

# Climate Equity II

Countries' Differentiation in the Paris Climate Deal





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POLICY CENTRE – GREENOVATION HUB ([www.ghub.org/cfc\\_en](http://www.ghub.org/cfc_en))

Greenovation Hub is a grassroots environmental NGO with a global outlook. G:HUB Policy Centre promotes the development and implementation of sound climate and environmental friendly policies through conducting in-depth analysis and research, as well as fostering dialogue among stakeholders, to drive China's green transition towards a sustainable, equitable and resilient future, contributing to the reduction of global ecological footprint.

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# Executive summary

The year 2015 is a critical period for international climate negotiation. At the 17th Conference of Parties (COP17) of the United Nations Framework Convention on Climate Change (UNFCCC) in 2011, countries agreed to establish the Durban Platform for Enhanced Action (ADP). The expectation for ADP is that COP21 (Paris, 2015) will agree on a new treaty that sets the rules for global cooperation on combating climate change after 2020. During the negotiation process for the post-2020 period, equity and justice have prevailed as the core elements.

As COP21 approaches, equity has garnered increasing attention from various parties. On the one hand, since COP15 in Copenhagen “bottom-up” and “pledge and review” have become the dominant paradigms in climate negotiation, as both provide flexible space for countries' decision-making. Meanwhile, this has made the differentiation between developed countries and developing countries ambiguous. Developing countries, based on the consideration of their own development rights and needs, do not want to break down the dichotomic differentiation between developing and developed countries, as stipulated in the UNFCCC and Kyoto Protocol (KP) annexes, based on the principle of equity. Instead, they insist on strongly urging for continuity in such differentiation. The new climate treaty needs to respond to this divergence.

A better understanding of fairness in terms of effort sharing with quantifiable indicators could be useful to shed light on the fairness and adequacy of the Intended Nationally Determined Contribution (INDC), submitted by countries before the Paris meeting. Greenovation Hub believes that further differentiation of responsibilities among countries based on the existing classification can help advance understanding of the INDCs. During the current negotiation, countries could present detailed explanation on the equity of their proposed INDCs, including elaboration on the correspondence between national circumstances and their commitment to emission reduction.

The paper's adherence to original annexes under KP recognizes the historical legacy of global climate negotiation, while further classification, based on the differentiated historical responsibility and capabilities of various countries, would serve as a response to the evolution of countries in terms of "Capability-Responsibility" during the past two decades. Through a review of representative proposals for further classification, including their indicator systems and related thresholds, Greenovation Hub finds that there is no significant difference among key emitters in terms of classification across different proposals.

Building on the existing research of others and Greenovation Hub's understanding of climate equity, this paper also presents two classification proposals for further discussion. One is a per-capita “Responsibility-capability Index” with reference to the “Greenhouse Development Right Framework.” Under three scenarios (Scenario 1: 100% of responsibility, 550ppm; Scenario 2: 50% of responsibility + 50% of capability, 450ppm; Scenario 3: 100% of capability, 450ppm), the world's 50 largest-emitting countries are ranked according to significant gap of values. The result shows that for major emitters there is no significant difference under different scenarios in terms of classification.

The other proposal, which is based on the framework put forward by Greenovation Hub in its previous Climate Equity report, analyzes the difference of countries in terms of "Capability-Need." The rationale of this framework is that countries at different development stages have different priorities in their development agendas. The difference between developed countries and less developed countries is not similar with the difference between underdeveloped countries and least developed countries. Such dissimilarity needs to be measured with an indicator system that is able to reflect the responsibility and capability attributes of both groups of countries in a differentiated and detailed manner, rather than with one single indicator system to make differentiation through threshold range. This classification method makes it easier to identify typical countries as representatives of different groups, meaning that other countries could align themselves with those typical countries by comparing national circumstances with them. That is to say, a country could choose its own group in which it has no qualitative difference with the corresponding typical country in terms of national circumstances. Yet, being in the same group does not mean making the same contributions, rather, countries' contributions should reflect the quantitative differences they have with the typical country of the group.

After comparing classification results based on different methodologies, this research identifies five groups of relatively typical countries:

Group 1: Advanced countries, typically Australia, Canada, France, Germany, Japan, Norway, the U.S., etc.

Group 2: Less advanced/transitional countries, typically other Annex-I countries, mainly in Eastern Europe.

Group 3: Rich developing countries, typically Saudi Arabia, Singapore, South Korea, etc.

Group 4: Rapidly developing countries, typically Argentina, China, South Africa, etc.

Group 5: Underdeveloped countries, typically the least developed countries in Africa

This paper believes that the debate on nation classification will have following implications for the Paris climate deal:

1) Within the new international climate regime, due to a possible review mechanism, there is a window for countries to improve and enhance their Nationally Determined Contribution (NDC) - once the NDCs are adopted as part of the agreement, they will no longer be "intended." The elements to be reviewed include equity, which means a country's elaboration on the equity aspect of its own contribution will also be "reviewed." Such elaboration needs to include two sets of relations, firstly, the correspondence between key national-circumstances indicators and development stages, and, secondly, the correspondence between different development stages and obligations of action.

2) For the relation between key national-circumstances indicators and development stages, the differentiation between different development stages is reflected in economic and technological development levels, and different historical responsibilities. Therefore, such differentiation should be described through appropriate indicators like capability, responsibility and real-development need.

3) The commitment or contribution of various countries under a new treaty of the Convention should correspond to different development stages (group of countries) in terms of form and quantity.

4) The first relation needs to be elaborated through an indicator system with equity considerations, while the second relation should be further refined based on the dichotomy in KP.

5) The clear elaboration of both relations in INDC, and other national explanatory documents, could help advance the process. On the one hand, it would help countries to understand the actions of each other and foster mutual trust and confidence in the climate regime before the Paris agreement; on the other hand, it would also provide a basic framework for "reviewing" the equity aspect among countries under the Paris climate agreement.

The research was independently conducted by the Greenovation Hub Policy Centre. During the period, it received guidance, support and encouragement from several experts, including Yang Fuqiang from the Natural Resources Defense Council; Chen Ying from the Research Center for Sustainable Development under the Chinese Academy of Social Sciences; Liu Qiang from the strategic planning division of the National Center for Climate Change Strategy and International Cooperation; and, Lu Mei and Wang Binbin from Oxfam Hong Kong's climate change and poverty team. We are extremely grateful to all of them.

The world is so diverse with different development stages and cultural backgrounds that inform our understanding of equity. However, we believe that in order to seek a future with safe climate, we must look for our shared values and understandings, which will enable us to bridge our differences through communication, to reach a consensus to promote positive changes.

Policy Centre, Greenovation Hub

May, 2015

# 2 Background



Equity has been a core component of the international climate regime. The UNFCCC adopted "Equity" and "Common but Differentiated Responsibilities" as its core principles. Not only have these principles been initially explained and applied in the UNFCCC text and its annexes, but also materialized through KP. In short: Firstly, developed countries should take the obligations of quantitative-emission reduction or limitation while developing countries could take voluntary measures according to their national circumstances. Secondly, developed countries should transfer technology and provide financial support to developing countries. With the evolution of global climate governance, the principle of equity has remained the corner stone. As the second-commitment period of KP was confirmed at the Durban Conference at the end of 2011, a new track of negotiation for post-2020 climate governance has been opened. It is undoubted that "Equity" remains one of the key elements for building up such an institutional arrangement.

The core of equity is how to make countries believe that other countries' actions are adequate compared to the legitimate expectations for them. The same point can be found in both Chinese and Western literature. In "The Analects of Confucius" it states, "do not impose on others what you yourself do not desire," while the Bible says, "do to others what you would have them do to you." In the context of climate change, these points imply that the efforts made by a country to tackle global climate change would be an indication of its expectations of other countries.

Besides the arguments of ethics and principles, it is also important how different countries perceive this arrangement. The classification through the annexes of the UNFCCC reflected the difference of responsibility and capability among parties (or party groups) to the Convention. In 1992, the gap between the development levels of developed countries and developing countries was significant. Under that context, it was unacceptable to require developing countries to undertake any kind of legally binding targets. After the UNFCCC came into force, the KP successfully launched an international mechanism on combating climate change. However, such an institutional arrangement was insufficient for ensuring climate security. Since the second commitment period of the KP is set to end in 2020, the current focus of negotiation is how to reach a new international climate agreement in COP21 that will regulate global climate

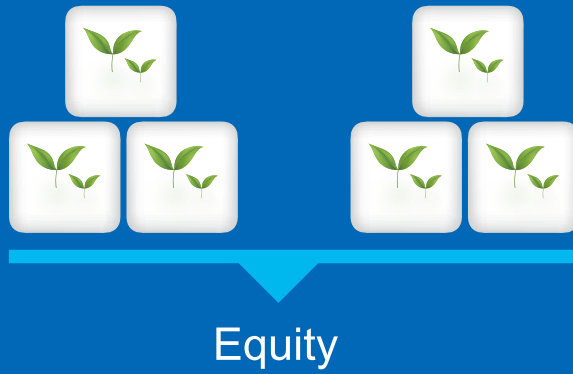
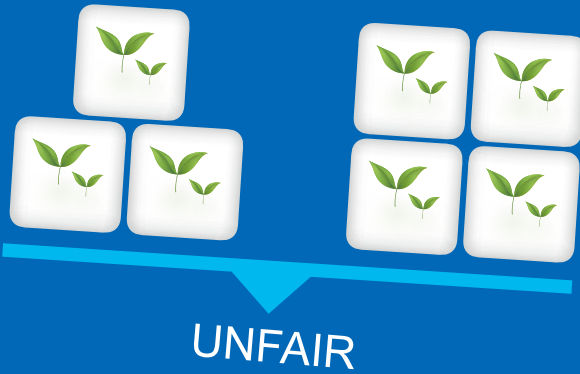
action beyond 2020. Thus, it is particularly important to make further improvements to the mechanisms under the existing framework.

In 2013, Greenovation Hub released its first report on Climate Equity. Based on John Rawls' theory on justice, the report reviewed the ethical meanings of the principle and analyzed indicators related to climate equity (sufficiency, responsibility, capability, need for sustainable development, etc.) The report reaffirmed the significance of adequacy of action as an indicator for climate equity. The first commitment period of KP (2008-2012) was accepted by parties as a relatively equitable and acceptable arrangement, but the emission-reduction targets it contained could not be quantitatively in line with the target of controlling the global average temperature rise within 2 degrees Celsius compared to pre-industrialization level. Besides responsibility, the report also particularly stressed the importance of current capability, ( as addressing the current issue is more relative to the current capability )and its relation to historical responsibility. The interpretation of equity by countries could be based more on short-term national interest rather than consensus in ethics and principles. The report, advocating a diversified form of climate contributions and quantitative targets, believes that an independent reviewing based on some form of quantitative reference system, is necessary to promote climate equity. With such review, climate security could be gradually achieved through a long-term process.

Based on previous Greenovation Hub work, this paper intends to suggest a pathway to progress under the current framework. The differentiated actions or contribution among countries should not only be reflected by the quantitative target, but also by the forms of action. Greenovation Hub believes that a more comprehensive and flexible classification based on the arrangement of the current Convention annex could help countries reach an equitable and ambitious climate agreement by the end of 2015. The core of such proposed classification lies in the further classification of developed countries and developing countries without breaking down the current classification, i.e. keep the "firewall." While keeping the existing differentiation between two large groups, such an arrangement also tries to demonstrate the differences among countries within both groups in a more systematic and clear-cut manner.

