SEAD SUPER-EFFICIENT EQUIPMENT AND APPLIANCE DEPLOYMENT INITIATIVE

Governments Working Together to Save Energy.

SEAD Policy Exchange Forum

Assessing Multiple Benefits of Improving Product Efficiency 7 April 2016, 12:00–14:00 UTC / GMT

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Welcome, Introductions & Agenda

Nicole Kearney, CLASP



SUPER-EFFICIENT EQUIPMENT AND APPLIANCE DEPLOYMENT INITIATIVE



A Global Initiative: SEAD governments work together to save energy





Foster Global Collaboration & Partnership







Welcome to the SPEx!





Who is on today's call?

- CLASP SEAD Operating Agent and SPEx coordinator, working together with Lawrence Berkeley National Laboratory – providing technical support to SEAD
- International Energy Agency, co-hosting today's SPEx
- Presentations from:
 - Ghana Energy Commission,
 - India's Energy Efficiency Standards Limited
 - Mexico's National Association of Home Appliance Manufacturers
- Participants on today's call include policy makers, industry representatives, civil society, consultants, international organisations



SPEx Call Agenda

- Background and Motivation: Energy Efficiency Prosperity
- Country Case Studies and Perspectives from: – Ghana
 - India
 - Mexico
- Q&A and Group Discussion All Participants
- Closing Remarks



Webinar Guidelines

- All on mute during the presentations
 - Submit questions via the webinar chat application
 - Raise Hand feature also available
- If you have questions:
 - Please introduce yourself (Name and Organisation)
 - Clarifying questions can be asked after each presentation
 - Share discussion questions for Q&A and General Discussion session
- During Q&A and General Discussion session:
 - All participants will be unmuted
 - If not speaking, please mute your phone
- Record of discussions
 - Webinar is being recorded
 - Presentations and Summary of Discussions available on SEAD website

Background & Motivation: Energy Efficiency Prosperity

International Energy Agency



SUPER-EFFICIENT EQUIPMENT AND APPLIANCE DEPLOYMENT INITIATIVE



Mel Slade International Energy Agency



Mel has spent over twenty five years in energy efficiency policy development and implementation in many parts of the world. She started out working in the UK Government on industry and product energy efficiency and has worked with many governments around the world to establish similar programmes, perhaps most notably, in China. In recent times she spent several years Chairing the Equipment Energy Efficiency Committee – the Australian and New Zealand Government committee overseeing the regulation of minimum energy performance standards and labels for lighting, equipment and appliances. One of the key policies Mel led while in Australia was the phase-out of inefficient lighting. Australia was second only to Cuba in this endeavour and has shared its experience widely both in the developed and developing world. Mel moved to the International Energy Agency in 2014 to manage the Energy Efficiency in Emerging Economies Programme.

For more information:

Email – Melanie.slade@iea.org



International Energy Agency Secure Sustainable Together

Energy Efficient Prosperity



Energy Efficient Prosperity Concept

from

doing more with less

to

doing more with the same

to

doing even more with more raising standards of living and promoting energy efficient prosperity

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Energy Efficient Prosperity Quotes

- 'Energy efficiency is a fuel that keeps on giving' Philippe Benoit, IEA
- 'The Chinese government fostered the development of more than 5 000 ESCOs, creating 600 000 jobs,' Dai Yande, Energy Research Institute, China
- 'Energy efficiency is the new way of power generation' Kofi Agyarko, Energy Commission, Ghana
- 'If you are going to invest in energy access, invest in energy efficiency – if you are going to invest in energy efficiency, invest in energy access' Matt Jordan, CLASP
- '90% of countries have 100% access to energy and they are all prosperous' Emmanuel Ackom, DTU
- 'Implementing energy efficiency measures in South Africa could effectively contain energy spending at current levels,' Marco Baroni, IEA



Relationship between Energy Access & Prosperity

GLOBAL NETWORK ON ENERGY FOR SUSTAINABLE DEVELOPMENT

Facilitated by UNEP





Electricity Access Database, IEA WEO, 2013; McKinsey, 2015



Energy Efficiency & Energy Access

Energy Access is providing un- or under-served households, businesses and communities with new or enhanced access to reliable, affordable, and adequate modern energy services.

