efficient lighting for developing and emerging countries

en.lighten

Beirut Energy Forum *'Regional Workshop on Technology Transfer in Energy and Efficient Lighting to Combat Climate Change'*

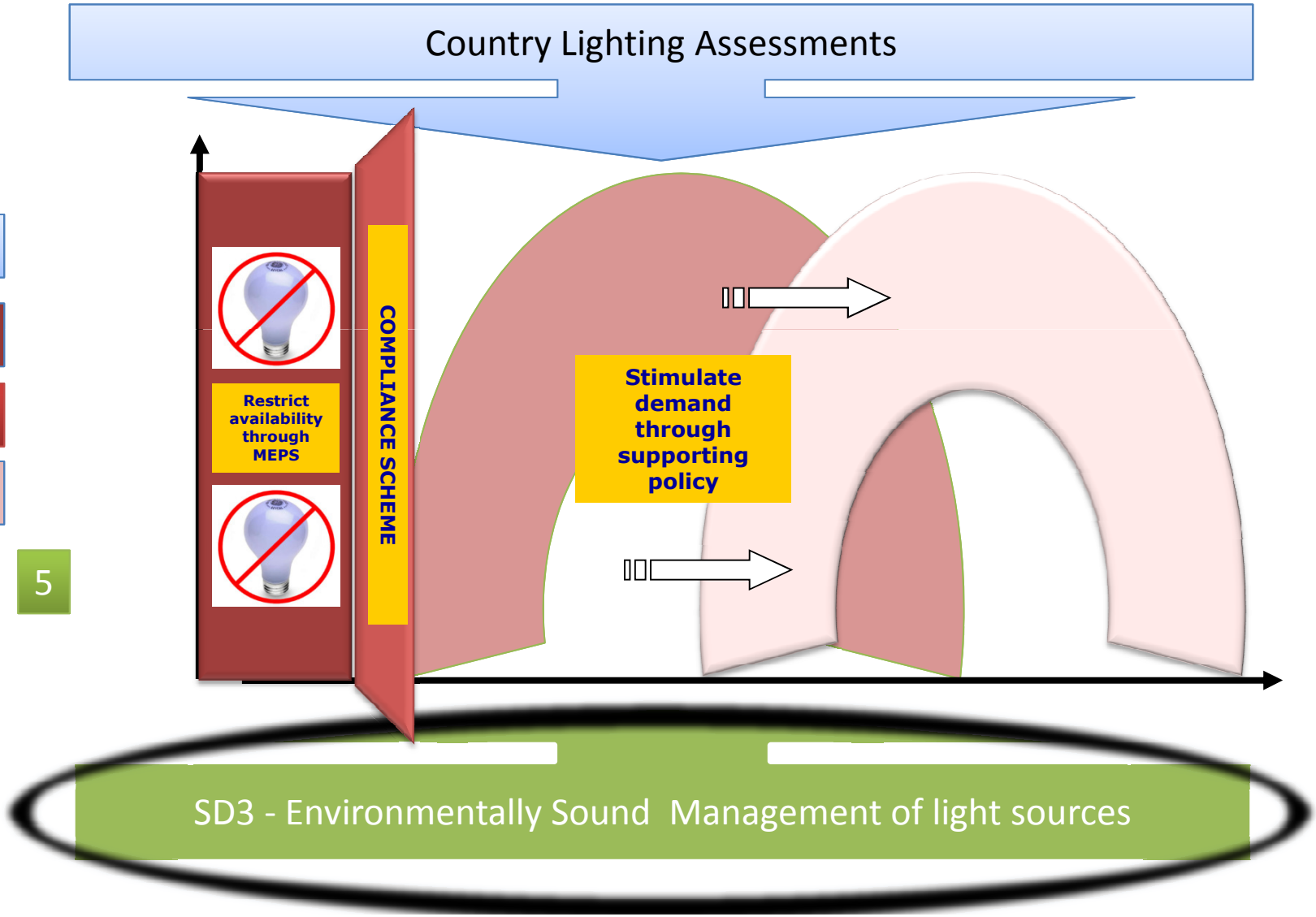
Environmental and Health Considerations of Efficient Lighting

28th September 2011

UNEP gef PHILIPS OSRAM

Policy Priorities

What should the global agreement deliver?