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Necessity for discussion of refined grouping





As stated above, the UNFCCC classification of countries reflected the difference in development levels of countries at that time, thus, it gained the support of these countries. However, in recent years, developed countries have repeatedly stated in negotiation that after more than 20 years such traditional classification no longer fully reflects differences in capability, responsibility and political strength. Besides, the action pledged under the Cancun Agreement varies among countries. The boundary between developed countries and developing countries has become less clear.

Furthermore, there are substantial differences among developing countries in terms of the form and substance of the pledge. While some developing countries criticized developed countries for not contributing in line with their historical responsibility, developed countries have also criticized some rich developing countries for dodging responsibility and hiding behind underdeveloped countries. As Todd Stern, the former US special envoy for climate change, put it, “you cannot build a system that treats China like Chad.” The call for rich non-Annex-I countries to “graduate” and to undertake quantitative-emission reduction or controlling targets together with developed countries has been persistent since the beginning of this century. This criticism demonstrates a lack of trust. The dispute on the “firewall” between developed countries and developing countries shows the increasingly severe confrontation between “South-North” groups on some issues despite the gap between countries, in terms of capability and responsibility, narrowing significantly. It is critically important to the maintenance or enhancement of political trust that the equity aspect of the international institutional arrangement on climate change is acceptable to all.

COP20 at the end of 2014 discussed how to address the differentiation between countries in the coming climate regime. In the final decision<sup>i</sup>, on the one hand, “common but differentiated responsibilities and respective capabilities,” the “firewall” deemed by developing countries, was kept in the final text; on the other hand, “according to different national

circumstances,” which reflected the actual differences between countries was also in the same sentence. These words foreshadowed that disputes on differentiated responsibilities would continue along the way to the 2015 climate agreement.

This paper believes that a refined classification of countries is helpful to bridge the varying opinions on whether to preserve the “firewall.” Such classification implies that rich developing countries shall not be treated like the least developed countries, nor undertake the same responsibility as developed countries. Rather, they should take action suitable to their own national circumstances. The current political reality makes it impossible to fully maintain or thoroughly break down the original dichotomy classification. The refined classification under “firewall” could be applied as a balanced convergence to improve the system with the precondition that the original classification in annex of the Convention would not be turned over. These improvements would enable both parties with opposite stances to make common progress while reserving their respective bottom lines, take action as soon as possible and gradually enhance mutual trust in the progress of action and review. In fact, there have always been classifications within developed and developing countries in climate change talks, such as the Umbrella Group, BASIC Countries, AOSIS, etc. Although these nation groups function only as a mechanism for coordination of positions during negotiations, the similar stances of countries within these groups reflect the understanding of climate change in their domestic politics and their similar interests on the issue, both of which are closely related to their national circumstances. If there were some more systematic and acceptable-to-all indicators for the description of national circumstances, as well as the buildup of corresponding relation between required actions to tackle climate change and national circumstances, it would help countries understand the actions of each other and improve confidence in the climate regime. This is why discussions on “classification” would largely contribute to the negotiation on differentiation of climate responsibilities among countries.

4

**Rationale and methodologies for refined grouping**



## 4.1. Review of existing research

Further grouping in the annexes of UNFCCC has always drawn interest from researchers in various countries. In particular, around the launch of international climate talks for the post-KP period, i.e. after the end of the first commitment period, many research institutions released reports and research. These works are still significant references for today's discussion on refined classification. They have provided not only extensive analysis and perspectives, but also lessons about why these proposals were not adopted.

### 4.1.1 Multi-stage proposal <sup>ii</sup>

Since 2001, the Netherlands National Institute for Public Health and the Environment (RIVM) has been envisioning the "multi-stage proposal," a potential country grouping mechanism intended to enhance the participation of developing countries. Through several years of development, the proposal has evolved into a comprehensive framework for classification.

The basic rationale of this framework is that the responsibility taken by developing countries to tackle climate change needs to evolve with their development stage, and there should be classification for different development stages. The adopted-basic principle is responsibility. That is to say, classification should be based on the contributions of different countries to climate change with corresponding capability also taken in to consideration. The method adopted the FAIR model independently developed by the institute. This instrument for simulation of policy-based emission reduction effect includes the IMAGE climate model used by IPCC for analysis of emission reduction scenarios, an instrument for shared responsibility and an instrument for calculation of emission reduction cost. The climate model would calculate total volume of global emission limit while the second instrument would

conduct the sharing of responsibilities by emission per capita and GDP per capita. Lastly, the cost instrument would calculate the price of tradable emission reduction volume. The model can be used for analysis of different ways of sharing. When being applied in "multi-stage proposal," its key function is to help identify the threshold for "graduation" to different groups.

From weak to strong, this proposal defines four stages of responsibilities for countries to take. The forms of responsibility in corresponding different stages and thresholds among different stages are shown in Table 4.1:

**Table 4.1 Form of responsibility and corresponding classification thresholds in the multi-stage proposal**

|           | Form of commitment/ obligation (reference)   | Threshold  |
|-----------|--|--|
| Stage IV  | Absolute emission reduction  | Global CO <sub>2</sub> emission from fossil fuel energy per capita   |
| Stage III | Stabilization of emission level 10 years duration  | Global CO <sub>2</sub> emission per capita   |
| Stage II  | Emission intensity target<br>Decarbonization rate (annual drop in carbon intensity <sup>1</sup> , %):<br>High-income developing countries <sup>2</sup> : 2.5% (from 2010)<br>Middle-income developing countries: 1% (2010) -2.5% (2030)<br>Low-income developing countries: 0.5% (2010) -2.5% (2050) | From 2010  |
| Stage I   | No quantitative responsibility   | The proposal was put forward in 2002 with the assumption that all developing countries would be in this stage before 2010. |

(Source: RIVM, 2002)

The design indicates that all countries should adopt quantitative targets from a certain point of time. For the least developed countries, since 2010 they would have to adopt a target of 0.5% annual carbon intensity reduction unless their per capita carbon emission

<sup>1</sup> GDP is calculated by PPP-corrected 1995 US\$.

<sup>2</sup> High-income countries are defined to have more than 5000 PPP\$ per capita); middle-income countries 2500-5000 PPP\$ per capita; and low-income countries less than 2500 PPP\$ per capita.

exceeds the threshold of stage III, the global average level of per capita carbon emission. This target of annual reduction of carbon intensity needs to rise gradually to 2.5% from 2010 to 2050. Such reference values and thresholds were produced through sensitivity analysis, test and adjustment by FAIR model with simulation under different scenarios. According to such an arrangement, there would be five groups after 2010, including Annex-I countries in stage IV, developing countries in stage III and three groups of developing countries in stage II. Thus, the grouping is based on different "stages".

Hoehne and Torvanger of the Institute for Global Environmental Strategies (IGES) also put forward similar proposals, but adopted different indicators. Though such arrangements would result in certain forms of grouping, the paths of different countries are supposed to be determined in the beginning; the graduation to a higher grade automatically taking place without negotiations. Such a once-and-for-all approach would introduce immense pressure to the negotiation of an agreement. The negotiation of technical details with strong political implications such as duration or ratio of reduction would take a very long time, if at all possible, with the effect of delaying the urgently needed actions.

#### 4.1.2 Analysis of different differentiation and related indicators by the Organization of Economic Cooperation and Development (OECD)<sup>iii</sup>

In 2008, Karosakis (OECD), etc., reviewed 10 existing grouping proposals, including the Dutch "multi-stage proposal" and conducted two analyses on "differentiation" among countries. Firstly, it analyzed the definitions of "developing" and "developed" countries. The scope of both the countries of "high human development" defined by the UNDP Human Development Index (HDI) and the "high-income economies" defined by the World Bank is significantly wider than the Annex-I countries of UNFCCC. Secondly, these 10 different grouping proposals led to similar results: The-most and least-developed

countries can be identified with less difficulty, then the grouping within the middle part, including rich developing countries, emerging economies and other developing countries, needs further effort. No matter whether the differentiation approach is to address stage or grouping of the countries, these steps cannot be skipped.

The report also conducted analysis on indicators that help differentiate countries. The author listed core indicators applied by different proposals (see Table 4.2) and produced a responsibility index of countries through the same weighted calculation according to combinations of indicators adopted by different proposals to rank responsibilities of countries to act.

**Table 4.2 National attributes/implications described by different indicators**

|    | Indicators   | Implications / attributes |
|----|--|---------------------------|
| 1  | National total GHG emission  | Responsibility            |
| 2  | Emission per capita  | Responsibility            |
| 3  | Percentage of national emission in global emission                       | Responsibility            |
| 4  | Percentage of national emission per capita in global emission per capita | Responsibility            |
| 5  | Emission per unit GDP  | Capability, demand        |
| 6  | Emission growth rate   | Capability, demand        |
| 7  | GDP per capita   | Capability, demand        |
| 8  | HDI  | Capability, demand        |
| 9  | Accumulated emission   | responsibility            |
| 10 | Climate Vulnerability Index  | Capability, demand        |
| 11 | Institutional indicators (e.g. Governance index)                         | Capability, demand        |

Eight different combinations of indicators (see Table 4.3) were applied to rank the countries' responsibility to act. Only quantitative indicators with accessible data were adopted, while indicators difficult to assess or difficult to be quantified were not adopted.

**Table 4.3 Combination of indicators for ranking of countries**

| Combination | Indicators  |
|-------------|---|
| 1           | Total emission, GDP per capita, emission per capita                   |
| 2           | Accumulated emission (1990-2004), GDP per capita, emission per capita |
| 3           | Total emission, GDP per capita  |
| 4           | Total emission, emission per capita                                   |
| 5           | Emission per unit GDP, GDP per capita                                 |
| 6           | Total emission, emission per unit GDP, GDP per capita                 |
| 7           | GDP per capita, emission per capita                                   |
| 8           | Total emission, emission per unit GDP                                 |

Please find result of ranking in Appendix I.

According to the report, the national total emission is the core indicator because it is related to the "share" of a country in global action. Therefore, the combination 1,2,3,7 in the table above could be used to allocate the global responsibility to individual countries. For grouping or classification, the key is to compare specific national circumstances or development stage of countries. The per capita indicators are more appropriate for classification than the absolute volume of action or responsibility. Such indicators include per capita economic and emission indicators that reflect national economic development and emission per unit GDP (or energy consumption per unit GDP) and evolution of total emission reflecting industrialization stage of a country.

Once the difference spectrum among countries is produced, with original Annex I and Annex II, the classification of five nation groups would be immediately presented. In Table 4.4, the grouping approach is shown with the result of 50 countries with the largest emission by combinations 5 and 7, which exclude national total emission. We could see from both combinations that only four countries highlighted below fall into different categories, demonstrating strong similarity.

