Learning by Doing: The Wealth of Experience Implementing Standards and Labeling Programs in Asia

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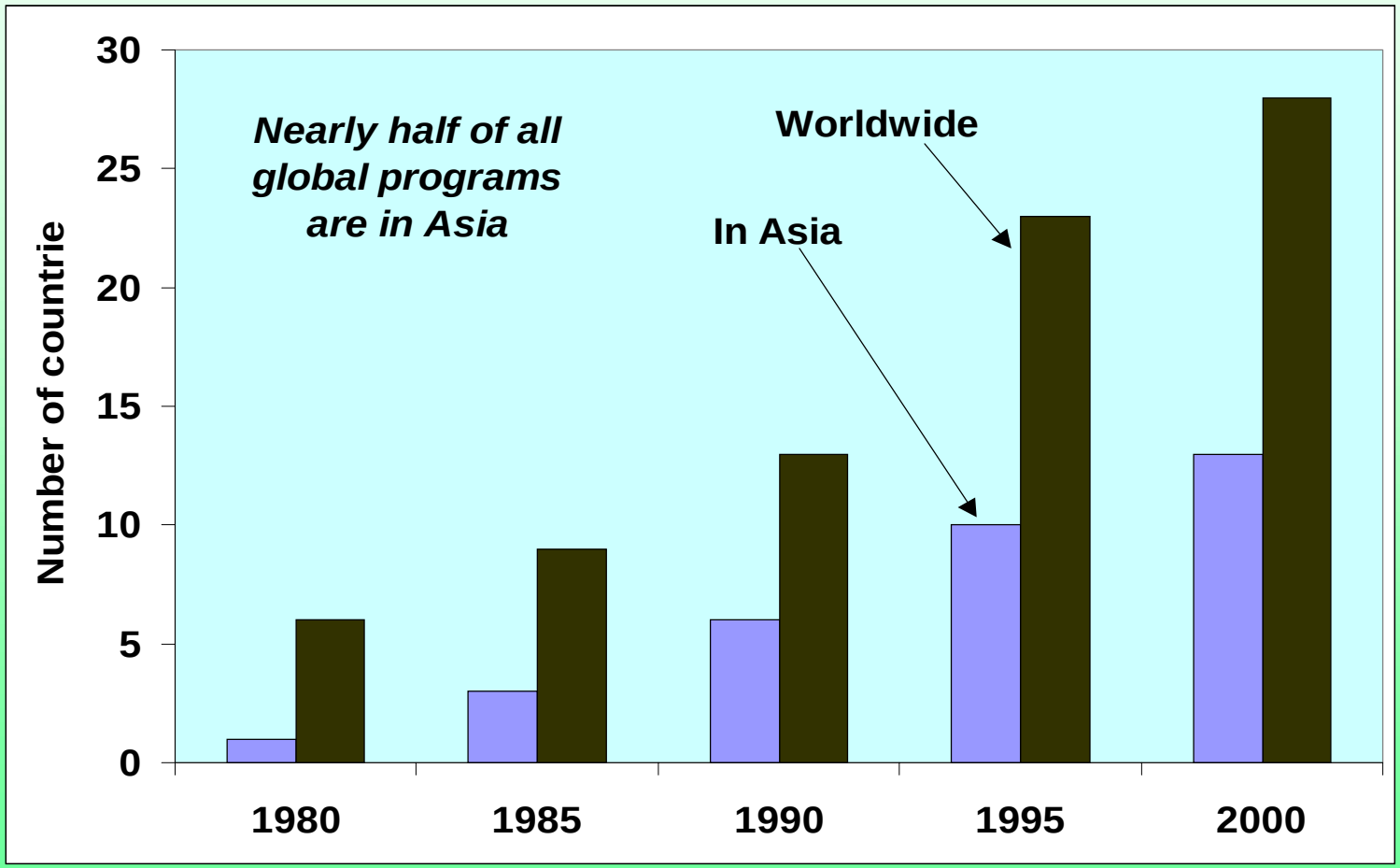
Labels and Standards in Context