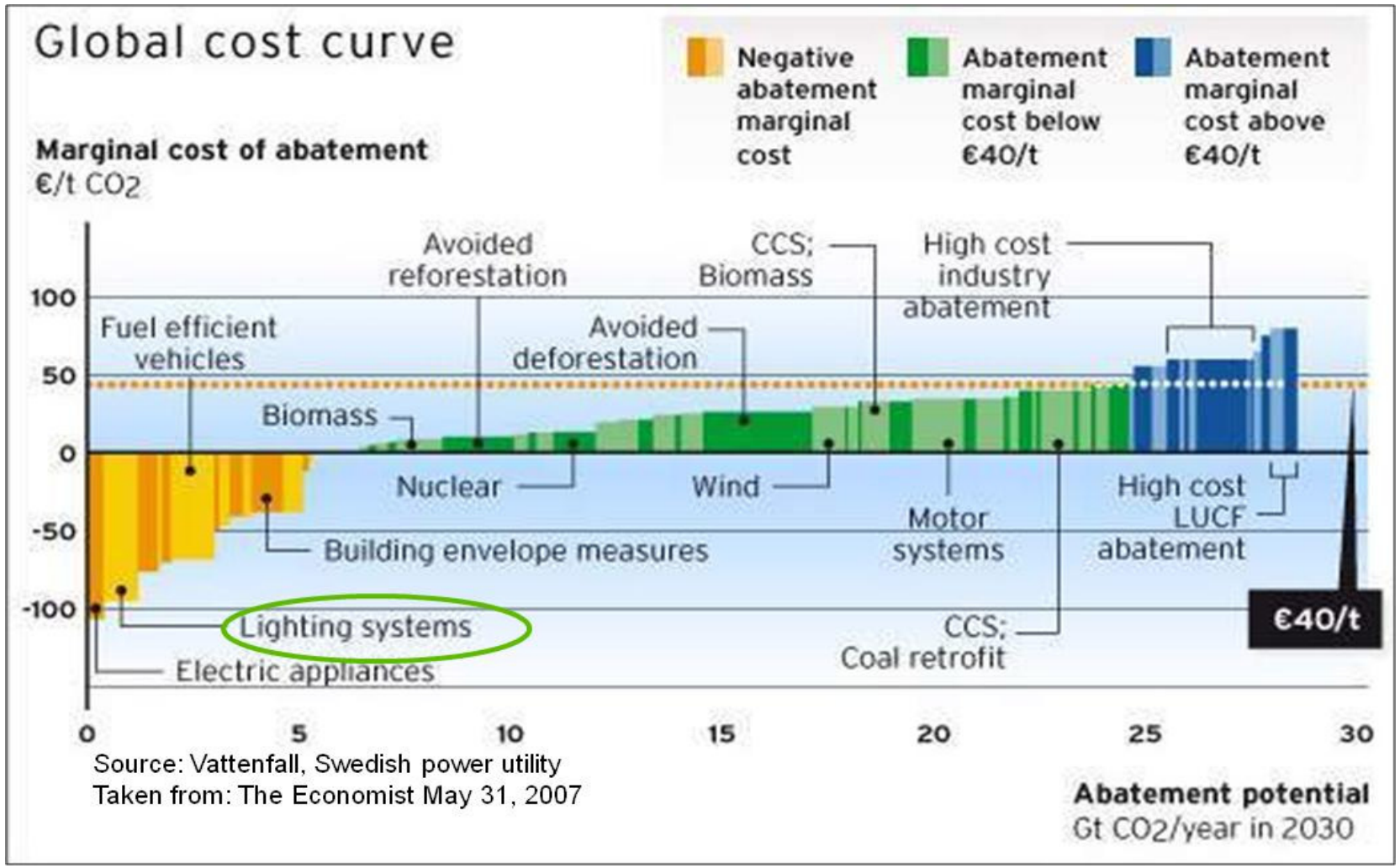
en.lighten

Holistic View of Sustainability

- Phasing out inefficient lighting viewed as most effective solution to limit the environmental impact of lighting
  - Up to 10% saving of the global electricity consumption
- From a life-cycle perspective mercury use in efficient lamps reduces CO2 emissions and overall mercury pollution from fossil fuel burning.
  - And up to 5x less energy

