

BRIEFING PAPER

Climate Change Policy? For a Better Understanding of India's and Germany's Approaches and Positions

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Summary

This background paper briefly introduces the different socio-economic and environmental conditions in Germany and India and summarizes the very accordingly unlike approaches to climate change policy in the two countries. Despite the observed differences, both Germany and India are developing and implementing low-carbon strategies. While Germany focuses its efforts in implementing its energy transformation (Energiewende) to meet its climate targets, India implements its National Action Plan on Climate Change and develops its eight missions further. Nevertheless, both countries are in very different situations and often take differing positions in the international climate negotiations. An Indo-German dialogue on topics like low-carbon development, equity, pre-2020 mitigation action and post-2020 implementation and ratcheting-up of nationally determined contributions (NDCs) could support the difficult process of identifying compromises and solutions that go beyond the differences between India and Germany. Bridging those differences could support action in both countries towards implementing the ambitious objectives set in the Paris Agreement reached in December 2015, benefitting the entire global community.

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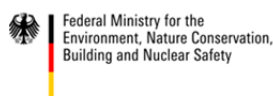
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The present paper does not necessarily represent the position of Germanwatch. This paper was meant to enable a compromise for cooperative action between central actors in the international civil society during the preparation phase of the Paris Agreement. Further discussion is required for consensus.



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1 Introduction

In international climate policy, agreements and compromises need to be found between different countries' differing national interests, needs and approaches that lead to diverging positions at the international negotiation tables. Analysing the example of India and Germany, a joint project of Germanwatch and Climate Action Network South Asia (CANSA) seeks to create a better understanding amongst civil society and other actors of these two countries' situations, their governments' negotiation positions and possible scope for bridging these positions.

As the largest democracy in the world, a developing country but also an economy in transition, India has a particularly interesting profile for the climate change debate as it combines large absolute emissions with comparatively very small per-capita emissions as well as high vulnerability to climate change that needs to be addressed mainly by meeting the development needs of the population. Germany, on the other hand, has the potential to be one of the frontrunners in climate change action by implementing its ambitious *Energiewende*, providing an example to the world of how low-carbon prosperity models can be realized.

With this paper, Germanwatch and CANSA seek to introduce some of the backgrounds to the different policy approaches of India and Germany in regard to national and international climate policy with a view to the ambitious and equitable implementation of the Paris Agreement. The paper at hand provides initial background on selected focus topics that have been elaborated further in the course of our project, including in additional briefing papers.

2 Country Profiles

Without doubt – it is hard to compare India and Germany as the cultural and socio-economic differences are striking. The densely populated Indian subcontinent with its remaining development challenges despite the growing economy has very different preconditions for climate policy than Germany, a heavily industrialized EU member state. Development and economic status, historic and current per capita GHG emission levels, vulnerability to climate change and adaptation needs, climate change mitigation capabilities, scientific research, technological resources, human capacity, governance structures and many other factors that influence climate policy differ immensely and deserve a closer look. The following chapters therefore introduce the country profiles of India and Germany. Such an overview of the different conditions in India and Germany is helpful in order to understand the background against which their respective governments determine their negotiation positions of and to identify the possible points of convergence for dialogue and cooperation between the two.

2.1 India

India, one of the oldest civilizations in the world, is a diverse country with a rich cultural heritage. It is the 7th largest country in the world and covers nearly ten times the area of Germany. It is bound by the snow-covered Himalayas in the north and by the Arabian Sea and Indian Ocean in the south. India's land frontier of about 15,200 km shares borders with Afghanistan, Bangladesh, Bhutan, China, Myanmar, Nepal and Pakistan. The total length of the coastline of the mainland, Lakshadweep Islands and Andaman & Nicobar Islands is about 7,500 km. The mainland comprises of

four regions, namely the great mountain zone, plains of the Ganga and the Indus, the desert region, and the southern peninsula. Six climate zones are spread over the subcontinent: mountain, humid subtropical, tropical wet and dry, tropical wet, semi-arid, arid.

The current population is approximately 1.33 billion (2016)¹, more than a sixth of the world's population. India's population is young, with more than 50% below the age of 25 and more than 65% below the age of 35.² India is ethnically and culturally very diverse with more than two thousand ethnic groups. Followers of every major religion live in India. The country has 22 officially recognized languages which represent four major families of languages (Indo-European, Dravidian, Austro-Asiatic and Tibeto-Burman languages).

The majority of the working population is occupied in the agricultural sector (about 58%)³. Industry and services account for around 20% each. This indicates the development challenge that India faces and impacts the priorities India sets on its political agenda. With the present sectoral economic structure, India is comparatively vulnerable to climate change impacts. Development needs and adaptation needs must therefore be considered in the national climate policy.

Climate Change Impacts and Development Needs

A recent report by the Asian Development Bank highlights that the impacts of climate change are likely to result in huge economic, social, and environmental damage to South Asian countries, including India, compromising their growth potential and poverty reduction efforts⁴. The study estimates a temperature increase of 4–5 degrees Celsius by 2100 in its high-emission scenario and concludes that countries in the greater Himalayas region, including Northern India, will face an increased frequency and magnitude of extreme weather events resulting in flooding, landslides, and damage to property and infrastructure, devastation of agricultural crops, reduction of hydro-power generation, and negative impacts on human health. Further, the coastal areas of India are at high risk from projected sea level rise that may cause displacement of human settlements, salt-water intrusion, loss of agricultural land and wetlands, damage to industrial infrastructure and megacities and a negative impact on tourism and fisheries. Increased temperatures and changes in rainfall pattern will reduce agriculture yields and even result in short-term crop failure. The cities of South Asian countries are vulnerable to water- and vector-borne infectious diseases (cholera, dengue, diarrhoea, and malaria). The report estimates that the mortality rate for the region caused by dengue, malaria, and diarrhoea would increase over time as a consequence of climate change. Climatic changes will make the present monsoon cycle more complex and it is anticipated that the region will have drier and warmer winter months with reduced snow cover, while the summer/monsoon months are predicted to become wetter and warmer.

The report estimates that, due to these impacts, South Asia will lose up to 1.8% of gross domestic product (GDP) (USD 40 billion) annually by 2050 which will increase to 8.8% of GDP (USD 73 billion) by 2100 in the high-emission scenario. If the temperature increase is kept below 2°C a loss of 1.2% of GDP (USD 31 billion) in 2050 and 2.2% of GDP (USD 41 billion) by 2100 would be the consequence. Even in the lower emission scenario, impacts on food security generally, and on the poor in particular, would be very severe. The impacts will also increase the energy demand of the country due to increased adaptive measures from cooling to creation of larger infrastructural and planning coping systems. This would further lower the region's capacities to lower emissions as well.

¹ www.indiaonlinepages.com/population/india-current-population.html

² Basu, Kaushik (25 July 2007): India's demographic dividend. BBC News. Retrieved 2011-09-24

³ www.ibef.org/industry/agriculture-india.aspx

⁴ Ahmed, M., and S Suphachalasai (2014): Assessing the Costs of Climate Change and Adaptation in South Asia, published by Asian Development Bank.

With all its diversity, India also presents striking economic contrasts. It is the 7th largest global economy in nominal GDP terms and 3rd largest economy in terms of purchasing power parity (PPP) adjusted GDP⁵. Even as the third largest, India's economy is only one-third the size of China's. Furthermore, India only ranks 140th⁶ in per capita GDP (PPP terms), significantly below all other countries frequently considered emerging economies like Brazil, South Africa, China or Mexico. Bulgaria, which ranks 77th, has the lowest per capita GDP PPP among developed and EU countries with a per capita income three times that of India. The large total size of India's economy is due to its large population, which is roughly equal to the population of all developed countries.

INDIAN STATES		
States	Constructed HDI score	Hypothetical HDI ranks
Kerala	0.7117	104
Himachal Pradesh	0.6701	116
Tamil Nadu	0.6663	118
Maharashtra	0.6659	119
Punjab	0.6614	124
Haryana	0.6613	125
Jammu and Kashmir	0.6489	128
Karnataka	0.6176	137
Andhra Pradesh	0.6165	138
Gujarat	0.6164	139
ALL INDIA	0.6087	
West Bengal	0.6042	142
Rajasthan	0.5768	151
Odisha	0.5567	154
Madhya Pradesh	0.5567	155
Assam	0.5555	156
Uttar Pradesh	0.5415	161
Bihar	0.5361	163

Figure 1:
UNDP 2015 Human Development Index

the MPI indicators, is an important dimension as lack of access to energy limits the opportunities for personal development and economic security. Only around 30% of Indian households have access to modern and clean sources of energy for cooking such as LPG (Liquefied Petroleum Gas) or electricity. A World Bank study⁹ estimated that in India about 57% of the population in rural areas and 28% of the population in urban areas live in energy poverty, which means that they consume less energy than needed for minimum tasks such as cooking and lighting.

The Gini coefficient, a measure for the income distribution inequity among a nation's people, indicates that India's income inequality (0.336) is comparable to that of European countries, with the mean value in the EU28 countries being 0.3. It is slightly higher than inequality in Germany, where the Gini coefficient is 0.3⁷.

