

Super- efficient Equipment and Appliance development (SEAD): Global Conjunction in Energy Efficiency

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Abstract

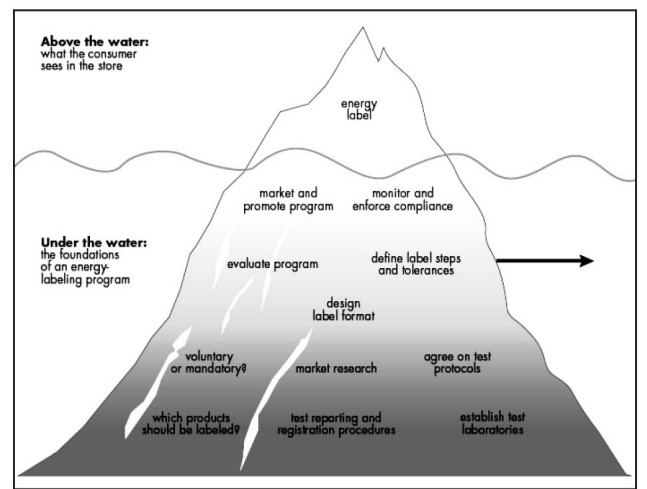
Energy Efficiency Policy has been identified as a measure to tackle climate change related issues globally. SEAD is developed to promote the multi-country collaboration and for exchange of information and learnings on energy efficiency. To strengthen and nourish the energy efficiency movement, Government of India has partnered in international dialogue under Clean Energy Ministerial to give a rewarding boost to “BEST of the BEST “technology to pool the global market with super energy efficient products. This paper, will torch on to the importance of the multi country collaboration to accelerate the introduction of Super-Efficient Appliances and mainly in Indian perspective towards such an initiative namely Super-Efficient Equipment Programme (SEEP) of Government of India.

Keywords: Energy Efficiency, appliances, challenges, labelling

1. Introduction

Super-Efficient Equipment and Appliance Deployment (SEAD) is an initiative championed by the U.S. Department of Energy (USDOE) and launched at the Clean Energy Ministerial (CEM) in Washington, D.C. in July 2010. It is basically the engagement of governments and a new public-private partnership, in conjunction with International Partnership for Energy Efficiency Cooperation (IPEEC). It is initiated to expand and energize markets all over the globe for efficient products in member countries. In the Ministerial, India also contributed on-ground experiences of the Bureau of Energy Efficiency, a statutory body under the Ministry of Power, on achieving energy efficiency in the country. Global Superior Energy Performance Partnership (GSEP) was the key initiative came into existence at this meet, The initiative focusing on increasing energy efficiency in commercial establishments. The SEAD initiative includes the member governments of Australia, Brazil, Canada, the European Commission, France, Germany, India, Japan Korea Mexico,

Russia, South Africa, Sweden, the United Arab Emirates, the United Kingdom, and the United States.



Source Bureau of Energy Efficiency

Fig 1: Iceberg-The Energy Labeling program

SEAD partners established product-specific collaborations on commercial refrigeration (Chair: Korea), televisions (Chair: United States), computers (Chair: United Kingdom), motors (Chair: United States), distribution transformers (Chair: Canada), network standby (Chair: Australia), and a new efficient lighting collaboration chaired by India. To accelerate the deployment of super-efficient appliances, SEAD member countries have joined their hands together and committed to strengthen stakeholder involvement in SEAD activities. The SEAD Efficient Product Promotion Collaborative provides a unique platform to host and facilitate the collective expertise and resources from public and private stakeholders. The Indian Bureau of Energy Efficiency has also proposed to initiate a program with the name “Super Efficient Equipment Programme (SEEP)” in the 12th five year plan. In partnership with Clean Energy Solutions Center SEAD will support efficiency programs for appliance by facilitating no-cost expert assistance to equip governments design, adopt tailored fit policies and program. Other activities like online webinars present key concepts, definitions, necessary to develop an unparalleled equipment energy efficiency standards and labeling (S&L) program. Participants of SEAD have launched international technical and policy collaborations focused on six categories viz. computers, distribution transformers, commercial refrigeration, solid-state lighting, motors, and televisions. Under the umbrella of this international dialogue partners will work together in voluntary activities to raise the efficiency ceiling and efficiency floor by pulling super-efficient appliances and equipment into the market through incentives, awards, procurement and investment in R&D and by working together to reinforce national or regional policies like minimum efficiency standards and strengthen the efficiency foundations of programs by coordinating technical work to support these activities.