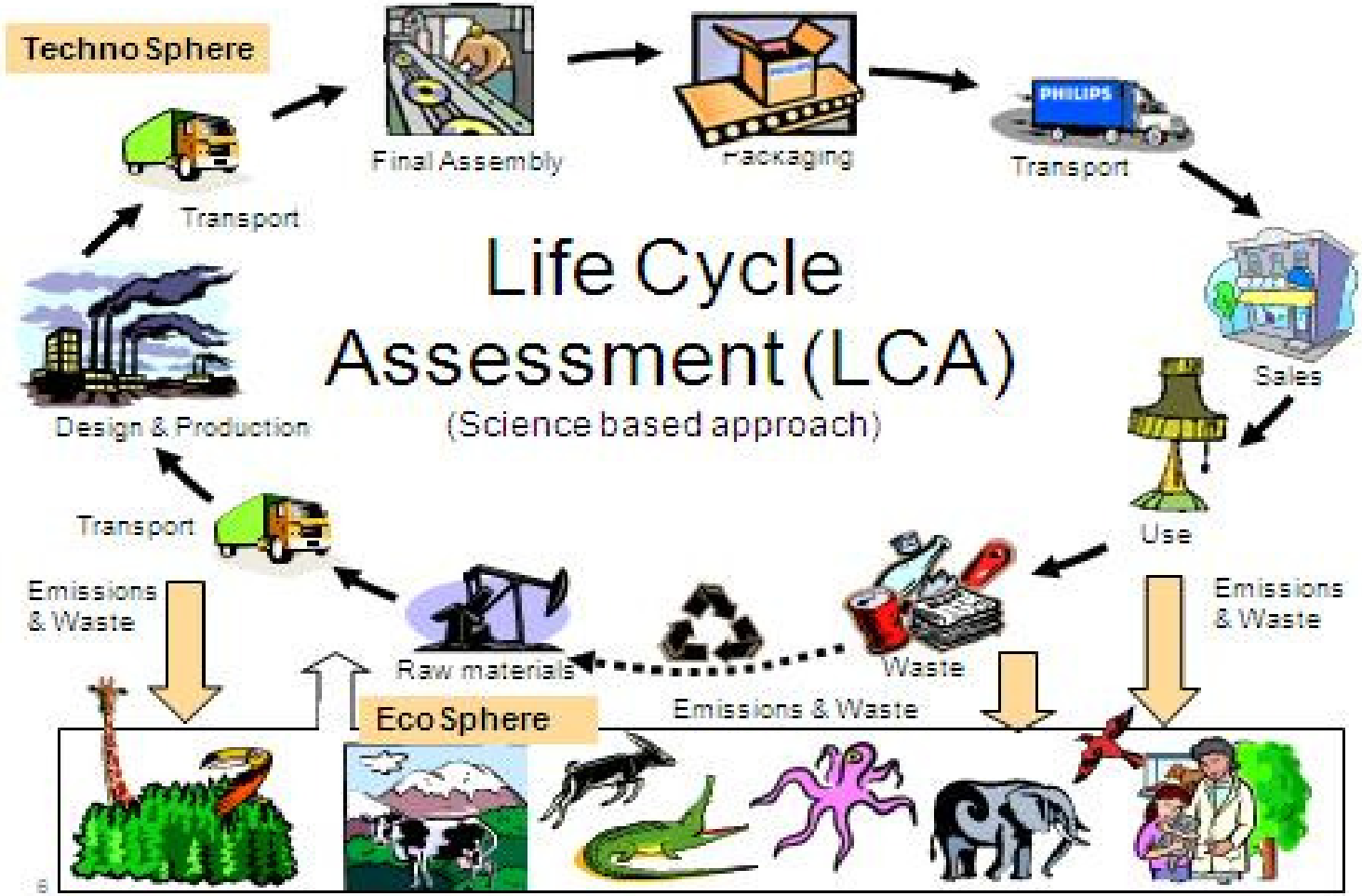
en.lighten

Energy Efficient Lighting and the influence on CO2



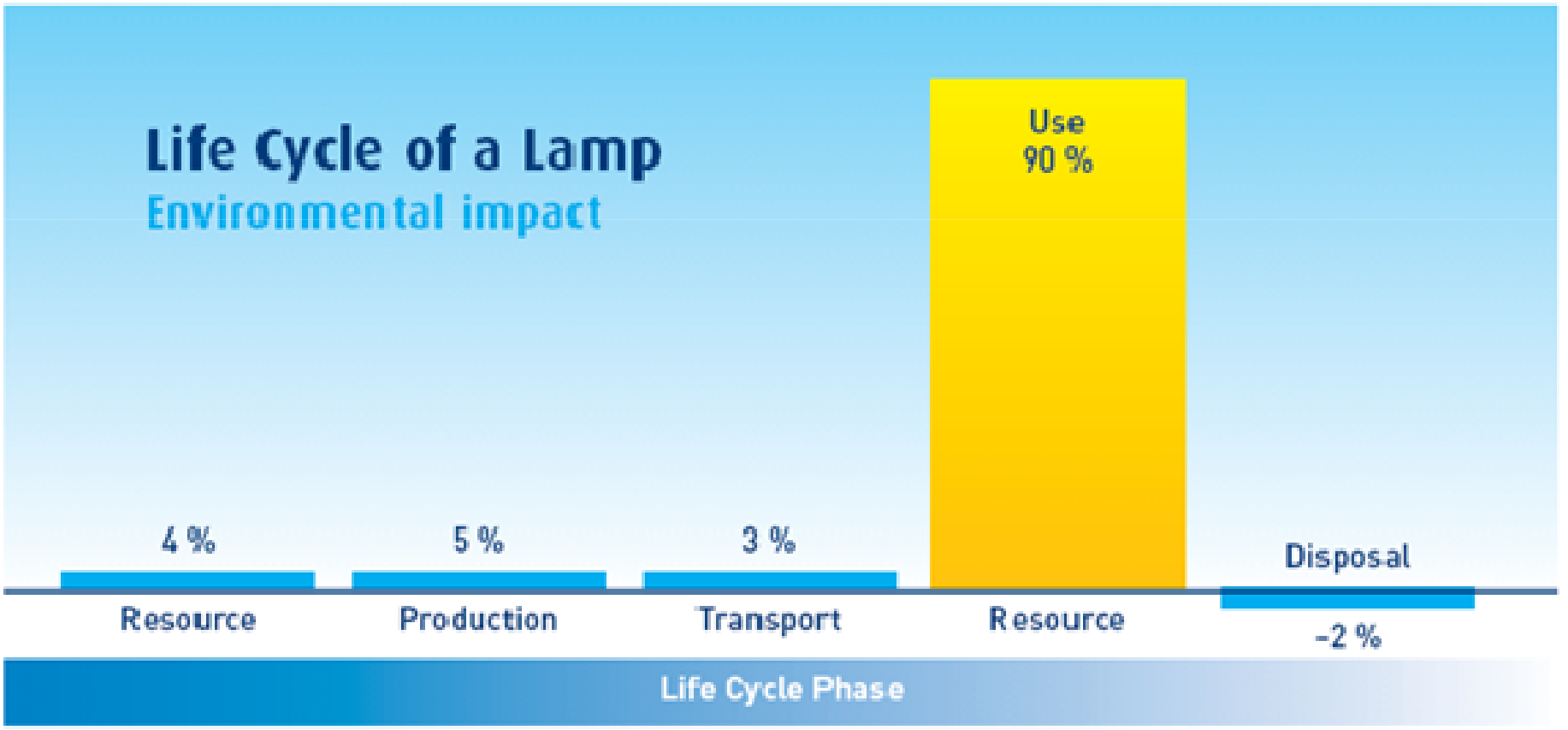
en.lighten

Life Cycle Assessment as science based approach



en.lighten

Life Cycle Assessment as science based approach



en.lighten

What is the energy and CO2 Savings Potential in Lighting Applications?

