from 0 to 100, with higher numbers representing higher levels of freedom; for this exercise, to keep the risk interpretation as noted above, we reverse the scale of the index so that lower numbers mean more business freedom and thus less risk for businesses.

Financial Depth (FINMARKET): While a firm may have the right to start a business and may find its existence not in jeopardy through capricious regulation or bureaucratic malfeasance, it still requires the *ability* to stay in business. For the SFPC industry, the sheer number and size of investments that are necessary to create the networks and economies of scale crucial for viability mean that a country requires effective financial intermediation to channel this funding. Countries with lower levels of financial depth thus have a high risk of not being able to a) undertake SFPC investments in the first instance, and b) support these investments should they begin. The importance of financial depth is shown in Equation 3, rated at 20% of the overall institutional country risk; this weighting is done as financial markets are the flip side of business freedom, with business freedom the permission to enter the world of commerce, and financial depth the means by which to do it. Both attributes are exogenous to the firm and part of a country's structure, with neither one alone being a sufficient condition for firms to survive.

Measured by: Private credit to GDP, taken from the World Bank's World Development Indicators (World Bank, 2025). This widely used metric of financial depth has been shown repeatedly to be correlated with economic growth when it occurs in moderation, while too high levels of credit growth create bubbles and lower growth in the long term. Thus, for this exercise, to account for the inverted U-shaped relationship, we take the percentage of credit to GDP and invert the inverted U, making it so lower levels of financial depth are associated with higher risk, decreasing until approximately 80% of GDP, and with the risk

then increasing again when private credit rises over 80% to GDP. As the entire dataset of credit to GDP from the World Bank ranges from 0.002% to 304.58%, the numbers have been refitted along a U-shape and rescaled from 0 to 100, as shown in Table 1 below.

Table 1 – Private Credit to GDP, rescaled

Credit to GDP (%)	Risk Score
0	100
20	75
40	50
60	25
80	0
100	25
120	50
160	75
200	100
250	100
305	100

Trade Restrictiveness (TRADERESTRICT): Freedom to trade across borders is a key component of economic freedom, one that cannot be measured by traditional metrics such as "trade openness" – commonly calculated as the sum of the value of exports and imports as a percentage of GDP. Openness and similar metrics are sensitive to the size of a country (the US, for example, scores low on openness because its internal market is huge) while also capturing outcomes metrics which can have nothing to do with a country's policy stance (if it has crucial natural resources, for example, high in demand globally). A better indicator of country risk is whether or not a country's leadership commits to and actually implements a free trade policy; this is of direct relevance for reFuel.ch as well, as it is measuring risk for Swiss imports. Countries with more trade restrictiveness would have a higher level of risk, and thus, like property rights, trade restrictiveness is weighted as 20% of the entire institutional risk component. While trade is an economic activity, this indicator measures the institutional rules on whether to allow free trade or not, which is why it is considered part of the institutional risk component.

Measured by: The IMF's Measure of Aggregate Trade Restrictions (MATR). A fairly recent innovation, the MATR has unbalanced coverage of 157 countries going back to 1949 (Estefania-Flores et al., 2022) and is based on tariff rates, exchange regimes, and restrictions on capital flows, showing more holistically the actual commitment of a government to free trade. MATR is a count variable ranging between 0 and 22, with higher numbers indicating more restrictions; to be used in the country risk analysis, it is rescaled between 0 and 100, but with the direction preserved to show that more restrictions equal more risk.

Intellectual Property (INTPROP): Research and development (R&D) has long been recognized in the economics literature as having positive externalities for society, but with the caveat that firms may underinvest in R&D if the proper incentives are not there to encourage such research. One means of incentivizing firms to invest in research is via intellectual property protection, including the granting of trademark and patent rights; with such rights granted, firms may have a temporary shield to realize super-normal profits, thus generating incentives to invest in R&D. For the SFPC sector, we believe this is also an important point, and we therefore capture the extent of intellectual property rights protection in a country as a proxy for R&D incentives. As firms involved in SFPC may already be working in affiliated or closely adjoining fields, the leap towards sustainable fuels may be less substantial, and hence this indicator is only weighted at 10% of the total institutional risk indicator.

Measured by: The International Property Rights Index (IPRI) (Levy-Carciente and Montanari, 2025) has a sub-index on the protection of intellectual property rights, comprising a series of measures including perception of IP protection, patent protection, copyright protection, and trademark protection. Measured on a continuous scale from 0 to 10, with higher numbers indicating better intellectual property rights, the indicators have been reversed here to correspond to higher numbers equaling higher risk, and then this reversed number is normalized on a scale of 0 to 100.

2.2 Political Risk

Political risk, unlike institutional risk, is a more medium-term threat that is focused on political institutions but also on political orderings, i.e., on policies related to the functioning of and competencies engaged by political institutions, which can also make this risk short-term in nature. To that end, this component mixes a blend of institutional and policy-based indicators with an eye on isolating the most important aspects of politics for SFPC imports. Additionally, befitting its status as in-between institutional risk, legal risk, and economic risk temporally, it also has a medium weighting for the overall risk index (30%). This is, in turn, broken down into, as with the previous and following categories, a further weighting scheme according to specific political risk indicators:

$$POLITICAL_{it} = 0.25 * EXECCON_{it} + 0.25 * SUBSIDIES_{it} + 0.15 * REGQUAL_{it} + 0.15 * CORRUPTION_{it} + 0.10 * FRACTIONAL_{it} + 0.05 * INEQUALITY_{it} + 0.05 * GEOPOLITICAL_{it} \quad (4)$$

The specific indicators (and reasons for their weighting) are:

Executive Constraints (EXECCON): Political power matters most for interfering with an economy if the power is concentrated and/or able to be used. In many political systems, the executive is hemmed in via a series of checks and balances, making the unfettered exercise of power difficult. Indeed, the greater the checks and balances, the less damage that the executive can do; alternatively, the more power delegated to other branches of government (and/or strata, such as sub-regional entities), the more incremental and consensual the changes implemented. Based on this and the vast political science literature relating executive constraints to better policy outcomes (e.g. Walter, 2015; Gates et al., 2016; Cox et al., 2017), we surmise that higher executive constraints correlate with less risk for the SFPC sector, mainly due to the lack of ability for an executive to change her mind suddenly and/or to implement said changes. Investment thrives on certainty, especially in an industry such as energy, and an erratic executive with the power to suddenly intervene without checks and balances will create uncertainty and raise risk premia. Given the importance of the executive in setting policy in most countries, and how this will impact energy transitions, this attribute is weighted at 25% of the entire political risk component.

Measured by: The Polity V Executive Constraints indicator (Center for Systemic Peace, 2025). Executive constraints are scored on an ordinal scale from 1 to 7, with 1 representing an unconstrained executive, 3 showing slight or moderate constraints, 5 representing substantial constraints, and 7 showing total subordination to other authorities (or at least on a perfectly equal footing). This measure is reversed for the purposes of the risk analysis (with 1 being total subordination and 7 being unconstrained) and re-scaled from 0 to 100 in order to mesh with the rest of the analysis.

Subsidies for fossil fuels (SUBSIDIES): Natural resource dependence has been correlated with poor institutional development and also stagnant economic performance, owing to a lack of diversity (e.g., van der Ploeg, 2011; Ross, 2015). In countries reliant on digging up things from the ground, with little value added, the industry of hole-digging often is politically powerful; if not entirely owned and run by the government, the extractive industries must have political connections and often benefit from the largess of government. These benefits arrive in the form of subsidies, whether consumption subsidies, direct payments, tax breaks, or other privileged fiscal instruments that are not available to other firms (Victor, 2009). In a country where subsidies for fossil fuels are extensive, we can thus surmise that a) the fossil fuel industry is politically powerful (particularly if the subsidies target the production rather than the consumption) and b) transitioning away from fossil fuels will be difficult. Countries with higher

subsidies to these extractive industries thus pose a higher risk for the SFPC industry. Given the importance of fossil fuel subsidies for developments in the energy sector, this indicator is weighted at 25% of the political risk component.

Measured by: The combined IMF/OECD/IEA Fossil Fuel Subsidy Database, compiled by the OECD and IISD (2025). The database contains data on the dollar value of subsidies across petroleum, natural gas, end-use electricity, and coal for 192 countries in an unbalanced panel database; for the calculation to be useful for reFuel.ch, we eliminate end-use electricity subsidies and use the sum of the other three as a per capita measure (that is, subsidies/population, which is already calculated in the database). This indicator runs in the "correct" direction already, in that more subsidies equal more risk, but it needs to be scaled to fit our 0 to 100 rating system. Unfortunately, this data only runs back to 2010, meaning that there is a limitation on how useful this measure is for looking at past risk.

