Chapter 6

Bridging the gap III: Overview of options

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6.1 Introduction

The analysis in Chapters 2 and 3 of this report concluded that the emissions gap in 2020 is likely to be 8–12 $GtCO_2e$ and showed an increase in projected business-as-usual emissions in 2020 compared to the 2012 report. Starting from the estimated total emission reduction potential, and based on the findings of the previous chapters, this chapter provides an overview of options to reduce the emissions gap.

The chapter starts by asking whether the gap can be bridged. To answer this question, the best available estimates of the total emission reduction potential and possible changes in these estimates are discussed. Following this, a summary of options to narrow, and potentially bridge, the emissions gap in 2020 is presented.

6.2 Emission reduction potentials in 2020 and 2030: can the gap be bridged?

The options to narrow the emissions gap discussed in the previous chapters of this report – emission reduction pledges, Chapter 2; national climate and development policies, Chapters 2 and 4; and international cooperative initiatives, Chapter 5 – all have connections with one another and all will help bridge the emissions gap in 2020.

UNEP's Bridging the Emissions Gap Report (2011a) estimated the total emission reduction potential in 2020 to be in the range of 17 ± 3 $GtCO_2e$ [1,2]. Table 6.1 provides an overview of emission reduction potentials by sector from the earlier report together with estimates for 2030 from the IPCC (2007).

The mid-range of 17 $GtCO_2e$ is slightly greater than the estimated difference between business-as-usual emissions in 2020 and the 2020 emissions level consistent with a likely chance of staying within the 2° C target of 15 $GtCO_2e$. This indicates that there is still a chance to close the gap by 2020, but it also means that even relatively small changes in the total emission reduction potential could have important implications on the ability of society to bridge the gap. Total emission reduction potentials change over time, reflecting among other things technological development and the speed and comprehensiveness with which policies and options are adopted and implemented.

Table 6.1 Estimates of sectoral greenhouse gas emission reduction potentials, 2020 and 2030

Sector	Emission reduction potential in 2020 ($GtCO_2e$ per year)	Emission reduction potential in 2030 ($GtCO_2e$ per year)
Power sector	2.2–3.9	2.4–4.7
Manufacturing industry	1.5–4.6	2.5–5.5
Transportation	1.7–2.5	1.6–2.5
Buildings	1.4–2.9	5.4–6.7
Forestry	1.3–4.2	1.3–4.2
Agriculture	1.1–4.3	2.3–6.4
Waste	Around 0.8	0.4–1.0
Total (central estimate)	**17 ± 3**	**23 ± 3**
Total (full range)	**10–23**	**16–31**

Source: Emission reduction potential in 2020 is taken from UNEP, (2011a; 2012). The 2030 potential is taken from IPCC (2007).

UNEP's Emissions Gap Report 2012 emphasized that, although the emission reduction potential in 2020 remains high, time is running out with respect to realizing this potential (Chapter 3). First, there can be a considerable time lag between the adoption of emission reducing policies and options, their implementation and the reaping of the associated emission reductions. Second, many investments in, for example, transportation systems, energy production, buildings and factories are long-lived. Failure to invest today in best available technologies and options not only represents a lost opportunity to reduce emissions, it also curtails our ability to reduce them in the near future as high energy use and emission patterns are locked-in for several decades. Postponing action implies that part of the potential in 2020 may be lost and that steeper and more costly action will be required to achieve the remaining potential (Chapter 3).

[1] Adopting a sectoral bottom-up approach, with marginal costs in the range of 50–100 US $/t$CO_2e$.

[2] Assuming that the uncertainties are independent between sectors, which may hold under many cases, an error propagation rule to calculate the range of the sum of the sectors is applied – that is, the square root of the sum of squares of the range for each sector. This gives a reduced range of ± 3 $GtCO_2e$ compared to the full range of ± 7 $GtCO_2e$.

