

## ANNEX 9: ESTIMATING IMPACTS OF CLIMATE CHANGE ON ENERGY GENERATION IN ALBANIA, EXCLUDING LARGE HYDROPOWER PLANTS

This Annex outlines the estimates of climate change impacts on Albania’s energy assets, excluding large hydropower plants<sup>1</sup>, to be used in the cost–benefit analysis. It has been developed by considering the climate change projections for Albania and drawing on the authors’ engineering expertise of the relationships between climatic factors and asset performance.

### A9.1 SMALL HYDROPOWER PLANTS (SHPPs)

Assume a 1 to 1 relationship between reduced river flows and SHPP production, that is, a 20 percent reduction by 2050<sup>2</sup>.

### A9.2 THERMAL POWER PLANTS (TPPs)

Estimate a 0.5 percent reduction in TPP output associated with higher temperatures in 2020, rising to 1 percent in 2050.

### A9.3 WIND

The climate change scenarios<sup>3</sup> projections of changes in wind are low confidence and show little or no change. The report therefore assumes no change.

### A9.4 DOMESTIC SOLAR HEATERS

The climate change scenarios<sup>4</sup> indicate a reduction in cloudiness as shown in Table A9.1.

**Table A9.1 Range of Projected Changes Compared to 1961–1990 Baseline**

Climate variable	Range of projected changes compared to 1961–1990 baseline					
	2020s			2050s		
	Annual	Summer	Winter	Annual	Summer	Winter
Cloudiness (%)	–4 to –1	–5 to –2	–2 to 0	–5 to –2	–8 to –6	–3 to 0

<sup>1</sup> For LHPP estimates see Annex 8.

<sup>2</sup> See Annex 8.

<sup>3</sup> Acclimatise. (2009). Climate change projections for Albania. Acclimatise, United Kingdom. (Jane, is this the elusive “CCSA”? If so the word here would be Scenarios? not projections)

<sup>4</sup> Ibid.

In summer, domestic solar heaters already provide all the required energy for water heating, so decreases in summer cloud cover will not act to reduce energy demand for water heating. In winter, however, this is not the case, so the report assumes that the winter water heating demand, taking account of climate change, should be reduced by 1 percent by the 2020s and 2 percent by the 2050s. For autumn and spring we suggest reduced demand of 1.5 percent by the 2020s and 3.0 percent by the 2050s.

#### **A9.5 CONCENTRATED SOLAR POWER**

The report uses the data on decreases in cloudiness to estimate equivalent increases in output from concentrated solar power.

#### **A9.6 TRANSMISSION AND DISTRIBUTION**

The efficiency reduction for transmission and distribution is estimated as 1 percent by 2050, associated with rising temperatures.