

# THE CLIMATE CHANGE PERFORMANCE INDEX

**BACKGROUND AND METHODOLOGY**

CLIMATE CHANGE  
PERFORMANCE INDEX

index



## GERMANWATCH

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### Germanwatch - Bonn Office

Kaiserstrasse 201  
53113 Bonn, Germany  
Ph.: +49 (0) 228 - 60492-0  
Fax: +49 (0) 228 - 60492-19

### Germanwatch - Berlin Office

Vossstrasse 1  
10117 Berlin, Germany  
Ph.: +49 (0) 30 - 28 88 356-0  
Fax: +49 (0) 30 - 28 88 356-1

E-Mail: [info@germanwatch.org](mailto:info@germanwatch.org)  
[www.germanwatch.org](http://www.germanwatch.org)



## CAN

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### Climate Action Network Europe

Rue de la Charite 48  
1210 Brussels  
Belgium

Ph.: +32 (0) 2 229 52 20  
Fax: +32 (0) 2 229 52 29

E-Mail: [info@climnet.org](mailto:info@climnet.org)  
[www.climnet.org](http://www.climnet.org)



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Authors: Jan Burck, Christoph Bals,  
Simone Ackermann

Editing: Thomas Spencer, Sean Heron,  
Gerold Kier

Design: Dietmar Putscher, Cologne  
[www.dietmar-putscher.de](http://www.dietmar-putscher.de)

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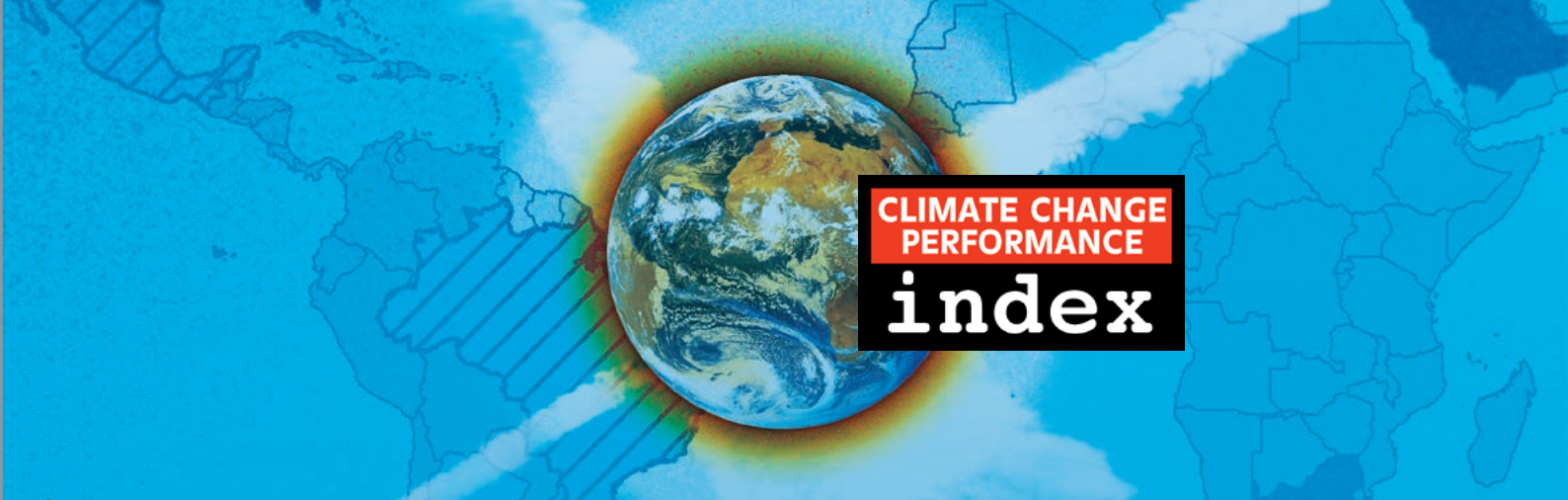
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## FOREWORD

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Global climate policy is at a crossroads. We must either achieve a foothold in serious climate protection, and thus take real steps towards a prosperous low energy and low carbon society, or we will have to face the consequences of barely manageable large scale risks. The Intergovernmental Panel on Climate Change (IPCC) offers a clear heading: the peak of emissions must come no later than 2020. Emissions by industrialized nations need to fall by 25 - 40 percent till 2020 and by some 80 to 95 percent until 2050. These numbers clearly show how unsustainable the lifestyle there currently is. But governments in high growth economies in newly industrialized countries also have the responsibility and capacity to engage more strongly in protecting the climate than they are doing now.