Furthermore, it is unclear to what extent national pledges and international cooperative initiatives cover the sectoral emission reduction potentials. As countries rarely specify a split of their pledge by sector, it is difficult to make a complete assessment of the degree of overlap. Ideally, such overlaps should be taken into account when assessing options for narrowing the emissions gap through additional action.

Comprehensive and regular updates of emission reduction potentials are a prerequisite for in-depth assessments of the feasibility of bridging the emissions gap. Unfortunately, the number of new studies published since the 2012 update (UNEP, 2012) is limited and prevents a thorough re-evaluation of the emission reduction potentials in Table 6.1. The new studies do, nonetheless, provide an assessment of the possible take-up of emission reduction options for particular scenarios and specific assumptions regarding policy regimes and carbon prices. They give an indication of current trends for the sectoral emission reduction potentials reported in Table 6.1. Recent developments in the power and transportation sectors point towards possible increases in the emission reduction potentials for 2020 – modest – and 2030 – potentially substantial. More specifically, for the power sector, rapid growth of renewable energy (Breyer, 2011; REN21, 2013) might be able to more than compensate for the limited development reported for nuclear energy and carbon capture and storage reported by the International Energy Agency (IEA, 2013). Some authors highlight that, if the current rate of growth of wind and solar photovoltaic power continues after 2020, decarbonization rates for electricity could be higher than expected in even the most ambitious scenarios, increasing the 2030 emission reduction potential by several $GtCO_2e$ (Blok and Van Breevoort, 2011). In the transportation sector, a rapid decline of carbon-dioxide emissions per vehicle kilometre for passenger cars is observed (IEA, 2013). Less is known about other parts of the transportation sector. A study for 2030 shows that implementation of appropriate policies for vehicle efficiency, modal shift and activity reduction could lead to a reduction in greenhouse gas emissions of 5.8 $GtCO_2e$ in 2030, compared to a business-as-usual scenario (Façanha *et al*., 2012). This is more than double the potential in 2030 given in Table 6.1, although developments in other parts of the transport sector would need to be factored in.

Progress in the manufacturing industry and building sectors is limited and raises concerns about the feasibility of achieving its mid-range potential by 2020. For the manufacturing industry current uptake of energy-efficient technology is moderate according to the International Energy Agency (IEA, 2013). However, large developing countries such as China and India now have substantial industrial energy efficiency programmes in place, although the actual impact of these is difficult to quantify at this stage. Given the limited level of implementation globally, the remaining potential in 2020 is likely to be closer to the lower end of the range rather than the higher. Since a large part of the potential is retrofit and add-on technology, the estimate of the 2030 potential is probably still valid. The building sector shows limited progress, according to Ürge-Vorsatz *et al*. (2012) and the International Energy Agency (IEA, 2013), who claim that a large untapped potential exists. This raises concern about the feasibility of reaching the 2020 potentials and also makes it difficult to make a statement about the change in potential for 2030.

Similarly for agriculture and forestry, the limited level of actual implementation of policies may limit the feasibility to achieve the higher ends of the range of emission reduction potentials for 2020.

To conclude, the findings of recent studies are generally consistent with the range of 2020 emission reduction potentials summarised in Table 6.1. However, they do give reason for concern about the feasibility of achieving the potentials by 2020. They also illustrate the need for comprehensive updates of the potentials for each sector for 2020 and 2030, and for tracking progress towards them.

Most of all, this section, along with the previous chapters of this report, illustrates that emission reduction potentials will only be realised if strong, long-term and sector-specific policies and policy portfolios are in place at the international and national level (Box 6.1).

6.3 Options to narrow and potentially bridge the emissions gap in 2020

A number of options to narrow the 2020 emissions gap can be identified based on the information of the previous chapters of this report. These range from applying more stringent accounting practices for pledges to increasing the scope of pledges to going beyond them. Figure 6.1 summarizes these options and illustrates how, if implemented together, they have the potential to bridge the emissions gap in 2020. Each of these options and their potential contribution to narrowing the emissions gap are summarised below.