**Table 4.4 is based on the classification in the annex of the Convention, and the result of ranking spectrum by combinations 5 and 7.**

|                                 | Standard   | Requirement on responsibility                           | Combination 5   | Combination 7  |
|---------------------------------|--|---|---|--|
| <b>Developed countries I</b>    | All Annex-I countries above the lowest level of Annex-II countries     | Comparable to current Annex II                          | Australia<br>Austria<br>Belgium<br>Canada<br>Czech Republic<br>Finland<br>France<br>Germany<br>Greece<br>Italy Japan<br>Netherlands<br>Spain UK<br>US               | Australia<br>Austria<br>Belgium<br>Canada<br>Czech Republic<br>Finland<br>France<br>Germany<br>Greece<br>Italy Japan<br>Netherlands<br>Spain UK<br>US            |
| <b>Developed countries II</b>   | Remaining countries in Annex I   | Comparable to current Annex I and non-Annex II          | Belarus<br><b>Poland</b><br>Romania<br>Russia<br>Ukraine  | Belarus<br>Romania<br>Russia<br>Ukraine  |
| <b>Developing countries I</b>   | All non-Annex-I countries above the lowest level of Annex-II countries | At least comparable to current Annex I and non-Annex II | Israel<br>Kuwait<br>South Korea<br>Qatar<br>UAE   | Israel<br>Kuwait<br><b>Saudi Arabia</b><br>South Korea<br>Qatar<br>UAE   |
| <b>Developing countries II</b>  | All non-Annex-I countries above the lowest level of Annex-I countries  | Approaching current Annex-I and non-Annex-II countries  | Argentina<br>Brazil Chile<br>Iran <b>Iraq</b><br>Kazakhstan<br>Libya<br>Malaysia<br>Mexico<br><b>Saudi Arabia</b><br>South Africa<br><b>Uzbekistan</b><br>Venezuela | Argentina<br>Brazil Chile<br>Iran<br>Kazakhstan<br>Libya<br>Malaysia<br>Mexico<br><b>Poland</b><br>South Africa<br>Venezuela                                     |
| <b>Developing countries III</b> | Other countries  | Comparable to current non-Annex I                       | Algeria<br>China<br>Columbia<br>Egypt<br>India<br>Indonesia<br>Nigeria<br>Pakistan<br>Thailand<br>The Philippines<br>Turkey<br>Vietnam                              | Algeria<br>China<br>Columbia<br>Egypt India<br>Indonesia<br>Iraq<br>Nigeria<br>Pakistan<br>Thailand<br>The Philippines<br>Turkey<br><b>Uzbekistan</b><br>Vietnam |



### 4.1.3 Clear-cut grouping by capability and responsibility

In recent years, Indian scholar Barnala proposed a simple and direct grouping method, which used GDP per capita and emission per capita to indicate capability and responsibility. Instead of weighting, thresholds of both indicators are used separately to differentiate the groups. As shown in Table 4.5, a country would be included in the group when it could reach the thresholds of both indicators. Barnala briefly described the methodology to adopt the threshold value. To differentiate high-capability and mid-capability countries, the approach used the lowest per capita emission of Annex-I and non-Annex-II countries (Hungary) as the threshold. To differentiate rich countries and high capability countries, the approach used per capita GDP, a capability indicator. Only the countries that reach the EU' level are defined as a rich country. Other G20 countries, apart from high-capacity and rich ones, excluding India, are counted as mid-capability large emitters. Barnala believes India should be put together with the rest of the countries into the group of lowest level of development.

The indicators, threshold, result and form of responsibility are shown in Table 4.5.

The merits for this method are that it is straightforward and concise with easy-to-access indicators and reasonably justified thresholds, which makes it easy to understand. However, because the target of the proposal was to break down fully the existing annex for regrouping, the old annexes were completely abandoned. Consequently, some richest developing countries and less rich countries in Annex I were included in the high-capability and high-responsibility group and large developing countries were included in the mid-capability group. The difference between rich countries and the high-capability and high-responsibility group lies in capability, while the difference between mid-capability large emitting countries and high-capability and high-responsibility group lies in responsibility. Such

**Table 4.5 is based on classification by emission per capita and GDP per capita.**

|  | Capability threshold   | Responsibility threshold                                 | Emission reduction responsibility                         | Finance responsibility | Classification   |
|--|--|--|---|------------------------|--|
| <b>Rich countries</b>                          | GDP per capita > EU's GDP per capita                                     | GHG emission per capita > Emission per capita in Hungary | Quantitative emission reduction target                    | Yes                    | Australia, Bahrain, Bermuda, Brunei, Canada, EU, Equatorial Guinea, Iceland, Israel, Japan, Kuwait, New Zealand, Norway, Oman, Qatar, Saudi Arabia, Singapore, UAE, US |
| <b>High-capability and high-responsibility</b> | GDP per capita > Belarus' GDP  | GHG emission per capita > Emission per capita in Hungary | Quantitative emission reduction target                    | No                     | Bahamas, Gabon, Kazakhstan, Malaysia, Seychelles, South Korea, Uruguay, Venezuela  |
| <b>Mid-capability large emitting countries</b> | G20 countries which are excluded from above two groups (excluding India) |  | Quantitative target                                       | Unclear                | Argentina, Brazil, China, Indonesia, Mexico, South Africa, Thailand  |
| <b>Other</b>                                   | The remaining countries  |  | Independently-decided according to national circumstances | No.                    | The remaining countries  |

(Source: Barnala, above information and classification result was collected by Greenovation Hub)

difference of defining thresholds of different groups has further elaborated the meaning of differentiation in the "common but differentiated responsibilities and respective capabilities" principle.

## 4.2. Logical framework of refined grouping

The rationale of country grouping is that differentiation among nation groups lies not only in quantity, but more in quality. The considered indicators and calculation methods should be different when defining or differentiating various groups. Greenovation Hub stated in its 2013 Climate Equity report that the differentiated responsibility of various countries in

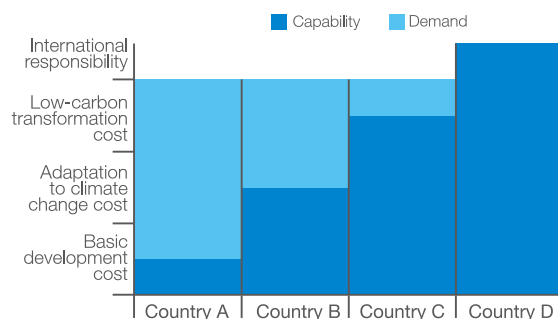
tackling climate change is derived from differentiated historical contributions to the climate change problem; differentiated capability and different development stages, including technological capability, potential for emission reduction and development agenda priorities. Several proposals for calculating national capabilities have considered such issues. According to Oxford Institute for Energy Studies, a country's capability to tackle climate change needs to be calculated using its total economic capability to pay minus its cost for poverty alleviation, where the national total economic capability to pay could be measured by taxable income and poverty-alleviation cost could be calculated on allowances for poverty alleviation. In the Greenhouse Development Right Framework, national capability was calculated on the population whose income has exceeded the threshold.

Based on existing research, Greenovation Hub conceptualized a framework shown in Figure 4.2, to differentiate the development stage among countries. Figure 4.2 illustrates the difference in national capability and development needs under the context of climate change while national development needs correspond to development stages. This paper believes that, under the context of climate change, the priority of national development agenda should be set like this: The safeguarding of basic livelihood, adaptation to existing climate change, mitigation of climate change or low-carbon transition and providing support to other countries as shouldering international responsibility.

Any country will surely work on these four or three levels at the same time, but here we indicate the ranking of priorities. Regarding the development stage, the least developed countries (A) even have no capacity to maintain basic development; the little richer countries (B) could take some cost for adaptation while maintaining its development with difficulty; and some countries with more capability (C) could take some cost for low-carbon transformation. Apart from the above cost,

the developed countries (D) would have strength or capability to spare. In reality, country B might spend on low carbon transition in the world. The point made by this capability-need framework is that even if such spending was allocated to domestic adaptation, the adaptation need would still not be met. Likewise, it also works for conditions of Country A and Country C.

**Figure 4.2 classification framework through “Capability-Demand” analysis**



(Source: Greenovation Hub)

The framework above not only considers the gap between economic capability and need, but also includes some important indicators measuring the national development stages, like technology or level of industrialization. Under the context of climate change, industrialization could be divided into three stages:

- 1) The extensive growth at the early stage of industrialization when carbon emission intensity is higher than the global average level and still growing.
- 2) The deeper stage of industrialization, namely the low-carbon transition stage, when energy intensity is significantly decreasing.
- 3) A deep emission reduction stage, where carbon intensity is below the world's average level with a lower marginal-decarbonizing rate and total carbon emission volume starting to decline.

The profile of Country C is in line with the description of the second stage while Country D would fall into the third stage. It is important to understand that the carbon intensity of an economy does not solely depend on its industrialization level, but also closely related to other factors like resource endowment, and industrial structure. Other indicators need to be applied to measure its technological level, such as the difference of the changing trajectory of carbon intensity or energy intensity compared to business-as-usual.

This approach mainly considers the gap between capability and need, without a direct calculation of historical responsibility, which is also highly controversial in effort sharing. This article suggests historical responsibility does not have a huge impact on grouping, because the groups reflect the comparative positions among countries rather than an absolute share of responsibility. Besides, the groups of countries are likely to change, so it is a temporary and dynamic arrangement only for comparison.

### 4.3. Detailed proposals for refined grouping

Based on existing research and Greenovation Hub's understanding of "Climate Equity" and its application implication in the 2015 climate deal, this paper suggests two grouping proposals for further discussion.

#### 4.3.1 Responsibility-Capability Index (RCI) Spectrum of the Greenhouse Development Right (GDR) Framework

Similar to Karosaki's approach, this proposal produces the ranking spectrum of a particular combination of indicators, and then uses the lowest values of Annex-I and Annex-II countries as the threshold to separate groups. The combination of indicators adopted in this approach is the Responsibility-Capability Index (RCI)<sup>v</sup> developed for the Greenhouse Development Right (GDR) framework, which

was proposed by Eco-Equity, Stockholm Environment Institute and Heinrich Böll-Stiftung for effort sharing. RCI is defined below:

- ◎ RCI indicates the percentage of a country's climate action in global action
- ◎  $RCI = aR + bC$  ( $a + b = 1$ )
- ◎ R is the percentage of a country's historically accumulated emission in global historically accumulated emission
- ◎ C is the percentage of the population in a country whose income exceeded the development threshold (middle class) in the world's population whose income exceeded the development threshold (global middle class);
- ◎ a and b are weighted percentage for R and C, respectively, and  $a + b = 1$

Since RCI indicates a country's proper share in the global effort of combating climate change and does not reflect national development stages. RCI per capita is adopted in this approach when grouping. Three sets of scenarios were put into test, 1) weak mitigation goal (550ppm), responsibility alone considered ( $a=1$ ); 2) strong mitigation goal (450ppm), responsibility equally considered with capability ( $a=b=0.5$ ); 3) strong mitigation goal (450ppm), capability alone considered. Spectrum of the leading 50 emitting countries<sup>vi</sup> has been made according to their ranking of RCI per capita in the three scenarios<sup>vii</sup>. The result can be seen in Appendix II. Five groups were identified by applying the thresholds, namely Developed Countries I (advanced countries), Developed Countries II (less-advanced countries), Developing Countries I (close to developed countries), Developing Countries II (leading developing countries), and Developing Countries III (under-developed countries).

It can be seen from the grouping results that despite the different settings of responsibility and mitigation goals, very few countries end up in different groups. This result suggests that the identification of typical or

reference countries of different groups is not sensitive to global ambition or the weight of responsibility and capability in consideration.

### 4.3.2 Multiple-indicator system

The biggest downfall of the spectrum-cut approach above lies in the fact that it could not reflect the qualitative differences among different groups, and implied there are only quantitative differences among them. In a strict sense, country grouping implies that there are qualitative differences among different groups. Such qualitative differences in development stages are reflected by responsibility, economic capability and industrialization level. The dominant differentiating factors between groups may vary. Barnala's approach in 4.1.3 has shown such "different differentiating factors." That approach used an emission per capita threshold to differentiate high-responsibility and mid-capability countries, a GDP per

capita threshold to differentiate high-capability and rich countries.

Table 4.6 shows another possible indicating system that can be used to describe national circumstances of various groups of countries. Groups of countries are in line with classification in Figure 4.2, while national circumstances are described and, thus, differentiated through indicators of technological level, economic capability and responsibility. However, different indicators are used to distinguish different groups. For instance, total emission trend and accumulated emission per capita are used to define advanced countries, while emission per capita and energy intensity trend are used to distinguish other countries. Whether indicators and reference value adopted in Table 4.6 are appropriate can be further debated, but the framework provides a useful example for countries to elaborate on their national circumstances.