The challenge of development faced by India is reflected in the Human Development Index (HDI) score of 0.6087, which is just above the level of low human development (0.54). Germany, in contrast, has a HDI of 0.911. 15 of the 29 states in India have a HDI above the low human development threshold. The other 14 Indian states fall below the low development threshold (see figure 1, www.livemint.com/Politics/3KhGMVXGxXcGYBRMsmDCFO/Why-Kerala-is-like-Maldives-and-Uttar-Pradesh-Pakistan.html).

The Multidimensional Poverty Index (MPI), developed by the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP), captures the level of poverty measured in terms of health, education and standard of living (access to energy, safe drinking water, sanitation, etc.) and estimates that in India 614 million people, half the population, are MPI poor.⁸ Energy poverty, one of

⁵ International Monetary Fund.

www.imf.org/external/pubs/ft/weo/2014/01/weodata/weorept.aspx?pr.x=79&pr.y=7&sy=2012&ey=2015&scsm=1&ssd=1&sort=country&ds=.&br=1&c=534&s=NGDPD%2CNGDPDPC%2CPPP%2CPPP%2CPPP&grp=0&a=

⁶ World Economic Outlook Database – April 2016, International Monetary Fund.

⁷ World Bank GINI Index, <http://data.worldbank.org/indicator/SI.POV.GINI/>

⁸ Oxford Poverty and Human Development Initiative (OPHI), Country Briefing 2014: India. www.ophi.org.uk

⁹ Khandeker, S., Barnes, D. & Samad, H. (2010): Energy poverty in rural and urban India: Are the energy poor also income poor?

Economic development is an imperative for India to meet these challenges. High GDP growth over the period 2004–2010 resulted in a decline of 7.4% in the poverty ratio in India. Addressing the many dimensions of poverty will require inclusive policies, not just growth alone. Energy, which accounts for around 70% of total GHG emissions, is key to development. Estimates by McKinsey & Company from 2014¹⁰ indicate that the energy demand can be expected to grow from 691 Mtoe (million tons of oil equivalent) in 2010 to 1508 Mtoe in 2030. In the business as usual scenario (BAU), 82% of this growth would come from fossil fuels. The industry and transport sector account for 63% of the total energy demand. The expected growing energy demand forms a challenging baseline condition for the required climate change mitigation policies.

Under the slogan “Make in India”, Prime Minister Narendra Modi has made the promotion of domestic Indian industry a central piece of the development agenda, to create jobs, increase incomes and address poverty. Thus the energy sector can be expected to grow at a faster pace compared to the past, leading to an even faster growth in energy demand. A key challenge for growth is security of energy supply, as oil and gas are mainly imported and lately coal imports too have increased because of a lack of investments in the domestic coal sector and the relatively mediocre quality of Indian coal.

As a major greenhouse gas emitter in absolute terms and with low per capita emissions, India's key mitigation challenge is to provide affordable low-carbon energy for both household and commercial and industrial sector while ensuring energy import dependency is reduced. Though coal might be seen as a solution in the immediate term, the environmental costs, the limits to its availability, and the investments required to increase the production, make it a questionable choice in the long run. Relying on coal for too long could make the transition to renewable energies, which will have to happen eventually, more difficult and expensive.

The other big challenge for mitigation is the cost, which in turn is related to provision of affordable energy. India's INDC¹¹ (Intended Nationally Determined Contribution prepared for the 21st Conference of the Parties in 2015) estimate the cost for India in the energy sector alone would be about USD 7.7 billion in 2030 to reduce energy intensity by up to 35% below 2005 levels by 2030. In a democratic country like India public opinion on issues has a bearing on government programmes and actions. Thus a greater awareness on climate change and its impacts could create a greater space for action by the government. The awareness of environmental issues in general is comparably low in India. BBC conducted a study across a number of countries, which revealed that in India the awareness related to climate change issues is low with only 15% of the respondents having heard of the climate change issue, whereas, 16% did not respond and 36% had never heard of the issue.¹² Though the awareness may be low, another study¹³ found that the perception of change in climate is higher. The study undertook a questionnaire based survey in five states and Mumbai. The study asked questions on perception of changes in temperature, rainfall and extreme weather events over a 10-year period. A majority of respondents (64–95%) felt they are experiencing higher temperatures, lower rainfall and less predictable weather than 10 years ago. Water shortage for all in India was the biggest concern and they perceive it is linked to changes in climate. Since this study undertaken in 2007, climate change awareness has risen but further action is required.

¹⁰ McKinsey & Company: India: Towards Energy Independence 2030, January 2014.

¹¹ India's INDC, 2015: www4.unfccc.int/submissions/INDC/Published%20Documents/India/1/INDIA%20INDC%20TO%20UNFCCC.pdf

¹² BBC World Service poll on Climate Change in 21 countries, <http://news.bbc.co.uk/2/hi/7010522.stm>

¹³ Gambhir, V and P Kumar: How the people of India live with climate change and what communication can do, published by BBC, UK.

A Short Introduction to India's National Climate Policy

Government of India presented its first comprehensive climate change policy document in 2008: the National Action Plan on Climate Change (NAPCC). NAPCC consists of eight national missions, four of which are focussed on mitigation. These include the National Solar Mission and the National Mission for Enhanced Energy Efficiency (NMEEE). These two pillars of renewable energies and energy efficiency are supplemented by the Green India Mission to increase forest cover and thus carbon sequestration. Energy security, and to some extent environmental concerns, have been the main drivers for action on renewable energy and energy efficiency rather than climate change mitigation. A key development challenge India faces is growth in urban population and resultant increase in energy demand as well as stress on natural resources. The NAPCC Sustainable Habitat Mission addresses this challenge through energy efficiency in buildings, efficiency improvements in transport sector including emphasis on public transport and recycling to address waste challenge. All these measures also address GHG emissions. Further, acknowledging that knowledge on understanding climate change as well as development of technologies to address adaptation and mitigation is key to addressing climate change, one of NAPCC is on Strategic Knowledge for Climate Change.

The energy efficiency component of the strategy, the NMEEE, focuses on increasing energy efficiency in energy intensity per GDP unit; energy efficiency of lighting and home appliances; and energy efficiency in transport sector. With the objective to make the Indian industrial sector energy efficient, the Bureau of Energy Efficiency (BEE) introduced the "Perform, Achieve and Trade" (PAT) scheme in 2012. The scheme sets energy efficiency targets for industries and makes those that fail the targets pay a penalty. Energy efficiency standards and labelling of home appliances is another initiative to reduce the energy consumption in the residential and commercial sector. A cornerstone of this strategy is moving to energy efficient lightning through LED use and to energy efficient fans among other appliances. These efforts are expected to result in savings of at least 5% of India's annual energy consumption and mitigate 98 million tons of CO₂ emissions per year by 2014–15.¹⁴ The government has also prepared efficiency norms for transport vehicles which are in force from 2016. Energy efficiency efforts in India are not new and have been an on-going process, see table 2 below. These efforts are reflected in the fact that energy intensity for India (0.147 koe [Kg oil equivalent] per unit GDP in PPP terms) is lower than that of the world average (0.188) as well as USA (0.26) and China (0.185), though not as energy efficient as Germany (0.125).

Table 2: Energy efficiency trends in key energy intensive industries in India

Type of Industry	1990	1995	2000	2005	AAGR (1990–2005)
Iron and Steel	41.9	37.6	33.3	29.1	-2.41%
Cement	3.6	3.4	3.3	3.1	-1.10%
Ammonia	55.3	60.4	51.9	42.9	-1.67%
Aluminium	399.0	393.8	380.5	364.9	-0.59%
Pulp and Paper	35.0	31.3	27.6	24.0	-2.48%

Source: Lawrence Berkeley National Laboratory, 2009¹⁵

¹⁴ Garnaik, S. P. (2011): National Mission on Enhanced Energy Efficiency." New Delhi: Bureau of Energy Efficiency. <http://moef.nic.in/downloads/others/Mission-SAPCC-NMEEE.pdf>

¹⁵ De la Rue du Can S, Michael McNeil, and Jayant Sathaye (2009): India Energy Outlook: End Use Demand in India to 2020, Lawrence Berkeley National Laboratory.

The push on renewable energy started with wind-based electricity in the late 1990s and the focus is now on exploiting solar energy. India's solar target of 22 Gigawatt (20 GW centralized grid connected capacity and 2 GW decentralized capacity) was upgraded to 100 GW by 2022. By mid of 2016, India is set to have 27 GW of wind capacity installed¹⁶, and has a planned target of adding 15 GW capacity between 2012–2017. India also plans to increase the nuclear-based electricity capacity to 66 GW by 2030. The government has adopted Renewable Purchase Obligation (RPO) and feed-in tariffs to promote the use of renewable energy. A tax on mined and imported coal of nowadays USD 6 per metric ton has been imposed to fund clean energy. The coal cess is meant to help finance the renewable installation of 175 GW by 2022.