Regulatory Quality (REGQUAL): Beyond the ability of an executive to work as it wants to within the halls of power, governments worldwide set regulations and legislation as part of their legitimate duties, laws that affect citizens, firms, and the economy more broadly. This indicator captures the government's ability to formulate and implement sound policies and regulations (World Bank, 2024). Such an indicator is important for SFPC because energy, along with healthcare and the financial sector, is one of the most highly regulated sectors of the economy, and a government that utilizes massive amounts of regulation but is generally ineffectual or uneven at doing so will create uncertainty, generate disincentives, and raise costs for businesses. Reflecting this reality, regulatory quality comprises 15% of the entire political risk indicator.

Measured by: The Regulatory Quality variable from the World Bank's Worldwide Governance Indicators, which combines several variables, such as burden of government regulation in general, but also price controls/administered prices, excessive protections, and inconsistent application of the tax code, investment and financial freedom, ease of starting a business (World Bank, 2024). This indicator combines several subjective sources, including the Economist Intelligence Unit, the Institutional Profiles Database, and the Bertelsmann Transformation Index, to create a continuous measure on a scale of -2.5 to 2.5, with higher numbers indicating higher regulatory quality. This scale is normalized from 0 to 100 for the purposes of our exercise and reversed, so that higher numbers once again represent higher risk.

Corruption (CORRUPTION): If regulatory quality is about how well a government does what it is supposed to in law, corruption is a measure of when governmental power is exercised for private gain. Bribes, kickbacks, political-favored procurement, differential treatment based on political leaning, and direct government interference (e.g., having a member of government sit on a company's board) all destroy a country's business environment and limit firms' ability to plan and invest in the long term. In the energy sector, again where capital is invested over a long period of time, corruption has an odd (endogenous) relationship – the steps involved in dealing with corruption may lead to only large firms succeeding, resulting in over-concentration and lack of competition, while the rents associated with energy production and transit can also encourage more corruption to occur. In any event, corruption is an unmitigated negative for the private sector, and higher levels of corruption correspond to higher country risk. This indicator represents 15% of the political risk component as it proxies for the utter breakdown of political institutions; that is, overall regulatory quality is already accounted for, while executive constraints captures the overarching variables which might allow for government malfeasance. In this sense, the corruption indicator is focused only on a narrow slice of extreme government failure, meaning the other, broader concepts are weighted more heavily.

Measured by: The Bayesian Corruption Index (BCI), a composite index created by a team of researchers at the University of Ghent in Belgium, described in Standaert (2015) and which measures perceived corruption. The BCI index values run continuously between 0 and 100, with an increase in the index corresponding to a rise in the level of corruption; thus, no transformation is necessary here.

Political fractionalization (FRACTIONAL): A key attribute of the political landscape can also determine country risk, and that is how polarized a country is. A proxy for trust but also a concrete manifestation of the inputs of the political system, fractionalization along party lines can increase the extremity of policies while also increasing the uncertainty surrounding elections. Simply put, countries that are highly politically polarized have greater stakes regarding who actually wins an election, as policies are prone to lurch far away from their previous level. Such uncertainty, of course, would plague the energy industry as well as green investments and can play directly into SFPC production depending upon the ideological priors of the parties contesting the election (Anderson & Robinson, 2025; Leng et al., 2024). We assume that this translates into more fractionalization or polarization, having a higher country risk for SFPC production and transmission than countries that are more broadly politically aligned. Political fractionalization represents 10% of the political risk component.

Measured by: The V-DEM "political polarization" indicator (Coppedge et al., 2025). On a continuous scale from -4 to 4, with higher numbers meaning more polarization, the indicator focuses on social relationships within a country and if supporters from opposing political camps are more/less likely to interact in a friendly manner. The V-DEM database has extensive coverage going back to 1900 for a large cross-section of countries, and the data here has been merely rescaled from 0 to 100. As noted, this rescaling implies that higher numbers indicate more country risk.

Inequality (INEQUALITY): Political fractionalization is meant to quantify the polarization in the political landscape, captured as an already-manifested phenomenon that could influence policymaking at the moment and in the future. However, further sources of polarization may lie underneath the surface of a political system, with one of the largest being economic inequality. Politicians are notoriously eager to play "us versus them" in order to get elected, and stirring up resentment via inequality can result in egregiously bad – and risky – economic policies, generating substantial risk. At the same time, while inequality itself may not per se be bad (it can come about from the proper functioning of a system which rewards initiative), if it derives from an overreliance on the political system, i.e., those connected to the ruling class can find riches while those not connected are doomed to poverty, or if it is extreme, inequality can create mass dissatisfaction with the existing system. For that reason, we assume that higher levels of inequality, and especially extreme inequality, are a source of latent political risk; this indicator is weighted with 5% of the overall political risk.

Measured by: The World Inequality Database's "Net personal wealth of the top 1%" indicator (Chancel et al., 2021). This variable captures the percentage of wealth within a country that is held by the top 1% in a year, with higher numbers indicating greater extreme wealth inequality. Wealth is chosen rather than income because in systems where largess is obtained due to political connections or reliance on the state, income may be understated or highly variable from year to year. However, wealth is much easier to see, even if it too is understated. Ranging from 0 to 100 (originally expressed as shares in decimal terms, multiplied by 100 here), the indicator already captures the "correct" direction of higher percentages indicating more risk.

Geopolitical Risk (GEOPOLITICAL): Finally, there are political risks that emerge from geopolitical rivalry and internal instability, including conflict. With regard to geopolitics, a country may have control over whom it goes to war with, but in other instances, a country can be invaded or attacked through no fault of its own – an exogenous shock which cannot be controlled by a country or its political system. On the other hand, weaker institutional orderings may be susceptible to internal conflict, including terrorism, civil war, and other manifestations of internal violence. To capture these two facets of geopolitical risk, we include a constructed index of both external and internal conflict, which captures the probabilities or realities of each specific country and its own particular risks. While conflict can be highly disruptive, in the context of the sustainable fuels and platform chemicals industries, it is possible that they may still operate as normal. In addition, several of the other political risks, including executive constraints and inequality, already partly explain the likelihood of conflict. For these reasons, this indicator is only weighted at 5% of the overall political risk index.

Measured by: An index built utilizing raw data from ICRG (PRS Group, 2025). The ICRG has two relevant indicators here: "external conflict," which measures the duress a government may be under diplomatically or explicitly (i.e., cross-border conflict), and "internal conflict," which is an assessment of political violence in a country, including civil war and terrorism. Both of these indicators are rated on a continuous scale from 0 to 12, with lower numbers indicating higher risk; here, we have reversed the scale so that higher numbers indicate higher risk, re-scaling them from 0 to 100. The geopolitical risk indicator used in the overall political risk category is found by then averaging the two scores (more formally, by weighting each indicator by 0.5 and then adding them together). For example, a country with a low chance of internal conflict (a 1 in the reversed ICRG ratings) and a high chance of external conflict (12 in the reversed ICRG ratings) would have a new internal conflict score of 8.33 and an external conflict score of 100; averaged, this would equal an overall geopolitical risk score of 54.17.

2.3 Economic Risk

The next component of Equation 1 and the overall country risk indicator, economic risk, encompasses macroeconomic and financial attributes of a country and can be thought of as a short-term, faster-moving phenomenon than the other categories described above. The Economic Risk component is comprised of the following indicators:

$$ECONOMIC_{it} = 0.20 * INFRASTRUCTURE_{it} + 0.20 * EDUC_{it} + 0.20 * INTRATE_{it} + 0.15 * INTRATEVOL_{it} + 0.15 * INF_{it} + 0.10 * XRATEVOL_{it} \quad (5)$$

Infrastructure (INFRASTRUCTURE): Trade, and especially trade in energy, requires an effective infrastructure network for transmission and dissemination (as well as in production). Countries with poor infrastructure are subject to delays in both production and transmission, representing a risk for the delivery of SFPC to the Swiss market and the consistency of production throughout. Roads, ports, airports, railroads, and other measures of trade logistics are crucial for ensuring that goods get to users; indeed, perhaps no measure is more important for the trade in these goods, and this is the reason that infrastructure is weighted so heavily in the economic risk category (20% of the total).

Measured by: The Notre Dame GAIN Index, sub-category HABI_05, "quality of trade and transport infrastructure." With coverage of 191 countries, some going back to 1995, the ND-GAIN (Global Adaptation Initiative) infrastructure variable measures the subjective perception of professionals of a country's quality of trade and transport-related infrastructure (e.g., ports, railroads, roads, and information technology). The scale ranges continuously from 1 to 5, with higher numbers signaling better quality infrastructure. The scale is inverted for our use here and normalized from 0 to 100 so that higher numbers signify worse infrastructure and therefore higher risks.