**Table 4.6 Indicators and thresholds that can be adopted for definition of different groups of countries**

|                                    | Underdeveloped countries (A)               | Industrializing countries (B)              | Transformation/Rich countries (C)          | Advanced countries (D)                                     |
|------------------------------------|--|--|--|--|
| Technological capability indicator |  | Significant drop in energy intensity       | Gradual decline in energy intensity        | Declining total emission                                   |
| Economic capability indicator      |  | GDP per capita <World's average level      | GDP per capita > Lowest value in Annex I   | GDP per capita > Lowest value in Annex II                  |
| Responsibility indicator           | Emission per capita <World's average level | Emission per capita >World's average level | Emission per capita >World's average level | Accumulated emission per capita > Lowest value in Annex II |

Since it is impossible for all countries to meet all three thresholds, this approach works better when identifying typical countries. The grouping arrangement in the table above is that every group contains the countries that exceed the three thresholds and the countries that exceed only two of the three thresholds of the upper group. In Table 4.7, we can see that

there are UNFCCC Annex-I countries and non-Annex-I countries in Group C. Therefore, countries could be divided into five groups according to such indicators with original Annex-I countries divided into Group D and Group C1 and non-Annex-I countries divided into Group C2, Group B and Group A.

**Table 4.7 Typical countries in different groups**

|                                   | Under developed countries (A) | Industrializing countries (B)   | Transformation/Rich countries (C)  |   | Advanced countries (D)   |
|-----------------------------------|-------------------------------|---|--|---|--|
| Typical countries <sup>viii</sup> | The least developed countries | Argentina China Iran<br>Kazakhstan Lebanon<br>Malaysia<br>Puerto Rico Serbia<br>South Africa Turkmenistan<br>Uzbekistan | C2: Non-annex I countries:<br>Bahrain Israel<br>Kuwait Oman<br>Qatar<br>Saudi Arabia,<br>Singapore<br>South Korea<br>UAE | C1: Original Annex I countries:<br>Belarus<br>Bulgaria<br>Hungary<br>Portugal<br>Romania<br>Slovakia<br>Ukraine | Western Europe, Northern European countries:<br>Australia Canada<br>Japan New Zealand the U.S., etc. |

The result of identifying typical countries in this grouping is elaborated below:

1) Countries with accumulated emission per capita lower than the lowest value in Annex–I countries, per capita GDP lower than world average, and energy intensity dropping faster than business as usual, like China and South Africa, are typical industrializing countries.

2) Singapore and OPEC countries in the Middle East such as Qatar, with accumulated emission per capita that is higher than the lowest level of Annex II, and GDP per capita far above the world’ s average level, are, in many ways, similar to Group D countries. However, as their total emission is still growing, they are filtered into Group C. Countries not in Annex I are filtered into Group C2, the Non–Annex I transformation/rich countries. For Group C2 countries, further grouping implies the biggest changes to the requirements on them. Combating climate change will have a significant impact on the lifeline of national economy of OPEC countries. With differences in industrial structure and technological capability among these countries, to determine grouping of each country, the framework of “Capability–Responsibility–Need” still needs further detailed analysis.

3) Although Ukraine, Bulgaria and Romania are included in Annex I, their GDP per capita are lower than the average of Annex–II countries with

emission per capita above the world's average level with repeated changes in energy intensity. Thus, they are included in Group C1, the transformation/rich countries in Annex I.

The strength of this approach is its clearer definition of different groups. It provides a way of elaborating the national circumstances through quantitative indicators and guidance for the form and content of the INDCs to be submitted before Paris (see Appendix III for brief introduction of INDC). In reality, the final grouping of countries is likely to be voluntary rather than obligatory. Under such circumstances, it is meaningful to identify the typical or representative countries of each group. The typical countries would be seen as a reference for participation of countries in corresponding groups because a country needs to use corresponding indicators to demonstrate its comparability with typical countries to put itself in a specific group. Meanwhile, the INDC of a country in a group needs to be well–comparable to the typical countries of the same group. That is to say, it is not to use a single indicator to “divide” countries, but to single out the most typical countries with the key features, so that other countries could seek to “stand with” the most–similar typical countries. To stand with typical countries does not require it to show similar features in all key indicators, rather it allows countries to choose a group to join on condition of some extent of similarity on objective data. However, a country must elaborate on the rationale for its choice.





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5

# How refined grouping works



## 5.How refined grouping works

The basic rationale of refined grouping is that the actions taken or the responsibilities shouldered by countries in different groups should be corresponding to their national circumstances. Ecofys, an international environmental consulting firm, in a brief report on

INDC, made a classification on INDC forms, which might be adopted by various groups of countries. Based on such classification, Table 5.1 helps review the relation between refined classification proposed by this report and forms of responsibility/contribution that should be shouldered/made by countries:

**Table 5.1 Examples on details of targets adopted by different groups of countries in its national actions and contributions (Areas with “\*” correspond to the most critical target for the group)**

|   | Underdeveloped countries (A)                        | Industrializing countries (B)   | Rich countries (C2)   | Transformation countries (C1)   | Advanced countries (D)  |
|---|---|---|---|---|---|
| Long-term emission target of countries                                |   | Long term pathway and scope of emission peak and decline  | Long term pathway and scope of emission peak and decline  | Long term pathway and scope of emission peak and decline                                      | Timetable for phasing out fossil fuel energies  |
| Short-term emission target of countries                               |   | Reduction target for 2025 or 2030 (gap with business-as-usual scenario, range for changed emission intensity or emission) | Specific economy-wide targets for quantitative emission cap by 2025 or 2030                     | Specific economy-wide targets for quantitative emission cap by 2025 or 2030 *                 | Specific economy-wide absolute emission reduction targets by 2025 or 2030 *                     |
| Energy target   | Targets of energy efficiency and renewable energies | Targets of energy efficiency and renewable energy, and targets related to land use and forest *                           | Targets of energy efficiency and renewable energy, and targets related to land use and forest * | Targets of energy efficiency and renewable energy, and targets related to land use and forest | Targets of energy efficiency and renewable energies, and targets related to land use and forest |
| Key policies and projects   | List of some progressive policies or projects*      | Governance structure and key policies and projects with specific targets *  | Governance structure and key policies and projects with specific targets *                      | Governance structure and key policies and projects with specific targets                      | Governance structure and key policies and projects with specific targets                        |
| Demand for international support (mitigation and adaption)            | Ranking on size of support needed                   | Specific targets and values for support needed  |   |   |   |
| Support provided to international community (mitigation and adaption) |   | Nationally determined support on South-South Cooperation  | Source, use and assessment of nationally determined support                                     | Source, use and assessment of nationally determined support                                   | Source, use and assessment of provided support *  |
| Elaboration   |   | Why such contributions are sufficient and equitable for global climate targets  | Why such contributions are sufficient and equitable for global climate targets                  | Why such contributions are sufficient and equitable for global climate targets                | Details on why such contributions are sufficient and equitable for global climate targets       |

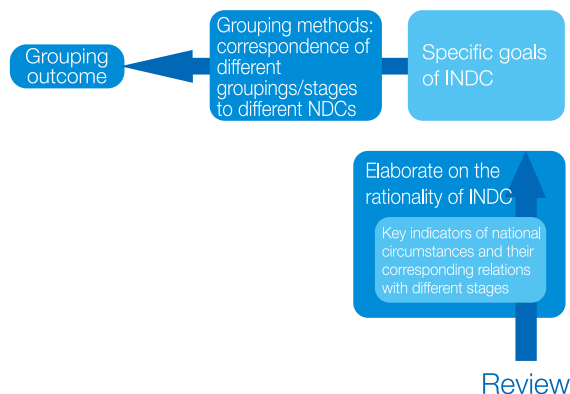
(Source: Greenovation Hub)

Table 5.1 has made distinctions of content and forms of INDC for different groups of countries. Generally speaking, countries with stronger capability should not only take a larger quantity of responsibilities, but also in a more comprehensive, stricter manner. Although the above table serves as a proposal, it could reflect the core rationale of INDC and grouping recognized among civil society and public opinion.

As discussed before, there are two possible approaches of further grouping. Countries could agree on a set of indicators and thresholds for grouping then accept the result, which is determined by such rules, or countries could determine their targets and climate actions within their capacity to choose a group in line with their national circumstances. According to experience, the latter is more practicable in reality. Besides, seen from the past-negotiation progress until the end of 2014, it is more likely the 2015 agreement will adopt the “bottom-up” approach to differentiate among countries. The problem of this approach is that it lacks drive to encourage more ambitious actions. The grouping indicating system suggested in this paper could play a role to address this.

The core rationale could also be illustrated through the following figure. Table 5.1 demonstrates the correspondence between different classification of groups and form and content of specific national contribution targets while Table 4.1 demonstrates the correspondence of key national indicators and different classification of groups. Both could be the basic rationale for grouping as well as for assessing national contributions. That is to say, a country, when putting forward its INDC, could clearly elaborate on the rationality of its contribution through both of these relations. This would explain the comparability of its contribution by helping others to compare it with other countries in the group to understand the rationale of its choice to join the group, and would

become a basis for future deliberation to promote countries to enhance their commitments with their improved national circumstances to keep up with the times. It would be ideal that countries could reach consensus on both corresponding relations through negotiation so as to simplify and streamline the INDCs for submission and the consequent grouping. Based on the current political reality, a more possible scenario is that countries would help other countries to understand their commitments by elaborating on their views on the both correspondences when explaining their respective INDC. This is in line with the COP19 decision “to communicate them well in advance of the 21<sup>st</sup> session of the COP in a manner that facilitates the clarity, transparency and understanding of the intended contributions<sup>xn</sup>”.



**Table 5.1 Importance of corresponding relation between the indicator system and description of group in the review mechanism**

The decision by COP20 invited countries to put forward their own INDC as soon as possible, however, it has neither decided the review mechanism for the INDCs,

nor clarified whether it would be revised in the future. The decision also has not provided a format to streamline the INDCs. That is to say, before the COP in Paris in 2015, the INDC proposed by countries would be various in scope and form, making comparisons difficult. If such INDCs were included in the new climate treaty as an annex without a review process to make possible the enhancement of countries' ambitions in the future, confidence in the global regime for combating climate change would suffer a heavy blow.

Under such context, the rationale framework based on development indicators and thresholds suggested by this paper could help countries explain the rationale behind their INDCs in a more transparent, comprehensive and comparable manner. Indicators and thresholds would also be helpful in identifying typical countries in different groups as a benchmark, which would largely facilitate the negotiation on a new agreement, and its implementation. Besides, although some countries cannot undertake very ambitious actions under the current pressure from development and poverty alleviation, relations among capability, demand and responsibility could be reflected through a series of indicators and thresholds to help them visualize their future responsibility and choose a more efficient and responsible development path.

Based on the analysis above, following proposals have been made:

1) Suggestions on the progress of INDC negotiation:

- ◎ Countries need to elaborate on their own national circumstances from the perspective of “capability-responsibility-demand” according to quantitative indicators and thresholds. Based on such

description, it should explain the sufficiency and equity of its climate actions to achieve the target of controlling the global average temperature rise within 2 degrees Celsius;

2) Suggestions on the arrangement of review mechanism:

- ◎ A comprehensive facilitative-review mechanism within the UNFCCC framework needs be established. There is a balance between the review mechanism and the ambition of the 2015 treaty: The weaker the ambition the more robust the review is needed. The review should not only be accurate, but also able to avoid finger pointing. It should focus on addressing the real issues and developing ways to improve mutual trust and strengthen ambition by learning from implementation. The equity reference system (key indicators and thresholds) and refined grouping results from this report could be included in the equity part of the review process as key references.
- ◎ The independent review by civil society could strongly supplement the review under the Convention framework, not only because the position of civil society is more neutral, but also because think tanks in civil society have already produced several proactive ideas and discussions on the equity reference system. Such output could not only contribute to the negotiation on UN review mechanism, but also serve as a back-up alternative when the UNFCCC review mechanism is insufficient.