2.2 Germany

As a central European country of relatively small size and temperate climate Germany is comparatively less affected by climate change, but certainly one of the high emitter countries particularly responsible for addressing the global issue of climate change. Given its economically stable and developed situation, Germany was included in Annex I (developed countries) when the UNFCCC was adopted in 1992. Even in the context of the financial crisis the German economy has proved remarkably resilient.¹⁷ The country is known for energy-intensive industries that are an important driver of the German economy. In the context of climate policy, this can lead to conflict. However, the government stresses that these energy-intensive industries are also essential for the implementation of climate change mitigation and play an important role on the way towards a low-carbon society.¹⁸ The steel industry, for instance is of great importance when it comes to the manufacturing of renewable energy plants such as off-shore wind energy turbines.¹⁹ The fact that those industries have deep roots in Germany is also seen as a key success factor for environmental technology development.²⁰ According to the OECD Germany is a leader in green technologies.²¹ Climate change mitigation is largely seen as engine for progress and as an opportunity for the creation of new, green jobs, including in heavy industry. Climate protection is therefore most often framed in the German policy discourse as creating economic benefits.²² Germany committed itself to become one of the most energy efficient economies in the world, and one of the first ones to be run predominantly by renewable energy.

Responsibility for Domestic Climate Action and International Support

Germany is the largest GHG emitter in the EU. German CO₂ emissions per capita (9.1 metric tonnes in 2010) were significantly above global average (4.9 t) and EU average (7.4 t).²³ Taking responsibility for the global challenge of climate change while protecting Germany's economic interest are

¹⁶ Physical Progress (Achievements). Ministry of New and Renewable Energy, Govt. of India. 31 January 2014.

¹⁷ OECD (2014): OECD Economic Surveys: Germany 2014, www.keepeek.com/Digital-Asset-Management/oeed/economics/oeed-economic-surveys-germany-2014_eco_surveys-deu-2014-en#page3

¹⁸ Bundesministerium für Wirtschaft und Energie [BMWi] (2014): Energieintensive Industrien. www.bmwi.de/DE/Themen/Industrie/Industrienerienation-Deutschland/energieintensive-industrien,did=491726.html

¹⁹ Wirtschaftsvereinigung Stahl (2013): Energiewende beginnt mit Stahl, www.stahl-online.de/wp-content/uploads/2013/10/121205_Energiewende_beginnt_mit_Stahl.pdf

²⁰ Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (2012): GreenTech made in Germany 3.0. Environmental Technology Atlas for Germany, p.8.

²¹ Klein, C. (2012): Climate Change Policies in Germany: Make Ambition Pay, OECD Economics Department Working Papers, No. 982, OECD Publishing. <http://dx.doi.org/10.1787/5k92sn0f8dbt-en>

²² See for instance the coalition agreement of the current governing coalition: CDU, CSU, SPD (2013): Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode, p.36.

²³ Worldbank: CO₂ emission (metric tonnes per capita), <http://data.worldbank.org/indicator/EN.ATM.CO2E.PC/countries/EU-DE-1W?display=graph>

often stated to be the main drivers for climate action in Germany.²⁴ The key mitigation challenge for Germany is thus to reduce emissions while maintaining its economic well-being. Germany seeks to take responsibility by committing itself to ambitious emission reductions with its targets of 40% emission reduction until 2020. The mid- and long-term targets of 55% by 2030, 70% by 2040 and between 80% and 95% in 2050 made Germany promote the decarbonisation concept internationally.

Even though Germany has a limited direct affectedness by climate change impacts, climate policy plays an important role in the political discourse. This is driven by a widespread understanding of climate science and of the importance of addressing this global issue. Climate research is being steadily funded by the German government.²⁵ Institutions like the German Advisory Council on Global Change (WBGU) and the Potsdam Institute for Climate Impact Research (PIK) contribute to a strong science-policy interface. Besides being important for policy, climate science is also observed to have an important influence on the awareness and perception in society.²⁶ According to a special Eurobarometer poll on Climate Change from 2014, 69% of Europeans perceive climate change as a very serious problem.²⁷ A study conducted in 2012 in Germany shows that a vast majority of German citizens is convinced that climate change is already taking place (81%).²⁸ Thus, in the German context the problem awareness is high and there is broad social consensus that climate change needs to be addressed.

A Short Introduction to Current National Climate Change Mitigation Policy

As mentioned above, general socio-political awareness on the problem of climate change does not necessarily guarantee it gets translated into sufficiently ambitious policies without problems. The Energiewende is a central element of Germany's climate policy, which also influences Germany's position in international negotiations. It has become the "flagship" for German climate policy targeting a minimum consumption of 80% renewable energy by 2050.

The comparably ambitious emission reduction target of Germany is to reduce emissions till 2020 by 40% in comparison to 1990. For 2050, Germany intends at least an 80–95% emissions reduction.²⁹ Whether these targets are ambitious enough to meet the Paris objective to keep global warming well below 2°C and pursue efforts to limit it to 1.5°C would need to be assessed in combination with other measures such as international support in terms of finance or technology cooperation that would enable additional reductions in other parts of the world. However it should be noticed that Germany has formulated emission reduction targets for itself, which go beyond those negotiated at the European and international level. In 2013, 23.8% emission reduction was already achieved.³⁰

But despite of past achievements and clear targets for the future, Germany for the first time dropped out of the top ten of the Climate Change Performance Index in 2013³¹ which evaluates and compares the climate mitigation performance of 58 high-emission countries. In 2012 and 2013

²⁴ See, for example, Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit [BMUB] (2014): www.bmub.bund.de/themen/klima-energie/klimaschutz/nationale-klimapolitik/klimapolitik-der-bundesregierung/#c17578

²⁵ Die Bundesregierung (2011): Klimaschutz braucht Forschung, www.bundesregierung.de/statisch/klimakonferenz/Webs/Breg/un-klimakonferenz/DE/Klimaforschung/klimaforschung.html

²⁶ FONA (2012): Klimaforschung Fakten für Entscheider, www.fona.de/mediathek/pdf/Perspektive_Erde_Klimaforschung.pdf

²⁷ European Commission (2014): Special Eurobarometer 409. Climate Change, p.21.

²⁸ Osberghaus, D., Schwirplies, C., Ziegler, A. (2012): Klimawandel in Deutschland: Risikowahrnehmung, Wissensstand und Anpassung in privaten Haushalten, p.13.

²⁹ BMUB and BMWi (2010): Energiekonzept für eine umweltschonende, zuverlässige und bezahlbare Energieversorgung, p.4.

³⁰ Bausch, Dr. C., Duwe, M., Görlach, B. (2014): Die Klima- und Energiepolitik der deutschen Bundesregierung. Ein Beitrag zum deutsch-französischen Dialog, p.18.

³¹ Burck, J., Marten, F., Bals, C. (2013): The Climate Change Performance Index. Results 2014, p.5.

emissions increased, mainly because of rising emissions from electricity generation (+1.6% from 2011 to 2012).³² This effect is mainly due to coal power, particularly relatively inexpensive domestic lignite, replacing natural gas within the German power mix. Emissions prices in the European Emissions Trading Scheme are so low that it is hardly functional; the lack of an adequate price on greenhouse gas pollution makes coal power comparatively cheap. As the share of renewable energy increases, they are pushing the more expensive fossil fuel sources out of the system first (beginning with natural gas, then hard coal, then lignite). In addition, the power from old written-off coal power plants is so competitive on the European market that Germany is increasingly exporting electricity. This imbalance needs to be corrected, because it favors old and dirty plants rather than modern, less polluting plants, which are also more flexible to complement renewables.

With the continued growth of renewables, the fossil fuel plants run less hours and emissions have started to decrease again in 2014, but too slowly to reach the -40% target by 2020. Without additional measures it would be not be possible to achieve this goal. This is why in December 2014 the federal government adopted the "Action Programme Climate Protection 2020", which lays out the additional measures to be taken across all sectors. According to experts it is would be possible that Germany is going to achieve its 2020 target if the additional measures are fully implemented in an ambitious way.³³ However, current trends indicate that Germany is going to miss its 2020 target. In 2016, the German government plans to adopt a "National Climate Protection Plan 2050" that will specify how the 80–95% target is going to be achieved.

The German government is convinced that ambitious national climate policy will strengthen its political position in bilateral and multilateral negotiations.³⁴ It is likely not a coincidence that the Climate Action Programme was adopted at the same time as the annual UN Climate Conference took place in Peru.

Having confirmed its intention to work towards ambitious mitigation targets for 2030 at EU level³⁵ the German government could not convince the European member states of a 40% emissions reduction target. Among Germany's motives to push the EU climate policy is Germany's need of European partners for realizing its own targets. The Petersberg Dialogue, which is organized annually by the German government since 2010, is an example how Germany takes efforts to support the international process of climate negotiations.

Also in regard to climate finance Germany wants to be recognized as reliable partner.³⁶ While it was criticized by civil society that the federal budget for 2014 reduced the amounts made available for climate finance³⁷, the positive role the German government played in the initial capitalization of the Green Climate Fund (GCF) was widely recognized. Germany was the first country to pledge a significant amount for the GCF, EUR 750 million at the Petersberg Climate Dialogue in July 2014.³⁸ Germany then hosted the donor conference in Berlin in November 2014, eventually leading to an initial resource mobilization of more than USD 10 billion for the GCF.³⁹ At the Petersberg Dialogue

³² Velten, E.K, et al. (2014): Assessment of climate change policies in the context of the European Semester. Country Report: Germany, p.5.