As described in Chapter 2, the gap can be narrowed by 1-2 $GtCO_2e$ by applying more stringent accounting practices for emission reduction pledges, i.e. by moving from lenient to strict rules. This includes:

- Minimizing the use of lenient land-use credits .
- Minimizing the use of surplus emission units
- Avoid double counting of offsets

The gap can be further narrowed by 2-3 $GtCO_2e$ if all countries were to move from their unconditional to their more ambitious conditional pledges. This would require the fulfilment of the conditions on those pledges and the swift implementation of policies to deliver the additional reductions. These conditions include expected action of other countries as well as the provision of adequate financing, technology transfer and capacity building. Alternatively it would imply that conditions for some countries be relaxed or removed.

These two approaches, applying more stringent accounting practices plus implementing the more ambitious pledges, leads to a reduction of the emissions gap of 4 $GtCO_2e$.

The gap can be further narrowed by other actions aimed at increasing the scope of current pledges:

- Coverage of all emissions in national pledges (up to 0.5 $GtCO_2e$): some country pledges cover only a part of a country's total emissions. For example some countries have pledges to reduce carbon dioxide emissions and have not specified actions for the other greenhouse gases. This would apply to roughly 3 $GtCO_2e$ of current emissions. Assuming these are reduced by 15 percent

[3] Some countries are set to move in this direction (see Section 2.5)

Box 6.1 Best-practice policies for reducing greenhouse gas emissions and achieving development goals from the 2012 and 2013 UNEP emissions gap reports

The 2012 and 2013 UNEP emission gap reports identify policies for four sectors that have proven successful in reducing greenhouse gas emissions in many different countries, while contributing to national development goals (Chapter 4; UNEP, 2012). Such sector-specific policies have the potential to make a significant contribution to bridging the gap, if scaled up in both ambition and geographical reach.

Agriculture

- Promotion of no-tillage practices: no-till refers to direct seeding under the mulch layer of the previous season's crop, reducing greenhouse gas emissions from soil disturbances and fossil-fuel use by farm machinery.
- Improved nutrient and water management in rice production: includes innovative cropping practices such as alternate wetting and drying and urea deep placement that reduce methane and nitrous oxide emissions.
- Agroforestry: consists of different agricultural management practices that all deliberately include woody perennials on farms and the landscape, and which promote a greater uptake of carbon dioxide from the atmosphere by biomass and soils.

Buildings

These policies lower energy use and therefore reduce carbon-dioxide and other emissions:

- Building codes: regulatory instruments that set standards for specific technologies or energy performance levels and that can be applied to both new buildings and retrofits of existing buildings.
- Appliance standards: regulations that prescribe the energy performance of manufactured products, sometimes prohibiting the sale of products that are below a minimum level of efficiency.
- Appliance labels: energy-efficiency labels that are fixed to manufactured products to describe the products' energy performance. Endorsement labels are seals of approval that are awarded if energy-saving criteria are met. Comparative labels allow consumers to compare performance among similar products.

Forests

These policies slow down deforestation and thereby reduce carbon dioxide and other emissions:

- Protected areas: designating some forested areas as protected areas.
- Command-and-control measures: enacting and enforcing environmental regulations and putting adequate monitoring systems in place to ensure compliance.
- Economic instruments: using economic tools such as taxes, subsidies, and payments for ecosystem services for encouraging forest conservation.

Transport

These policies reduce energy use and therefore reduce carbon dioxide and other emissions:

- Transit-oriented development: the practice of mixing residential, commercial and recreational land uses to promote high-density neighbourhoods around public transit stations.
- Bus Rapid Transit (BRT): key elements of bus rapid transit include frequent, high-capacity service; higher operating speeds than conventional buses; separated lanes; distinct stations with level boarding; and fare prepayment and unique branding.
- Vehicle performance standards: establish minimum requirements based on fuel consumption or greenhouse gas emissions per unit of distance travelled by certain vehicle classes.

These policies do not represent a comprehensive list. Moreover, some best-practice policies will be more appropriate and successful in reducing emissions in some countries than in others. Their success also depends on how stringently they are implemented.