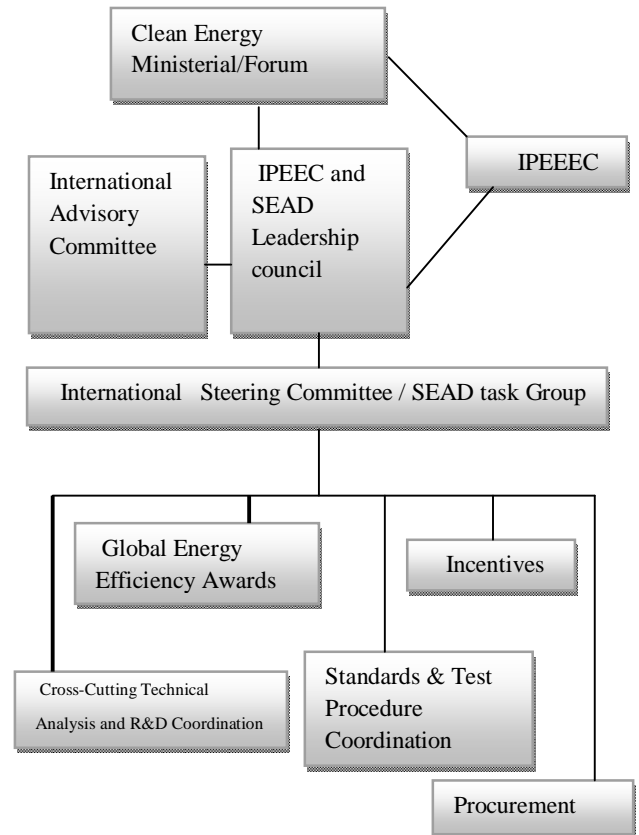
2. Global SEAD Structure

(i) **Cross-cutting technical analysis:** The standards & labeling working groups and cross-cutting technical analysis have launched a subgroup for integrative analysis that has two key objectives first, to provide a forum for practitioners to share experiences, prioritization exercises and conducting gap analyses for appliance/equipment standards, and a forum for discussing the development of a common analytical platform to assess opportunities and progress in equipment efficiency across SEAD partner countries.

(ii) **Global Energy Efficiency Awards:** It leads to develop awards to recognize the most efficient commercially available

appliances which are internationally available in each targeted category and the planned deliverable will include announcement of 2012 flat-panel televisions awards competition and future award categories.

(iii) **Incentives** aims to develop and implement internationally coordinated incentive programs for highly efficient products and emerged with the outcomes of information exchanges about incentives program design between utility executives in participating countries.



Source : Clean Energy ministerial

Fig 2: SEAD Mechanism

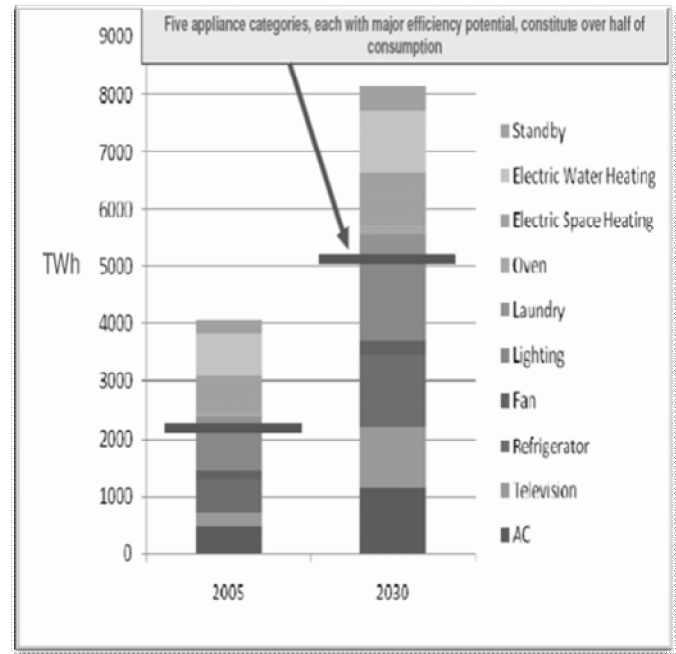
(iv) **Standards & Test Procedure** aim to speed up national efforts to implement standards with increased compatibility of test procedures to enhance compliance with regulatory requirements.