The Climate Change Performance Index was developed to escort countries along their path, and show

strengths and weaknesses in their national development. At the time of publication of this background paper in December 2008, there was unfortunately still not one country making sufficient efforts to stop dangerous climate change. Simultaneously, worldwide emissions are rising faster than ever.

Germanwatch and the Climate Action Network Europe are presenting the Climate Change Performance Index to the global public for the fourth time in December 2008. It is meant to induce enhanced action on climate change at both the national and the international level. The booklet you are reading explains the background and methodology of the Climate Change Performance Index. The most current findings can be found online at [www.germanwatch.org/ccpi.htm](http://www.germanwatch.org/ccpi.htm)

With best regards



Matthias Duwe  
(Director of CAN-Europe)



Klaus Milke  
(Chairman of the Board, Germanwatch)





Matthias Duwe, Christoph Bals and Jan Burck introducing the CCPI 2007 in Nairobi at the UN Climate Change Conference.  
Photo: Manfred Treber

## 1. THE CLIMATE CHANGE PERFORMANCE INDEX WHO DOES HOW MUCH TO PROTECT THE CLIMATE?

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Getting a clear understanding of national and international climate policy is difficult, as the numerous states which need to be taken stock of have various initial positions and interests. To untangle the knot of differentiated responsibilities, held and broken promises, and encouraging steps towards an effective international climate policy, Germanwatch has developed the Climate Change Performance Index (CCPI).

The index compares the 57 states that together are responsible for more than 90 percent of annual worldwide carbon dioxide emissions. Their climate change performance is evaluated according to uniform criteria and the results are ranked.

Both industrial nations and nations in transition (which are Annex I parties to the Framework Convention on Climate Change of Rio 1992, and as such accept a special responsibility) as well as all countries that emit more than one percent of global CO<sub>2</sub> emissions are included in the Index. According to Article 2 of the United Nations Climate Convention, all of these countries are required to ensure the prevention of dangerous climate change. Every year, the CCPI evaluates how far nations have come in achiev-

ing this goal. With the help of the Index, the climate change policy, emissions level and emissions trend of a country can swiftly be accessed and judged. The component indicators give all actors an instrument to probe in more detail the areas that need to see movement. The objective is to raise the pressure, both political and from civil society, on decision makers and move them to consequently protect the climate – the Index is to be both a warning as well as encouragement to everybody involved.

