

Technology Fact Sheet for Mitigation

Technology 10: Small scale hydropower plant ⁱ

<i>Subsector</i>	Energy supply
<i>Sector GHG emission (tCO₂-eq)</i>	6,399,000 tCO ₂ -eq from the energy supply subsector in 2006
<i>Technology Name</i>	Small scale hydropower plant
<i>Background/Notes, Short description of the technology option sourced from ClimateTechWiki, Seminars, etc</i>	Small hydropower here refers to hydroelectric power plants below 15MW installed capacity. Hydroelectric power plants are power plants that produce electrical energy by driving turbines and generators thanks to the gravitational force of falling or flowing water. Through the natural water cycle mainly evaporation, wind and rain, the water is then brought back to its original height. It is thus a renewable form of energy. Small-scale hydro power may be a useful source for electrification of isolated sites and may also provide an extra contribution to national electricity production for peak demand.
<i>Implementation assumptions, How the technology will be implemented and diffused across the subsector?</i>	<p>Mongolia has experience in construction of hydropower plants with capacity of 11 and 12 MW.</p> <p>The Taishir 11MW hydropower plant is constructed on the ZavkhanRiver with power generation of 37,000 MWh of electricity per year, which is provided to the Gobi Altai and Zavkhan provinces. It achieves CO₂ emission reductions of 29,600tCO₂-eq /yr by displacing electricity that would otherwise be generated by diesel generators (Taishir Project Design Document).</p> <p>The Durgun 12 MW hydropower plant is constructed on the Chono Kharaih River with power generation of 38,000 MWh of electricity per year distributed to Bayan Ulgii, Khovd and Uvs provinces.It achieves CO₂ emission reductions of 30,000 tCO₂-eq /yr by displacing electricity that would otherwise be generated by a coal-fired power plant (Durgun Project Design Document).</p> <p>It is assumed that a 12 MW hydropower plant is compared with a coal-fired power plant.</p>
<i>Reduction in GHG emissions</i>	12 MW hydropower plant will reduce GHG emissions of 30,000tCO ₂ -eq/yr compared with a coal-fired power plant.
<i>Impact Statements - How this option impacts the country development priorities</i>	

<i>Social development priorities</i>	<p>Small scale hydropower plant could:</p> <ul style="list-style-type: none"> • displace imported fossil fuel with domestic resources for power generation; • prevent mass migration of local people to urban areas and degradation of remote areas • provide assistance in the development of potential tourist attractions; • be incorporated with other productive water use projects such as water supply, irrigation, tourism and recreation.
<i>Economic development priorities</i>	<p>The electricity can be used to increase income generating activities, in particular it can improve irrigation, crop processing and food production (ESHA, 2005). The income generating activities may provide more jobs to the rural communities. http://climatetechwiki.org/technology/smallhydro</p>
<i>Environmental development priorities</i>	<p>Substituting traditional fuels by the switch to electricity can reduce air pollution, improve health and decrease social burdens, e.g. from collecting firewood.</p>
<i>Other considerations and priorities such as market potential</i>	<p>The market potential is medium</p>
Costs	
<i>Capital costs</i>	<p>The capital cost of small HPPs depends on geographical location. For example, the investment costs for 12 MW Durgun HPP and 11 MW Taishir HPP were 26.5 million USD and 38.9 million USD respectively.</p> <p>We assume the cost of small hydropower plant with capacity 12 MW as average of above 2 plants as 32.7 million.</p> <p>Assuming a life time of 100 years the annualized cost would be around 0.33 million USD.</p>
<i>Operational and Maintenance costs</i>	<p>Operational and maintenance costs can be assumed to be about 300,000 USD as average for Durgun (191000 USD) and Taishir (400,000 USD) HPPs (Source: Durgun and Taishir PDDs).</p>
<i>Cost of GHG reduction</i>	<p>Annual capital cost 0.33 Million USD plus O&M cost 0.3 million USD.</p> <p>Total cost is 0.66 million USD.</p> <p>Mitigation achieved 30,000 tCO₂-eq /year.</p> <p>Therefore cost of GHG reduction is 22 USD/ tCO₂-eq.</p>

ⁱ This fact sheet has been extracted from TNA Report – Technology Needs Assessment For Climate Change Mitigation– Mongolia. You can access the complete report from the TNA project website <http://tech-action.org/>