

SOLAR ENERGY AN – AWAKENING: A DOCUMENTARY FOR SOLAR ENERGY EDUCATION IN INDIA

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1. Introduction

In recent years, India's energy consumption has been increasing at a relatively fast rate due to population growth and economic development. In the last six decades, India's energy use has increased 16 times and the installed electricity capacity by 84 times. In 2008, India's energy use was the fifth highest in the world. However, there is a considerable gap between demand and supply. The demand is likely to grow significantly further with a projected growth of economy at 8-9% per annum. This is a result of rapid urbanization and improving standards of living. As per the estimates made in the Integrated Energy Policy Report 2005, if the country were to progress on the path of sustained GDP growth during the next 25 years, it would imply quadrupling of its energy needs over 2003-04 levels. India therefore, needs a secure, affordable, and environmentally sustainable option/s of energy resources. Along with energy conservation and energy-efficiency, renewable energy is fast emerging as a key option. Renewable Energy in general and Solar Energy in particular will play an important role in augmentation of grid power, providing energy access, reducing consumption of fossil fuels and helping India pursue its low carbon developmental pathway (MNRE, 2011).

India is bestowed with a good sunshine. About 5,000 trillion kWh of Solar Energy is annually incident with most parts receiving 4-7 kWh/m² per day. Solar thermal and solar photovoltaic technologies can therefore, effectively be harnessed on a massive scale. Recognizing this fact, Government of India has launched -Jawaharlal Nehru National Solar Mission- a major national initiative for extensive implementation of solar technologies (MNRE, 2008).

Residential hot water demand forms one of the major components of increased energy needs of India, which can be met easily using Solar Heat. Table 1 shows estimated potential for Solar Water Heating (SWH) in India.

Table 1 Estimated Potential of Solar Water Heating in India (million m²) (MNRE, 2010)

Year	2010	2013	2017	2022
Residential	2.58	4.25	7.68	15.74
Commercial/ Institutional				
• Hotels	0.19	0.35	0.61	0.97
• Hospitals	0.10	0.17	0.27	0.43
• Others	0.18	0.27	0.39	0.52
	0.19	0.33	0.57	1.05
Total	3.24	5.37	9.52	18.70

Reasonable penetration of SWH in residential sector has been observed in some states of India like Karnataka and Maharashtra. In spite of the potential of 18.7 million m², general awareness about Solar

Water Heating was found to be low in rest of the country. Though people are familiar with the concept, the awareness on technologies and products was found to be very low. The knowledge of owners of small private hospitals is less-favorable for-SWH climatic zones and limited to existence of SWH products [MNRE, 2010].

The rapid and large-scale diffusion of solar technologies in India necessitate a huge technical as well as non-technical manpower, which must be aware about Solar Technologies. By the end of 2022, solar industry in India will employ at least 100,000 personnel across the skill spectrum. On the backdrop of above scenario in India, an urgent need was felt to educate and inspire a large number of school and college students about Solar Energy in their formative years of learning; so also professionals, technocrats and technicians [MNRE, 2008].

Educating masses and growing awareness about potential of solar energy and technologies available in India was perceived to be the urgent need of the hour. To achieve this objective, on a huge scale, an Audio-Visual route of education might be more effective and rapid than the print media. A documentary on Solar Energy, therefore, has been contemplated and produced. The title of the documentary is 'Solar Energy – An Awakening'. This is the first short educational film on Solar Energy in India. The 25-minute documentary is available in DVD format.

2. Execution of the project

The project of Solar Documentary production was accomplished through following stages.

