Himachal Pradesh State Cooperative Bank

Shimla, Himachal Pradesh, India

Solar Passive and Active Designs for energy efficiency

Nasruddin Nazerali, 2006
Concept of Building

- **Innovative combination of solar passive and active systems for a predominantly day-use building to cut down heating needs during winters** *(Representative Designs of Energy Efficient Buildings in India, Ministry of Non-conventional Energy Resources and Tata Energy Research Institute, 2001)*

- **Institutional Framework:** State Council for Science, Technology and the Environment, HP [http://himachal.nic.in/hpscste/solar.htm](http://himachal.nic.in/hpscste/solar.htm) 10/24/06
  
  “HP first state in the country to introduce solar passive building technology for the design & construction of Govt. & Semi Govt. buildings on large scale. The Council has formulated a **Solar House Action Plan** in May 1994, which is being supported by Ministry of Non-Conventional Energy Sources, Govt. of India.”

  “The Council is coordinating the **Solar Passive Building Program** in Himachal Pradesh in collaboration with HP Public Works Department, HP Housing and Urban development authority (HIMUDA) Board & other organizations”
Design Process and Implementation

- Client/Owner: HP Cooperative Bank
- Architect: Ashok B. Lall
- Local Architect: C.L. Gupta
- Energy Consultant: S.S. Chandel, Principal Scientific Officer and Coordinator, Solar House Action Plan, HP CSTE
- Total building cost: Rs 22 million ~ USD 500,000. Solar passive component 5.6% increase in cost.

“A Technical Project Management Cell [TPMC] has been set up in the Council to provide technical inputs to the state housing agencies for the implementation of policy decision & solar house action plan for HP.

Financial Incentives: Under the Solar Passive Building Program, the Ministry of Non-Conventional Energy Sources (MNES), Government of India, provides incentive of Rs. 50,000 for the preparation of the Detailed Project Report (DPR) for a solar passive building. The additional cost for solar passive buildings is met by the MNES, limited to 10% of the cost of the building or Rs 10 lakh (USD 20,000) per building. These incentives are available only in Govt./ semi Govt. sector.”
Major Design Features

1. Sunspaces on the southern side
2. Solar wall on the southern side
3. Solar air heating system: solar heat collector on roof-top with duct system for supply to various rooms
4. Double glazed windows
5. Air-lock lobby at the main entrance
Economic Considerations

- Built-up area of 1650 m² (35% heated by solar air heating system)
- Total area of solar air heating panels 38 m²
- External walls 23-cm thick masonry with 5-cm thick glass wool insulation. Windows double-glazed. Total area 155 m². Roofing corrugated galvanized iron sheeting.
- Electrical back-up 3 × 15 kW (3 stages)
- Blower 4000 cfm (cubic ft of air/min)
- Ducting

- **Cost of entire system**: Rs 1.1 million ~USD 25,000
- **Total building cost**: Rs 22 million ~ USD 500,000
  - “The initial cost of the bank building without incorporation of passive solar measures was Rs 12 666/m², which was increased by Rs 680/m² to Rs 13 346/m² thus resulting in 5.6% increase in cost due to incorporation of passive solar measures”
Economic Considerations

• Council operates consultancy service for small fees to private owners
• Incremental costs 5–10% recovered in energy bill savings in 5–7 years
Conclusion

• The institutional setting in India is different from that of the U.S.
  – More government involvement
  – More focused approach
Sources

• *Representative Designs of Energy Efficient Buildings in India* Ministry of Non-conventional Energy Resources and Tata Energy Research Institute, 2001

• Solar Passive Building Technology in Himachal Pradesh http://himachal.nic.in/hpscste/solar.htm 10/24/06