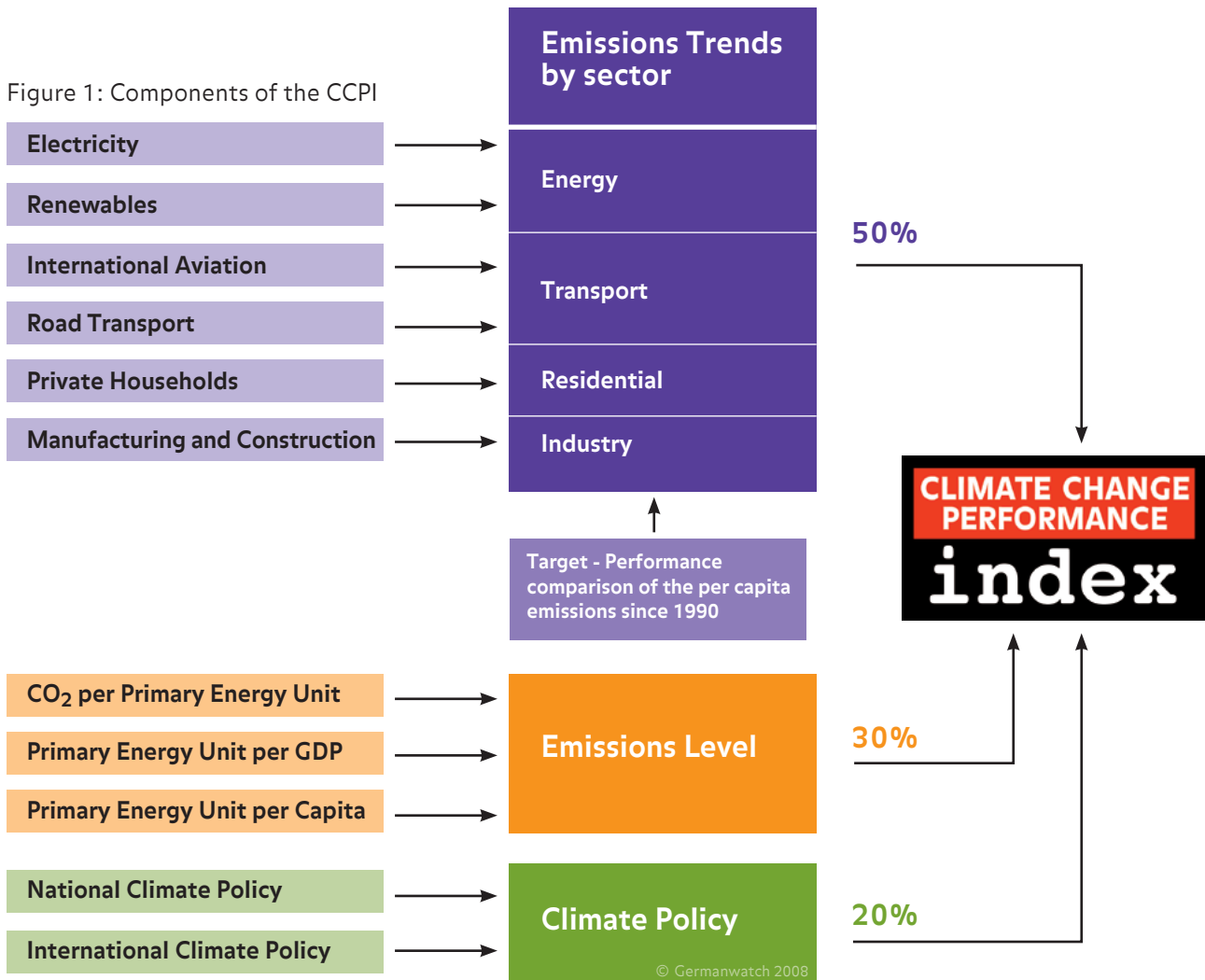
With this in mind CAN-Europe and Germanwatch present the CCPI every year at the UN Climate Change Conference, thus creating as much attention as possible in the observed states and so pushing forward the discussion on climate change. The astounding press echo to the CCPI shows its relevance: after just the third publication in Bali 2007, the Index was reported on in over 100 countries. Both at the national as well as the international level, numerous media reported on the outcomes and on how well their country did. Awareness was also raised in politics. Many delegates at the climate conferences inform themselves on ways of increasing their countries rank. Naturally, the Index is also available online.<sup>1</sup>

<sup>1</sup> [www.germanwatch.org/ccpi.htm](http://www.germanwatch.org/ccpi.htm)

## 2. METHODOLOGY

The climate change performance is measured via twelve different indicators. They can be classified in the categories emissions trend, emissions level and climate policy. These three partial indicators one another and together give a differentiated picture

of the evaluated countries' climate change performance. The following figure gives an overview of the indicators and the weight of the categories in the overall score.



To reward initiatives to protect the climate on the national or international level, they are integrated as indicators in the overall evaluation. Whether or not these measures are effective can be read – with a time lag – in changes to the emissions trends. The entire energy related emissions of a country are included, with respect being given to the initial position, e.g. population and economic strength. They determine the level from which emissions reductions can be achieved.

With a weight of 70%, climate policy and emissions trend together count for more than the overall value of the emissions level. This allows achievements in

reducing emissions to be adequately reflected. As the absolute amount of CO<sub>2</sub> that a country emits can only be changed in long time periods, a stronger weighting of the current emissions would hardly allow movement within the ranking. The Index would then not be responsive enough to ambitious climate policy of countries with a high level of emissions. On the other hand, the category "emissions level" with a weight of 30%, ensures that countries which are making their emissions reductions from a very high level are not being rewarded too generously.

