# Supplemental data for

"Energy use and greenhouse gas emissions in selected Hindu Kush–Himalayan countries" by Ram M. Shrestha, published in *Mountain Research and Development* 33(3), 2013. (See http://www.bioone.org/toc/mred/33/3)

**Table S1:** Models and assumptions used in different projections

| Countries | Study[a] | Methodology/model | Assumptions | | |
|---|---|---|---|---|---|
| | | | GDP growth rate (%, 2005–2030) | Population growth rate (%, 2005–2030) | Other |
| Bangladesh<br>Bhutan<br>India<br>Nepal<br>Pakistan | ADB (2009) | Econometric approach to energy demand forecast (Institute of Energy Economics, Japan) | Bangladesh: 4.8<br>Bhutan: 6.3<br>India: 5.8<br>Nepal: 3.6<br>Pakistan: 4.2 | Bangladesh: 1.4<br>Bhutan: 1.2<br>India: 1.1<br>Nepal: 1.7<br>Pakistan: 1.7 | Crude oil price:<br>USD33.3/barrel in 2000<br>USD122/barrel in 2030 |
| Bangladesh<br>Bhutan<br>Nepal | Shrestha et al (2013) | Bottom-up integrated energy system model based on MARKetALlocation(MARKAL) framework | Bangladesh: 6.0, 5.5, 5.0, and 4.5 during 2005–2010, 2010–2015, 2015–2020, and 2020–2030, respectively<br>Bhutan: 9.0, 7.0, and 7.8 during 2005–2010, 2010–2015, and 2015–2030, respectively<br>Nepal: 4.2, 5.5, 5.8, and 6.0 during 2005–2010, 2010–2015, 2015–2020, and 2020–2030, respectively | Bangladesh: 1.40, 1.20, 1.30, 1.20, and 1.10 during 2005–2010, 2010–2015, 2015–2020, 2020–2025, and 2025–2030, respectively<br>Bhutan: 1.85, 1.70, 1.35, 1.01, and 0.82 during 2005–2010, 2010–2015, 2015–2020, 2020–2025, and 2025–2030, respectively<br>Nepal: 2.08, 1.90, 1.78, 1.65, and 1.52 during 2005–2010, 2010–2015, 2015–2020, 2020–2025, and 2025–2030, respectively | A discount rate of 10% in Bangladesh and Nepal and 12% in Bhutan has been considered. |
| Bangladesh | Mondal et al (2010) | Bottom-up integrated energy system model based on MARKetALlocation(MARKAL) framework | 6.8 | No precise number mentioned | A financial discount rate of 10% is considered.<br>Only the centralized electricity grid is covered. |
| India | IEA (2007) | International Energy Agency's World Energy Model | 6.3 | 1.1 | No new energy policy interventions by governments<br>Crude oil import price:<br>USD32.49/barrel in 2000<br>USD62.00/barrel in 2030 |
| | Garg and Shukla(2009) | Asia-Pacific Integrated Assessment Model with a Geographical Information Systeminterface | No precise number mentioned | No precise number mentioned | |

| | | | | | |
|---|---|---|---|---|---|
| | Shukla(2006) | Intergovernmental Panel on Climate Change Special Report on Emissions Scenarios | 7.5% (IA1—globalization high growth scenario)<br>5.5% (IA2—mixed economy scenario)<br>6.5% (IB1—sustainable development scenario)<br>4.5% (IB2—self reliance scenario)<br>(2000–2030) | No precise number mentioned | |
| | Parikh and Parikh (2011) | Bottom-up discounted cost optimizing continuous linear programming model; integrated energy system model | 8.0 | 1.1 | |
| | Parikh et al (2009) | Bottom-up discounted cost optimizing continuous linear programming model; integrated energy system model | 8.0 and 9.0<br>(this paper uses 2 growth rates for its analysis) | 1.1 | |
| | MoEFI(2009) | Modeling study 1: Top down nonlinear general equilibriummodel | 8.84 | | |
| | | Modeling study 2: Linear programming MARKAL model | 8.84 | | |
| | | Modeling study 3: Linear programming model, which uses the activity analysis framework to model the linkages between the national economy and the environment | 7.66 (2010/11–2030/31) | | |
| | | Modeling study 4: MARKAL modeling framework | 8.2 (2001–2031) | | |
| | | Modeling study 5: Bottom-up approach | 7.51 | | |
| | Rout (2011) | Linear programmed TIMES G5 Model on TIMES Modeling framework | 4.3 (2000–2030) | 1.1 (2000–2030) | |
| Nepal | Shakya et al (2011)<br>Shakyaand Shrestha (2011) | Bottom-up integrated energy system model based on MARKAL framework | 5.5 (2010–2015)<br>5.8 (2015–2020)<br>6.0 (2020-2050) | 2.0 (2001–2021) | Electrification rate increase from 40% in 2005 to 100% by 2030 |
| Pakistan | Khan et al (2011) | No model mentioned | Precise figure not mentioned | Precise figure not mentioned | |

[a] All references mentioned here are listed in the article for which this table is Supplemental Material: "Energy use and greenhouse gas emissions in selected Hindu Kush–Himalayan countries" by Ram M. Shrestha, published in *Mountain Research and Development* 33(3), 2013. (See http://www.bioone.org/toc/mred/33/3)