Education (EDUCATION): As was raised during one of the many presentations of this methodology, the creation and refinement of SFPC requires skilled workers, including scientists and engineers, making the issue of human capital crucial in a country. Simply put, countries without the requisite level of human capital are a much higher risk for investments in SFPC production, and thus, we have weighted education at 20% of the total economic risk score.

Measured by: Gross secondary enrollment, in percent, taken from the World Bank's World Development Indicators (World Bank, 2025). While school enrollment is only an indicator of access to education, data on educational quality do not have the same cross-country coverage. Nonetheless, research has shown that certain minimum levels of enrollment at the primary and secondary levels are a necessary (but not sufficient) condition for a functioning and qualitative higher education system (Michaelowa, 2007). As higher enrollment would correspond with lower risk, the raw data is inverted and normalized to 100 (as some countries have gross enrollment ratios over 100%).

Interest rate spread and volatility (INTRATE and INTRATEVOL): The net present value/internal rate of return of energy projects, stretching as they do over long periods of time, are highly sensitive to the time value of money. Interest rates – whether real, policy, or lending - are thus an important barometer

of economic risk as well as a good measure of the cost of capital; higher interest rates and especially interest rates that fluctuate frequently show that a country is risky, its economic policies are erratic, its economic policy administration is highly interventionist, or perhaps all three. In order to capture this reality, we include both the level of real interest rates and their volatility. Higher levels of interest rates mean a higher cost of capital, which should dampen investment. At the same time, higher rates of volatility of the interest rate increase uncertainty, and this leads directly to an increase in country risk related to SFPC (among other areas). A full 35% of the economic risk indicator is thus dedicated to the time value of money, split between 20% for the level of interest rates and 15% for their volatility.

Measured by: Interest rate levels are obtained from the IMF's International Financial Statistics (IMF, 2025) and from the Trading Economics database (Trading Economics, 2025), while volatility is a constructed variable from the same source. As interest rates can theoretically be unlimited, the actual interest rate in country X in percent is subtracted from the corresponding US Federal Reserve policy rate (to proxy for risk-free investments) at that date to give a spread metric. The precise measure of interest rates may differ across country due to differences in the choice of instruments used for policy rates and/or variations in rates; that is, for many countries, central banks change their policy rate infrequently but lending or deposit rates can change more rapidly, reflecting the market's reliance on the time value of money as a signal for price coordination. This interest rate spread is then placed on a stepwise continuum to show how lower spreads correspond with lower risk (Table 2).

Interest rate volatility is calculated as the squared *monthly* (rather than daily) "returns" to the real interest rate averaged over the year. The skew of the data and tiny movements meant that regular normalization using the max/min method was not sufficient. A simple cumulative distribution function (CDF) gave the spread in the raw data a more realistic normalization, giving much higher volatility and much higher weight. Once the CDF was applied to the raw data, this measure was then normalized between 0 and 100, with, again, higher numbers signaling both more volatility and higher risk.

Table 2 – Interest Rate Spread Risk Ranking

Interest Rate Spread	Risk Score
0-5%	0
5.01-10%	25
10.01-15%	50
15.01-20%	75
>20%	100

Inflation (INF): This further indicator included in the economic risk component encompasses several attributes of a country: first and foremost, inflation shows that a government cannot protect the value of its money, leading to mispricing, misallocation of capital, and a tax on the poorest members of society (more likely to hold cash). Inflation also serves as an excellent proxy for government fiscal profligacy as well, as worldwide, episodes of prolonged high or hyperinflation have usually been because of fiscal irresponsibility requiring monetization of expenditures. For the SFPC segment of the market, inflation will both increase costs over time, making current investments less profitable, as well as make it more difficult to project the future value of new investments. It perhaps goes without saying that higher levels of inflation should be correlated with high country risk, and that is exactly how we treat it here.

Measured by: Year-on-year inflation rates as captured in the World Bank's World Development Indicators and the IMF's International Financial Statistics were used as the basis for calculations. However, given that inflation rates are heavily left-skewed but with massive outliers (such as Venezuela's 2000% inflation), it was better to use a stepwise metric (Table 3), similar to the interest rate spreads shown above. Note that this measure is not a spread but uses the actual year-on-year inflation rates as recorded by the IMF or the World Bank.

Table 3 – Inflation Rate Risk Ranking

Inflation Rate, Year on Year	Risk Score
0-5%	0
5.01-10%	25
10.01-15%	50
15.01-20%	75
>20%	100

Exchange rate volatility (XRATEVOL): Relative prices of commodities are crucial for many countries, especially those dependent on natural resources, but the relative price encapsulated in an exchange rate can also affect all tradables, including energy. Countries that see their relative prices fluctuate consistently against the CHF will likely see either a) fluctuations against other currencies as well (making trade difficult for both importers and exporters) or b), in the case of fluctuations only against the CHF, an orientation away from trade with Switzerland and towards other countries with more stable exchange rates. We surmise that the volatility of the exchange rate is therefore correlated with much higher risk. Given that high exchange rate volatility occurs rather rarely, this indicator gets only 10% of the economic risk.

Measured by: A constructed variable from the IMF's International Financial Statistics and other historical exchange rate sites (such as Investing.com). Exchange rate volatility from year to year obscures a large number of fluctuations that happen daily, and thus the measure is constructed using an average of daily "returns" of the currency of country X to Swiss Francs over the year:

$$XRATEVOL_{it} = (\frac{1}{365}\sum_{y=1}^{365}\left(log\left(\frac{\left(\frac{X}{CHF}\right)_y}{\left(\frac{X}{CHF}\right)_{y-1}}\right)^2\right) \quad (6)$$

Where the exchange rate is expressed as the ratio of X (the currency of the target country) to CHF (higher numbers of the exchange rate mean that currency X is getting weaker). The log changes in the exchange rate day to day are then squared to give a realized volatility metric, summed over the year, and then averaged. The skew of the data and tiny movements within volatility meant that regular normalization using the max/min method was not sufficient, requiring a Box-Cox transformation to give the spread in the raw data a more realistic normalization. Once the Box-Cox transformation was applied to the raw data, this measure was then normalized between 0 and 100, with, again, higher numbers signaling both more volatility and higher risk.

2.4 Legal Risk

The final component of risk related to SPFC is legal risk. While aspects of a country's legal structure are captured in the institutional risk indicator, this specific component is related to the international treaties and conventions that a country has agreed to, signed, and/or acceded to, related specifically to SPFC and/or ease of trade bilaterally. This last point is crucial, as we are focused on treaties that enable or prescribe the conditions related to the SPFC industry rather than larger-scale adherence to international conventions. Under this component, Legal Risk is composed of:

$$LEGAL_{it} = 0.40 * FTAs_{it} + 0.30 * PARTNERBITs_{it} + 0.20 * BITs_{it} + 0.10 * DISPUTE_{it} \quad (7)$$

***Free Trade Agreements (FTAs)*:** While the domestic institutional environment towards trade openness is covered in the institutional component of overall risk, the international legal instrument that can facilitate bilateral trade and lessen the risk inherent in trade in a dynamic sense (i.e., over time) is the free trade agreement. Much like the BITs indicator above, the FTA indicator measures if a country has

an FTA in force either with Switzerland or the European Free Trade Association (EFTA), using this as a proxy for legal risk related to the physical act of trade. As trade is the flip side of investment, but FTAs have a more expansive remit on average, this measure also has a 40% weighting within the Legal Risk component.

Measured by: The list of FTAs that Switzerland has in force, available through UNCTAD. Also a binary measure, the original coding for this indicator is a 1 for any year that an FTA is in force and 0 otherwise; as with the BITs measure above, this is reversed so that an FTA is coded as 0 (low risk) and no FTA is coded as 100 (high risk). The fact that this is actually a dummy variable, which has been rescaled to the two extremes of our 0 – 100 scale, creates some concerns about introducing bias. This concern affects two of the legal risk indicators. We address this concern by giving the overall legal component of the risk index a low weight of only 15%.

Partner Bilateral Investment Treaties (PARTNERBIT): The presence of multiple bilateral investment treaties (BITs) in force is a reliable indicator of general openness to foreign investment. Thus, this variable captures the number of BITs that a country has with the world (including with Switzerland, if applicable) that are currently in force. While this indicator may merely be a proxy for economic size, in that a much larger country would be expected to have more BITs, the actual distribution of BITs does not necessarily correspond with size: for example, Vietnam has 51 BITs in force as of 2024 while Turkey, a country with a GDP three times larger, has 83 in force. We are thus reasonably confident that this measure is an effective proxy of overall openness to investment. For this reason, this indicator is 30% of the total Legal Risk component.