³³ Ibid., p.9.

³⁴ Bundesregierung (2014): Klimaaußenpolitik der Bundesregierung bis zur VN-Klimakonferenz 2015 in Paris, p.5.

³⁵ CDU, CSU, SPD (2013): Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode, p.36.

³⁶ BMUB and BMZ (2013): Together for a common cause Germany's contribution to international climate financing, p.4.

³⁷ Oxfam (2014): Eins-zu-Null für den Finanzminister: Klima-Hilfen für arme Länder sinken, <http://blog.oxfam.de/jan-kowalzig/zu-null-den-finanzminister-klima-hilfen-arme-laender-sinken>

³⁸ Deutsche Klimafinanzierung (2014): Endlich: Merkel sagt 750 Mio. Euro für den Green Climate Fund zu, www.deutschemklimafinanzierung.de/blog/2014/07/endlich-merkel-sagt-750-mio-euro-fur-den-green-climate-fund-zu/

³⁹ Oxfam (2014): Green Climate Fund (GCF) – Who will rally behind the Green Climate Fund? Who will let it down?, www.germanclimatefinance.de/2014/11/13/will-rally-behind-green-climate-fund-will-let/

2015, Chancellor Merkel announced that Germany would double its contribution to public international climate finance from currently 2 billion euros to 4 billion euros annually, as a contribution to the commitment by developed countries to mobilize 10 billion dollars annually from a variety of sources by 2020.

3 Low-Carbon Development in India and Germany

The central climate change mitigation challenge is to decarbonise economies while ensuring development for all in India and sustained prosperity in Germany. To ensure a fair and equitable response to climate change, the different conditions of India and Germany need to be taken into account when defining how the two countries can develop towards low-carbon and resilient societies. This chapter looks at the different states of potential, policies, economical and technology capacities for low-carbon development; as well as political mindsets and levels of public acceptance. It also touches on the different roles that selected actors such as national and local governments, civil society, business groups but also the middle classes play for decisions on pathways towards a low-carbon society in India and Germany.

3.1 Energiewende: Germany's Attempt to Decarbonize

In contrast to India, where still a large number of people live without access to electricity, Germany is in the comfortable position not to be challenged by this form of energy poverty. Security of supply is an important issue for Germany, as the country imports almost all of its oil, gas, hard coal and uranium. Germany produces more power than it needs to drive its economy and exports some of the generated electricity. The key energy challenge for Germany is to sustain this stable and affordable energy supply, which is also key to its stable economic situation, while reducing emissions and promoting climate friendly economic development. Renewable energies have grown from a niche technology to an important part of German energy supply.⁴⁰ In 2014, 27% of electricity was generated from renewable energy sources⁴¹ and about 35% in mid-2016⁴². Additionally, a huge renewable potential in Germany is yet to explore.

Thus, low-carbon development in Germany has become synonymous to the Energiewende (energy transition). In 2010, the government published the Energy Concept which is often seen as the basis of the Energiewende but ideas are actually much older, first mentioned in the 1970s.⁴³ The successful promotion of renewable energy began with the Electricity Feed-In Act in 1991, which gave renewable energy generators a right to be connected to the grid and to be paid for the elec-

⁴⁰ Ibid., p.11.

⁴¹ AG Energiebilanzen (2014): Bruttostromerzeugung in Deutschland von 1990 bis 2013 nach Energieträgern. Stand 6.6.2014.

⁴² Fraunhofer Institut für Solare Energiesysteme (2016): Stromerzeugung in Deutschland – Erneuerbare Energien erreichten 2015 einen Anteil von rund 35%, www.ise.fraunhofer.de/de/aktuelles/meldungen-2016/stromerzeugung-in-deutschland-erneuerbare-energien-erreichten-2015-einen-anteil-von-rund-35-prozent

⁴³ Bausch, Dr. C., Duwe, M., Görlach, B. (2014): Die Klima- und Energiepolitik der deutschen Bundesregierung. Ein Beitrag zum deutsch-französischen Dialog, p.7.

tricity they fed into it. In 2000, this law was expanded and became the Renewable Energy Act, kicking off a period of rapid development of renewable energy sources (see box).

The Energiewende aims at phasing out nuclear power and reducing the share of fossil fuels through a phase-in of renewable energies, mainly on- and off-shore wind and solar, and improvements in energy efficiency. A nuclear phase-out over 20 years was agreed by the federal government in 2000. This decision remained politically controversial and in 2010 the subsequent government of Angela Merkel extended the lifetimes of nuclear plants again. However, after the nuclear accident in Fukushima and massive public demonstrations against nuclear power, that government changed its position once more. Now there is an all-party consensus in Germany that nuclear will be phased-out by 2022.⁴⁴ In contrast to some other countries, nuclear energy is thus not seen as a sustainable low-carbon energy source in the German context. In the context of geopolitical conflicts (like the Ukraine crisis) concerns of security of energy supply and import dependency are also drivers for the Energiewende. Reducing the dependency on imports of e.g. Russian gas and thereby increasing energy security is seen as one central motive for the Energiewende.

Renewable Energy Sources Act (REA; Erneuerbare Energien Gesetz [EEG]):

The REA came into force in 2000 as a policy instrument providing priority to renewable energies in the grid. Power generated from renewable energy sources receives a fixed feed-in tariff in order to attract private citizen investment. The rates are technology-specific and differentiated by project size (and by location in the case of wind power), reflecting the costs of different types of installations plus a reasonable return on investment. The rates for new installations are regularly reduced to incentivize and reflect technology cost reductions. The Renewable Energy Act triggered an investment boom for renewable energies in the power sector. The REA concept was exported to many countries worldwide (about 60 according to the Global Status Report Renewables 2015), but its main global effect was to enormously lower the prices for renewable technologies worldwide.

The REA has been a successful policy for the development of renewable energies in Germany but at the same time its success has led to a new baseline situation for which the REA in its initial form is no longer considered the appropriate instrument to push the energy transition further. A reform of the REA was required especially because of the high costs. The EEG levy, which is collected from customers, has risen due to lower electricity prices at the spot market and exception rules, which relieve industrial electricity consumers from the levy. The required reform of REA was therefore decided in early 2014 and another reform is being discussed in 2016. The current reform proposals are controversial as they would replace a key feature of the REA – guaranteed feed-in tariffs – with auctions and enforce a cap on annual capacity additions. Many observers are worried that this might significantly slow down the pace of renewable energy deployment.

The Energiewende is highly focused on electricity generation and is often criticized for paying less attention to other sectors with a great potential for savings such as the transport and buildings

⁴⁴ Die Bundesregierung (2011): Regierungserklärung von Bundeskanzlerin Dr. Angela Merkel zur aktuellen Lage in Japan vor dem Deutschen Bundestag am 17. März 2011 in Berlin, www.bundesregierung.de/Content/DE/Bulletin/2011/03/27-1-bk-bt.html

sectors especially for energy efficiency.⁴⁵ Increasing energy efficiency therefore remains a key challenge for Germany's low-carbon development. Back in 2008, the Renewable Energies Heat Act (EEWärmeG) was launched, which became the principal instrument for the promotion of renewable heat. The EEWärmeG was last amended in 2011 and now "...obliges owners of any new buildings and of public buildings undergoing major renovations to cover part of the heating or cooling with renewable energies. The overall objective is to increase the share of renewable energy in heating to 14% in 2020."⁴⁶

In general, the public acceptance of the Energiewende is high in Germany. The low-carbon development and the reorientation of the energy sector associated to it are seen as necessary. 93% of Germans consider the intensive expansion of renewable energies as important.⁴⁷ This high support of the public creates a greater scope for governmental action than it is the case in other countries. Nevertheless, fields of tension exist. The costs and pace of the Energiewende, especially the Renewable Energy Act (REA), have been issues of debate, both in policy and in the public (see box on page 13). The affordability of energy is thus an issue in the German debate as well. Protests of residents in the past affected the implementation of concrete renewable energy projects. Research shows that public participation is key in this regard in order to enhance public acceptance of concrete projects.⁴⁸

Not only with regard to concrete installations but also for the Energiewende as a whole public participation is a key element. This can be seen in the high proportion of private individuals investing in renewable energies for electricity generation. In 2010, 40% of installed power output was in private hands, e.g. in the form of private solar rooftops or community financed wind or solar installations by single owners or communities.⁴⁹ This again underlines the importance of citizen involvement for the energy transition. Public participation has been recognized as a need to emphasize even in other related policy decisions. Dialogue with associations and civil society to create participation possibilities for citizens was formulated as a separate target of the Action Plan Climate Protection 2020.⁵⁰ A further example is the transmission grid expansion: "...citizens that are affected by the construction of a transmission line receive the opportunity to invest in that specific grid extension project. The contribution needs to be at least EUR 1,000 at an interest rate of 5%".⁵¹

Challenges for the Energiewende and its Implementation

The Energiewende and its implementation certainly face barriers and challenges, which need to be overcome to make it a success, such as the following:

1. Political challenges: Shifting the renewable energy portfolio from the Ministry of Environment to the Ministry for Economic Affairs and Energy (BMWi) was one attempt to tackle some challenges by ending the split of political responsibility on energy issues.⁵² A recent paradox of the Energiewende is that the renewable energy share can increase, while CO₂ emissions increase as well. The reason

⁴⁵ Bausch, Dr. C., Duwe, M., Görlach, B. (2014): Die Klima- und Energiepolitik der deutschen Bundesregierung. Ein Beitrag zum deutsch-französischen Dialog, p.17.