6

# Conclusion





In summary, this report believes that, in the new international climate regime, a further differentiation of obligations among countries based on the original annexes of UNFCCC and KP is needed. The continuation of “firewall” would indicate the recognition of the legacy of global climate talks, while the further refined grouping based on differences in historical responsibility and capability would be a timely response to the evolution of countries' national circumstances relating to “capability-responsibility.” Such refined grouping, whether the top-down “division” or bottom-up “taking stance,” needs to refer to or be based on a indicating system built on the idea of “equity,” to help various countries enhance understanding of actions and commitments among one another and establish mutual trust and confidence in the system.

As “benchmarks” of each group, the typical countries in different groups need to adopt targets as ambitious as possible to stimulate the efforts of actions in the rest of the group. The issue of equity should be reflected in the design of the system and a mechanism for regular review on equity and effectiveness should

be established within and outside of the Convention framework to gradually foster mutual trust for improved confidence in future actions.

As a China-based NGO for environmental protection, Greenovation Hub is closely tracking the efforts made by China and the world to tackle climate change and keeps following global climate talks, in particular, by conducting timely analysis of INDC submitted by major countries this year. China is neither among developed countries nor among the least developed countries. In different grouping approaches reviewed and discussed in this paper, China is mainly in the second group of developing countries as a representative of fast-growing country that is in the late stage of industrialization. Given its huge economic size and political influence, China's positive and transparent attitude on equity will not only encourage other countries in the same group to take climate action, but also have a very positive impact on the global negotiation progress.

7  
Appendix



## Appendix I: OECD Rankings through adoption of various combinations of indicators in 2008

| Scenario 1     |        | Scenario 2     |        | Scenario 3     |        | Scenario 4                      |        | Scenario 5                   |        | Scenario 6                   |        | Scenario 7  |        | Scenario 8                   |        |
|----------------|--------|----------------|--------|----------------|--------|---------------------------------|--------|------------------------------|--------|------------------------------|--------|-------------|--------|------------------------------|--------|
| Countries      | Grades | Countries      | Grades | Countries      | Grades | Countries                       | Grades | Countries                    | Grades | Countries                    | Grades | Countries   | Grades | Countries                    | Grades |
| US             | 69     | US             | 63     | US             | 81     | US                              | 71     | Luxembourg                   | 51     | US                           | 55     | Qatar       | 84     | Democratic Republic of Congo | 53     |
| Qatar          | 56     | Qatar          | 56     | China          | 55     | China                           | 54     | Democratic Republic of Congo | 50     | China                        | 39     | Luxembourg  | 74     | China                        | 53     |
| Luxembourg     | 49     | Luxembourg     | 49     | EU (27 states) | 55     | Qatar                           | 50     | Bolivia                      | 48     | EU (27 states)               | 37     | US          | 55     | US                           | 51     |
| EU (27 states) | 42     | EU (27 states) | 39     | Luxembourg     | 50     | EU (27 states)                  | 43     | Qatar                        | 39     | Democratic Republic of Congo | 35     | Australia   | 55     | Bolivia                      | 48     |
| China          | 39     | Australia      | 38     | Norway         | 35     | Kuwait                          | 34     | Angola                       | 37     | Luxembourg                   | 34     | Kuwait      | 53     | Angola                       | 38     |
| Australia      | 39     | Kuwait         | 36     | Qatar          | 34     | UAE                             | 32     | Norway                       | 35     | Bolivia                      | 33     | UAE         | 51     | EU (27 states)               | 35     |
| Kuwait         | 36     | UAE            | 34     | Japan          | 33     | Australia                       | 32     | US                           | 35     | Angola                       | 26     | Brunei      | 51     | Mongolia                     | 31     |
| Canada         | 35     | Canada         | 34     | Canada         | 32     | Brunei                          | 32     | Mongolia                     | 32     | Qatar                        | 26     | Canada      | 48     | Republic of Congo            | 29     |
| UAE            | 35     | Brunei         | 34     | Australia      | 31     | Bolivia                         | 29     | Ireland                      | 31     | Norway                       | 24     | Norway      | 45     | Zambia                       | 28     |
| Brunei         | 34     | Norway         | 30     | Ireland        | 30     | Russia                          | 28     | Iceland                      | 30     | Japan                        | 23     | Ireland     | 44     | Cote d'Ivoire                | 23     |
| Norway         | 30     | Ireland        | 29     | Germany        | 30     | Bahrain                         | 26     | Australia                    | 30     | Canada                       | 23     | Bahrain     | 43     | Russia                       | 20     |
| Ireland        | 29     | Bahrain        | 28     | Iceland        | 29     | Canada                          | 25     | Canada                       | 29     | Australia                    | 23     | New Zealand | 41     | Tanzania                     | 20     |
| Bahrain        | 28     | Japan          | 28     | UK             | 29     | Luxembourg                      | 24     | Republic of Congo            | 29     | Mongolia                     | 21     | Iceland     | 39     | India                        | 18     |
| Japan          | 28     | New Zealand    | 27     | Switzerland    | 27     | New Zealand                     | 21     | Zambia                       | 28     | Ireland                      | 21     | Netherlands | 38     | Brazil                       | 17     |
| New Zealand    | 28     | Germany        | 27     | France         | 27     | Brazil                          | 21     | Denmark                      | 27     | Germany                      | 21     | Finland     | 37     | Iraq                         | 16     |
| Germany        | 27     | Iceland        | 26     | Netherlands    | 27     | Republic of Trinidad and Tobago | 19     | Switzerland                  | 27     | Iceland                      | 20     | Denmark     | 37     | Uzbekistan                   | 15     |
| Netherlands    | 26     | Netherlands    | 26     | Denmark        | 27     | Angola                          | 19     | Austria                      | 27     | UK                           | 20     | Belgium     | 37     | Benin                        | 14     |
| Iceland        | 26     | UK             | 25     | Austria        | 27     | Japan                           | 19     | Netherlands                  | 27     | Republic of Congo            | 19     | Austria     | 37     | North Korea                  | 12     |
| UK             | 26     | Finland        | 25     | Sweden         | 27     | Saudi Arabia                    | 18     | Finland                      | 27     | Russia                       | 19     | UK          | 34     | Myanmar                      | 12     |
| Belgium        | 25     | Belgium        | 25     | Italy          | 27     | Germany                         | 17     | Sweden                       | 27     | Netherlands                  | 19     | Singapore   | 34     | Serbia and Montenegro        | 11     |
| Finland        | 25     | Denmark        | 25     | Finland        | 26     | India                           | 17     | Belgium                      | 26     | Zambia                       | 19     | Germany     | 34     | Japan                        | 10     |
| Austria        | 25     | Austria        | 25     | Belgium        | 26     | Ireland                         | 14     | Kuwait                       | 26     | France                       | 19     | Switzerland | 33     | Sudan                        | 10     |
| Denmark        | 25     | Italy          | 23     | Singapore      | 24     | UK                              | 14     | UK                           | 26     | Denmark                      | 19     | Japan       | 33     | Indonesia                    | 10     |

## Seven, appendix

Climate Equity II—Countries' Differentiation in the Paris Climate Deal

|                                 |    |                                 |    |                |    |                              |    |                                 |    |                                 |    |                                 |    |                                 |   |
|---------------------------------|----|---------------------------------|----|----------------|----|------------------------------|----|---------------------------------|----|---------------------------------|----|---------------------------------|----|---------------------------------|---|
| Russia                          | 24 | Singapore                       | 23 | Spain          | 23 | Czech Republic               | 14 | UAE                             | 25 | Austria                         | 19 | Sweden                          | 32 | Paraguay                        | 9 |
| Italy                           | 23 | Russia                          | 23 | Greece         | 23 | Netherlands                  | 13 | Japan                           | 25 | Switzerland                     | 18 | Greece                          | 32 | Venezuela                       | 9 |
| France                          | 23 | France                          | 23 | Russia         | 23 | South Korea                  | 13 | Brunei                          | 25 | Italy                           | 18 | Italy                           | 31 | Turkmenistan                    | 9 |
| Singapore                       | 23 | Switzerland                     | 22 | Kuwait         | 21 | Belgium                      | 13 | France                          | 24 | Finland                         | 18 | France                          | 31 | Nigeria                         | 9 |
| Switzerland                     | 22 | China                           | 22 | New Zealand    | 21 | Oman                         | 13 | Singapore                       | 24 | Sweden                          | 18 | Republic of Trinidad and Tobago | 30 | Iran                            | 8 |
| Sweden                          | 22 | Sweden                          | 22 | UAE            | 21 | Turkmenistan                 | 13 | Germany                         | 24 | Belgium                         | 18 | EU (27 states)                  | 29 | Mozambique                      | 8 |
| Greece                          | 22 | Greece                          | 22 | South Korea    | 21 | Spain                        | 12 | Italy                           | 24 | Kuwait                          | 18 | Spain                           | 29 | Yemen                           | 8 |
| Spain                           | 22 | Spain                           | 21 | Israel         | 21 | Venezuela                    | 12 | New Zealand                     | 23 | UAE                             | 17 | Bolivia                         | 29 | Germany                         | 8 |
| Bolivia                         | 20 | Republic of Trinidad and Tobago | 20 | Brunei         | 19 | Kazakhstan                   | 12 | Greece                          | 23 | Brunei                          | 16 | Israel                          | 28 | Kazakhstan                      | 8 |
| Republic of Trinidad and Tobago | 20 | South Korea                     | 20 | Brazil         | 19 | Italy                        | 12 | Cote d'Ivoire                   | 23 | Singapore                       | 16 | Czech Republic                  | 28 | Ukraine                         | 8 |
| Saudi Arabia                    | 20 | Saudi Arabia                    | 20 | India          | 18 | Estonia                      | 12 | Bahrain                         | 22 | Spain                           | 16 | Cyprus                          | 28 | Togo                            | 8 |
| South Korea                     | 20 | Czech Republic                  | 19 | Cyprus         | 18 | Mongolia                     | 12 | EU (27 states)                  | 22 | Greece                          | 16 | Saudi Arabia                    | 28 | Ethiopia                        | 7 |
| Czech Republic                  | 19 | Bolivia                         | 19 | Slovenia       | 17 | Finland                      | 12 | Spain                           | 21 | New Zealand                     | 16 | South Korea                     | 27 | Australia                       | 7 |
| Israel                          | 19 | Israel                          | 19 | Bahrain        | 17 | Iran                         | 11 | Israel                          | 21 | Cote d'Ivoire                   | 16 | Slovenia                        | 26 | Cameroon                        | 7 |
| Cyprus                          | 19 | Cyprus                          | 19 | Portugal       | 16 | Poland                       | 11 | Tanzania                        | 19 | Brazil                          | 15 | Oman                            | 25 | Canada                          | 7 |
| Brazil                          | 18 | Slovenia                        | 17 | Czech Republic | 16 | Norway                       | 11 | Cyprus                          | 19 | South Korea                     | 15 | Estonia                         | 24 | Saudi Arabia                    | 7 |
| Slovenia                        | 17 | Oman                            | 16 | Malta          | 15 | Singapore                    | 11 | South Korea                     | 19 | Bahrain                         | 15 | Portugal                        | 22 | Mexico                          | 7 |
| Oman                            | 16 | Estonia                         | 16 | Saudi Arabia   | 15 | France                       | 11 | Slovenia                        | 19 | Israel                          | 14 | Russia                          | 22 | UAE                             | 6 |
| Estonia                         | 16 | Portugal                        | 15 | Hungary        | 14 | Austria                      | 11 | Czech Republic                  | 18 | Tanzania                        | 14 | Malta                           | 20 | Azerbaijan                      | 6 |
| Portugal                        | 15 | Poland                          | 14 | Poland         | 13 | South Africa                 | 11 | Portugal                        | 17 | India                           | 13 | Hungary                         | 20 | Republic of Trinidad and Tobago | 6 |
| Poland                          | 15 | Malta                           | 14 | Argentina      | 13 | Greece                       | 11 | Republic of Trinidad and Tobago | 17 | Cyprus                          | 13 | Slovakia                        | 19 | Kuwait                          | 6 |
| Malta                           | 14 | Hungary                         | 14 | Mexico         | 12 | Denmark                      | 10 | Saudi Arabia                    | 16 | Saudi Arabia                    | 13 | Poland                          | 19 | South Africa                    | 6 |
| Hungary                         | 14 | Slovakia                        | 13 | Oman           | 12 | Cyprus                       | 10 | Malta                           | 16 | Czech Republic                  | 13 | Angola                          | 18 | Moldova                         | 6 |
| Angola                          | 14 | Argentina                       | 13 | Slovakia       | 12 | Uruguay                      | 10 | Iraq                            | 15 | Slovenia                        | 12 | Argentina                       | 15 | Pakistan                        | 6 |
| Argentina                       | 13 | South Africa                    | 12 | Estonia        | 12 | Ukraine                      | 10 | Uzbekistan                      | 15 | Portugal                        | 12 | Turkmenistan                    | 17 | Kenya                           | 5 |
| Slovakia                        | 13 | Angola                          | 12 | South Africa   | 11 | Democratic Republic of Congo | 10 | Oman                            | 15 | Republic of Trinidad and Tobago | 11 | Uruguay                         | 17 | Brunei                          | 5 |
| India                           | 13 | Kazakhstan                      | 12 | Lithuania      | 11 | Mexico                       | 10 | Estonia                         | 15 | Uzbekistan                      | 11 | Kazakhstan                      | 17 | Libya                           | 5 |