The emissions data, on which the CCPI ranking is built, is taken from the annual "CO<sub>2</sub> Emissions from

Fuel Combustion" Edition of the International Energy Agency (IEA). This allows a thorough comparison of the 57 countries every year. In addition to this, qualitative data on the climate policy of the evaluated countries is surveyed through a questioning of local climate change experts. The representatives of non governmental organisations thereby explain the most important measures in the sectors energy, transport, residential and industry, and evaluate their effectiveness. Thus a country's climate policy has a direct effect on its rank in the Index, although change in emissions trend and level will only be seen with a time lag. The CCPI only evaluates the energy related emissions of a country, however. The burning of fossil fuels is the main contributor to the dangerous rise in level of greenhouse gases in the atmosphere. Non energy related emissions from e.g. livestock and deforestation can not be taken into account due to the uncertain data base. Livestock alone are responsible for 18% of global emissions, which is comparable to the world wide CO<sub>2</sub> emissions through transport<sup>2</sup>. The conversion of forests to agricultural land is another important source of

emissions. If the area is then used for cattle raising, the arising methane release means additional negative effects on the climate. However the data base is too thin: although there is relatively certain data for some countries, like Brazil, this is not the case for all countries for which deforestation would need to be considered. We hope that the data basis, in Russia for example, improves, so that this source category can be included in a future CCPI. Until then, we can merely point out the special responsibility for the protection of forests in these countries.

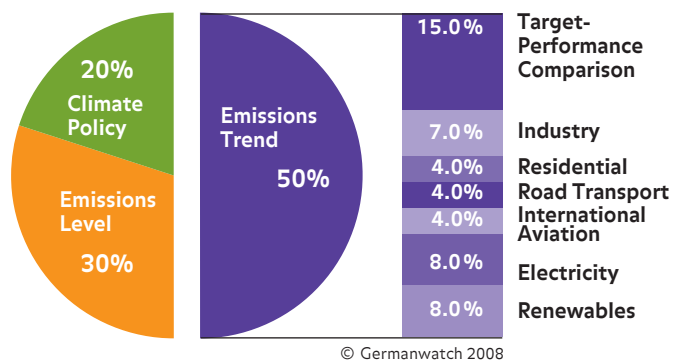
The methodology that is used for the CCPI's ranking follows the OECD guideline for creating performance indicators<sup>3</sup>. It has been slightly modified a number of times since its first publication. The choice of standardisation method sets the frame according to which the results of countries are evaluated in separate areas. A single value therefore only has a meaning in its relation to others. The CCPI thus only compares climate change protection efforts, it does not assign absolute values.

## 2.1 EMISSIONS TREND

Effective political measures to reduce the emissions of CO<sub>2</sub> are especially visible in the sectors they have an impact on. The trend indicators that weight in at 50% of the CCPI therefore need to measure changes in emissions from energy, industry, transport and residential. This categorisation corresponds to the IPCC guideline for energy related emissions inventories.<sup>4</sup> The evaluated time-frame consists of two three-year periods which are spaced by five years. These periods have the advantage of being able to average out temporary fluctuations.

In the category **Energy**, emissions from electricity generation are considered. As a high risk energy fuel, nuclear power is taken into account with so called risk equivalents per energy unit (which are roughly equivalent to the emissions of a modern coal power plant). This avoids rewarding the construction of new nuclear power plants. Only countries that supplant nuclear energy with low emissions fuels can improve their position. Nuclear energy is not accounted as a separate indicator, however.

Figure 2: Weighting of emissions trend indicators



**Renewable energy** also plays a special role. The expansion of such energy generation offers great potential for CO<sub>2</sub> reduction, as it is especially sustainable. This can be exemplified by looking at the reduction in CO<sub>2</sub> emissions in Germany just for 2006: 97 million tons, 10% of the emissions total, were avoided – using "just" 5.3% of primary energy.<sup>5</sup> A targeted increase of the share of renewable energies can therefore contribute an essential part of climate change protection efforts. The German Advisory Council on Global Change (WBGU) there-

<sup>2</sup> Steinfeld et al. (2006)

<sup>3</sup> Freudenberg (2003)

<sup>4</sup> IPCC (1997)

<sup>5</sup> BMU (2007)





Wind park in Germany, Photo: Dietmar Putscher

fore recommends an increase to 20% till 2020 – and even to 50% by mid-century.<sup>6</sup> To emphasise the importance of renewable energies, they are included as an own indicator, weighing into the energy generation value at 8 %.