⁴⁶ Velten, E.K, et al. (2014): Assessment of climate change policies in the context of the European Semester. Country Report: Germany, p.18.

⁴⁷ Wunderlich, C. (2012): Akzeptanz und Bürgerbeteiligung für Erneuerbare Energien. Erkenntnisse aus Akzeptanz und Partizipationsforschung, p.6.

⁴⁸ Ibid., p.14.

⁴⁹ Ibid., p.15.

⁵⁰ Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit [BMUB] (2014): Aktionsprogramm Klimaschutz 2020: Eckpunkte des BMUB, p.2.

⁵¹ Velten, E.K, et al. (2014): Assessment of climate change policies in the context of the European Semester. Country Report: Germany, p.19.

⁵² Ibid., p.4

is the increase of electricity generation by coal power plants due to high gas prices and low CO₂ emissions allowance prices. This situation has also led to the export of electricity on record levels. To achieve the emission targets a transformation strategy for coal power is needed.⁵³ Moreover, in the coalition agreement it is decided that the expansion of renewable energies will take place in corridors (share of renewable energies 40–45% in 2025, and 55–60% in 2035⁵⁴). This is seen as a negative decision for the dynamic development of renewable energies as leading technology, because it sets a cap on renewable energy deployment.⁵⁵ Another political challenge is related to the fact that 50% of German emissions are subject to the European Emissions Trading Scheme (EU ETS). This has an influence on target achievement on the national level.⁵⁶ Improved cooperation on the European energy market and grid structure as well as on European climate and energy policy are needed for the Energiewende to be successful. Another issue is related to the scope of policies. The building sector was long neglected but new funding schemes of the German government-owned development bank KfW for new and existing buildings are planned to be further developed.⁵⁷

2. Technological challenges: Technological challenges for the Energiewende are particularly related to integrate increasing shares of renewable energies into the grid, namely through flexible demand and supply management, grid expansion and management as well as energy storage systems.

3. Social challenges: As technological solutions like renewable energies and energy efficiency alone will not lead to a success of the Energiewende, behaviour changes will need to be considered more strongly in order to reduce energy demand. Mainstreaming demand-side management and fostering behaviour change, including change in lifestyle⁵⁸, are part of the essentials for the Energiewende.

4. Economic and systematic challenges: Way beyond the current challenge of renewable energy prices, Germany faces the challenge to shape a sustainable prosperity model. In this sense, the German Energiewende experience confirms that the transformation towards a low-carbon society needs to be put in the context of a new prosperity model.

The Great Transformation: Low-Carbon Development beyond the Energiewende

Climate change and the aspiration towards sustainable development require alternative models of growth to be defined and put into practice. Low-carbon development in the German context needs to take place from a different starting point than in the Indian context. Germany as industrialized and highly developed country needs to leave behind its emission intensive past while maintaining the same level of prosperity. For India the challenge is to achieve a similar level of development, allowing well-being of all its citizens, without taking the unsustainable detour Germany has taken in the past. Based on historical responsibilities, Germany has a moral obligation as well as the technological research capacity to prove that low-carbon development is possible. Alternative development paradigms towards a low-carbon development need to manage the transformation of many aspects of daily life of the industrialized society. Thus, the Energiewende is just

⁵³ Agora Energiewende (2014): Das deutsche Energiewende-Paradox: Ursachen und Herausforderungen, p.19.

⁵⁴ CDU, CSU, SPD (2013): Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode, p.37.

⁵⁵ WWF (2014): Bewertung der Eckpunkte zur Reform des Erneuerbare-Energien-Gesetzes.

⁵⁶ Ibid., p.18.

⁵⁷ CDU, CSU, SPD (2013): Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode, p.37.

⁵⁸ Ibid.

one part of a much bigger transformation. Low-carbon development needs to be the target of all relevant sectors. The energy concept of the Federal Government already contains specific targets for energy saving in the transport sector: reduce final energy consumption by 10% until 2020 and by 40% until 2050. Increase the number of electric vehicles up to 1 million in 2020 and up to 6 million in 2030.⁵⁹ Scenarios for the future transport structure in the German private transport sector often account motorised private transport as holding the biggest market share. Even if more efficient motors are utilized such scenarios cannot be seen as sustainable. Experts advocate considering scenarios in which public transport accounts for 50% of private transport by 2050.⁶⁰ This requires the government to shift investments from emission intensive forms of transport and invest in low-carbon (public) transport solutions in order to start a transformation of transportation. A similar paradigm shift, denoted as the agricultural transition (Agrarwende), calls for a structural reorganisation of agricultural policy to make the sector more sustainable and acknowledge its importance for climate friendly development.

In 2011, the German Advisory Council on Global Change (WBGU) published a report which highlights that the transformation towards climate compatibility needs to go beyond technical and technocratic reforms. A new narrative is needed based on a global social contract which acknowledges that there is a collective responsibility to avoid dangerous climate change.⁶¹ In the German context this is an ongoing process which is driven by different initiatives. In 2011, for instance, a commission of inquiry named "Growth, Prosperity and Quality of life" was established in order to reflect about pathways for sustainable economic activity and life.⁶²

3.2 The Low-Carbon Inclusive Growth Challenge in India

Given the remaining challenges of development and economic growth in the Indian context, solutions for a low-carbon inclusive economic development that addresses poverty and basic needs ought to be found. At the same time policy makers recognize that climate change impacts increases the challenge of delivering inclusive economic development and begin to see that low-carbon solutions offer potential co-benefits for development.

The Challenges

In order to understand the state of the present debate and adopted and planned policies on low-carbon development in India, key challenges that shape the difficult pre-conditions in India must be analysed:

1. The inclusive growth challenge: The Indian Environment Ministry recently stated that the key development challenge for India is raising the HDI from 0.55 to 0.9.⁶³ Both the current 12th Five-Year Plan (FYP) and more recent plans under Prime Minister Modi outline strategies like "Make in India"

⁵⁹ www.bundesregierung.de/Webs/Breg/DE/Themen/Energiewende/Fragen-Antworten/7_Verkehr/_node.html;jsessionid=BB6F00016FB6A7EC1D57D800E8ADAFB1.s1t1#doc605200bodyText1

⁶⁰ Treber, M. (2010): Wachstum und Schrumpfung im Landverkehr; available at www.germanwatch.org/de/download/2645.pdf

⁶¹ WBGU (2011): Welt im Wandel. Gesellschaftsvertrag für eine Große Transformation; www.wbgu.de/fileadmin/templates/dateien/veroeffentlichungen/hauptgutachten/jg2011/wbgu_jg2011.pdf

⁶² www.gruene-bundestag.de/uploads/tx_ttproducts/datasheet/r17-136_Enquete_Wachstum_-_web.pdf

⁶³ Low Carbon Development Pathways for A Sustainable India, 2014, outlines what this implies in terms of various health, education, access indicators (see table 1 in its executive summary). Prepared by collaborative partnership of Church's Auxilliary for Social Action (CASA), Centre for Environment Education (CEE), LAYA, Welthungerhilfe, and World Wide Fund for Nature – India and IRADe.

to facilitate sustained growth in order to meet the development needs. Provision of access to basic needs (education, sanitation, decent accommodation, safe drinking water, clean energy) and provision of productive income opportunities (employment for all and job security, massive infrastructure extension, sustainable agriculture, manufacturing, higher education and technical skill development) demand development and growth, which must be decoupled from environmental impacts and resource exploitation. Prime Minister Modi has identified the manufacturing sector as the driver of inclusive growth with the purpose of creating jobs. While growth in its own is seen as a challenge, low-carbon growth is understood as an additional layer of effort.

2. The investment challenge for inclusive growth and its constraints for low-carbon development: Achieving the above development goals requires huge investments. The 12th FYP estimated annual investment needs equal to 37% of GDP (roughly 660 USD billion) to generate 8% growth over the five-year period (2012–2017). The key component of inclusive development is investments by the central and state governments in social programmes. The central government and state governments invest about 10–12% of GDP (roughly 220 USD) to address the inclusive growth elements by supporting programmes in social sectors. This is likely insufficient as one study⁶⁴ identified that investment in health care, waste, sanitation and education alone requires 7% of *additional* annual investment for a sustained period to address the deficit. Sustained economic development is critical to address inclusive growth as well as generate resources to move the economy towards low-carbon pathways. Therefore, it is in the Indian context indispensable to create a conducive environment for the private sector to enhance investments in the economy so that the government can focus on devoting resources for investments in inclusive growth. Still, increasing resources available to the government for low-carbon development and mitigation measures remain a challenge and it would need international collaborations to address these constraints.