EE

Energy Efficiency is requiring less energy to maintain or improve a given level of energy service.

Source: CLASP



Energy Efficient Prosperity Stories

 Energy efficiency can promote economic development and well-being





Energy Efficient Prosperity Stories

www.iea.org

Green buildings don't just save energy – they improve our lives





Energy Efficient Prosperity Stories

From our kitchens to our streets, energy efficiency helps build safer, healthier





Installing LED street lights saved 55% Light level improvement by 70-100% High levels of public satisfaction

Source: EESL (Snapshots from Vizag Street Light Project)



Avoided consumption topped 22 EJ (520 Mtoe) in 2014

Avoided consumption generated by energy efficiency increased by 10% in 2014



Consumers saved USD 550 billion in 2014; USD 5.7 trillion since 1990



IEA countries saved USD 550 billion in 2014 as a result of energy efficiency investments since 1990



Annual savings are greater than the EU's fuel import bill

Avoided expenditure in IEA countries from energy efficiency investments made since 1990



Efficiency's domestic production substitutes for fuel imports

 In 2014, IEA countries avoided primary energy imports totalling 190 Mtoe, saving USD 80 billion in energy import bills and improving trade balances



Domestically produced, efficiency supports energy security



A clean energy source, efficiency reduces emissions

- Energy efficiency investments since 1990 have helped to reduce IEA country emissions to below 1996 levels
- In 2014 alone, 870 Mt CO₂ were avoided



Almost one year's worth of end-use sector emissions have been avoided by efficiency investments since 1990 in IEA countries



In Saudi Arabia, energy efficiency is increasing export revenues

Domestic energy consumption has nearly doubled since 2000 reducing share of energy production going to exports:



Saudi Arabia has implemented efficiency standards on key sources of domestic energy demand including vehicles and air conditioners

Air conditioner standards alone are targeted to improve efficiency by 35%, saving 47 million barrels of oil and increasing export revenues by USD 2.4 billion





Multiple Benefits of Energy Efficiency







International Energy Agenc

Measuring the Positive Impacts



Case Study Presentations





Questions to be addressed:

- What non-energy benefits from improved product efficiency did you identify?
- How did you assess these non-energy benefits?
- How have you used the assessment of these benefits to inform efficiency policies?
- What challenges have you faced in assessing these benefits?
- What additional research / collaboration could facilitate this in the future?

Energy Efficiency: The New Way of Power Generation

Kofi Agyarko – Energy Commission, Ghana



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Kofi Adu AGYARKO Energy Commission, Ghana



As head of the Energy Efficiency and Climate Change Division, Kofi is responsible for the Ghanaian standards and labeling programme. He develops and implements projects targeted at improving energy efficiency; is involved in rules and regulation elaboration; and works on public education and behavioural change to encourage the transition to more efficient energy. Kofi's work extends beyond appliances, to improving energy efficiency in industrial, commercial and residential and transport sectors and their climate impacts. He is also involved in educating the media and public on the Commission's work and for designing and implementing publicity and public education programmes and campaigns on energy waste reduction.

Before joining the the Energy Commission, Kofi worked with SEED Solutions, a consultancy firm specializing in energy management. Kofi obtained my Bachelor of Science Degree in Administration from School of Administration, Legon, in 1991 and a Master of Science Degree in Energy Management from Norwegian School of Management in 1999.

For more information:

Email (1) – kofiagyarko@gmail.com | Email (2) – agyarkok@energycom.gov.gh



Kofi Agyarko Energy Commission, Ghana

Energy Efficiency: the new way of power generation

Assessing the Multiple Benefits of Improving Product Efficiency

April 2016



Presentation outline

Introduction

Energy Efficiency Programmes & Results

- Lighting retrofit programme 2007
- Room Airconditioner standards programme
- Capacitor Installation Programme 2009
- Refrigerator Market Transformation programme 2011
- "Switch off Deep Freezer" Campaign 2014





- Electricity demand is grows with the economy. The average growth rate in Ghana is between 6%-7% p.a.
- System losses in electricity distribution are about 25%,
- Wastage in the end-use of electricity also estimated at about 30%. (2007).
- Energy efficiency and conservation can free a lot of megawatts for use by the unserved communities.
- Reduction of losses in energy supply and more efficient use of energy would also slow down the demand for energy.