In the **transport sector** emissions from road transport and international aviation are evaluated. Aviation is thereby regarded with a "climate weighting". The background is that aeroplanes emit not only CO<sub>2</sub> but also water vapour. This causes an especially large atmospheric burden due to the flight level and therefore needs to be translated into so called CO<sub>2</sub> equivalents. Aviation emissions are calculated into the index with the IPCC's 1999 "best guess" factor of 2.7.

The CO<sub>2</sub> emissions are calculated, according to the IEA method, by the amount of so called "bunker fuels" that a country has stored for aviation use. This is under the assumption that it will in fact be used to fuel up. International shipping has to be excluded in our observation, as shipping emissions can not be calculated in the same way: Ships fuel is mainly held in important ports e.g. Rotterdam or Shanghai, but put into use in ships from various countries. Therefore it is hardly possible to decide who is responsible for the emissions. Here (similarly to in international trade, see below), the CCPI follows the "Kyoto reasoning" of only counting countries emissions within their borders.

The **residential sector** includes those emissions that are generated through the heating of building and the expansion of domestic use water (not those from electricity though – else they would be counted

twice). Emissions from the manufacturing and construction industries are to be found in the industrial sector.

The trends are incorporated into the overall ranking with a value of 50%. These are differentiated into two parts: The raw evaluation (35%) and the **comparison between targeted and real trends** (15%). This is based on the principle of "common but differentiated responsibilities" that is laid forth in the Framework Convention on Climate Change<sup>7</sup>. The proportion of a sector in the raw evaluation is according to its relevance to climate change. The electricity sector is therefore weighed with 40%, the sectors transport and industry each at roughly 20% and the residential sector at 10%.

The comparison between targeted and real trends corrects the raw evaluation. It compares the trend in per capita emissions from 1990 onwards with the "desired" development in the same time period. The underlying principle of this desired development is the target of limiting global warming to 2°C – if this were achieved, dangerous climate change could be averted. In this scenario the concentration of CO<sub>2</sub> equivalents in the atmosphere is kept below 400ppm. The development pathways to this target envision a gradual convergence of per capita emission in industrial, as well as developing and transitional nations to comparable levels by 2050. This of course means the industrial nations need to reduce their emissions far more drastically than the less industrialized ones. The target-reality comparison allows such countries to temporarily increase their emissions without losing the basic target of CO<sub>2</sub> reductions out of sight.

<sup>6</sup> WBGU (2003)

<sup>7</sup> UNFCCC (1992)



Earth's City Lights, Photo: NASA

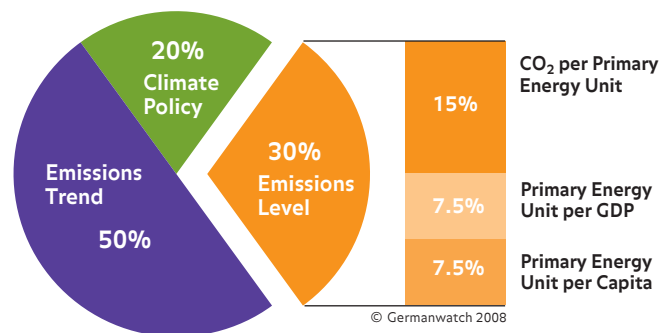
## 2.2 EMISSIONS LEVEL

To take into account the initial position of a country, the absolute emissions values need to be put into context with the lifestyle and level of industrialisation within it. Therefore the absolute CO<sub>2</sub> emissions of countries are put into relation to the following core data: Population size, economic power (measured as gross national product in purchasing power parity) and primary energy use. This leads to three emissions level indicators: The CO<sub>2</sub> emissions per primary energy unit, primary energy consumption per capita and primary energy consumption per unit of GDP. Altogether the emissions level accounts for 30 percent of the overall score, with the CO<sub>2</sub> emissions per primary energy unit weighing 15 percentage points and the other two indicators each 7.5.

### Trade emissions

Due to continuous globalisation and the spatial division of production and consumption that goes in hand with it, there are distortions in the measuring of environmental effects, which can also show themselves when surveying CO<sub>2</sub> emissions. These so called trade emissions can lead to potential errors, as emissions are registered at the place of production, not consumption. Canada, South Korea and also China, for example, all three amongst the world's 10 largest emitters, are highly integrated in international trade. Measuring emissions based on what is consumed would lead to an increase of the absolute amount of CO<sub>2</sub> by 5% for the industrial nations.<sup>8</sup> It is therefore important not to lose the international perspective out of sight when interpreting

Figure 3: Weighting of emissions level indicators



national emissions data. Thus Canada, Russia and China, for example, belong to the greenhouse gas exporters whose emissions are currently being reported too high, while France, Germany and the USA, amongst others, would be burdened by a larger share due to their imports. It is interesting that Germany, one of the world's largest exporters, is reckoned to the group of importers regarding CO<sub>2</sub>. This is explained by the fact that part of the energy intensive industry in Germany has been shifted abroad.