Measured by: The total number of BITs that a country has, as shown in the UNCTAD database on international investment agreements (UNCTAD, 2025a). The scaling for this measure is slightly tricky, as theoretically a country can have only as many BITs as countries in the world (197 as of 2024). Practically, the country with the highest number of BITs is China, with 108, far ahead of the closest competitor; we have thus rescaled the number of BITs from 0 to 100 and then reversed them so that a higher number of BITs is indicative of lower risks.

***Bilateral Investment Treaties (BITs)*:** The presence of a bilateral investment treaty between Switzerland and another country signals a more specific willingness to send and receive investment from that country to Switzerland and, more importantly, provides a mechanism for dispute settlement once the investment arrives. Switzerland has been signing BITs since 1961, and the existence of a BIT between a country and Switzerland, while no guarantee of increased investment, is a proxy for lowered barriers to investment in or from a specific location. Given the signals which come from the presence of a BIT – but not necessarily the outputs which could be expected – we attribute 20% of legal risk to this indicator.

Measured by: The actual bilateral investment treaties signed by Switzerland, available from UNCTAD (2025a). In the database, a 1 signifies that a BIT with Switzerland is in force and 0 if there is no BIT; the dummy variable is coded as 1 in the year in which a BIT entered into force and a 0 if it was terminated. For example, Switzerland had a BIT with the United Republic of Tanzania that came into force in 1965 and was terminated in 2006. However, it was supplanted with a new BIT, meaning that Tanzania's BIT score would be continuous from 1965 to the latest year available. Given that this is a binary variable, the scaling is also binary, meaning that no BIT returns a value of 100, and having a BIT returns a re-scaled value of 0 (again, showing that lower numbers correspond with lower risk).

***Investment Arbitration Disputes (DISPUTE)*:** Finally, the guarantee of a process for investors in the eventuality of a dispute is codified in a BIT; whether or not such a measure is actually utilized, however, is an indicator of realized risk, in the sense that an investor felt aggrieved enough to escalate a conflict to arbitration. This indicator captures Swiss firms operating in foreign countries to capture if there is a dispute that could possibly threaten the Swiss-foreign country relationship, as well as to act as a proxy

for the legal risk in that foreign country. As disputes are rare under international investment treaties, this indicator has been given only a 10% weighting as part of the Legal Risk component.

Measured by: The number of open disputes that a country has had with Swiss firms in a particular year, obtained from UNCTAD/ICSID data (UNCTAD, 2025b). As arbitrated disputes can be a multi-year proceeding, this measure is coded as a 1 for every year that a proceeding was open until it was closed. In the case of overlapping disputes, the indicator will take the value of 1 for each dispute in that year, meaning that the scale can theoretically run from 0 to 3 (the highest number of disputes for a country in the database). The measure is ordered correctly, in that fewer disputes mean lower risk, but is rescaled to fit the 0-100 scaling. This means that, in the confines of the database, the possible scores are 0 (no disputes/low risk), 33 (one dispute/moderate risk), 67 (two disputes/elevated risk), and 100 (3 disputes/high risk).

3 An Example Calculation: Brazil, 2020

This section takes the index as formulated and applies it to a specific country, Brazil, for a specific year, 2020. This country-year pairing was chosen as Brazil has good data availability for nearly every indicator mentioned here, with more recent years having perfect coverage. Choosing an example that has such coverage can also help us fine-tune the source of the indicators, which, as noted above, may differ according to country and their basis of collecting and disseminating data.

Table 4 – Original and New Scores for the Constituent Indicators of the Index

Indicator	Old Scale	Old Score	Reversed (if necessary)	Rescaled New Score
INSTITUTIONAL				
Property Rights	0-12	8.75	3.25	27.08
Business Freedom	0-100	60.5	39.5	39.5
Financial Depth	0-304.58	68.7	68.7	14.12
Trade Restrictions	0-22	15	15	68.18
Intellectual Property	0-10	5.478	4.522	45.22
POLITICAL				
Executive Constraints	0-7	missing	missing	missing
Subsidies to Fossil Fuels	0-∞	20.49	20.49	0.771
Regulatory Quality	-2.5-2.5	-0.11	-0.11	52.22
Corruption	0-100	45.178	45.178	45.178
Political Fractionalization	-4.0-4.0	2.285	2.285	78.56
Inequality	0-100	0.37	0.37	37.36
Geopolitical Risk	0-12	10	2	16.67
ECONOMIC				
Infrastructure	1-5	3.065	1.935	48.375
Education	0-164	104.13	62.80	37.20
Interest Rate Spread	0-∞	2.812	2.812	0
Interest Rate Volatility	0-∞	0.015	0.015	4.870
Inflation	0-∞	3.21	3.21	0
Exchange Rate Volatility	0-20+	0.0034	0.0034	75.384
LEGAL				
Free Trade Agreement	0-1	0	100	100
Number of BITs	0-141	25	116	82.27
Bilateral Investment Treaty	0-1	0	100	100
Disputes	0-3	0	0	0

Note: 0-∞ refers to an indicator that has no theoretical upper bound and where the boundaries are driven solely by the data.

The first step for calculating Brazil's risk country index is to rescale all of the indicators noted above to a number between 0 and 100, with lower numbers corresponding to lower risk. This is done in Table 4, which shows the original score for every metric, broken out by category, if it needed to be reversed to comply with the low-risk/low-number approach, and its corresponding new score for our index. As can be seen in Table 4, Brazil scores as having low risk on a number of indicators, including property rights, financial depth, and executive constraints (as well as on subsidies per population), but has very high risk with regard to interest rate volatility, political fractionalization, and across the entire legal component.

Table 5 – Construction of the Categories with Weighting

Indicator and Weight	Rescaled New Score	Component Weighting	Component Indicator
INSTITUTIONAL			
Property Rights (0.30)	27.08	8.124	37.01
Business Freedom (0.20)	39.5	7.9	
Financial Depth (0.20)	14.12	2.824	
Trade Restrictions (0.20)	68.18	13.636	
Intellectual Property (0.10)	45.22	4.522	
POLITICAL			
Executive Constraints (0.25)	missing	missing	33.81
Subsidies to Fossil Fuels (0.25)	0.771	0.193	
Regulatory Quality (0.15)	52.22	7.833	
Corruption (0.15)	45.178	6.777	
Political Fractionalization (0.10)	78.56	7.856	
Inequality (0.05)	37.36	1.868	
Geopolitical Risk (0.05)	16.67	0.834	
ECONOMIC			
Infrastructure (0.20)	48.375	9.675	25.38
Education (0.20)	37.20	7.440	
Interest Rate Level (0.20)	0	0	
Interest Rate Volatility (0.15)	4.870	0.731	
Inflation (0.15)	0	0	
Exchange Rate Volatility (0.10)	75.384	7.538	
LEGAL			
Free Trade Agreement (0.40)	100	40	84.681
Number of BITs (0.30)	82.27	24.681	
Bilateral Investment Treaty (0.20)	100	20	
Disputes (0.10)	0	0	

Once this re-scaling has been carried out, we can combine them according to the weights shown in Section 2. This combination by category is shown in Table 5, showing that Brazil in 2020 had moderate levels of risk across each component, with the highest risk found in the legal risk category, followed by institutions, with similar levels of risk across politics and economics. An astute reader will note that we have one missing indicator, executive constraints, which could throw off the weighting for the political

component. What was done in the database was to distribute the weight of that one missing indicator, here 25% of the total political component, across the other indicators in this component, based on their relative weights. In this way, the total weighting for the political component still sums to 1, with the weighting for executive constraints (or any missing variable) distributed to the other metrics for which data is available. This is also why the component sum is larger than the original weighting, as shown above.

Table 6 – Country Risk Index for Brazil, 2020, using our weighting scheme

Component and Weight	Component Indicator	Component Weighting	Full Risk Score Weighted
Institutional (0.35)	37.01	12.952	40.875
Political (0.30)	33.81	10.143	
Economic (0.20)	25.38	5.077	
Legal (0.15)	84.68	12.702	

Finally, the three constructed categories are brought together according to the weighting shown in Equation 1 to create the complete country index. This is shown in Table 6 and returns a country metric for Brazil in 2020 of 40.88. As noted in the introduction and in Equation 2, we also attempt this analysis by simply weighting each component equally; this is shown in Table 7 and returns a slightly higher risk rating of 45.22. For either of these scores, however, on our scale of 0 to 100, we would categorize them both as “moderate risk” (Table 8). This means that, with regard to the SFPC industry, Brazil in 2020 could have been seen as a more reliable partner than other, higher-risk countries. However, based on our categories, if we weight equally, Brazil appears to be farther along in the category of “elevated risk.”