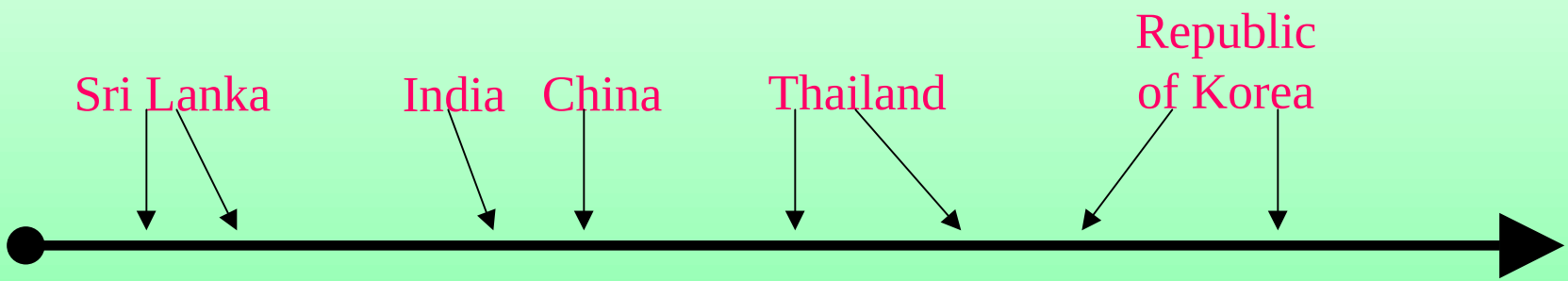
- Global importance
  - Appliances, equipment, and lighting ≈ 34% of total energy consumption
  - They contribute ~25-30% of energy-related CO_2 emissions
  - Most products that will use energy in buildings in 2020 have not yet been built
  - Mandatory Energy Efficiency Standards
    - Remove inefficient products from the workplace
  - Energy Labels
    - Influence consumer and manufacturer decisions

Cumulative Number of Countries with S&L Programs in Asia and Worldwide



Conceptual Spectrum of Steps in Developing Standards and Labels

CASE STUDIES EXAMINED:



Feasibility Study

Establish Testing Facilities

Label Design

Voluntary Labeling

Mandatory Labeling

Minimum Energy Performance Standards (MEPS)

Summary of Country Programs Reviewed

Country	Program element reviewed
Sri Lanka	Feasibility study for appliance testing and labeling program
India	Label design
China	Certification of energy conservation products
	Unified labeling program development
Thailand	Voluntary labeling leading to minimum efficiency performance standards (MEPS)
Republic of Korea	Standards and labeling implementation and upgrading