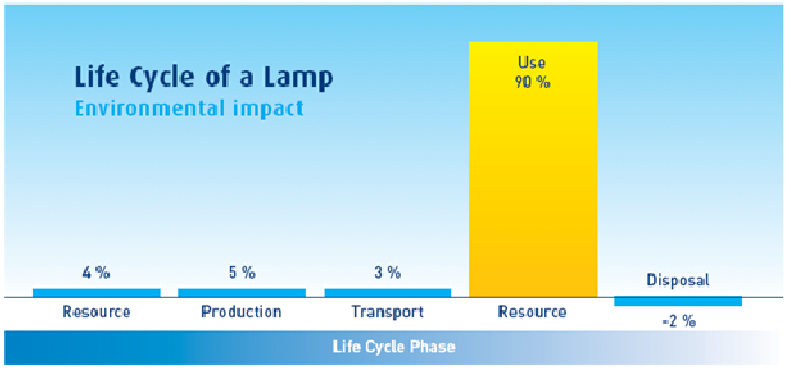
Application in general lighting	Energy saving through innovative lamp technologies			~savings / lamp / year*
Street lighting	 Mercury vapor	~40%	High-pressure sodium lamp 	220 kWh / 110 kg CO_2
Office & Industry Lighting	 Fluorescent lp. w. halophosphate phosphor	~65%	New T5 fluorescent w/ electronic control & light management 	180 kWh / 90 kg CO_2
Shop lighting	 3 Standard Halogen lamps	~80%	New Ceramic metal halide lamps 	500 kWh / 250 kg CO_2
Hospitality Spotlighting	 Low voltage halogen reflector	~30%	Dichroic Halogen lamp with infrared coat technology 	60 kWh / 30 kg CO_2
Household lighting (private)	 Standard Incandescent	~80%	Compact fluorescent 	50 kWh / 25 kg CO_2
		~30%	Halogen Energy-Saver 	18 kWh / 9 kg CO_2
Lighting design	 Low voltage halogen reflector	~50%	White LED Module COINlight OSTAR 	45 kWh / 22 kg CO_2

* For typical usage / Energy-Mix 0,5 kg CO2/kWh

Resource Focus

Materials and Substances in Lamps

- Focus on hazardous substances
- Emphasis on regulating the level of mercury in fluorescent and other mercury-containing lamps.
- Summary on the European Union's Restriction of Hazardous Substances (RoHS) Directive - global benchmark for regulating use and level of hazardous substances