Table 7 - Country Risk Index for Brazil, 2020, using an equal weighting scheme

Component and Weight	Component Indicator	Component Weighting	Full Risk Score Equal Weight
Institutional (0.25)	37.01	9.253	45.22
Political (0.25)	33.81	8.453	
Economic (0.25)	25.38	6.345	
Legal (0.25)	84.68	21.17	

Note: The summary risk score is not exactly equal to the sum of components due to rounding.

Table 8 – Interpretation of Country Risk Index scores

Country Risk Index	Interpretation	Description
0-25	Low Risk	Countries in this category have a very low risk of disruption
26-50	Moderate Risk	A country may face some disruption related to one component or indicator within a component
51-75	Elevated Risk	Countries in this category may have one component that is of high risk or may have more risk of disruption due to difficulties across all components
76-90	High Risk	High-risk countries are very likely to see disruptions due to low levels of institutional or political quality or high levels of economic volatility
90-100	Very High Risk	Countries with the highest probability of disruption and inconsistency

4 Dataset Description

The dataset comprises all individual indicators, component risk scores, and various versions of the total risk score for 197 countries plus Hong Kong over the period 1984-2023. The data is unbalanced, with substantial amounts of missing values, in particular for the 1980s and 90s. Table 9 displays the descriptive statistics for all indicators and risk scores. A correlation table across all indicators and subcomponents can be found in Table A1 in the Appendix. The full dataset, as well as an overview of variables and data sources, is available as an Excel document and is part of this deliverable. Only those indicators that have been obtained from commercial sources are not included in the dataset in raw form.

As explained above, to avoid losing too many observations in the overall risk scores due to missing data in individual indicators, we distribute the weight of any missing indicator across the other indicators within the same component (institutional, political, economic, or legal), also in a weighted manner. To

reduce concerns about any biased results due to missing values, however, we focus the analysis of the results on the data for the period 2010-2019, for which we generally have the fewest missing values.

To generally assess the extent to which the number of missing values is affecting the overall risk scores, we calculate the bivariate correlation between the number of missing values across all indicators and the risk score. For the whole dataset, the correlation coefficient is 0.36, indicating that missing values indeed affect the risk score results substantially. If we keep only the 2010-2019 time period, which is the focus of the analysis below, the correlation coefficient falls to 0.22, suggesting that the potential bias introduced by missing values decreases substantially.

Table 9 – Descriptive Statistics

Variable Code	Variable Name	Original Scale	Standardized Scale				Obser-vations	Share of Missings	Share of Missings (period 2010-19)
			Min	Max	Mean	Median			
inst_a	PROPERTY	0–12, continuous	0.00	100.00	39.73	38.54	5640	0.29	0.29
inst_b	BIZFREEDOM	0–100, continuous	0.00	100.00	36.22	36.30	4826	0.39	0.09
inst_c	FINMARKET	0–304.58, continuous	0.00	100.00	60.28	61.37	5498	0.31	0.14
inst_d	TRADERESTRICT	0–22, integers	9.09	95.45	48.61	47.73	6154	0.22	0.16
inst_e	INTPROP	0–10, continuous	12.88	87.00	45.12	45.81	2016	0.75	0.41
inst_score	**INSTITUTIONAL_SUBSCORE**		0.00	100.00	48.04	47.63	7384	0.07	0.03
pol_a	EXECCON	0–7, integers	0.00	100.00	40.87	41.67	5501	0.31	0.25
pol_b	SUBSIDIES	0–∞, continuous	0.00	100.00	1.05	0.00	7920	0.00	0.00
pol_c	REGQUAL	-2.5–2.5, continuous	3.83	100.95	51.03	51.41	4689	0.41	0.03
pol_d	CORRUPTION	0–100, continuous	0.00	78.94	46.94	48.43	6397	0.19	0.01
pol_e	FRACTIONAL	-4–4, continuous	2.45	99.16	47.04	47.01	6815	0.14	0.12
pol_f	INEQUALITY	0–100, continuous	12.05	57.58	27.46	27.11	7880	0.01	0.01
pol_g	GEOPOLITICAL	0–12, continuous	0.00	100.00	27.01	22.92	5640	0.29	0.29
pol_score	**POLITICAL_SUBSCORE**		0.00	69.68	28.18	27.99	7920	0.00	0.00
econ_a	INFRASTRUCTURE	1–5, continuous	10.00	97.50	59.35	61.38	4872	0.38	0.15
econ_b	EDUCATION	0–164, continuous	0.00	100.00	56.12	55.55	4447	0.44	0.29
econ_c	INTRATE	-11.9–266.7, continuous	0.00	100.00	22.57	12.50	3782	0.52	0.23
econ_d	INTRATEVOL	0–∞, continuous	0.00	100.00	7.50	2.03	3552	0.55	0.29
econ_e	INFLATION	-17.6–∞, continuous	0.00	100.00	22.88	12.50	6436	0.19	0.09
econ_f	XRATEVOL	0–26.7, continuous	0.00	100.00	51.97	52.06	4454	0.44	0.21
econ_score	**ECONOMIC_SUBSCORE**		0.00	100.00	42.04	40.65	7431	0.06	0.01
legal_a	FTAs	0–1, binary	0.00	100.00	92.60	100.00	7920	0.00	0.00
legal_b	PARTNERBIT	0–141, integers	0.00	100.00	87.63	90.78	7920	0.00	0.00
legal_c	BITs	0–1, binary	0.00	100.00	57.60	100.00	7920	0.00	0.00
legal_d	DISPUTE	0–3, integers	0.00	100.00	0.99	0.00	7920	0.00	0.00
legal_score	**LEGAL_SUBSCORE**		0.00	100.00	0.85	0.00	7920	0.00	0.00
full_score_orig	**FULL_SCORE_WEIGHTED**		12.70	83.53	44.58	44.30	7111	0.10	0.04
full_score_equal	**FULL_SCORE_EQUALWEIGHTS**		14.03	84.60	47.82	47.52	7111	0.10	0.04

5 Overall Results: Main Specifications

For reFuel.ch, we are interested in finding out which countries have the lowest level of risk. For each country, we calculate average risk values across all years in the period 2010-2019. Table 10 displays the ten countries with the highest risk (highest scores) and the ten countries with the lowest risk (lowest scores) for the two versions of the Full Risk Score (with original and with equal weighting across the four components). The coloring reflects each country's risk category introduced in Table 8. Countries written in bold are those that can be found in both rankings (i.e., for the weighted and the equal-weight Full Risk Score).

The table shows that the results are quite consistent between the two versions of the Full Risk Score. The weighted Full Score generally results in lower risk scores than the equal-weighted Full Score (this is the case for 6427 out of 7111 observations in the overall dataset, or about 90%).[1] The difference between both types of scores is, however, mostly very small: Only for 23 out of 7111 observations (about 0.3%), the difference between both scores is equal or above 10 points on the 0-100 scale; it never reaches above 13 points. For 1808 observations (around 25%), the difference between both Full Scores is between 5 and 10 points. Countries' rank order is often only slightly affected by the type of weighting. Overall, the correlation between both versions exceeds 0.98, demonstrating the robustness of the Risk Scores to the type of weighting chosen.

All ten countries with the highest average risk scores in the 2010-2019 period can be classified as "elevated risk" following the scheme shown in Table 8. Most of the ten countries with the lowest average risk scores in this period can be classified as "low risk" (up to 25 in the 0-100 scale), suggesting that all of these countries have a very low risk of disruption due to institutional, political, economic or legal aspects, and are in this sense attractive for SFPC investments.

Table 10 – Top Ten Countries with Highest and Lowest Risk Scores, period 2010-2019

Rank Type	Country	Full Score Weighted	Rank Type	Country	Full Score Equal Weight
Highest risk	**South Sudan**	72.83	Highest risk	**South Sudan**	74.12
Highest risk	**Eritrea**	70.25	Highest risk	**Eritrea**	72.39
Highest risk	**Turkmenistan**	66.78	Highest risk	**Somalia**	69.11
Highest risk	**Somalia**	65.67	Highest risk	**Turkmenistan**	65.66
Highest risk	**Afghanistan**	63.18	Highest risk	**Afghanistan**	65.34
Highest risk	**Venezuela**	62.96	Highest risk	**Venezuela**	63.83
Highest risk	**Korea DPR**	62.83	Highest risk	Yemen	62.47
Highest risk	Uzbekistan	60.29	Highest risk	Comoros	61.04
Highest risk	Equatorial Guinea	60.19	Highest risk	**Korea DPR**	60.90
Highest risk	Syria	59.86	Highest risk	Haiti	60.58
Lowest risk	**United States**	23.96	Lowest risk	**Liechtenstein**	26.34
Lowest risk	**Israel**	23.38	Lowest risk	Jordan	26.24
Lowest risk	Finland	22.11	Lowest risk	**Germany**	25.96
Lowest risk	**Hong Kong**	21.82	Lowest risk	**Israel**	25.74
Lowest risk	**Liechtenstein**	21.71	Lowest risk	South Korea	25.71

[1] This result – that risk scores are generally lower in the weighted version of the Full Risk Score – is probably driven by the fact that in the institutional and political risk components there are various indicators that tend to have low risk values; this includes property rights, business freedom, executive constraints, inequality, geopolitical risk and in particular fossil fuel subsidies, while in the legal risk component we have three indicators that tend to have high or very high risk values.