The CCPI follows the judgement that precisely following the global shifts through international trade is impossible: Acquiring such data is regarded as too complex and intransparent.<sup>9</sup> Beside that, there is the question of system weaknesses of such a method, as countries profit from their exports and must therefore not be entirely relieved of their responsibility.

<sup>8</sup> Baumert et al (2005).

<sup>9</sup> dito.





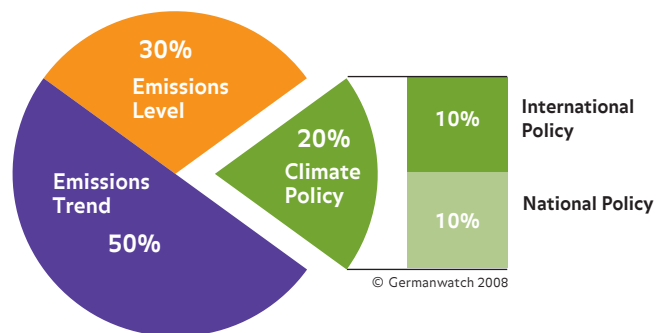
The UN Climate Change Conference 2007 in Bali. Photo: IISD

## 2.3 CLIMATE POLICY

These indicators consider the fact that measures taken by governments to reduce CO<sub>2</sub> often take several years to show their effect on the emissions trends and level (on top of which comes that the most current CO<sub>2</sub> emissions data provided by the IEA is about two years old). However, the assessment of climate policy includes very recent developments. It is thereby avoided that governments benefit or suffer from the consequences of the preceding administrations climate actions.

The qualitative data is assessed annually in a comprehensive research study. Its basis is the performance rating by climate change experts from non governmental organisations in the actual countries that are evaluated. By means of a questionnaire, they give a judgement and "score" on the most important measures of their governments in the sectors energy, transport, residential and industry. Beyond that the current climate policy is evaluated with regard to fulfilling the legally binding targets of the Kyoto Protocol as well as additional reduction potential. Both the national and international efforts and impulses of climate policies are so scored. To compensate the absence of independent experts in some countries (due to the lack of functioning civil society structures), the national policy of such countries is flatly rated as scoring average points. The goal is to close these gaps in future and steadily expand the network of experts. Over 120 selected national climate experts contributed to the evaluation of the 57 countries of the CCPI 2009. They evaluated their own countries' national and international policy. The latter is also rated by climate experts that observe the participation of the respective countries at the climate conferences.

Figure 4: Weighting of climate policy indicators



Climate policy has an overall weight of 20%, with both national and international policy making 10%. Despite the apparently low influence of climate policy on the overall ranking, this category has quite a considerable influence on short term changes in rank. Unlike the "sluggish" categories trends and level, a positive change in climate policy can lead a country to jump multiple positions upwards. On the other hand the "sluggish" categories can only be changed through successful climate change protection – the policy therefore plays a decisive role for future scores within the CCPI!

# CLIMATE CHANGE PERFORMANCE INDEX

CLIMATE CHANGE PERFORMANCE

index

## 2.4 CALCULATION AND RESULTS

From the publication of the CCPI 2009 onwards, the first three places of the ranking can only be achieved if a country takes the plunge and pursues climate change protection in earnest. We have decided this because, so as not to deceive and to also show more clearly that until now, there is no country that is making even close to the efforts and impulses that are necessary to stay within the 2 degrees limit. This is measured by means of the target-performance indicator (compare p. 7). The analysis of this indicator clearly shows that not one country has yet made sufficient efforts and reduced its emissions enough to play its part in averting dangerous climate change. As long as a country isn't on the right path, it has no right to "stand on the podium".