The Efficient Lighting Project 2007

- The Government of Ghana with the advice of the Energy Commission procured and distributed for FREE 6million CFLs as direct replacement of 6 million Incandescent Lamps
- Ghana is the first country in Africa to take such action.
- All 6 million lamps were distributed and installed in 3 months



Objectives of Lamp Project

- Peak electricity demand reduction 200-220MW
- Stabilisation of Electricity Grid System
- Reduction of Brownout and transformer overloads
- Reduction of Diesel and other Thermal generators to supplement the existing power generation mix
- Introduction of consumers to quality lighting technologies





Peak Saving of 124 MW

 Energy Saving of 452MWh per day or 162.7GWh per annum

 At US\$120/bbl, energy cost saving is US\$3.3million per month or US\$39.5million per annum.

 Between October 2007 and June 2008 Savings of US\$29.6million was recorded.

 2 Factories established to produce CFLs in Ghana employing 100 workers





- Between Sept. 2007 and Sept. 2009
- Penetration of CFL increased from 3% to 79%
- Penetration of Incandescent decreased from 58% to 3%
- The average household income savings was USD36
- Electricity access rate increased without additional capacity


Refrigerator Market Transformation Efficiency Project

 Average Refrigerator in Ghana consumed 1,200kWh per annum

Large used refrigerator market share – 84%

Standards and labelling regime introduced in 2008

 Law of prohibition of importation of used refrigerators passed in 2009



Estimated 2million used refrigerators in use

Refrigerator Efficiency Rebate Scheme launched in 2012





The average consumption has been reduced from 1,200kWh to 385kWh per annum.

9000 used inefficient refrigerating appliance have been exchanged for the same number of new and efficient ones.

The average consumer savings is 850kWh

The direct and indirect savings of the project is 43GWh

 One refrigerator assembly has been set up. Small scale production has started.



Transformed Refrigerator market





Fig 2.3 Trended yearly imported refrigerating units by New and Used

Institutional Energy Conservation

Installation of Capacitor Banks

- Office of the President
- State House
- Ministry of Defence
- Foods & Drugs Board,
- Accra Sports Stadium
- Korle Bu Teaching Hospital

Savings

- Capacitors Installed 7167kvar
- Total savings 1,851kva
- Total monetary savings
- (\$27,567/mth) (\$330,804/yr)
- Simple pay back period Based on project cost of \$258,200

(Less than 10 months)

 The savings had doubled since 2014 after up scaling





"Switch off Deep Freezer

Campaign"

- An estimated total of 2million deep freezers (chest freezers) in Ghana.
- Most of them are used and inefficient ones from Europe with yearly average consumption of 1,800kWh
- The campaign was launched to coincide with the Brazil world cup in 2014.
- A total of 70MW was saved.





kofiagyarko@gmail.com agyarkok@energycom.gov.gh



The Growing Benefits of the Energy Efficiency Paradigm in the Home Appliance Sector

Pablo Moreno, Mexico



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Pablo Moreno Corporate Affairs Director, Mabe



Pablo Moreno is the Corporate Affairs Director at Mabe, a Mexican global company which designs, produces, and distributes home appliances to more than 70 countries around the world. He is the Chairman of the Association of Home Appliance Manufacturers of Mexico, ANFAD, whose members include manufacturers of mayor and portable home appliances, air conditioning, water heaters, and bathroom furniture.

Pablo previously chaired the Association of Standards and Certification, ANCE, that elaborates, certifies, validates, tests and audits over 500 standards of the electro technical, forest, mining, food and beverages sectors and managements systems. He is Vice-President of the National Electrical Manufacturers Chamber that represents companies that manufacture products use in the generation, transmission, distribution, control, and end use of electricity. Throughout his career, he has held different positions such as Institutional Relations Director in Vitro and Public Relations and Communication Director in Prodigy MSN.

Raised in Mexico, he received his bachelors in Business Administration at the Autonomous Technological Institute of Mexico.