Lowest risk	**Chile**	20.80	Lowest risk	**United States**	25.08
Lowest risk	**Germany**	20.44	Lowest risk	**Hong Kong**	22.73
Lowest risk	**Singapore**	20.37	Lowest risk	**Canada**	21.32
Lowest risk	Taiwan	19.31	Lowest risk	**Chile**	20.65
Lowest risk	**Canada**	17.96	Lowest risk	**Singapore**	20.63

Table 11 presents the top five countries with the lowest average Full Risk Scores by geographic region, again for the period 2010-2019. As above, the coloring reflects the risk classification and bold letters indicated countries that can be found in both rankings. Here again, we find that both versions of the Full Risk Score are quite consistent with each other. The results show that countries classified as “low risk” can be found across all world regions, except for Sub-Saharan Africa, where the best ranked countries are classified as “moderate risk”.

Table 11 – Top Five Countries with Lowest Risk Scores, by region, period 2010-2019

Region	Country	Full Score Weighted	Country	Full Score Equal Weight
Americas	**Canada**	17.96	**Chile**	20.65
	Chile	20.80	**Canada**	21.32
	United States	23.96	**United States**	25.08
	Peru	28.56	**Peru**	27.98
	Panama	29.29	Mexico	29.12
Europe & Central Asia	**Germany**	20.44	**Germany**	25.96
	Liechtenstein	21.71	**Liechtenstein**	26.34
	Finland	22.11	North Macedonia	26.80
	Netherlands	24.10	**Iceland**	27.14
	Iceland	24.20	Albania	27.59
Middle East & North Africa	**Israel**	23.38	**Israel**	25.74
	Jordan	27.51	**Jordan**	26.24
	Morocco	29.56	**Morocco**	27.17
	United Arab Emirates	30.21	**Lebanon**	30.48
	Lebanon	32.19	Tunisia	30.62
South & East Asia & Pacific	**Taiwan**	19.31	**Singapore**	20.63
	Singapore	20.37	**Hong Kong**	22.73
	Hong Kong	21.82	South Korea	25.71
	New Zealand	24.24	**Japan**	26.53
	Japan	25.00	**Taiwan**	26.67
Sub-Saharan Africa	**Mauritius**	28.66	**Mauritius**	32.83
	Cabo Verde	31.41	**Cabo Verde**	34.86
	Botswana	32.32	**Botswana**	36.57
	South Africa	38.66	Gabon	41.44
	Kenya	40.12	**South Africa**	41.77

6 Robustness: Alternative Variables, Different Weightings

To further confirm the robustness of the results, particularly in relation to the variable weights and to the missing values, we carry out several variations of the calculation of the risk scores:

- We replace the variable DISPUTE, which records the number of investment arbitration disputes from each country with Switzerland, with an alternative version, DISPUTE_ALL, which counts all investment arbitration disputes initiated between the respective country and any other country around the world. This version then provides a fuller picture of the extent to which each country has a stronger tendency to engage in investment disputes.
- We omit the variable INTPROP (intellectual property), given that this is the variable with the highest number of missing values in the period 2010-2019 (41%). Its weight is redistributed proportionally to the other indicators within the institutional risk components. Once this variable is omitted, the variables with the highest number of missing values are PROPERTY, GEOPOLITICAL, EDUCATION, and INTRATEVOL (all 29%).
- We omit the variable SUBSIDIES (fossil fuel subsidies) for two reasons. First, a strong domestic fossil fuel industry may affect investments in SFPC in the opposing direction as expected, particularly if the fossil fuel industry itself decides to enter the SFPC market in order to reorient itself in a cleaner direction. Second, if most subsidies target consumers rather than producers of fossil fuels and have the aim of protecting vulnerable parts of the population from fluctuations in global fossil fuel prices, then they may not reflect the power of the domestic industry very accurately. The weight of this variable is redistributed proportionally to the other indicators within its risk component (political risk).
- We exclude all observations where there is more than one indicator with a missing value within each risk component.
- We give an equal weight to all individual indicators across all risk components.

These changes result in nine further versions of the Full Risk Scores. Table A2 in the Appendix shows the top five countries with the lowest risk scores by region across these nine variations of the risk score index, compared to the original weighted Full Score. Table A3 in the Appendix, in addition, displays a correlation table between all versions of the risk score index. Again, we find quite high consistency and high correlation across all Full Score versions, with a minimum of 0.93 correlation coefficient with the main specification. This supports our confidence in the robustness of our risk rankings and classification results.

7 Conclusion

This report has described a methodology for constructing a country risk index for sustainable fuels and platform chemicals (SPFC) imports to Switzerland. Focusing on four major components – institutional risk, political risk, economic risk, and legal risk – we have detailed how these components combine to increase the risk of a country's disruption in this industry. This was illustrated with the example of Brazil in 2020, showing it as a moderate risk for disruptions.

The overall results show that low-risk countries can be found across almost all world regions. Robustness tests show that the results are robust to different weighting schemes across the four risk components and across the individual indicators, as well as to different ways of dealing with missing values.

This methodology can be applied across panel and time-series data, as a way to trace the evolution of risk over time, and can be refined as needed based on data availability and the needs of the project. It purposefully focuses on general institutional, political, economic, and legal risks that can be assessed with statistical data available for a large sample of countries and a long time series. Based on this classification, the next step includes a more detailed assessment of resources and conditions necessary for biomass-based and synthetic fuel and chemicals production, such as renewable energy and water availability, or sustainable waste biomass feedstocks. This step will focus on a subset of countries with promising risk scores across various world regions and will result in Deliverable 2.7 (Focus report on selected case study countries) within reFuel.ch.

8 References

Anderson, A. & Robinson, D.T. (2025). Populism, polarization and green investment. *NBER Working Paper Series 32131*. Available at: http://www.nber.org/papers/w32131 (Accessed 10 December 2025).

Center for Systemic Peace. (2025). Policy 5 Project – Political Regime Characteristics Database. Available at: https://data360.worldbank.org/en/indicator/POLITY5_PRC_XCONST (Accessed 30 June 2025).

Chancel, L., Piketty, T., Saez, E., & Zucman, G. (2021). *World Inequality Report 2022*. World Inequality Lab. Data available at: **https://wid.world/data/** (Accessed 30 June 2025).

Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I., Teorell, J., Altman, D., Angiolillo, F., Bernhard, M., Cornell, A., Gjerløw, H., Glynn, A., Grahn, S., Hicken, A., Kinzelbach, K., Marquardt, K., McMann, K., Mechkova, V., Medzihorsky, J., Neundorf, A., … Sundström, A. (2025). *V-Dem Dataset v15*. Varieties of Democracy (V-Dem) Project. Available at: https://doi.org/10.23696/VDEMDS25 (Accessed 30 June 2025).

Cox, G. W., & Weingast, B. R. (2017). Executive constraint, political stability, and economic growth. *Comparative Political Studies*, *51*(3), 279-303. https://doi.org/10.1177/0010414017710254**.**

Estefania-Flores, J., Furceri, D., & Hannan, M. S. A. (2022). *A measurement of aggregate trade restrictions and their economic effects*. Washington DC: International Monetary Fund.

Gates, S., Graham, B. A. T., Lupu, Y., Strand, H., & Strøm, K. W. (2016). Power sharing, protection, and peace. *The Journal of Politics*, *78*(2), 512-526. https://doi.org/10.1086/684366

Hartwell, C.A. (2013). *Institutional barriers in the transition to market: examining performance and divergence in transition economies*. Basingstoke: Palgrave Macmillan.

Heritage Foundation. (2025). About the index of economic freedom (Updated February 2025). Available at: https://www.heritage.org/index/pages/about (Accessed 12 December 2025).

Hess, D. J. (2014). Sustainability transitions: A political coalition perspective. *Research policy*, *43*(2), 278-283.

IMF. (2025). Monetary and financial statistics (MFS), interest rate. Available at: https://data.imf.org/en/datasets/IMF.STA:MFS_IR (Accessed 30 June 2025).

Leng, T., Atanassov, J., & Julio, B. (2024). Political polarization and corporate investment. *SSRN Scholarly Paper No. 5037085*. Social Science Research Network. Available at: https://doi.org/10.2139/ssrn.5037085 (Accessed 12 December 2025).