(v) **Procurement** will account in the value addition in accelerating implementing standards.[8,2]

3. SEAD Potential: Eventuality to Reality

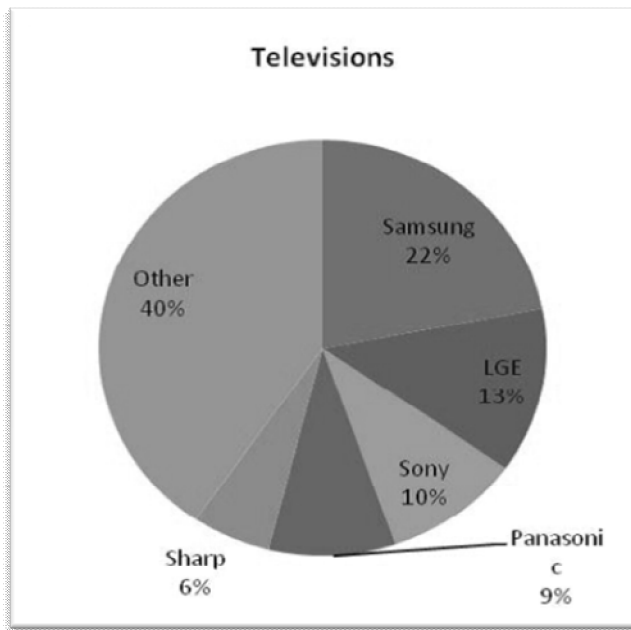
It can be seen from the representation in pie-chart provided at Fig no 3, only about fifteen manufactures produce more than

70% of the world’s major energy consuming appliances and equipment, many of these are very similar across multiple countries, and as can be seen from the inputs highlighted in Fig no. 4, a few of them constitute a large portion of the residential and commercial consumption of electricity. The common analytical platform of SEAD is built upon the Bottom-Up Energy Analysis System (BUENAS) model of Lawrence Berkeley National Laboratory (LBNL); BUENAS forecast the penetration of efficient appliances in future under different policies using an econometric diffusion model with the help of macroeconomic drivers and, wherein available, detailed sales. During March 2011, LBNL estimated that appliance efficiency enriching measures in the 16 economies participating in SEAD as of the first Clean Energy Ministerial could, by 2030, save 1,800 terawatt hours per year of electricity which is almost equivalent to 21 hexajoules per year of primary energy (equivalent to three billion barrels of oil), and that roughly reduces \$150 billion dollars per year in net energy-related expenditures. Moreover it would also lead to the reduction of carbon dioxide (CO₂) emissions over the next 2 decades by 11 billion Tonnes. Since the Super-Efficient Equipment and Appliance Deployment (SEAD) initiative launched in 2010, participating governments have implemented and begun development of efficiency requirements that are sufficient to achieve almost 30 percent of potential cumulative CO₂ emissions reductions,



Source: Authors compilation based on McNeil et al, 2008

Fig: 4 Global energy consumption in key energy consuming appliances and equipments in residential sector



Source : Display Search Quarterly Advanced Global TV Shipment and Forecast Report

Fig: 3 Global Market share of Major manufacturers

35 percent of the projected fuel savings potential, and 30 percent of the estimated available electricity savings potential as well. SEAD fosters collaboration among its 16 participating governments and endorse them to strengthen their standards and labeling programs to more quickly keep pace with technology as well as put efforts to work together on incentives, prizes, and procurement programs that can stimulate the development of super-efficient devices.[1,4,9,10,11]

4. Barriers and Market transformation: Obstruction to renovation

Though many energy efficient measures in present portrait are cost effective, the thorny barriers rising like higher upfront costs of efficient products, lack of knowledge of efficient technology ,absence of awareness, curtailment of technical capability to monitor the cost benefit analysis of investing in efficient appliances, and many others are in need to conquer to cultivate energy efficient and acquainted market with socially cost effective measures. To address the tremendous challenge of climate achieving market transformation (MT)which is defined as resilient sustainable changes in the functioning of a market achieved by cutting barriers to the