For more information: Email: <u>pablo.moreno@mabe.com.mx</u>



Asociación Nacional de Fabricantes de Aparatos Domésticos, A.C.

The Growing Benefits of the Energy Efficiency paradigm in the Home Appliance Sector

April, 2016

THE ENERGY CHALLENGES OUR SOCIETY IS FACING **TODAY**

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DEMAND

HOW MUCH ENERGY
IS REQUIRED
FOR OUR DAILY
ACTIVITIES?







Tackle the demand through Energy Efficiency

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Asociación Nacional de Fabricantes de Aparatos Domésticos, A.C.

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THE FINANCIAL PERSPECTIVE

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THE FINANCIAL PERSPECTIVE



Asociación Nacional de Fabricantes de Aparatos Domésticos, A.C.

BENEFITS OF ENERGY EFFICIENCY IN APPLIANCES

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HIGH IMPACT IN ENERGY REDUCTION

- Decrease the cost of production
- Decrease the investment of energy generation facilities



HIGH IMPACT IN ENVIRONMENT Reduce the indirect CO2 emissions

HIGH IMPACT IN SOCIETY



• Create awarness in the use of more efficient equipment

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- Increase the people's quality of life
- Benefits the vulnerable population economy

HIGH IMPACT IN PRODUCT DEVELOPMENT

58%

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Asociación Nacional de Fabricantes de Aparatos Domésticos, A.C.

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THE IMPACT OF STANDARDIZATION IN FRIDGES

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CASE STUDY









- Fridge (1993)
 1,150 kWh/year
- Fridge (2003)
 - 442 kWh/year

HOW DID WE ACHIEVE THIS?







HOME APPLIANCE REPLACEMENT PROGRAM



ANFAD

INVESTMENT & RESULTS:



• **RESULTS**:

1,682,802 Refrigerators replaced201,327 Air conditioning equipments replacedAverage credit amount USD \$250

SENER

Origin counter warranty - USD \$36 Million Incentives to users – USD \$134 Million Final disposal of old appliances – USD \$39 Million

NAFIN – World Bank

Credit Line NAFIN: USD \$295 Million Credit LINE World Bank: USD \$60 Million

Operational fund: USD \$709 Million

Thank you

Impacts of LED based Energy Efficiency Programme in India

India



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Neelima Jain Energy Efficiency Services Limited



Neelima Jain is a Programme Manager with Energy Efficiency Services Ltd (EESL), a Government of India Undertaking. She leads and manages the roll-out of the Domestic Efficient Lighting Programme (DELP), launched by the Hon'ble Prime Minister of India, in 100 cities. DELP is the largest LED based lighting programme in the world. She also works with public sector entities and state governments to help shape demand side management programmes.

In her previous roles, she has led planning and operations for one of the largest CDM programs in the world, and has implemented smart grid initiatives at gas and electricity utilities in India and UK. Neelima has 12 years of programme management and consulting experience across energy efficiency, carbon finance, power, and gas industries. She has provided advisory services across the entire gas and electricity value chain.

Neelima has a Master of Science in Engineering from Birla Institute of Technology and Sciences, Pilani.

For more information:

Email: njain@eesl.co.in



Impacts of LED based Energy Efficiency Programme in India

SEAD Policy Exchange Forum 2016 7th April, 2016

Energy Efficiency Services Limited

(A JV company of PSUs of Ministry of Power, Govt of India)

Energy Efficiency Services Limited

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Who we are..

- Promoted by Ministry of Power, Government of India
- 100% public owned company
- Governed by all rules and procedures of Government of India
- Board of Directors represented by Ministry of Power and Bureau of Energy Efficiency (BEE)
- Authorized share capital of 80 Million USD
- Line of credit from KfW & AFD. In process: ADB, KfW , and JICA

What we do..