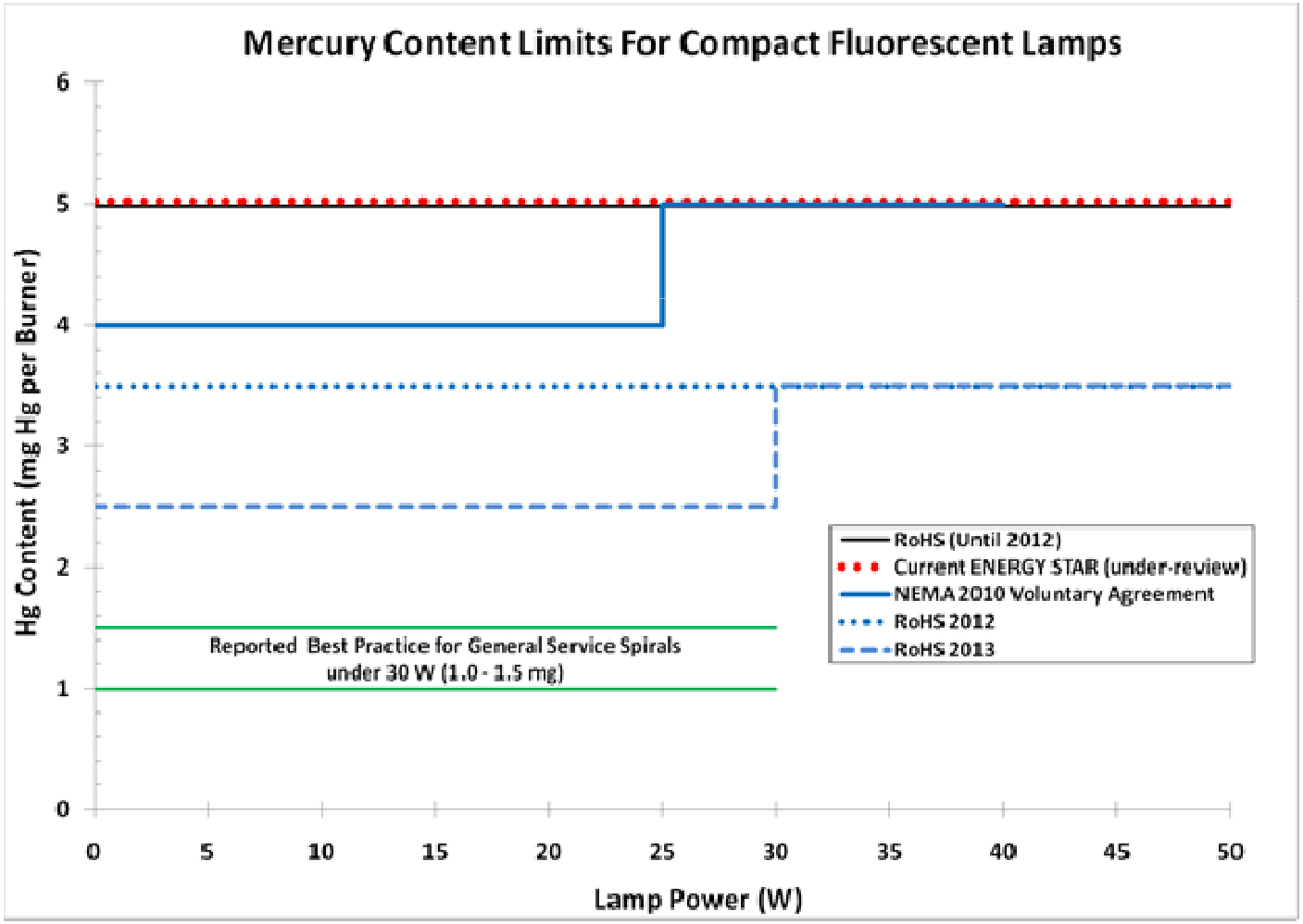
en.lighten

International Context

- Focus on sustainability in lighting is in line with global regulatory best practices
  - Basel Convention on the Control of Transboundary Movement of Hazardous Wastes and their Disposal,
  - Intergovernmental Negotiating Committee to prepare a legally binding agreement on mercury.

en.lighten

Mercury Content Limits CFL



en.lighten

Sustainable Lighting not ***only*** about energy efficiency and End-of-Life

- Material composition of a typical lamp
- Global best practice benchmark for regulating use and level of hazardous substances in lamps such as mercury (Hg)
- Lamp Hg dosing techniques
- Potential health issues related to light, EMF and mercury in fluorescent lighting
- Compliance with health-related legislation
- The concept of extended producer responsibility
- Collection and recycling systems (and technologies) for gas discharge/mercury containing lamps

en.lighten

Usage Phase

Consumer Related Environmental, Health & Safety Issues

- Focus on environmental, health and safety aspects of lighting
- Based on scientific data and government policy responses
- Emphasis on issues surrounding the breakage of mercury-containing lamps.
- Global review of compliance related health legislation

en.lighten

End-of-Life Phase

Worker Safety, Environmental Impacts and Environmentally Sound Management

- Focus on end-of-life management of lamps
- Highlights current regulatory frameworks
- Best practice in setting up, managing and financing end-of-life collection, recycling and environmentally sound management and disposal of mercury-containing lamps.

en.lighten

What needs to be done?