- i.* Writing a script or screen play
- ii.* Preparation of shooting script
- iii.* Undertaking shooting sessions
- iv.* Editing, Insertion of Graphics, Voiceover and Background music
- v.* Screening, Feed back, Certification

i. Writing a script or screen play

The most convenient way of documentary presentation has been one of - showing a continuous sequence of scenes with narration and music on the background. The same way is adopted for the solar documentary project. Script or screenplay is the activity plan of the events in the documentary. While preparing a screenplay, one must have a clear idea of the target audience of the documentary. The target audiences in the solar documentary were technicians, school or college students or common men who might be unacquainted with Science and Technology. The elucidation needed to be logical, clear, simple and slow. Script preparation therefore, involved creation of narration. Sequence of the topics in the narration of the documentary was maintained as follows.

- a. Introduction of the sun and its potential
- b. Description of the Basic concepts
- c. Discussion of the prevailing technologies and applications
- d. Prospect

The screenplay began with a preamble by Padmashri S. P. Sukhatme, former Director of Indian Institute of Technology, Bombay. He is an eminent personality in the field of Solar Energy. The script then, described the sun, its potential, fundamental concepts of solar thermal and solar photovoltaic utilization.

Basic concepts were followed by description of solar photovoltaic and thermal appliances. The emphasis was on solar thermal applications. Discussion on solar thermal section included technologies of power generation. The narration appealed wholehearted acceptance of solar technology to the viewers and concluded suggesting a possible solution to energy and environmental problems of India.

ii. Preparation of shooting script

The screen play was discussed with the director, assistant director cameraman, editor etc. With some omissions and additions, the same is approved for production. Preparation of shooting script was the next step. Shooting script is the version of a screenplay used during the production of a motion picture or a documentary [Wikipedia, 2011]. Shooting script was prepared by breaking the screen play into scenes. The scenes are assigned numbers which are included in the script alongside the scene headers. The numbers provide a convenient way for the various production departments to reference individual scenes. Shooting script was circulated to the production team with page numbers locked. Figure 1 shows a snap shot of a page of the shooting script of the Solar Documentary.

<i>Scene No.</i>	<i>Narration</i>	<i>Shooting Event/Visuals</i>	<i>Remark</i>
5	There are sixty students in Rahul's class and about a thousand students in his college. Can you imagine the energy consumed by all of them?	<i>Rahul entering his college classroom with a friend. Montage of students in Rahul's class</i>	
6	Most homes use every month 100 to 150 kWh!!	<i>Graphic with montage of electrical appliances with text superimposed.' Most homes use every month 100 to 150 kWh!!'</i>	
7	On the back ground of rising population, rising fuel prices and increasing environmental pollution, the struggle for leading a quality life has become harder. It will be much harder in the coming future.	<i>Montage of a flock of Pigeons, a crowd of people on the street, an bustling road with vehicles, more crowded street, local trains passing by, shot of a crowded slum, vehicles on a pot holed road in the rainy season</i>	
8	A perennial source of energy that assures us to reduce these hardships is the sun.	<i>Silhouette of bullock carts passing, bullock carts passing, landscape with sun shots.</i>	
9	Solar heat and light has a tremendous potential to save coal, oil and gas in India.	<i>Shots of an industrial chimney, vehicles on road, cooking on gas.</i>	
10	The sun is the closest star. It is a great ball of hot gases.	<i>Animated shots of the sun</i>	
11	The outer surface of the sun is called Corona. The temperature of Corona is 6000 K	<i>Animated shots of the sun Superimposed text 6000 K i.e. 5727 degrees Celsius.</i>	
<i>Page No.3/18</i>			

Figure 1 A page in the Shooting script of the Solar Documentary

iii. Undertaking shooting sessions:

With the help of finalized shooting script shooting sequence was determined. The shooting matter was categorized into indoor events, outdoor events, graphic contents and matter to be taken from available collection of prefilmed raw stock. Indoor and outdoor shooting locations were decided. Formal permissions and consents for filming formed essential part of the of film production, the the same were sought prior to shooting. Outdoor sessions were critical and required a careful planning and coordination of manpower and equipment. Outdoor events were, therefore, scheduled and shot first. Indoor sessions followed. The documentary was shot on Digital Video Camera (DV Cam) with professional light equipment. The experience during shooting sessions was that two hours of filming became necessary for a two minute final caption in the documentray. Graphics of Sun and earth were adopted from copyright free, broadcast quality clippings from the website of Hubble [hubblesite, 2011].