 Implement energy efficiency projects for Central and State Government

- Implement Demand Side Measures:
 - Domestic
 - Municipalities
 - Agriculture
 - Buildings
 - Industry
- Pipeline of 151 EE projects in Domestic Sector worth 170 mln USD
- Pipeline of 240 projects in EE Street Light worth 852 mln Euros

Key Achievements

- Our projects have helped avoid capacity addition of 285 MW in 2014-15
- Implemented largest EE street lighting project in India – replaced 92,000 street lights in 6 weeks
- Implementing largest domestic efficient lighting program in India – replacement of 60 million conventional lamps
- EESL's LED programmes adopted as national programmes that will cover 100 cities

Pipeline of 3 bln USD

National LED Program: EESL is implementing the largest LED program in the world



TARGET

- Distribution of 770 million LEDs
- Replacement of 35 million conventional street lights with LEDs



PM launches: Scheme for LED bulb distribution under Domestic Efficient Lighting Programme in Delhi

EESL: Creating market for energy efficiency in India



- Demonstration of successful business models
- Aggregating demand to bring economies of scale
- Strong Public Private Partnership (PPP) model
- De-risking of investments
- Simplification of Monitoring and Verification
- Standardization of templates
- Capacity building and awareness creation

National LED Programmes – Monitoring and Outreach





Real time monitoring of progress and impact at www.delp.in

Outreach to enhance awareness at www.iLEDtheway.in

WWW.EESL.CO.IN | 72
DELP – Snapshots from project site





Snapshots from Vizag Street Light Project





- Energy savings of about 55% automatic controls being installed and savings to increase further
- Light level improvement by 70-100%
- High levels of public satisfaction

Traditional benefits of LED Programs



- Avoided capacity addition of 1800 MW achieved target will result in additional capacity avoidance of 25,000 MW
- 21 million KWh of energy is saved every day target will result in annual energy savings on 109 billion KWh
- Cost savings of 1.3 bln USD achieved savings to the tune of 18 bln USD on achievement of actual target
- 17,500 t CO2 reductions per day target will result in reduction of 85 mln tonnes of CO2

LED Programs: Different benefits to different stakeholders

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- India's share in the global LED market has increased from 0.1% to 12%
- Penetration of LEDs increased from 0.4% to 10% in domestic market
- Cost savings owing to public procurement 80% reduction in LED price through the national scheme
- Investment of about 455 mln USD in the last one year in LED industry – 6 fold increase
- Creation of 60,000 additional jobs
- 12 mln USD of additional tax revenue to the govt. expected to increase to 158 mln USD
- 4 fold increase in the domestic manufacturing capacity
- Failure rate of less than 0.3% achieved

Social Audit Survey Results

Marine Drive, Mumbai









Thank You

For more information contact <u>njain@eesl.co.in</u> www.eeslindia.org

Q&A and Group Discussion

Moderated by:

Michael McNeil, Lawrence Berkeley National Laboratory Mel Slade, IEA Nicole Kearney, CLASP





Q&A and Guiding Questions

EE as Economic Policy

- Is energy efficiency seen in your country as a policy to promote economic growth, in terms of increasing the productivity of businesses and the disposable income of households?
- What type of evidence is needed to quantify this?
- Would providing this information facilitate buy in from a new group of stakeholders, for example your Ministries of Economy and Finance?

EE as Clean Investment Strategy

- EE policies strongly impact clean energy investment – for every euro spent on the program, much more is invested in high-efficiency equipment. EE investment can also reduce fuel imports and defer investment in new power generation capacity. Is this well understood?
- Are EE policy investments considered equally to investments in renewable or conventional energy capacity?
- What type of analysis can demonstrate this, and who needs to be persuaded?

EE as Industrial Policy

- A significant barrier to EE policy implementation is the perceived threat to local manufacturers. Adopting high efficiency production can encourage industry to export and become more competitive, reducing costs to society of rapidly increasing energy demand.
- Can direct support from industries for R&D and retooling mitigate barriers to policy implementation?
- What evidence is needed to persuade industry ministries to prioritize manufacturing of energy efficient products?



Closing Remarks

- Key takeaways
- Possible collaboration opportunities
- Encourage participants to follow up the discussions with additional questions and thoughts
- All materials will be made available online
- Thank you for your participation!

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Governments Working Together to Save Energy.

For more information or follow up questions please contact:

Hans Alarcon, SPEx Coordinator (CLASP) Email: halarcon@clasp.ngo Tel: +1 202 750 5119

The presentations and discussion summary will be posted on the SEAD website, along with a recording of the webinar

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