|                              |    |                        |    |                                 |    |                       |    |                       |    |                       |    |                        |    |             |   |
|------------------------------|----|------------------------|----|---------------------------------|----|-----------------------|----|-----------------------|----|-----------------------|----|------------------------|----|-------------|---|
| South Africa                 | 13 | Turkmenistan           | 12 | Republic of Trinidad and Tobago | 11 | Iceland               | 10 | Hungary               | 15 | Iraq                  | 11 | South Africa           | 16 | Bahrain     | 5 |
| Kazakhstan                   | 12 | Uruguay                | 11 | Latvia                          | 10 | Argentina             | 9  | Benin                 | 14 | Malta                 | 10 | Lithuania              | 16 | Nepal       | 5 |
| Turkmenistan                 | 12 | Brazil                 | 11 | Croatia                         | 10 | Libya                 | 9  | Russia                | 14 | Poland                | 10 | Croatia                | 15 | UK          | 5 |
| Mexico                       | 12 | Malaysia               | 11 | Iran                            | 10 | Paraguay              | 9  | Slovakia              | 14 | Oman                  | 10 | Malaysia               | 15 | Poland      | 5 |
| Uruguay                      | 12 | Lithuania              | 11 | Chile                           | 10 | Slovenia              | 9  | Turkmenistan          | 13 | Hungary               | 10 | Venezuela              | 15 | Kyrgyzstan  | 5 |
| Iran                         | 11 | Venezuela              | 11 | Malaysia                        | 10 | Malaysia              | 9  | Poland                | 13 | Estonia               | 10 | Brazil                 | 15 | Belarus     | 5 |
| Venezuela                    | 11 | Croatia                | 10 | Botswana                        | 9  | Israel                | 8  | Argentina             | 13 | Argentina             | 10 | Libya                  | 14 | South Korea | 5 |
| Malaysia                     | 11 | Mexico                 | 10 | Thailand                        | 9  | Indonesia             | 8  | North Korea           | 12 | Mexico                | 10 | Botswana               | 14 | Zimbabwe    | 5 |
| Lithuania                    | 11 | Iran                   | 10 | Turkey                          | 9  | Belarus               | 8  | Serbia and Montenegro | 12 | Benin                 | 9  | Latvia                 | 14 | Qatar       | 5 |
| Croatia                      | 10 | Ukraine                | 10 | Indonesia                       | 8  | Slovakia              | 8  | Kazakhstan            | 12 | South Africa          | 9  | Belarus                | 13 | Tajikistan  | 5 |
| Libya                        | 10 | Libya                  | 10 | Uruguay                         | 8  | Cote d'Ivoire         | 8  | Lithuania             | 12 | Venezuela             | 9  | Chile                  | 13 | Thailand    | 5 |
| Ukraine                      | 10 | Botswana               | 10 | Costa Rica                      | 8  | Hungary               | 7  | Paraguay              | 12 | Iran                  | 9  | Bulgaria               | 13 | Vietnam     | 5 |
| Botswana                     | 10 | Latvia                 | 9  | Ukraine                         | 8  | Bulgaria              | 7  | Venezuela             | 12 | Slovakia              | 9  | Iran                   | 13 | Italy       | 5 |
| Latvia                       | 9  | Belarus                | 9  | Romania                         | 8  | Portugal              | 7  | Uruguay               | 12 | Turkmenistan          | 9  | Mexico                 | 13 | Uruguay     | 5 |
| Chile                        | 9  | Chile                  | 9  | Bulgaria                        | 7  | Thailand              | 7  | Croatia               | 11 | Kazakhstan            | 9  | Mongolia               | 13 | Eritrea     | 4 |
| Belarus                      | 9  | Bulgaria               | 9  | Kazakhstan                      | 7  | Republic of Congo     | 7  | South Africa          | 11 | North Korea           | 9  | Ukraine                | 12 | Malaysia    | 4 |
| Bulgaria                     | 9  | Mongolia               | 9  | Venezuela                       | 7  | Serbia and Montenegro | 7  | Latvia                | 11 | Serbia and Montenegro | 8  | Paraguay               | 12 | Senegal     | 4 |
| Thailand                     | 9  | Romania                | 8  | Columbia                        | 7  | Uzbekistan            | 7  | Myanmar               | 11 | Paraguay              | 8  | Romania                | 11 | Jamaica     | 4 |
| Mongolia                     | 9  | Thailand               | 8  | Tunisia                         | 6  | Switzerland           | 7  | Malaysia              | 11 | Ukraine               | 8  | Thailand               | 11 | Spain       | 4 |
| Romania                      | 8  | Paraguay               | 8  | Belarus                         | 6  | Sweden                | 7  | Botswana              | 11 | Malaysia              | 8  | Gabon                  | 11 | France      | 4 |
| Paraguay                     | 8  | Turkey                 | 7  | The Dominican Republic          | 6  | Azerbaijan            | 6  | Libya                 | 11 | Lithuania             | 8  | Namibia                | 10 | Argentina   | 4 |
| Turkey                       | 8  | Gabon                  | 7  | Libya                           | 6  | Croatia               | 6  | Brazil                | 11 | Myanmar               | 8  | Turkey                 | 10 | Guatemala   | 4 |
| Indonesia                    | 7  | Namibia                | 7  | Algeria                         | 6  | Romania               | 6  | Chile                 | 10 | Indonesia             | 8  | Bosnia and Herzegovina | 9  | Egypt       | 4 |
| Gabon                        | 7  | India                  | 6  | Cuba                            | 6  | Gabon                 | 6  | Belarus               | 10 | Uruguay               | 8  | Azerbaijan             | 9  | Syria       | 4 |
| Columbia                     | 7  | Bosnia and Herzegovina | 6  | Panama                          | 6  | Malta                 | 6  | Iran                  | 10 | Croatia               | 8  | China                  | 9  | Gabon       | 4 |
| Namibia                      | 7  | Azerbaijan             | 6  | Namibia                         | 6  | Zambia                | 5  | Bulgaria              | 10 | Latvia                | 8  | Costa Rica             | 9  | Lebanon     | 4 |
| Democratic Republic of Congo | 6  | Columbia               | 6  | Bosnia and Herzegovina          | 5  | Turkey                | 5  | Ukraine               | 10 | Libya                 | 7  | Macedonia              | 9  | New Zealand | 4 |