iv. Editing, Insertion of Graphics, Voiceover and Background Music

The indoor and outdoor stock shots were arranged in a sequence that matched the narration speed. Basic concepts as well as working principles of solar flat plate collector, evacuated tube collector, solar still etc. were explained using graphical media. Figure 2 illustrates sketches of Flat Plate Solar Collectors showing their construction and collector tilt angle for mounting. Undistracted attention of the viewers was ensured. This was accomplished through insertion of interesting shots adopted from the available collection. Narration was recorded next in a professional studio, employing a professional voice-over. Flow of the nartraion was synchronized with the visuals. Background music was added. Fine tuning in editing was then done to ascertain flow and continuity. Acknowledgements were appended in the final stage. Editing and graphics were done on a commercially available software “Final cut Pro” of Apple on a Macintosh Machine.

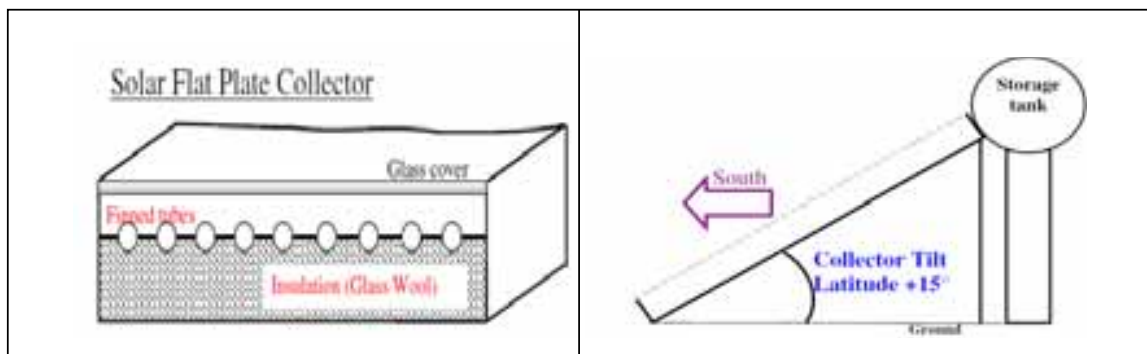


Figure 2 Sketches used for illustration in the documentary

v. Screening, Feed back, Certification

The documentary -complete in all respects- was screened before sample viewers, which represented the target audience. The feedback was recorded. Refinements were done. For any documentary to be published,

a certification from Indian Censor Board is mandatory. The same was duly obtained and the documentary was launched. Figure 3 illustrates some still images of visuals in the opening part of documentary.



Figure 3 Still images of visuals in the documentary

3. Results

Till date, nearly 5000 viewers have watched the documentary. In addition to this, at least 80 School and College libraries in India have adopted the DVD of the documentary for their regular viewing to students. Viewers gave a feed back that reflected increased awareness about solar energy and its potential in India. After watching the documentary, considerable number of viewers resolved to procure and use solar appliances and spread the word. The documentary received recognition at National level by way of bagging a “Best Educational Film of The Year 2008” award and “Best Animation and Graphics Category Award “ of the Consortium of Educational Communication of University Grants Commission of India.

4. Conclusion

The project of Documentary production for Education and Training of masses in Solar Energy Technology has demonstrated encouraging results. The aim of mass education of an imminent technology through electronic media is being achieved largely. The objective of spreading awareness will receive a great impetus with an Institutional or Governmental support. Efforts are in progress to seek the same. Taking inspiration from the success of Solar Documentary Project, similar exercises may be premeditated in the other areas of Renewable Energy like Biomass, Biogas etc. as well as in the areas of Energy Efficiency and Conservation.

5. References

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