3. The adaptation challenge: Increasing impacts increase the cost of growth by both, increasing the costs of climate proofing investments, beyond those required by current variability in weather, and economic damages from residual climatic impacts. India is already investing in adaptation, beyond investments to address weather related uncertainties, affecting resources available for addressing inclusive growth. Investing in mitigation avoids adaptation costs, but it requires mitigation by all countries for a country's mitigation effort to be effective, else it creates uncertainty whether mitigation investments help minimize adaptation costs. Further, adaptation costs even in a 2°C scenario are unavoidable and additional to mitigation costs. Thus a country in its short-term planning may very well choose to avoid mitigation costs and invest the same in growth so that its capacities for adaptation are enhanced in the future when it would face higher adaptation costs. In the longer run, the challenge lies in defining the equitable share of domestic mitigation effort according to the “well below 2°C”/1.5°C limit, responsibilities and capabilities as well as development and adaptation needs.

The 12th FYP recognized the increasing evidence of climatic impacts in India and set up an expert group to make recommendations on adaptation measures. This growing realization is also reflected in National Action Plan on Climate Change (NAPCC) for adaptation through the National Mission for Sustaining the Himalayan Ecosystem, National Mission for Sustainable Agriculture and generation of better information on climate change impacts and adaptation needs through the National Mission on Strategic Knowledge for Climate Change. Further, the government of India recently established an “India Adaptation Fund” and capitalized it with 1 billion Rupees (about USD 16 million).

⁶⁴ Low Carbon Development Pathways for Sustainable India, 2014. Prepared by collaborative partnership of Church's Auxilliary for Social Action (CASA), Centre for Environment Education (CEE), LAYA, Welthungerhilfe, and World Wide Fund for Nature – India and IRADe.

Adaptation is thus playing an increasingly important role in Indian national and international climate policies. On the one hand the investment need for adaptation may result in less available financial resources for low-carbon development/mitigation measures but on the other hand the insight that more mitigation avoids future adaptation costs can facilitate low-carbon development.

4. The energy challenge: Energy is the key driver of development and the demand for energy is expected to increase tremendously despite the Indian economy being quite efficient and the existing initiatives at improving energy efficiency. Energy efficiency is a key short-term strategy to lower the growth in demand but eventually the energy demand will still grow. Barring new and significant discoveries, it is expected that 80% of oil and gas demand in India will have to be met through imports. Import dependencies and borrowing in turns affects the economic growth negatively. The future dependence on imports is also related to the issue of energy security, which is a key driver for the development of renewable energies in India.⁶⁵ Thus focus on enhancing use of indigenous energy sources is key to meeting the energy demand for sustained economic development and to ensure energy security. Low-carbon energy sources, especially renewable energies, have a great potential to contribute to meeting the growing demand. It is estimated that the renewable energy potential for India is about 89,744MW, whereby according to recent assessments the highest potential lies in wind power (54.7% of renewable share).⁶⁶ Further, the solar energy potential should not be neglected.

Coal is likely to continue to play an important role in the Indian energy mix. There are environmental consequences of using coal, but the choice is often made to avoid perceived high immediate cost of renewable energy versus a delayed cost paid in terms of health and environmental damages. Thus, a reduction in coal use needs to be planned as a phase-out while renewable energy is phased-in – similar to the German energy transitions but with a different time line due to the various challenges. Renewables start being the economically wiser choice in India, too, as Energy Minister Piyush Goyal said in May 2016, “a new coal plant would give you costlier power than a solar plant”.⁶⁷

Further, with present technologies for grid management, it is estimated that current grids can accommodate no more than 15–20% renewable energy⁶⁸, thus significant investments in technology and capacities are required to increase share of renewable energy in electricity. Therefore, working towards lowering the cost of renewable energy is a priority as well as identifying alternative energy sources for industry and transport. Germany through the technology development and China with its mass production brought down the costs of renewables remarkably. At present, grids and storage systems are the problematic and expensive elements for further progress on the global energy transition. Addressing these bottle necks might be interesting for an Indio-German cooperation.

Alternative Development Paradigms

Any alternative development paradigm towards a low-carbon economy has to meet the test of delivering on inclusive growth and ensure India achieves an HDI of 0.9, as the developed European

⁶⁵ Ernest & Young LLP (2013): Mapping India's Renewable Energy growth potential: Status and outlook 2013, p.5, [www.ey.com/Publication/vwLUAssets/Mapping_Indias_Renewable_Energy_growth_potential/\\$FILE/EY-Mapping-Indias-Renewable-Energy-growth-potential.pdf](http://www.ey.com/Publication/vwLUAssets/Mapping_Indias_Renewable_Energy_growth_potential/$FILE/EY-Mapping-Indias-Renewable-Energy-growth-potential.pdf)

⁶⁶ Central Statistics Office Ministry of Statistics and Programme Implementation Government of India (2013): Energy Statistics, p.3.

⁶⁷ www.climatechangenews.com/2016/04/18/solar-is-now-cheaper-than-coal-says-india-energy-minister/

⁶⁸ International Electrotechnical Commission (2012): Grid integration of Large-capacity Renewable Energy sources and use of large-capacity Electrical energy storage. Switzerland.

countries, at the earliest. A challenge to that development and growth in general comes from climate change impacts. There is an overlap between strategies for sustainable development and addressing climate change in many areas, and this is reflected in the NAPCC for mitigation for example in energy efficiency (industry, transport, household appliances, buildings, electricity transformation, etc), use of public transport (especially in urban areas, including non-motorised transport), solid waste management (and its use as energy source, both, in urban and rural areas), and others.

As mentioned, generating employment is key to sustaining the gains of addressing poverty and enabling inclusive growth. Alternatives to industrial led growth which meet the objectives of inclusive growth and creation of productive employment opportunities are not yet explored to great extent. The challenge is that the developed countries so far have not demonstrated any alternative model of growth based on reduced consumption and sustainable resource management. This includes the German Energiewende with its trust in the renewable energy potential, technology solutions and citizen engagement.

The question of an alternative model is also linked to the consumption of goods and services by households, which are at the centre of the economic cycle. Shifting the consumption patterns away from those that creates demand for energy intensive infrastructure and production is key to identifying alternative development models. This also includes the organization of economic activities that ensure sustainable development and has minimum impact on GHG emissions. A central open question, especially for a populous country like India, is whether development should be oriented towards creating more urban concentrations or rather decentralized multiple growth centres – or both. Bringing these changes into effect requires a deeper analysis to identify such options and a wider stakeholder consultation to gain greater acceptability.

Existing and Potential Policies and Technologies for Low-Carbon Development in India

The growth in emissions from development will primarily take place in the electricity, industry and transport sector in the business as usual (BAU) scenario. A significant part of these emissions are from urban areas where the demand comes from both transport and energy use in buildings (residential and commercial). Coal is projected to continue to be the main source of energy in the electricity sector and industry in the BAU in short- to medium-term, despite increased shares of renewable energy. Reducing the GHG emissions therefore requires continued efforts to reduce energy demand and shifting to renewable energy at a faster pace.

Energy efficiency in all sectors is key to immediate-term reduction of demand and avoidance of creating fossil fuel-based infrastructure. Acknowledging this, the Indian Government launched the National Mission for Enhanced Energy Efficiency (NMEEE) as one of the eight missions of the National Action Plan on Climate Change (NAPCC) aiming at 5% energy efficiency improvements. A large potential exists in reducing technical losses in transmission and distribution of electricity, which are estimated at 25–30%.⁶⁹ A study by Sathaye et. al. (2011) estimated that energy efficiency measures in efficient home appliances, industrial motors, and agriculture can result in reducing the need for creating electricity supply capacity by about 10% and lower the total capital expenditure required by 2017.⁷⁰ Ernst and Young (2012) estimated a potential of at least 30% energy sav-

⁶⁹ India's Energy Efficiency and Renewable Energy Potential: Policies and Programs.
http://transatlanticenergyefficiency.eu/sites/default/files/India_Sathaye_0.pdf

⁷⁰ <http://igov.berkeley.edu/content/india%E2%80%99s-energy-efficiency-potential>

ings in the commercial sector and 7% energy savings potential in the industrial sector.⁷¹ Another element of energy demand reduction is through addressing the consumption pattern.

A number of initiatives are underway in India to increase the share of renewable energy in the energy mix with a plan to achieve 175 GW of renewable energy by end of 2022.⁷² The previous goal of 55 GW for renewable energy goal was up-scaled to 175 GW from solar, 60 GW from wind, 10 GW of biomass and 5 GW of hydro power. Currently, renewable energy contributes 12.3% (approximately 28 GW) of power generation capacity, with wind-based power generation (19.1 GW) accounting for 68% of the renewable energy capacity, and the remaining from small hydro power (3.6 GW), bio-energy (3.6 GW) and solar energy (1.7 GW).⁷³ The installed capacity of solar water heaters as of March 2013 was 6.98 million sq. m. The renewable energy investments are growing but increasing the pace of renewable energy is dependent on bringing down renewable energy technology costs and achieving technological advances in order to enable a high level of renewable energy integration into the grid for stable and continuous electricity supply. One of the studies⁷⁴ for India estimated that if the costs of renewable energy electricity can be brought down to electricity from coal by 2017 (and government addresses the infrastructural bottlenecks), India could be able to achieve 66 GW of solar capacity by 2022. A study by Global Wind Energy Council (GWEC)⁷⁵ estimated that in low scenario wind capacity in India would grow to 59 GW by 2020 and optimistic scenario estimates that capacity could grow to 89 GW.

Shifting the household, commercial and a significant part of transport demand to electricity too enables shift away from fossil fuels, if renewable energy becomes main source of electricity. Apart from the cost of renewable energy, the challenge India has is to have a reliable electricity sector for consumers for them to make the shift to electricity from solid/liquid fuels.

In terms of renewable energy solar, wind, biomass, biofuels and hydro are the key renewable energy source. Large hydro has significant potential but also significant environmental challenges. Biofuels, which is key to shifting fossil fuel in transport sector in the short- to medium-term, can displace food production. Thus, ensuring that it does not impact the food production is key to increasing its use. An immediate focus should be on creating off-grid decentralized renewable energy-based energy supply systems which are already very cost competitive across the board. This would speed up the creation of market chains for renewable energy and help a faster uptake of renewable energy. These systems could be integrated with the national grid as the capacities grow. Further, policy framework to make it possible for households to sell solar energy to the grid should be put in place quickly, as a vast market exists here. A comparison of the tariff for consumption above 600 kWh in Delhi, which is currently USD cents 12/kWh (in market exchange rate) with the latest offers for solar-based electricity, which were USD cents 10/kWh⁷⁶, confirms the large economic potential. For high electricity consuming households in big cities, roof top solar with net metering would be financially very attractive. Also, this will help deepen the solar market chain by creating more commercial opportunities for solar firms.

The government should take measures to ensure that infrastructure and policy bottlenecks to implementing renewable energy and energy efficiency measures are addressed. It should also explore possibilities of generating extra revenues by taxing higher end consumption such as large

⁷¹ www.austrade.gov.au/ArticleDocuments/1418/Energy-Efficiency-Opportunities-in-India-Presentation.pdf

⁷² www.globalbioenergy.org/uploads/media/1106_World_Bank_-_Unleashing_the_potential_of_renewable_energy_in_India.pdf

⁷³ www.ey.com/IN/en/Industries/Power---Utilities/Renewable-energy-in-India-status-and-growth-2013

⁷⁴ The Rising Sun: A Point of View on the Solar Energy Sector in India, 2011. KPMG India.

⁷⁵ www.gwec.net/wp-content/uploads/2012/11/India-Wind-Energy-Outlook-2012.pdf

⁷⁶ http://articles.economictimes.indiatimes.com/2014-03-17/news/48297593_1_grid-parity-solar-capacity-solar-power

cars, large refrigerators, taxes on eating outside, electricity consumption⁷⁷ above, say, 900 kWh/month, etc. This will enable higher investments in inclusive growth and to that extent enable it earlier than later to also address deeper mitigation. This also enables reducing demand for energy by evolving unsustainable lifestyles.

4 Climate Positions in International Discussions

The described and analysed different country specific situations shape the key negotiation positions on climate change and related themes in the international negotiations at UNFCCC, other UN forums, at the Major Economies Forum (MEF) and G20 meetings and other fora for international debate. This chapter introduces the main policy approaches and positions of India and Germany within the UNFCCC as well as the SDG process.

4.1 Germany's Climate Change Positions

In the coalition agreement, negotiated after the September 2013 elections, the German government confirmed its call for an ambitious and binding climate protection treaty to be agreed at COP21 in Paris 2015.⁷⁸ The Paris Agreement was generally received positively by German policy-makers and experts. The German government in particular emphasizes the following aspects of the new climate regime:

Contributions from all countries: The German government puts great emphasis is on obligations of *all* countries and the internationally legally binding character of the new agreement. Germany expects greater engagement and commitments of industrialized countries like the United States (which still did not ratify the Kyoto Protocol) and emerging economies, especially China but also India.

Structure of the new agreement: The German government holds the view that the new climate regime should include bottom-up (e.g. proposing that all countries should commit themselves to develop national climate action plan) and top-down (e.g. calling for clear common rules and proposing a ratchet-up mechanism – the five year cycles) contributions. The German government emphasizes the need for increasing ambitions, by setting incentives (Annexes as incentives for the formation of pioneer alliances) and the possibility of dynamic inclusion of increased ambitions into the process, proposing a ratchet-up mechanism. Germany criticizes that the 2°C limit is often not translated into long-term objectives on the national level. In order to induce an economic transformation the new agreement should have made reference to a time horizon beyond 2020 including clear statements about 2050 targets and commitments for the development of decarbonisation path. The German government therefore highlights the need to ensure the long-term effectiveness of a new agreement by including statements with regard to a longer time horizon (e.g. commitment to develop a national decarbonisation path within national Climate Action

⁷⁷ In India though the energy price above 400 kWh roughly ranges, in PPP, 20 US cent to 40 US cents per kWh.

⁷⁸ CDU, CSU, SPD (2013): Deutschlands Zukunft gestalten. Koalitionsvertrag zwischen CDU, CSU und SPD. 18. Legislaturperiode, p.37.

Plans). The German government ascribes great importance on closer linkages to voluntary initiatives to utilize the dynamic emerging in those initiatives for the UN-process.

Transparency, assessability and comparability of obligations (MRV): The German government frequently emphasizes the importance of transparency, assessability and comparability of countries commitments.⁷⁹ The EU had called for regular international assessment of progress made by Parties towards staying below 2°C and review of mitigation ambition under the Paris Agreement. Such an assessment should inform the renewal and upward adjustment of mitigation commitments. Pre-Paris, the EU held the view that the Paris Agreement must provide for a robust rules-based regime, including MRV and accounting rules applicable to all Parties. With regard to their application it is highlighted that Parties' capabilities and national circumstances should be recognized. The importance of a compliance regime in order to enhance trust and confidence that all Parties are doing their share is also emphasized.⁸⁰

Finance: Germany has an active role in international climate finance. In the past Germany has been one of the major contributors to international climate finance, especially by its support for adaptation activities in developing countries.⁸¹ Germany is committed to get the Green Climate Fund (GCF) operational and German pledge of 750 million euros in July 2014 was an important signal in this regard. Also the pledge of 50 million euros to the adaptation fund announced at COP20 in Lima was echoed as a positive signal for Germany's commitment to international climate finance.⁸² Germany announced a major new pledge of 50 million euros (USD 54.5 million) for the Adaptation Fund even during COP21 in Paris. In comparison to other donor countries this pledge is low in terms of per capita contribution and does not yet meet Germany's fair share.

Nevertheless, Germany holds the view that all countries should make commitments with regard to finance.⁸³ In the pre-Paris context of Germany demanding that the Paris Agreement is applicable to all countries, Germany calls for developing countries to set out their own assets for national climate finance and what they are willing to do at the national level without international financial support.⁸⁴

Technology: Germany is aware of its position and its obligation to provide knowledge and technology to developing countries. Germany welcomes that technology transfer and capacity building are part of the Paris Agreement.⁸⁵

Adaptation: The EU underlined that action on adaptation must be a central part of a balanced 2015 agreement. Thereby it is highlighted that especially vulnerable countries should be supported to achieve climate-resilient sustainable development.⁸⁶

INDCs: With regard to the scope of INDCs the EU's position was that mitigation should be at the core of INDCs. The EU decision of autumn 2014 to cut emissions by at least 40% until 2030, scale-up renewable energies to at least 27% and increase energy efficiency by at least 27% was the preparation of EU's INDC. The wording "at least" leaves room for further scaling-up of the targets.

⁷⁹ BMUB (2014): Hintergrundinformation zur Fortsetzung der Verhandlungen eines Klimaschutzabkommens und zur Nebenorgantagung SB 40 in Bonn vom 4. bis 16. Juni 2014, p.2.

⁸⁰ www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/145508.pdf, p.3.

⁸¹ BMUB (2013): Together for a common cause German y's contribution to international climate financing, p.11.

⁸² www.klimaretter.info/dossiers/klimagipfel-lima/nachrichten/17792-ngo-auszeichnung-fuer-deutschland

⁸³ BMUB (2014): Hintergrundinformation zur Fortsetzung der Verhandlungen eines Klimaschutzabkommens und zur Nebenorgantagung SB 40 in Bonn vom 4. bis 16. Juni 2014, p.2.

⁸⁴ *Ibid.*, p.4.

⁸⁵ *Ibid.*, p.3.

⁸⁶ www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/145508.pdf, p.3.

The EU supported the idea that Parties should explain why their intended contribution is fair and ambitious.⁸⁷

Work stream II: Within the EU position it is stressed that all Parties need to act in order to close the pre-2020 mitigation gap. Therefore it is seen as important that the EU and its member states increase global pre-2020 mitigation ambition. The importance of the Technical Expert Meeting process for the development of practical propositions that can deliver enhanced mitigation action is emphasized by the EU.⁸⁸ In the German (and EU) context, subnational entities are ascribed an important role.