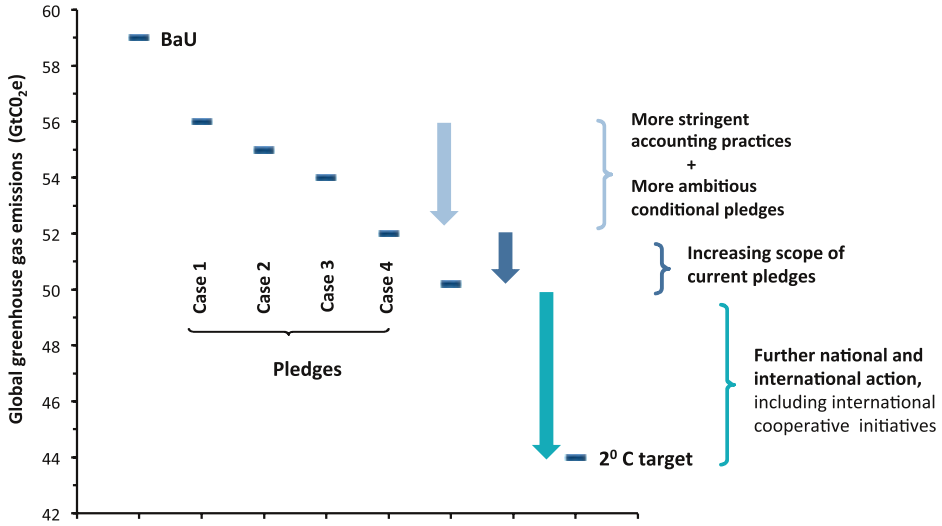

Figure 6.1 Overview of options to narrow the emissions gap in 2020.

by 2020, the order of magnitude of pledges made by other countries, the resulting reduction would be 0.5 $GtCO_2e$.

- New pledges by countries that have not yet pledged (up to 1 $GtCO_2e$): some countries have not yet put forward pledges. Aggregated emission levels from those countries amounted to roughly 7 $GtCO_2e$ in 2010. If they were to reduce emissions by 15 percent by 2020, which is the order of magnitude of pledges made by other countries, the resulting reduction in emissions would be 1 $GtCO_2e$.
- Additional reductions from sectors not covered by national pledges (0.3 $GtCO_2e$): Some sectors, notably international transport, are not covered by national pledges. The mitigation potential in these sectors is 0.3 $GtCO_2e$ (UNEP, 2011a).

These three actions to increase the scope of current pledges would further reduce the gap by up to 1.8 $GtCO_2e$.

Adding together the more stringent accounting practices, the more ambitious pledges, and the increased scope of current pledges, reduces the gap by around 6 $GtCO_2e$, or about a half.

The remaining gap can be bridged through further national and international action, including international cooperative initiatives. These initiatives may partly overlap with national pledges, but can also be additional to these pledges. If they are additional and implemented rapidly, they have the potential to substantially reduce the gap by 2020 (Blok *et al.*, 2012).

Reductions of short-lived climate pollutants would have to occur in addition to reductions of emissions of long-lived greenhouse gases, and would not be a replacement. Some ozone precursors and black carbon are not covered by national pledges, but are already assumed to be reduced in the calculations of the gap. Missing out on these reductions would increase the gap by a rough equivalent of 1–2 $GtCO_2e$ (Hare *et al.*, 2012; UNEP, 2011b).

6.4 Conclusions

This chapter illustrates that it is difficult to estimate the impact of various options for reducing emissions and narrowing the gap. For this reason it would be beneficial to set up an objective accounting system for tracking progress towards closing the gap. Also, comprehensive updates of emission reduction potentials in different sectors would provide invaluable information for decision making as we move closer to 2020.

Importantly, this chapter shows that applying more stringent accounting practices, implementing more ambitious pledges, and increasing the scope of current pledges, will bring the world halfway to bridging the gap. The remaining gap can be bridged through further national and international action, including international cooperative initiatives. As shown in the beginning of this chapter this is technically possible.