

P2.2-3 Transition to Low Carbon Economies in Developing Countries - Case Study: Bangladesh

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The two main features of Bangladesh's demographic and economic context that are highlighted in the Bangladesh's Climate Change Strategy and Action Plan (BCCSAP) of 2008 are that (a) economic growth has been accelerating over the last 5 years, with the opportunity that it could become a middle-income country by 2020, and that (b) Bangladesh's population growth rate per annum has fallen to 1.4% in 2006. However, it is still expected that the population will grow from an estimated 150 million people in 2008 to 200 million by 2050, with almost half of the population living in urban areas: Dhaka alone is predicted to become a 'mega city' of 40 million people.

Over 80 million people in Bangladesh do not have access to electricity, relying on biomass stoves for cooking and kerosene lamps for lighting. The remaining 60 million or so have access to intermittent electricity supplies, with load shedding (of between 500 and 1000 MW in the late afternoon and evening) a persistent problem. In rural areas, 75% of people in 2005 were not connected to the grid in contrast to 50% of those living in Dhaka, showing a rural-urban divide in electricity provision.

Bangladesh currently has a total energy use per capita of between 1700-2600 kWh / year of which roughly 8% was electricity (28 TWh in 2009). This compares to developed countries such as the UK which have energy use per capita around 45,000 kWh/year of which roughly 15% was electricity (370 TWh in 2009). Although UK energy use per capita is expected to decrease by 2050, electricity demand is expected to double by 2050 to 30% of energy use (750 TWh), mostly because of improvements in efficiency, and the electrification of transport and heating. This analysis has been carried out in order to calculate how the UK will meet its requirement to reduce GHG emissions by 80% by 2050. Whilst this constraint is not appropriate for Bangladesh an examination of options for meeting the expected energy demand for 2050 on the assumption that economic growth will continue is

necessary in order to plan infrastructure investments that will still be functioning in 2050.

Economic growth has always been closely coupled with energy consumption, and it is therefore a sensible approximation to assume that energy use/capita will increase with GDP/capita. In recent years Bangladesh has been able to sustain economic growth of roughly 6% and GDP is currently approximately \$600/capita.

As part of a UK-Bangladesh pilot project on collaboration on research on climate change, a simple scenario was constructed to predict the energy use in 2050 using the following assumptions:

- GDP/capita and energy/capita increase by 6% per year;
- Electricity generation increase by 10% per year; and
- Population increases to 200 million in 2050, therefore grows by 0.56% per year.

The scale of this challenge should not be underestimated, combined with the additional challenges of providing the infrastructure to support a population approaching 200 million to a standard of living commensurate with becoming a developed country.

To put this into context, UK electricity demand is currently around 370 TWh (42 GW), and recent work completed by the UK Government has shown that it could double by 2050 to 750 TWh (85 GW). If Bangladesh were to achieve energy consumption which was roughly 50% of that in the UK by 2050, with a population roughly 3 times larger, and with similar consumption patterns, i.e. transport and heat demand are both mostly electrified, then it would require roughly 1,267 TWh (145 GW) of electricity generation.

Therefore, these assumptions and this scenario is broadly commensurate with a contraction and convergence by 2050 of developed and developing

countries. However, the goal should clearly not be to compare Bangladesh to the UK or to achieve energy consumption per capita targets, but to deliver the services necessary to deliver a good quality of life. For example the high population density of Bangladesh may reduce transport demand per capita compared to other countries.

Even with the discovery of large coal deposits and the dwindling gas reserves in Bangladesh, fossil fuels will not be able to provide the bulk of the electricity demand unless there are substantial imports.

Renewable energy, particularly solar and biomass, will need to be expanded to generate electricity at scale to meet increasing demand. Therefore, massive expansion of renewable energy is not only desirable but necessary in the medium to long term.

However, it is clear the scale of the infrastructure that needs to be delivered by 2020 and beyond to 2050 requires significant expansion of all sectors of the economy including electricity generating capacity.