The Experts: Sources for this Paper

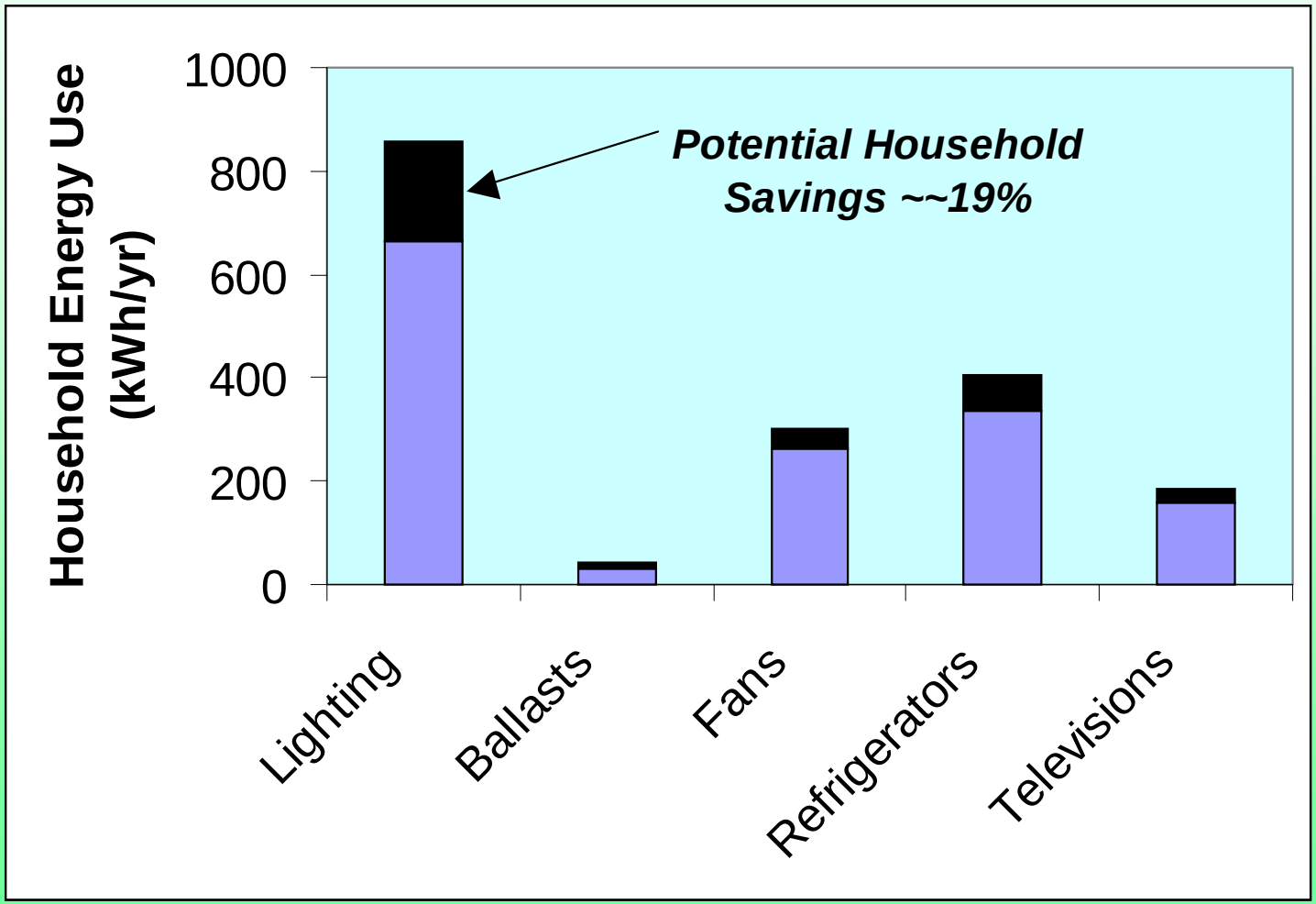
- **Sri Lanka**
  - Lawrence Berkeley National Lab and IIEC
- **India**
  - Vijay Deshpande and Linda Dethman
- **Thailand**
  - Napaporn Phumaraphand, The World Bank, and ERM-Siam
- **China**
  - Li Tienan and Paul Waide
- **Republic of Korea**
  - Sun-Keun Lee

Sri Lanka – Feasibility Study (1)

- Background
  - Feasibility Study for Appliance Testing and Labeling Program
  - Funded by Asian Development Bank (ADB)
  - Carried out by Lawrence Berkeley National Lab and IIEC
  - Lead Sri Lankan agency: DSM Unit at Ceylon Electricity Board

- Steps in Feasibility Study
  - International review
  - Screening of appliances and equipment
  - Testing infrastructure needs assessment
  - Program design
  - Final program recommendations

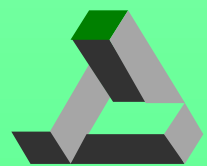
Sri Lanka – Feasibility Study (2)



Sri Lanka – Feasibility Study (3)

- 4 test laboratories recommended
  - Lighting, A/Cs, refrigerators, motors
  - US$ 1.6 million start-up costs
  - US$ 106K annual operating costs

- Current status
  - CEB hopes to launch lighting test lab by mid-2002
  - