SOLAR THERMAL COAL SAVERS

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Abstract - Hybridisation of solar heat with fossil plant can be carried out either as simple fuel substitution, or through creation of additional firm capacity.

On electricity grid systems in developed nations, there are usually not immediate capacity shortages. This is why attention is paid to developing countries, which seek additional capacity.

However, the emissions of developed countries must be reduced, and there is a developing market seeking the maximum offset of CO2. The largest initial solar thermal market in developed countries may be the small solar fraction retrofitting of existing fossil generation capacity, especially coal.

Using such a strategy, relatively low cost CO2 emission reductions can be achieved in the transition years when fossil fuel capacity is still predominant. This and other hybridisation strategies are compared using costings of parabolic trough, central receiver, and new compact linear fresnel reflector (CLFR) technology. Comparisons against wind and PV generation are also supplied.

For CLFR arrays, the cost of emissions savings from solar supplementation of an existing coal-fired power plant is calculated to be significantly lower than the emissions saving costs of other solar thermal electricity options such as integrated combined cycle plants. Although coal fuel saving is only an interim strategy, the emissions reductions from the solar utilisation of existing steam turbine equipment present an attractive and simple transition strategy for achieving high volume production of solar components which can also be used by stand-alone solar thermal systems.