Levy-Carciente, S., & Montanari, L. (2025). International Property Rights Index 2025. Washington DC: Property Rights Alliance, Tholos Foundation. Available at: https://internationalpropertyrightsindex.org/full-report (Accessed 30 June 2025).

Liu, P. H., & Lin, J. C. (2025). Integrated risk assessment and mitigation strategies for geothermal energy development: technical, socio-political, and financial dimensions. *Sustainable Energy Research*, *12*(1), 1-21.

Michaelowa, K. (2007). The impact of primary and secondary education on higher education quality. *Quality Assurance in Education*, *15*(2), 215–236. https://doi.org/10.1108/09684880710748956

OECD & IISD. (2025). Fossil Fuel Subsidy Tracker. Available at: https://fossilfuelsubsidytracker.org (Accessed 15 November 2025).

PRS Group. (2025). ICRG Researchers Dataset Table 3B. Available at: https://epub.prsgroup.com/products/icrg/researcher-dataset-icrg-t3b-political-risk (Accessed 25 June 2025).

Ross, M. L. (2015). What have we learned about the resource curse? *Annual Review of Political Science*, *18*, 239-259. https://doi.org/10.1146/annurev-polisci-052213-040359

Standaert, S. (2015). Divining the level of corruption: a Bayesian state-space approach. *Journal of Comparative Economics*, *43*(3), 782-803. Data available at: https://users.ugent.be/~sastanda/BCI/BCI.html (Accessed 30 June 2025).

Sung, B., & Song, W. Y. (2021). Are Political Factors More Relevant Than Economic Factors in Firm-Level Renewable Energy Technology Export? Evidence from Path Analysis. *Sustainability*, *13*(16), 8788.

Trading Economics. (2025). Interest rate | World. Available at: https://tradingeconomics.com/country-list/interest-rate?continent=world (Accessed 30 June 2025).

UNCTAD. (2025a). International Investment Agreements Navigator. Available at: https://investmentpolicy.unctad.org/international-investment-agreements (Accessed 1 July 2025).

UNCTAD. (2025b). Investment Dispute Settlement Navigator. Available at: https://investmentpolicy.unctad.org/investment-dispute-settlement (Accessed 1 July 2025).

van der Ploeg, F. (2011). Natural resources: Curse or blessing? *Journal of Economic Literature*, *49*(2), 366-420. https://doi.org/10.1257/jel.49.2.366

Victor, D. (2009). The politics of fossil-fuel subsidies. Manitoba and Geneva: International Institute for Sustainable Development. Available at: https://www.iisd.org/sites/default/files/gsi/politics_ffs.pdf

Walter, B. F. (2015). Why bad governance leads to repeat civil war. *Journal of Conflict Resolution*, *59*(7), 1242-1272**.** https://doi.org/10.1177/0022002714528006

World Bank. (2024). Worldwide Governance Indicators, 2024 Update. Available at: https://www.worldbank.org/en/publication/worldwide-governance-indicators (Accessed 30 June 2025).

World Bank. (2025). World Development Indicators. Available at: https://databank.worldbank.org/source/world-development-indicators (Accessed 30 June 2025).

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Department of the Environment, Transport,
Energy and Communications DETEC

Swiss Federal Office of Energy SFOE
Energy Research and Cleantech

Appendix

Table A1 –Correlation Table, All Indicators

Variable Code	inst_a	inst_b	inst_c	inst_d	inst_e	**inst_score**	pol_a	pol_b	pol_c	pol_d	pol_e	pol_f	pol_g	**pol_score**	econ_a	econ_b	econ_c	econ_d	econ_e	econ_f	**econ_score**	legal_a	legal_b	legal_c	legal_d	legal_e	**legal_score**
inst_a	1.00																										
inst_b	0.52	1.00																									
inst_c	0.36	0.38	1.00																								
inst_d	0.49	0.50	0.30	1.00																							
inst_e	0.75	0.73	0.24	0.58	1.00																						
inst_score	0.88	0.75	0.71	0.75	0.79	1.00																					
pol_a	0.41	0.45	0.30	0.39	0.39	0.50	1.00																				
pol_b	-0.14	-0.07	-0.11	-0.11	-0.13	-0.12	0.07	1.00																			
pol_c	0.76	0.79	0.46	0.62	0.88	0.81	0.62	-0.05	1.00																		
pol_d	0.57	0.68	0.48	0.52	0.90	0.68	0.45	-0.11	0.82	1.00																	
pol_e	0.32	0.30	0.14	0.30	0.46	0.31	0.33	-0.05	0.43	0.46	1.00																
pol_f	0.00	0.05	0.11	0.10	0.08	0.10	0.17	0.00	0.08	0.21	0.09	1.00															
pol_g	0.67	0.29	0.27	0.33	0.50	0.64	0.39	-0.04	0.50	0.45	0.30	0.02	1.00														
pol_score	0.43	0.61	0.38	0.48	0.69	0.50	0.92	0.14	0.83	0.72	0.51	0.22	0.37	1.00													
econ_a	0.56	0.64	0.43	0.54	0.85	0.69	0.43	-0.18	0.80	0.78	0.33	0.12	0.35	0.61	1.00												
econ_b	0.55	0.59	0.56	0.57	0.63	0.66	0.53	-0.22	0.66	0.68	0.24	0.20	0.36	0.56	0.67	1.00											
econ_c	0.48	0.32	0.31	0.33	0.46	0.47	0.20	-0.10	0.44	0.40	0.15	0.15	0.23	0.29	0.41	0.39	1.00										
econ_d	-0.10	-0.20	-0.12	-0.21	-0.29	-0.18	-0.13	0.04	-0.28	-0.20	-0.11	-0.10	-0.02	-0.18	-0.27	-0.23	-0.10	1.00									
econ_e	0.50	0.28	0.30	0.31	0.39	0.44	0.14	-0.05	0.38	0.37	0.16	0.09	0.34	0.23	0.32	0.34	0.68	-0.05	1.00								
econ_f	0.12	-0.06	-0.14	-0.05	-0.08	-0.01	-0.18	-0.05	-0.08	-0.09	-0.12	-0.03	0.02	-0.19	-0.11	-0.08	0.15	0.05	0.18	1.00							
econ_score	0.57	0.46	0.43	0.42	0.63	0.54	0.30	-0.11	0.59	0.54	0.26	0.11	0.39	0.35	0.65	0.75	0.84	0.09	0.79	0.25	1.00						
legal_a	0.19	0.19	0.11	0.09	0.10	0.15	0.05	0.01	0.20	0.13	-0.05	-0.08	0.05	0.03	0.16	0.16	0.14	0.00	0.13	0.17	0.17	1.00					
legal_b	0.37	0.22	0.31	0.19	0.23	0.36	0.25	-0.22	0.27	0.22	0.02	0.12	0.19	0.04	0.48	0.42	0.22	-0.13	0.16	0.09	0.29	0.21	1.00				

legal_c	0.05	-0.19	-0.01	-0.17	-0.47	0.00	-0.04	-0.10	-0.19	-0.29	-0.09	-0.07	0.07	-0.28	-0.21	-0.09	-0.07	0.10	-0.02	0.15	0.00	0.08	0.36	1.00		
legal_d	-0.03	0.02	-0.05	-0.02	0.09	-0.04	-0.04	0.10	0.01	0.03	0.04	0.01	-0.02	0.03	-0.05	-0.11	-0.03	0.07	-0.02	0.04	-0.05	-0.05	-0.18	-0.12	1.00	
legal_e	-0.07	-0.03	-0.07	-0.05	0.09	-0.08	-0.09	0.12	0.00	0.03	0.08	0.01	-0.05	0.03	-0.08	-0.16	-0.03	0.06	-0.04	-0.01	-0.08	-0.17	-0.30	-0.19	0.32	1.00
legal_score	0.25	0.09	0.15	0.02	-0.07	0.20	0.08	-0.11	0.11	-0.02	-0.07	-0.06	0.13	-0.13	0.13	0.18	0.12	0.02	0.11	0.23	0.18	0.70	0.61	0.71	-0.11	-0.28	1.00

Table A2 –Top Five Countries with Lowest Risk Scores, by region, period 2010-2019, Additional Specifications

