The ISCCS Crisis

The Perspective of the World Bank and GEF on Solar Thermal Generation

THE WORLD BANK GROUP

GEF's OP7: Reducing the long term costs of low GHG emitting technologies

- Promote the increased use of 'backstop' technologies with low emissions of GHG
- Reduce costs by moving down the technology learning curve
- PV, biomass, solar thermal, wind, fuel cells and advanced fossil fuel generation technologies
- Targeted research, capacity building and investment

So what does OP7 tell us?

- Although early stage OP7 projects do not necessarily demand them, these must offer a pathway to a sustained and significant reductions in fossil fuel use
- Projects must lead to real market development, not create an artificial market of its own

History of Project Preparation of Mathania

Date	Design	ç (%)	Size (MW)	Avoided CO_2 Comparison
1988	SEGS	15	35	100% with coal as baseline
1992	SEGS + Boiler (LSHS fuel)	15 33	35	28% with LSHS as baseline
1994	ISCCS LSHS	15	35	11% with LSHS in CCGT but 6% if auxilliary firing is employed
	$\Rightarrow$ Frame 6	44	115	
1998	ISCCS Naphtha	15	35	6% with Naphtha in CCGT but 0.5% if auxilliary firing is employed
	$\Rightarrow$ Hi-ç GT	55	115	

So what is Mathania telling us?

- Bottom firing in an ISCCS negates the solar contribution
- Even without bottom firing, ISCCS is still difficult to justify
- We believe these issues are not confined to Mathania

Why is bottom firing necessary?

- To meet baseload:
  - Operator must maximize full load hours
- To meet peak or intermediate loads:
  - Peak demand in developing countries (almost always) occurs after dark

Restricting the use of bottom firing would be an artificial constraint to the least cost operation of the plant

Can ISCCS be justified without bottom firing?

- ‘Low impact’ (Bechtel) concept
  - Will 2% of output contribute to the OP7 objective and revitalize the industry?
  - How will it lead to sustained and significant reductions in fossil fuel use?

Can ISCCS be justified without bottom firing?

'Regular' concept (oversize bottom cycle ST by as much as 100%) without bottom firing

- Benefits?
  - Incremental ST cost
  - Better 'with sun' ç
  - Lower O&M
  - Others?
- Penalties?
  - For 75% of time ST runs below capacity (as much as 50%)
  - Integration costs in the WHRS
  - To build a 40MW plant must create a 200MW opportunity
  - Ensures head to head competition with gas

The dilemma

- ISCCS gives you:
  - High capacity factor and/or dispatchable power
  - More efficient use of fossil power than a straight forward CCGT
  - High solar contribution
- Pick any two