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adoption of energy efficiency quantum, in its fastest and cheapest manner is very important. There are primarily three market strategies shown in fig no 5 viz. providing information about the energy use i.e. labeling programs, financial incentives, and Minimum energy performance standards are used to increase the penetration of efficient end-use devices. Appliance labeling programs address first two barriers which are very generic in nature i.e. related to awareness and cost benefit analysis of investing in EE by covering a small portion of the customers known as “early adopters” to indulge in the new efficient technology at a higher cost to that of inefficient one with the help of appliance labels provided by Bureau of Energy Efficiency, in India. Financial incentives is one of the another key strategies for accelerating the energy efficient devices by utility EE programmes.

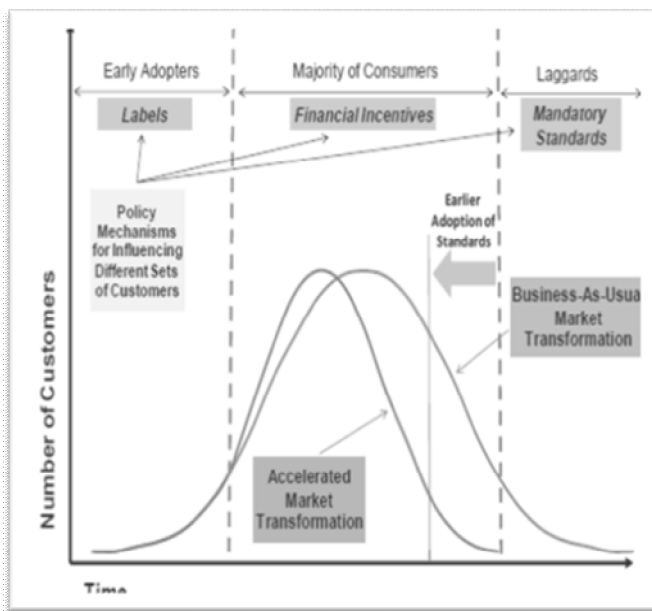


Fig: 5 Accelerating market penetration of super-efficient appliances and equipment

A substantial amount of preparatory technical analysis such as evaluating various efficiency improvement options, cost effectiveness, factors affecting the choice of consumers of energy efficient products and the manufacturing capacity to produce higher efficiency products is needed, to implement all the inventions applied in transforming the market. Moreover a least developed and developing country required technical capacity within entities involved in designing and implementing these programs, which was identified as a major hurdle in rapid speed up of market transformation program. Hence, some aggressive efforts need to be undertaken to build capacity to implement MT programs,

simultaneously it is important to leverage the existing technical capacity optimally. [4]

5. The Winning touchdown

The partners of the multilateral, voluntary effort among the regions have been working together to achieve the following:

(i) *Development of Most Energy-efficient televisions globally.*

SEAD partners announced the first Global Efficiency Medal in January 2012, for flat-panel televisions in four countries namely Europe, Australia, India, and North America, with one international winner in each of three size categories. By augmenting the adoption of most efficient television and assuming that awarded televisions are 30 percent more efficient than the best currently market average models, the Global Efficiency Medal could help to save 1.1 Twh.

(ii) *Amelioration of public and private procurement of efficient appliances.*

To avail the purchasers to calculate and compare the energy use and life-cycle costs of street lighting fixtures, partners have developed a Street Lighting Tool—a free, easy to use calculator. To promote the penetration of the tool, marketing campaign, including instructional webinars, was launched in April 2012. A preliminary study of the challenges faced in energy-efficient public procurement programs has been completed. SEAD partners are also assembling a procurement specification catalog consisting of public acquisition specifications from six countries. The purpose is to perform a stringency and gap analysis of these specifications for mutual advantages as well as more allowances in broader use.