Germany's View on SDG

The German government also has a strong interest in the Sustainable Development Goals (SDG). Germany supported the idea that these goals are formulated in a universal way and move beyond the division between developing and developed countries, which implies that the SDG set goals for Germany, too.⁸⁹ The German government holds the view that time has come for a new, more comprehensive and efficient development agenda, which builds upon the Millennium Development Goals but goes further than just a revision of content.⁹⁰ After the adoption of the SDG in September 2015 in New York, Germany emphasises the national implementation of the SDG.

4.2 India's Climate Change Positions

As the Paris Agreement was adopted on 12 December 2015, India showed satisfaction over all Indian concerns been addressed in the agreement. The section presents the Indian position⁹¹ subdivided into key elements of its submissions in preparation of the Paris deal to understand where the red lines and flexibilities were lying during the time of negotiation the agreement. India left the question of the legal form open as it held the view that contents of the agreement should be clear before the legal nature can be agreed upon.

Work Stream I (post-2015 deal)

Pre-Conditions for post-2015 agreement: India has time and again reiterated that Ad Hoc Durban Platform (ADP) is as much about a post-2020 agreement as about pre-2020. Its main concern is that by not undertaking the responsibilities of mitigation in accordance with science and providing means of support (MOI), especially provision of USD 100 billion by 2020, shifts the responsibility of mitigation to developing countries. The Indian stand is that developed countries need to take lead in enhancing action on emission reduction: Ratification of amendment of Kyoto Protocol; increased mitigation ambition of developed countries; delivery of finance, technology transfer and capacity building support to developing countries.

Equity and differentiation of responsibility: India's viewpoint is that as the new treaty is under the Convention all principles of the Convention should apply. This implies historic responsibility as key in defining responsibility for addressing climate change. According to India, the available car-

⁸⁷ Ibid., p.2.

⁸⁸ Ibid., p.4.

⁸⁹ BMZ: www.bmz.de/de/was_wir_machen/ziele/ziele/millenniumsziele/post2015/index.html

⁹⁰ BMZ: www.bmz.de/de/was_wir_machen/ziele/ziele/millenniumsziele/index.html

⁹¹ The description of Indian position presented in this section is based on Indian Government submissions to the ADP process.

bon budget allocation should be divided on a per capita basis taking into account historic cumulative emissions of countries.

India considers Annexes as basis of differentiation: developed countries to take deep economy wide reduction targets compared to 1990; and, priority of developing country is social and economic development and poverty alleviation, thus their mitigation actions will be in context of sustainable development and supported by MOI from developed countries. Differentiation should be applied to all elements. Indian accepts differentiation among developing countries based on respective capabilities.

India is not in favour of an international ambition and equity review of contributions submitted by developing countries. Its point of view is that developed countries have the primary responsibility to ensure adequacy of the overall mitigation effort. This limits the support of a ratcheting-up mechanism.

Structure of the Paris Agreement: The deal should not be limited to mitigation but include all elements such as adaptation, finance, capacity building, technology development and transfer, etc. Further it should build on Kyoto Protocol and have MRV and compliance elements.

Measurement, Reporting, and Verification (MRV) framework & Compliance: MRV should cover mitigation and finance contributions of developed countries (finance and technology support is responsibility of Annex II countries). There should be common accounting rules for developed country mitigation targets in order to instil confidence. India supports the creation of a compliance system in line with the Kyoto compliance system. The system must contain differentiated structure for developed and developing countries. Developed countries are subjected to compliance and consequences of breach of their obligations and developing countries are encouraged to remain compliant through incentives.

Finance: Developed countries should scale-up finance support, building on the existing promises (USD 100 billion by 2020). Current institutions (SCF and GCF) should be used for delivering finance.

Technology: In Indian viewpoint climate change is a human emergency and climate change related technologies should be widely shared to enable wide-spread adoption at affordable cost. Thus a key ask is that developed countries should operationalize technology transfer to developing countries, ensure financing for technology development, remove obstacles to and provide financing and incentives for transfer of technology, and facilitate R&D cooperation. India has proposed establishment of facilitative IPR regime to enable developing countries take deeper mitigation actions.

Lifestyles: Since the climate emergencies are not to be mitigated by climate-friendly technologies alone, India suggests tackling the climate issue by its root causes and proposes a shift to sustainable lifestyles.

Adaptation: India had outlined two key asks for adaptation: predictable and adequate adaptation funding by developing countries; and, an institutional mechanism for loss and damage. According to India's pre-Paris developed stand on climate change, adaptation is the key priority to India nationally, internationally and for the new agreement.

INDCs and finalization of NDCs: India is of the opinion that INDCs should cover all aspects including mitigation. Further, it is of the view that INDCs are nationally determined and are not subject to international review.

Work stream II (enhancing pre-2020 ambition): Indian position on work stream II has been that the work has to focus on all elements of the Bali pillars, vis-à-vis, mitigation, adaptation, finance, technology, finance and transparency. Further, in context of the enhancing ambition, the en-

hancement has to be of nationally appropriate mitigation commitments or actions of the developed countries in line with the requirements of Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 (AR5). Further, as the enhancement of actions includes full operationalization of the institutions established at Cancún, all the institutions, including mechanisms for loss and damage should be operationalized. This includes capitalization of the Green Climate Fund (GCF) to appropriate level. On finance India's position is that work stream II outcome should define a clear goal and timeline for scaling-up finance by developed countries to meet the agreed target of USD 100 billion finance by 2020.

India's views on SDG

India played a constructive role in preparing the SDG in the open working group process during 2014. The Indian government is in favour of establishing the SDG goals based on three pillars of sustainable development, viz. social, economic and environmental. It also is of the view that such goals should be universal but differentiated based on the principle of common but differentiated responsibility (CBDR) taking into account the development level of countries. Its position is that in developing countries priority has to be given to economic growth to reduce poverty level and to provide social and economic justice. Further, it stressed that means of implementation have to be an integral part of the SDG.

After the adoption of the SDG, India committed itself to the SDG. NITI Aayog (the National Institution for Transforming India) has appointed the respective ministries with the implementation of the 17 SDG.

5 Conclusions

This background paper has analysed the different socio-economic conditions in Germany and India, which help explain the very different approaches to climate change mitigation action and international policy. In Germany, the Energiewende is generally understood as a central contribution to a comprehensive shift towards a more sustainable society and enjoys strong support across the population. The high acceptance of climate change policy also makes it easier for the German government to propose and implement top-down policies. The Energiewende is seen by the majority as a large transformation that has costs, but also provides large economic opportunities. In India, climate mitigation is still associated by most with large costs and thus its economic feasibility is questioned. Climate mitigation is often perceived as additional burden on investments for development. Development and economic growth are the key priorities of the country and the climate change agenda has not been fully integrated in these priorities. Despite those different contexts, both countries already work on low-carbon solutions and a closer dialogue between German and Indian actors would certainly support the German and Indian efforts and low-carbon goals. Showing that the developmental ambition of India can be achieved through a low-carbon pathway is a key challenge, which could be faced through enhanced cooperation on finance and technology between the two countries. Closer dialogue can also highlight the co-benefits of low-carbon development, which are a key narrative within the German climate policy framing. The German example also shows that high public awareness of climate change can create a greater space for action by the government. Learning from the environmental consciousness achieved in Germany could therefore be useful to promote low-carbon development in India. On the other hand, Germany would benefit from a dialogue with India not only regarding business

and research opportunities but also Indian best practices on energy efficiency instruments and sustainable lifestyles.

With regard to the issue of equity in the UNFCCC negotiations, India has valid reasons for calling on the developed countries to take the lead: their historic responsibility, their capacities, India's development and adaptation needs. At the same time, India should make the effort to strive for a sustainable and low-carbon development. Germany, driven by the scientific evidences, calls for climate action by all countries and sees India as part of the group of larger emitters despite the low per capita emissions. Enhancing the understanding of each other's expectations and a dialogue on a new definition of development in the context of the Sustainable Development Goals and planetary boundaries have been identified as possibilities to bridge the country's positions and to develop an agreed set of equity principles.

After the successful conclusion of the Paris Agreement, the focus of international climate policy will be on implementation and on enhancing ambition in the short, medium and long-term. Accelerated action before 2020 is crucially important to keep any realistic chance of achieving the objectives of the Paris Agreement to limit global warming to well below 2°C, or even 1.5°C. In Paris, a dedicated process was set up to address pre-2020 action. India would like to put a particular emphasis on immediate action delivered by developed countries both in terms of increased emissions reduction commitments and provision of means of implementation to developing countries, which would reflect developed countries' responsibility to take the lead and contribute to the essential trust building between developed and developing countries. Germany would like to focus the discussions on the facilitation of any additional action, also from non-state and subnational actors. India from its national viewpoint remains sceptical that this is an appropriate approach to ensure additional emissions reductions. Even given these differences, India and Germany can find many ways to cooperate to increase short-term ambition, for example on renewable energy. The Indo-German Solar Energy Partnership is one example of such collaboration. Both countries also support developing countries on renewable energy. For instance, the International Solar Alliance championed by India and the African Renewable Energy Initiative, to which Germany is the largest contributor, are both part of the Action Agenda launched by the COP presidencies, the UNFCCC secretariat and the UN Secretary General's office. It could be useful to explore linkages between these initiatives.

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