- Make the switch to substantially more efficient and long-lasting lamps/lighting technologies to reduce overall emissions of mercury, GHG and increase energy efficiency (example CFL, LED etc.)
- Recommend the adoption of maximum mercury and other hazardous substance content standards in line with global best practice in this area (i.e. RoHS)
- Establish monitoring, verification and enforcement programs for sustainability related issues on national or regional levels such as:
  - Labeling (minimal energy-saving performance standards)
  - Mercury content
  - Extended life
  - Collection and Recycling

en.lighten

What else needs to be done?

- Make the proper collection and recycling and disposal of lamps a strong national recommendation by emphasizing environmental and economic gains.
  - Establish collection requirements for gas discharge and other lamp types
  - Enable local funding mechanisms in support of the changeover from IL to CFL
  - Develop a communication strategy on recycling
- Communicate about sustainability and adapt communications to specific audiences
  - The amount of mercury saved from coal plants
  - Other environmental and economic gains (for example from recycling)
- Provide fact based communication on lamp breakage issues
- Recommend regionally harmonized labeling approaches for mercury content and lamp disposal

Back Up Slides

en.lighten

U.S. “Universal Waste” Regulations Foster More Economic Lamp Collection

- USEPA designated mercury-added lamps as Universal Waste Regulation (UWR)
- Previously, designated as hazardous waste under the strict Resource Conservation and Recovery Act.
- The UWR classification was designed to maximize flexibility lamp users while assuring proper recycling or environmental sound management solutions
- The UW regulations are run under state programs that are the "functional equivalent" of the federal program.
-
- States can issue permits, enforce regulations and further foster more cost effective lamp collection.

USA UWR Lamp Collection Programs

- UWR and Extended Producer Responsibility (EPR) lamp collection legislation adopted in Maine, Vermont, Massachusetts, Washington
- Pending EPR legislation in other locations-California, Wisconsin, Illinois, Oregon, New York & many others
- Many areas (cities and counties) recycle locally
- Extensive lamp collection opportunities at retail stores, as discussed in the next slide

en.lighten

EU Adopts EPR Approach to Collect Mercury-Added Lamps

--EU WEEE Directive led to extended producer responsibility (EPR) policy shifts in responsibility for end-of-life management away from local government upstream to producer

--EU WEEE directive led to producers collection schemes for lamps in each European Country.

--Under these programs, third-party operators are contracted to organize and finance collection and recycling of lamps at the end of life.

--Producers proposing EPR approaches in 10 developing countries

National Lamp Collection Initiatives

- **Taiwan**. Taiwanese lamp retailers face fines unless they accept lamps back for recycling. In 2007, Taiwan reported achieving an 80% recycling rate for lamps

- **South Korea**. The South Korean government has adopted EPR approaches for lamps. The national system includes a deposit/refund system & mandatory recycling regulations.

- **Australia.** In July 2010 a voluntary, national scheme began to increase recycling of mercury-added lamps.

- **Canada.** Several provinces will soon adopt EPR regulations for collecting lamps.

en.lighten

Lamp producer initiated pilot lamp collections

- South Africa (pilot collection underway)
- Planning on working in at least 10 developing countries
- Countries include:
  - --South Africa, Turkey, China,
  - --Indonesia, Thailand,
  - --Argentina, Brazil, Chile,
  - --Columbia & Mexico

USA Retail Outlet Lamp Recycling

- Ace/True Value Hardware – owner/operator agreement (franchised stores) many participate
- Aubuchon Hardware - some participation
- Home Depot – 1,973 stores in 2008, 75% of population within 10 miles of a store, CFLs only
- IKEA – Swedish retailer, all lamps accepted for recycling
- Lowe's – National home improvement chain similar to Home Depot
- Menards – Midwest only home improvement chain -

en.lighten

Thank you

www.enlighten-initiative.org

gef

OSRAM

PHILIPS

UNEP