## Seven, appendix

Climate Equity II—Countries' Differentiation in the Paris Climate Deal

|                        |   |                              |   |                              |   |                        |   |                        |    |                        |   |                              |   |                        |   |
|------------------------|---|------------------------------|---|------------------------------|---|------------------------|---|------------------------|----|------------------------|---|------------------------------|---|------------------------|---|
| Azerbaijan             | 6 | Costa Rica                   | 6 | Turkmenistan                 | 5 | Chile                  | 5 | Sudan                  | 10 | Thailand               | 7 | Columbia                     | 9 | Bulgaria               | 4 |
| Bosnia and Herzegovina | 6 | Macedonia                    | 6 | Macedonia                    | 5 | Lithuania              | 5 | Mexico                 | 10 | Chile                  | 7 | Serbia and Montenegro        | 9 | Bangladesh             | 4 |
| Costa Rica             | 6 | Serbia and Montenegro        | 6 | Gabon                        | 5 | Botswana               | 5 | Azerbaijan             | 9  | Botswana               | 7 | Tunisia                      | 8 | Oman                   | 4 |
| Macedonia              | 6 | Tunisia                      | 6 | Peru                         | 5 | Columbia               | 5 | Romania                | 9  | Sudan                  | 7 | Cuba                         | 8 | Columbia               | 4 |
| Serbia and Montenegro  | 6 | Algeria                      | 6 | The Philippines              | 5 | Namibia                | 5 | Gabon                  | 9  | Belarus                | 7 | Lebanon                      | 8 | Turkey                 | 4 |
| Algeria                | 6 | Cuba                         | 5 | Egypt                        | 4 | North Korea            | 4 | Thailand               | 9  | Bulgaria               | 7 | The Dominican Republic       | 8 | Ecuador                | 3 |
| Tunisia                | 6 | Lebanon                      | 5 | Lebanon                      | 4 | Lebanon                | 4 | Mozambique             | 8  | Turkey                 | 7 | Algeria                      | 8 | Czech Republic         | 3 |
| Cote d'Ivoire          | 6 | The Dominican Republic       | 5 | Jordan                       | 4 | Bosnia and Herzegovina | 4 | Namibia                | 8  | Romania                | 7 | Panama                       | 8 | Estonia                | 3 |
| Cuba                   | 6 | Panama                       | 5 | Azerbaijan                   | 4 | Sudan                  | 4 | Togo                   | 8  | Azerbaijan             | 6 | Cote d'Ivoire                | 8 | Georgia                | 3 |
| Lebanon                | 5 | Cote d'Ivoire                | 5 | Albania                      | 4 | Myanmar                | 4 | Cameroon               | 8  | Nigeria                | 6 | Republic of Congo            | 7 | Romania                | 3 |
| The Dominican Republic | 5 | Uzbekistan                   | 5 | Salvador                     | 4 | Latvia                 | 4 | Costa Rica             | 8  | Columbia               | 6 | Jordan                       | 7 | Cambodia               | 3 |
| Panama                 | 5 | Republic of Congo            | 5 | Morocco                      | 4 | Macedonia              | 4 | Turkey                 | 8  | Gabon                  | 6 | Democratic Republic of Congo | 7 | Ghana                  | 3 |
| Uzbekistan             | 5 | Indonesia                    | 5 | Pakistan                     | 4 | Algeria                | 4 | China                  | 8  | Mozambique             | 6 | Uzbekistan                   | 7 | Nicaragua              | 3 |
| Republic of Congo      | 5 | Jordan                       | 5 | Paraguay                     | 4 | Guatemala              | 3 | Bosnia and Herzegovina | 8  | Cameroon               | 6 | Peru                         | 6 | Jordan                 | 3 |
| Peru                   | 5 | Democratic Republic of Congo | 4 | Bolivia                      | 3 | Jamaica                | 3 | Yemen                  | 8  | Namibia                | 6 | Guatemala                    | 6 | Namibia                | 3 |
| Jordan                 | 5 | Peru                         | 4 | Guatemala                    | 3 | Egypt                  | 3 | Macedonia              | 8  | Togo                   | 5 | Jamaica                      | 6 | Algeria                | 3 |
| Guatemala              | 4 | Jamaica                      | 4 | Armenia                      | 3 | Pakistan               | 3 | Lebanon                | 8  | Costa Rica             | 5 | Ecuador                      | 5 | Bosnia and Herzegovina | 3 |
| Jamaica                | 4 | Guatemala                    | 4 | Vietnam                      | 3 | Jordan                 | 3 | Columbia               | 7  | Bosnia and Herzegovina | 5 | Zambia                       | 5 | Haiti                  | 3 |
| Egypt                  | 4 | Egypt                        | 4 | Angola                       | 3 | Cameroon               | 3 | Nigeria                | 7  | Yemen                  | 5 | Albania                      | 5 | Netherlands            | 3 |
| Zambia                 | 4 | Ecuador                      | 4 | Sri Lanka                    | 3 | Iraq                   | 3 | Tunisia                | 7  | Ethiopia               | 5 | Indonesia                    | 5 | Macedonia              | 2 |
| Ecuador                | 4 | Zambia                       | 3 | Ecuador                      | 3 | Vietnam                | 3 | Jamaica                | 7  | Algeria                | 5 | Syria                        | 5 | Honduras               | 2 |
| North Korea            | 4 | Albania                      | 3 | Democratic Republic of Congo | 3 | Tanzania               | 3 | Cuba                   | 7  | Macedonia              | 5 | Egypt                        | 5 | Peru                   | 2 |
| Albania                | 3 | North Korea                  | 3 | Jamaica                      | 3 | Cuba                   | 3 | Ethiopia               | 7  | Lebanon                | 5 | North Korea                  | 5 | Slovakia               | 2 |
| Syria                  | 3 | Syria                        | 3 | Syria                        | 3 | Syria                  | 3 | The Dominican Republic | 7  | Tunisia                | 5 | Armenia                      | 5 | Morocco                | 2 |
| Sudan                  | 3 | The Philippines              | 3 | Serbia and Montenegro        | 2 | Ecuador                | 3 | Algeria                | 7  | Cuba                   | 5 | Morocco                      | 4 | Belgium                | 2 |
| The Philippines        | 3 | Armenia                      | 3 | Nicaragua                    | 2 | Peru                   | 3 | Panama                 | 7  | Jamaica                | 5 | Salvador                     | 4 | Chile                  | 2 |
| Vietnam                | 3 | Morocco                      | 3 | Bangladesh                   | 2 | Benin                  | 3 | Guatemala              | 7  | Guatemala              | 5 | The Philippines              | 4 | The Philippines        | 2 |
| Bangkok                | 3 | Salvador                     | 3 | Honduras                     | 2 | Tunisia                | 3 | Moldova                | 7  | The Dominican Republic | 5 | Sudan                        | 4 | Hungary                | 2 |

|            |   |            |   |                   |   |                        |   |                 |   |                 |   |            |   |                        |   |
|------------|---|------------|---|-------------------|---|------------------------|---|-----------------|---|-----------------|---|------------|---|------------------------|---|
| Morocco    | 3 | Sudan      | 3 | Uzbekistan        | 2 | Nigeria                | 2 | Jordan          | 6 | Egypt           | 5 | Nicaragua  | 4 | Croatia                | 2 |
| Armenia    | 3 | Nicaragua  | 3 | Georgia           | 2 | Panama                 | 2 | Indonesia       | 6 | Panama          | 5 | Cameroon   | 4 | Cuba                   | 2 |
| Pakistan   | 3 | Cameroon   | 3 | Sudan             | 2 | The Dominican Republic | 2 | Kyrgyzstan      | 6 | Pakistan        | 5 | Georgia    | 4 | Greece                 | 2 |
| Salvador   | 3 | Georgia    | 3 | Myanmar           | 2 | Morocco                | 2 | Peru            | 6 | Moldova         | 4 | Myanmar    | 3 | Albania                | 2 |
| Cameroon   | 3 | Vietnam    | 2 | Nigeria           | 2 | Moldova                | 2 | Ecuador         | 6 | Jordan          | 4 | Vietnam    | 3 | Botswana               | 2 |
| Nicaragua  | 3 | Myanmar    | 2 | Cambodia          | 2 | Georgia                | 2 | Syria           | 6 | Peru            | 4 | Sri Lanka  | 3 | Cyprus                 | 2 |
| Georgia    | 3 | Sri Lanka  | 2 | Cote d'Ivoire     | 2 | Nicaragua              | 2 | Zimbabwe        | 6 | Vietnam         | 4 | Honduras   | 3 | Finland                | 1 |
| Sri Lanka  | 2 | Honduras   | 2 | Cameroon          | 2 | The Philippines        | 2 | Kenya           | 6 | Syria           | 4 | India      | 3 | Portugal               | 1 |
| Honduras   | 2 | Iraq       | 2 | Ghana             | 2 | Togo                   | 2 | Nepal           | 6 | Ecuador         | 4 | Moldova    | 3 | Armenia                | 1 |
| Iraq       | 2 | Pakistan   | 2 | North Korea       | 2 | Albania                | 2 | Egypt           | 5 | Kyrgyzstan      | 4 | Benin      | 3 | Singapore              | 1 |
| Tanzania   | 2 | Moldova    | 2 | Zimbabwe          | 1 | Costa Rica             | 2 | Albania         | 5 | Zimbabwe        | 4 | Cambodia   | 3 | Ireland                | 1 |
| Benin      | 2 | Benin      | 2 | Mongolia          | 1 | Bangladesh             | 2 | Tajikistan      | 5 | Kenya           | 4 | Iraq       | 3 | Austria                | 1 |
| Cambodia   | 2 | Cambodia   | 2 | Moldova           | 1 | Zimbabwe               | 1 | Georgia         | 5 | Nepal           | 4 | Zimbabwe   | 2 | Slovenia               | 1 |
| Moldova    | 2 | Zimbabwe   | 2 | Ethiopia          | 1 | Mozambique             | 1 | Vietnam         | 5 | The Philippines | 4 | Pakistan   | 2 | Panama                 | 1 |
| Nigeria    | 2 | Kyrgyzstan | 1 | Kyrgyzstan        | 1 | Ethiopia               | 1 | Nicaragua       | 5 | Tajikistan      | 4 | Kyrgyzstan | 2 | Tunisia                | 1 |
| Bangladesh | 2 | Togo       | 1 | Nepal             | 1 | Kyrgyzstan             | 1 | Senegal         | 5 | Albania         | 4 | Togo       | 2 | Israel                 | 1 |
| Zimbabwe   | 2 | Ghana      | 1 | Senegal           | 1 | Honduras               | 1 | Armenia         | 5 | Georgia         | 4 | Tanzania   | 2 | Lithuania              | 1 |
| Ghana      | 2 | Tanzania   | 1 | Iraq              | 1 | Armenia                | 1 | Morocco         | 5 | Morocco         | 4 | Ghana      | 2 | Denmark                | 1 |
| Kyrgyzstan | 2 | Nigeria    | 1 | Tanzania          | 1 | Cambodia               | 1 | Eritrea         | 5 | Nicaragua       | 3 | Senegal    | 2 | Luxembourg             | 1 |
| Togo       | 1 | Senegal    | 1 | Haiti             | 1 | Nepal                  | 1 | Pakistan        | 5 | Senegal         | 3 | Mozambique | 2 | The Dominican Republic | 1 |
| Mozambique | 1 | Mozambique | 1 | Kenya             | 1 | Ghana                  | 1 | Honduras        | 5 | Armenia         | 3 | Nepal      | 1 | Latvia                 | 1 |
| Senegal    | 1 | Bangladesh | 1 | Togo              | 1 | Senegal                | 1 | Cambodia        | 4 | Eritrea         | 3 | Bangladesh | 1 | Salvador               | 1 |
| Nepal      | 1 | Nepal      | 1 | Zambia            | 1 | Kenya                  | 1 | Salvador        | 4 | Bangladesh      | 3 | Nigeria    | 1 | Norway                 | 1 |
| Ethiopia   | 1 | Tajikistan | 1 | Mozambique        | 1 | Yemen                  | 1 | The Philippines | 4 | Cambodia        | 3 | Tajikistan | 1 | Malta                  | 1 |
| Kenya      | 1 | Kenya      | 1 | Republic of Congo | 1 | Salvador               | 1 | India           | 4 | Honduras        | 3 | Kenya      | 1 | Sri Lanka              | 1 |
| Tajikistan | 1 | Ethiopia   | 1 | Tajikistan        | 1 | Tajikistan             | 0 | Ghana           | 4 | Salvador        | 3 | Ethiopia   | 1 | Sweden                 | 1 |
| Yemen      | 1 | Haiti      | 1 | Benin             | 1 | Sri Lanka              | 0 | Sri Lanka       | 4 | Ghana           | 3 | Haiti      | 1 | Switzerland            | 1 |
| Haiti      | 1 | Yemen      | 0 | Yemen             | 0 | Eritrea                | 0 | Bangladesh      | 3 | Sri Lanka       | 3 | Yemen      | 1 | Iceland                | 1 |
| Eritrea    | 0 | Eritrea    | 0 | Eritrea           | 0 | Haiti                  | 0 | Haiti           | 3 | Haiti           | 2 | Eritrea    | 0 | Costa Rica             | 0 |

## Appendix II: Classification through adoption of per capita “responsibility-capability index”

|                          | Weak path for 2-degree target<br>100% historical responsibility<br>benchmark year for historical<br>responsibility: 1850                          | Strong path for 2-degree target<br>50%responsibility+50%Capability<br>benchmark year for historical<br>responsibility: 1990                             | Strong path for 2-degree target<br>100%capability  |
|--------------------------|---|---|--|
| Developed countries I    | Australia Austria Belgium Canada<br>Czech Republic Finland France<br>Germany Greece Italy Japan<br>Netherlands Russia Spain<br>UK US              | Austria Belgium Canada<br>Czech Republic Finland France<br>Germany Greece Italy Japan<br>Netherlands Spain UK US  | Australia Austria Belgium Canada<br>Finland France Germany Greece<br>Italy Japan Netherlands Spain<br>UK US                                  |
| Developed countries II   | Belarus Poland Romania<br>Turkey Ukraine  | Australia Belarus Poland<br>Romania Russia<br>Turkey Ukraine  | Belarus Czech Republic<br>Poland Romania<br>Russia Turkey<br>Ukraine   |
| Developing countries I   | Kuwait Qatar UAE  | Kuwait Qatar UAE  | Israel South Korea Qatar<br>Kuwait UAE   |
| Developing countries II  | Argentina Brazil Chile China<br>Columbia Iran Iraq Israel Libya<br>Malaysia Mexico Saudi Arabia<br>South Africa South Korea<br>Thailand Venezuela | Argentina Brazil Chile China<br>Columbia Iran Israel Kazakhstan<br>Libya Malaysia Mexico Saudi Arabia<br>South Africa South Korea<br>Thailand Venezuela | Algeria Argentina Brazil<br>Chile China Columbia Iran<br>Kazakhstan Libya Malaysia Mexico<br>Saudi Arabia South Africa Thailand<br>Venezuela |
| Developing countries III | Algeria Egypt India Indonesia<br>Kazakhstan Nigeria Pakistan<br>The Philippines Uzbekistan Vietnam  | Algeria Egypt The Philippines<br>Indonesia India Iraq Pakistan<br>Vietnam Uzbekistan Nigeria  | Egypt India Indonesia Iraq<br>Nigeria Pakistan The Philippines<br>Uzbekistan Vietnam   |

# Appendix III: Introduction of INDC

International climate negotiation has entered a new critical period. After the "roller-coaster" style of climate negotiation in Copenhagen in 2009, which only reached a non-binding agreement, the Cancun Conference turned the situation around by restarting the negotiation. In 2011, parties agreed to set the second-commitment period of KP (post-2012) and launched ADP. Now comes the time when parties reach a new global climate deal beyond 2020 in Paris at the end of 2015. The world is experiencing increasingly more severe climate concerns, and last year, the 5<sup>th</sup> IPCC report reminded us that time will not wait for us to tackle climate change.