The CCPI's final ranking is calculated from the weighted average of the achieved scores of the evaluated countries in the CCPI's separate indicators. An absolute evaluation is not made. The CCPI only evaluates countries in comparison with one another. The following formula is used to calculate the index:

$$I = \sum_{i=1}^n w_i X_i$$

I: Climate Change Performance Index;

$X_i$ : normalised indicator;

$w_i$ : weighting of  $X_i$ ,  $\sum_{i=1}^n w_i = 1$  and  $0 \leq w_i \leq 1$ ,

$i$ : 1, ..., n.

The current evaluation method sets zero as the bottom cut off, 100 points are the maximum that can be achieved. A country that was best in one indicator receives full point (in that indicator). The best possible overall score is therefore 100 points. Important for interpretation is the following: 100 points are possible in principle, but for each partial indicator, and for the overall score, still only means the best relative performance, which is not necessarily the optimal climate change protection effort!

$$\text{Score} = 100 \left( \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} \right)$$

As their weighted averages are what count to the overall score, the rankings within the separate indicators have a less important function. The differences between countries' efforts to protect the climate is only to be seen clearly in the achieved points, not in the ranking itself. When taking a closer look at the top position of 2008 one can see that Sweden, while achieving the highest rank, was not at the top in all indicators, let alone achieved 100 points. This example shows that failures and weak points of a country can be recognised in the separate categories and indicators.

**The current version of the Climate Change Performance Index including model calculations, and the press review can be found online at [www.germanwatch.org/ccpi.htm](http://www.germanwatch.org/ccpi.htm).**

### 3. APPLICATION AND VIEW FORWARD

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The Climate Change Performance Index (CCPI) was introduced to a professional audience for the first time at the 11<sup>th</sup> Global Climate Summit in Montreal 2005 (COP11). The growing press resonance in the affected countries affirms the increasing relevance of the index and encourages us in our work.

Since 2006, Germanwatch has been cooperating with the rating agency oekom research. They use the data the CCPI is based on for their sustainable country ranking and for sustainable investment consulting. CAN Europe also supports us through their international expert network on the topic of climate protection.

We will continue to present the Climate Change Performance Index every year at the UN Climate Summit. It is not intended to be used only by experts, however, but by everybody. We wish to make clear that until now, still none of the world's countries has been doing enough to protect the climate, and hope that the index provides a stimulus to significantly intensify climate protection efforts.

We would be pleased to give you more detailed information about the possibilities of specific country analyses. If you are interested or have questions, we ask you to contact:

Jan Burck  
Phone: 0228-60 492-21  
**E-Mail: [burck@germanwatch.org](mailto:burck@germanwatch.org)**

### 4. DATA SOURCES AND FURTHER LITERATURE

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- [www.germanwatch.org/ccpi.htm](http://www.germanwatch.org/ccpi.htm)



## GERMANWATCH

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Following the motto "Observing, Analysing, Acting", Germanwatch has been actively promoting North-South equity and the preservation of livelihoods since 1991. In doing so, we focus on the politics and economics of the North with their worldwide consequences. The situation of marginalised people in the South is the starting point of our work. Together with our members and supporters as well as with other actors in civil society we intend to represent a strong lobby for sustainable development. We endeavour to approach our aims by advocating fair trade relations, responsible financial markets, compliance with human rights, and the prevention of dangerous climate change.

Germanwatch is funded by membership fees, donations, grants from the "Stiftung Zukunftsfähigkeit" (Foundation for Sustainability), and by grants from a number of other public and private donors.

You can also help to achieve the goals of Germanwatch and become a member or support our work with your donation:

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## CAN EUROPE

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**Climate Action Network Europe (CAN-E)** is recognised as Europe's leading network working on climate and energy issues. With over 100 members in 25 European countries, CAN-E unites to work to prevent dangerous climate change and promote sustainable energy and environment policy in Europe.

**The Climate Action Network (CAN)** is a worldwide network of over 365 Non-Governmental Organizations (NGOs) working to promote government, private sector and individual action to limit human-induced climate change to ecologically sustainable levels.

**The vision of CAN is** a world striving actively towards and achieving the protection of the global climate in a manner that promotes equity and social justice between peoples, sustainable development of all communities, and protection of the global environment. CAN unites to work towards this vision.

**CAN's mission is** to support and empower civil society organisations to influence the design and development of an effective global strategy to reduce greenhouse gas emissions and ensure its implementation at international, national and local levels in the promotion of equity and sustainable development.