(iii) *Accelerate national and regional labeling programs and efficiency benchmarks through international technical cooperation.*

A product-specific collaborations, established by SEAD partners will collaborate with the United Nations Environment Program of enlighten initiative and coordinate activities to shift to more efficient lighting technologies, such as compact fluorescent lamps(CFL) and (SSL) Solid –state lighting that could reduce global electricity consumption by approximately 2.5 percent in mutual conjunction of International Energy Agency (IEA) Efficient Electrical End-Use Equipment (4E) and Solid State Lighting.

(iv) *Incentivize the deployment of super-efficient equipment.*

A public-private partnership to promote super-efficient products such as targeting super-efficient fans in India is one of the examples under such initiative. Billions of dollars are spent globally by Department of Energy (DOE) on efficiency

programs each year through Clean Energy Solutions Center that provide appliance efficiency program design insights on a global basis.

(v) Uncertain cost-effective technologies pertaining to efficiency reserves

A study in July 2011 by Cross-Cutting Technical Analysis Working Group identified highly cost-effective opportunities to reduce energy consumption of television by 25 percent or more with existing technology. Potential savings in SEAD economies could be quantified as high as 8 TWH per year by 2020. Easy and automated web-based data lookups through webinars and Quick Response codes could transform purchase decisions of consumer and facilitate the effective implementation of government standards along with the labeling programs.[5,7,8]

6. SEEP: The Indian context

The Indian Bureau of Energy Efficiency's Super Efficient Equipment Programme (SEEP) offers an example of the kind of work that the Collaborative can engage in and learn from. SEEP will provide an incentive to manufacturers that produce ceiling fans that are twice as efficient as the market average. The SE (Super Efficient) fan will be of 35 W consumption and air delivery of 210 cubic meter per minute(CMM) than the currently available fan of 70 W consumption of the market average. With huge sales volume of 25-30 millions and extended life of 15 years it is estimated that deployment of approximately 5 million SE fans will lead to the appearance of a new chapter in economic survey reflecting the benefitted annual saving of 0.38 billion units (TWH) of electricity with 4.5 billion tons of avoided CO₂ emission assuming (Fan running hours = 15hrs./day).At the rate of Rs. 3.5 per unit of consumption the estimated monetary benefit is approximately equivalent to the Rs. 13 crores. This policy will act as a catalyst in terms of market transformation along with providing low carbon development path for the country henceforth.[6]

7. Upcoming Activities

SEAD partners also intend to announce two new rounds focusing on electric motors accounts for 45 percent of total global electricity demand, computer monitors, and other displays in the next chronological event of SEAD Global Efficiency Medal competition. The state agencies and municipalities of Sweden ,Canada and Mexico are looking to pilot the Street Lighting Tool with the dual objective of identifying the requirements for broader dissemination of the tool and improving the tool with the feedback gained from

already established pilots as well. The Efficient Product promotion Collaborative will address studies of effectiveness of existing efficiency programs and describe priority opportunities for engagement in future design of the program. The complete analysis of cost-effective technologies will lead to reduced electricity consumption of ceiling fans, domestic refrigerators, air conditioners etc. which will be accomplished by Technical Analysis Working Group. One study from Preliminary analysis suggests and spur that if all future ceiling fans designed by using the commercially available energy-saving technology sold then, 40 Twh per year (equivalent to 13 mid-sized coal-fired power plants) and 25 million metric tons of global CO₂ could be avoided per year by 2020.[7,9,10]

8. Conclusion

Last but not the least, as a result of the given facts and analysis presented in this paper, one can expect, SEAD will provide technical support for regional, national and international efforts to develop appliance energy efficiency programs, including standards and labeling program. The encouraging virtuous cycle between incentives, and ratcheting up of minimum energy performance standards (MEPS) for the global intervention of the latest high-efficiency devices results in savings of billions of dollars and certainly a stair up in the right direction, to pace up the development of super efficient appliances and equipment. SEAD particularly aims to substantially accelerate on-going global ascend in equipment efficiency. We assess the potential electricity and CO₂ savings which would lead to a greater cost and sources of funds savings, we find that there are many benefits of such collaboration nationwide and worldwide as well. The implementation options for the same could lead to a rapid and much required scale-up in capturing the vast cost effective energy efficiency potential. We show that only a handful of appliances constitute a large portion of the electricity consumption in residential and commercial sectors and such program focused on a select few appliances and equipment would result into large savings.[1,4]

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