## Background

According to the decision of the climate conference in Warsaw, Poland, in 2013, parties should independently propose the intended climate actions to take beyond 2020 through INDC for negotiation during COP21. The core essence of INDC is on which responsibilities and actions should be taken by different countries to tackle climate change. This has always been the focus of UN climate change negotiation, such as the quantitative emission reduction commitments of developed countries in the KP, quantitative-emission reduction and emission controlling targets proposed by countries during COP15 as well as commitment on climate finance. In the lead up to the Paris climate deal, such core elements are incorporated in the term and process of INDC.

The INDC progress firstly requires countries to propose which actions they are willing to take or which goals they are willing to achieve in a specific period. Then, through a review mechanism, it would assess whether their intended contributions could meet the needs for scientifically tackling climate change and whether the related equity principle in the Convention would be reflected. Lastly, countries would decide whether their own INDC would be adjusted according to the results of the review. The achievement from this progress is expected to be secured in Paris Climate Treaty in a certain legal form.

## Principle of INDC

Based on key principles under the framework of Convention, like common but differentiated responsibilities, INDC would help improve the application of such basic principles.

### © Common responsibilities:

The target is to control global average temperature rise within 2 degrees Celsius (compared to pre-industrialization level). In the INDCs, the countries should explain why their nationally-determined targets are in line with the scientific requirement.

### © Differentiated responsibilities:

There would be differences among INDC submitted by various countries in terms of form, content or/and quantity. Countries should explain the reasons for such differences. That is to say, they should elaborate on their own understanding of the relation among capability, responsibility and target in terms of equity and ambition.

### © Challenges:

The interpretation of "equity" as a universal value by different countries must be based on value judgment and methodologies. For instance, some countries would emphasize the importance of current capability--"stronger capability, larger responsibility", while some countries would emphasize the importance of historical responsibility (inherence of debt). This could be seen as value judgment, based on which there should be a set of reasonable calculation methodologies. In fact, the research on "equally-shared responsibility" has been always ongoing. In this report, Greenovation Hub reviewed three key research findings. Although they have not been adopted as national stances, these studies on equity theories and methodologies could be used as references to INDC proposals.

### © Key differences:

The classification of developed countries and

developing countries in the Convention since early 1990s has now become a key divergence between developed countries and some developing countries. Developed countries believe such classification can not reflect the international situation in the second decade of the 21<sup>st</sup> century, and whatever from the perspective of capability or responsibility, differentiation among countries has evolved into a diversified and complicated spectrum from the previous polarization. Therefore, previous models where “developed countries have responsibility of quantitative emission reduction while developing countries take voluntary actions,” are not suitable in the new situation. However, some developing countries believe that the Annex, or classification, of the Convention, as the key component part, could not be modified. Although some countries have experienced large economic development in the past two decades, their status as developing countries has not changed, so the statement in the Convention requiring “developed countries to firstly take actions” could not be changed. Developing countries could take more positive actions voluntarily according to their own condition, but the previous dichotomy, as an existing framework of the Convention, should be reserved.

On the relation between national action and historical responsibility as well as current capability, parties do not have differences in principle, but they have different interpretations. Some developing countries believe that the actions of developed countries should more closely correspond to their historical responsibility and developing countries could only try their best according to capability, while a few developed countries believe, due to the very severe threat posed by climate change, all countries should confront it as soon as possible with “unreserved efforts” with current capability of various countries taken in to consideration ( Even though developed countries acknowledge their historical responsibility, there would be disputes on the benchmark year for calculation of historical responsibility.) .

In other words, developed countries believe that “the historical responsibility taken by developed countries” could indicate that “developed countries shall firstly take action;” but should not indicate “the emission reduction contribution made by developed countries

shall be strictly in line with their contribution to emission since the industrialization proportionally”. Of course, capability of various countries should not only be seen from their GDP or per capita income, because the poverty alleviation measures of developing countries accounts for a large amount of domestic capital. For developing countries, there would be a gap in the proportion of capital to be invested in tackling climate change in per capita income compared with developed countries. Meanwhile, capability should not be referred to as financial capability, but rather incorporate capabilities in technology, management and organization, etc.

## Possible forms of INDC

The forms of INDC may include quantitative targets, policies/plans and projects, etc. On quantitative targets, besides a quantitative emission reduction target, there could also be relative reduction target. It might also be conditional quantitative target or quantitative demand. Quantitative targets could also be set in finance, adaptation and technology, etc. Policy targets could include a road-map for phasing-out fossil fuel energy subsidies or the establishment of carbon emission trading mechanisms. Specific projects, like “Enterprises Campaign for Energy Conservation” in China could also be included in INDC.

## Possible elements in INDC

- For reduction target, there could be a near-term target (like 2025 or 2030) and mid-/long-term (like 2050) target. It could be a target for absolute emission reduction volume (compared with a baseline year) or for a limit on absolute emission growth; for relative emission reduction, like carbon emission per capita or carbon intensity per unit GDP; for reaching emission peak and peak year, target for energy efficiency or proportion of renewable energy, etc. There is relation between the near-term and mid/long-term targets. A strong long-term target is obviously ill-matched to a weak short-term target. There could, however, be another possibility, which is to set a long-term quantitative target first before making policy-based actions as short-term targets. This can be understood with the Chinese saying, “crossing the river by feeling the stones”



- © For the adaptation target, it is not so easy to define and quantify as reduction target but it could be included in policy action.
- © In fact, finance, technology, capacity building and transparency are in a different dimension to

emission reduction and adaptation (see below table) with both aspects of “supply” and “demand.” That is to say, countries with capability could propose the support they could provide to the international community while countries without capability could also propose their demands.

|            | Long-term target | Short-term target | Finance (Supply/Demand) | Technology (Supply/Demand) | Capacity Building (Supply/Demand) | Transparency (Supply/Demand) |
|------------|------------------|-------------------|-------------------------|----------------------------|-----------------------------------|------------------------------|
| Mitigation |                  |                   |                         |                            |                                   |                              |
| Adaptation |                  |                   |                         |                            |                                   |                              |

## Progress of INDC

- © Draft: Departments in national governments (such as the department responsible for energy conservation and emission reduction)
- © Consultation: Domestic groups (key stakeholders)
- © Submission: Countries that have prepared INDC well by the end of March 2015 could submit it. The earlier submission would indicate a shorter period for domestic preparation and longer review.
- © Review: Reviewed/assessed by a multilateral process of UNFCCC or civil groups like research institutions and NGOs, etc.

In the INDC explanation, there would be mixture of two thoughts: Firstly, there would a comparison between “supply” and “demand”, the gap between “supply” and “demand” should be gradually bridged from the perspective of problem solution; Secondly, there would be “debt payment,” which is whether the current INDC of a country is linked proportionally to its historical responsibility. This demonstrates the close relation between “equity” and “ambition”. On the one

hand, without equity, there would be no cooperation; on the other hand, without ambition, even the most harmonious cooperation would be unable to solve problems. Therefore, the review should be conducted on both aspects. The process of review would be determined by COP21. It would be likely become a formal work process like the establishment of working groups, but wisdom would be needed to inform how it would facilitate encouragement instead of criticism.

For the review on “equity,” it would be ideal to introduce an “equity reference framework” in the negotiation progress to provide reference on various countries’ INDC to measure whether it is equal. Besides this, there would be many flexible methods to review the equity of various countries’ targets, such analysis frameworks and indicators, review through unofficial channels (unofficial review launched simultaneously with official negotiation); and review focused on key countries instead of all countries to improve efficiency, etc. We need to avoid the review becoming a mere skeleton where countries propose something to itself without the suitable mechanism to enhance their ambitions. Otherwise, the “pledge and review” emerging from Copenhagen would be left with merely a “pledge”.

<sup>1</sup>[http://unfccc.int/files/meetings/lima\\_dec\\_2014/application/pdf/auv\\_cop20\\_lima\\_call\\_for\\_climate\\_action.pdf](http://unfccc.int/files/meetings/lima_dec_2014/application/pdf/auv_cop20_lima_call_for_climate_action.pdf)

<sup>2</sup>M G.J. DEN ELZEN, Exploring Climate Regimes for Differentiation of Future Commitments to Stabilise Greenhouse Gas Concentration, Integrated Assessment, 2002, Vol. 3, No. 4, pp. 343-359

<sup>3</sup>K . KAROUSAKIS et al, Differentiating Countries in Terms of Mitigation Commitments, Actions and Support, OECD, IEA, 2008

<sup>4</sup>Greenovation Hub, Climate Equity, website: [http://www.ghub.org/cfc\\_en/wp-content/uploads/sites/2/2014/02/Climate-Equity.pdf](http://www.ghub.org/cfc_en/wp-content/uploads/sites/2/2014/02/Climate-Equity.pdf)

<sup>5</sup>The Greenhouse Development Right Framework, Eco-Equity, Stockholm Environment Institute, Heinrich Böll-Stiftung , website:<http://gdrights.org/2009/02/16/second-edition-of-the-greenhouse-development-rights/>

<sup>6</sup>Source of emission data: World Bank, website: <http://data.worldbank.org/indicator/EN.ATM.CO2E.KT/countries>

<sup>7</sup>The greenhouse development right calculator, website: <http://www.gdrights.org/calculator/>

<sup>8</sup>Source of data: U.S. Energy Information Administration, website: <http://www.eia.gov/>

<sup>9</sup>Discussion paper Intended Nationally Determined Contributions under the UNFCCC, website:<http://www.ecofys.com/files/files/ecofys-giz-2014-intended-nationally-determined-contributions-under-unfccc.pdf>

<sup>10</sup>Clause 2-b, No.1/CP.19 Resolution in 19th Session of COP under United Nations Framework on Climate Change, website: <http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf>

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微信：气候与金融面面观



## 创绿中心

是一个扎根本土，放眼全球的环保公益组织。我们相信人类的发展应以生态为本，解决环境问题须多方协力。机构旨在提供创新的工具和渠道促进公众参与环境保护，融合社会、企业和政府的力量，共同推动中国的绿色转型。

## GREENOVATION HUB

Greenovation Hub is a grassroots environmental NGO with a global outlook. G:HUB believes development should be ecological, and only by collaborative effort can environmental problems be solved. We provide innovative tools to enable wider public participation in environmental protection and foster joint power of civil society, business and government to accelerate China's green transition.