Region	Country	Full Score Weighted	Country	All Disputes, Weighted	Country	All Disputes, Equal Weights	Country	No Int. Property, Weighted	Country	No Int. Property, Equal Weights	Country	No Subsidies, Weighted	Country	No Subsidies, Equal Weights	Country	Only One Missing per Component, Weighted	Country	Only One Missing per Component, Equal Weights	Country	Equal Weights for All Indicators
Americas	**Canada**	17.96	**Canada**	18.09	**Chile**	20.67	**Canada**	17.67	**Chile**	20.42	**Canada**	18.78	**Chile**	21.99	**Canada**	17.96	**Chile**	20.65	**Canada**	22.04
Americas	**Chile**	20.80	**Chile**	20.81	**Canada**	21.54	**Chile**	20.47	**Canada**	21.11	**Chile**	22.40	**Canada**	22.01	**Chile**	20.80	**Canada**	21.32	**Chile**	22.09
Americas	**United States**	23.96	**United States**	24.00	**United States**	25.14	**United States**	24.22	**United States**	25.26	**United States**	25.46	**United States**	26.32	**United States**	23.96	**United States**	25.08	**United States**	26.56
Americas	**Peru**	28.56	**Peru**	28.63	**Peru**	28.10	**Peru**	28.00	**Peru**	27.59	**Peru**	31.14	**Peru**	30.14	**Peru**	28.56	**Peru**	27.98	Costa Rica	28.95
Americas	Panama	29.29	Panama	29.37	Mexico	29.31	Panama	28.47	Mexico	28.79	Costa Rica	31.64	Mexico	31.41	Costa Rica	29.71	Mexico	29.12	**Peru**	28.97
Europe & Central Asia	**Germany**	20.44	**Germany**	20.46	**Germany**	25.98	Liechtenstein	18.46	Liechtenstein	23.74	**Germany**	21.10	**Germany**	26.51	**Germany**	20.44	**Germany**	25.96	**Germany**	23.51
Europe & Central Asia	Liechtenstein	21.71	Liechtenstein	21.71	Liechtenstein	26.34	**Germany**	20.07	**Germany**	25.69	Finland	22.04	Liechtenstein	27.83	Finland	22.11	North Macedonia	26.45	Finland	24.33
Europe & Central Asia	Finland	22.11	Finland	22.11	North Macedonia	26.62	Finland	22.02	North Macedonia	25.89	Liechtenstein	23.49	Finland	28.81	Netherlands	24.10	Iceland	27.37	Netherlands	25.55
Europe & Central Asia	Netherlands	24.10	Netherlands	24.10	Iceland	27.14	Iceland	24.11	Iceland	27.08	Sweden	24.59	North Macedonia	28.99	Sweden	24.43	Albania	27.59	Sweden	26.03
Europe & Central Asia	Iceland	24.20	Iceland	24.20	Albania	27.67	Netherlands	24.17	Albania	27.16	Netherlands	24.77	Iceland	29.00	Iceland	24.54	Finland	28.87	Iceland	26.70
MENA	**Israel**	23.38	**Israel**	23.38	**Israel**	25.74	**Israel**	22.93	**Israel**	25.42	**Israel**	24.88	**Israel**	26.99	**Israel**	23.38	**Israel**	25.74	**Jordan**	26.79
MENA	**Jordan**	27.51	**Jordan**	27.54	**Jordan**	26.29	**Jordan**	26.97	**Jordan**	25.85	United Arab Emirates	29.75	**Jordan**	29.19	**Jordan**	27.61	**Jordan**	26.37	**Israel**	27.17
MENA	**Morocco**	29.56	**Morocco**	29.59	**Morocco**	27.22	**Morocco**	29.14	**Morocco**	26.87	**Jordan**	31.06	**Morocco**	30.12	**Morocco**	29.56	**Morocco**	27.17	United Arab Emirates	27.88
MENA	United Arab Emirates	30.21	United Arab Emirates	30.22	Lebanon	30.52	United Arab Emirates	29.83	Lebanon	29.93	**Morocco**	33.10	United Arab Emirates	32.46	United Arab Emirates	30.21	Lebanon	30.48	**Morocco**	28.22

Region	Country	Full Score Weighted	Country	All Disputes, Weighted	Country	All Disputes, Equal Weights	Country	No Int. Property, Weighted	Country	No Int. Property, Equal Weights	Country	No Subsidies, Weighted	Country	No Subsidies, Equal Weights	Country	Only One Missing per Component, Weighted	Country	Only One Missing per Component, Equal Weights	Country	Equal Weights for All Indicators
MENA	Lebanon	32.19	Lebanon	32.21	Tunisia	30.62	Lebanon	31.42	Tunisia	30.46	Lebanon	35.50	Lebanon	33.25	Lebanon	32.19	Tunisia	30.62	Oman	30.99
Asia & Pacific	Taiwan	19.31	Taiwan	19.31	**Singapore**	20.63	Taiwan	19.31	**Singapore**	20.63	Taiwan	20.73	**Singapore**	22.54	**Singapore**	18.97	**Singapore**	19.39	**Singapore**	20.45
Asia & Pacific	**Singapore**	20.37	**Singapore**	20.37	**Hong Kong**	22.73	**Singapore**	20.38	**Hong Kong**	22.77	**Singapore**	22.67	**Hong Kong**	24.64	**Hong Kong**	21.82	**Hong Kong**	22.73	**Hong Kong**	22.88
Asia & Pacific	**Hong Kong**	21.82	**Hong Kong**	21.82	South Korea	25.63	**Hong Kong**	21.88	South Korea	25.71	**Hong Kong**	24.10	**Japan**	27.53	New Zealand	24.24	South Korea	25.71	New Zealand	26.60
Asia & Pacific	New Zealand	24.24	New Zealand	24.24	**Japan**	26.53	New Zealand	24.13	Taiwan	26.67	New Zealand	24.81	South Korea	27.56	South Korea	25.48	**Japan**	26.99	**Japan**	26.78
Asia & Pacific	Japan	25.00	**Japan**	25.00	Taiwan	26.67	**Japan**	25.45	**Japan**	26.86	**Japan**	26.20	Taiwan	27.86	**Japan**	25.61	China	29.21	South Korea	27.92
Sub-Saharan Africa	**Mauritius**	28.66	**Mauritius**	28.69	**Mauritius**	32.88	**Mauritius**	27.72	**Mauritius**	32.16	**Mauritius**	30.79	**Mauritius**	34.61	**Mauritius**	28.99	**Mauritius**	32.64	**Mauritius**	29.74
Sub-Saharan Africa	Cabo Verde	31.41	Cabo Verde	31.42	Cabo Verde	34.87	Cabo Verde	31.44	Cabo Verde	34.88	Cabo Verde	33.74	Cabo Verde	36.80	**Botswana**	32.32	**Botswana**	36.57	Cabo Verde	30.21
Sub-Saharan Africa	**Botswana**	32.32	**Botswana**	32.32	**Botswana**	36.57	**Botswana**	32.10	**Botswana**	36.41	**Botswana**	34.08	**Botswana**	38.04	**South Africa**	38.66	Gabon	41.44	**Botswana**	31.86
Sub-Saharan Africa	**South Africa**	38.66	**South Africa**	38.66	Gabon	41.46	**South Africa**	38.97	Gabon	41.57	**South Africa**	41.05	**South Africa**	43.76	Namibia	39.14	**South Africa**	41.77	Namibia	37.16
Sub-Saharan Africa	Kenya	40.12	Kenya	40.13	**South Africa**	41.77	Kenya	39.72	**South Africa**	41.99	Kenya	43.01	Gabon	44.67	Kenya	40.12	Namibia	42.25	**South Africa**	38.13

Table A3 – Correlation Table, All Full Risk Score Specifications

Variable	Full Score Weighted	Full Score Equal Weight	Full Score with All Disputes, Weighted	Full Score with All Disputes, Equal Weights	Full Score, no IP, no Fractionalization, Weighted	Full Score, no IP, no Fractionalization, Equal Weights	Full Score, no Subsidies, Weighted	Full Score, no Subsidies, Equal Weights	Full Score, only One Missing per Component, Weighted	Full Score, only One Missing per Component, Equal Weights	Full Score, Equal Weights for All Indicators
Full Score Weighted	1.00										
Full Score Equal Weight	0.98	1.00									
Full Score with All Disputes, Weighted	1.00	0.98	1.00								
Full Score with All Disputes, Equal Weights	0.98	1.00	0.98	1.00							
Full Score, no IP, Weighted	1.00	0.98	1.00	0.98	1.00						
Full Score, no IP, Equal Weights	0.98	1.00	0.98	1.00	0.98	1.00					
Full Score, no Subsidies, Weighted	0.99	0.97	0.99	0.97	0.99	0.97	1.00				
Full Score, no Subsidies, Equal Weights	0.98	0.99	0.98	0.99	0.98	0.99	0.98	1.00			
Full Score, only One Missing per Component, Weighted	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.98	1.00		
Full Score, only One Missing per Component, Equal Weights	0.97	1.00	0.97	1.00	0.97	1.00	0.95	1.00	0.97	1.00	
Full Score, Equal Weights for All Indicators	0.93	0.95	0.93	0.95	0.93	0.95	0.94	0.96	0.98	0.97	1.00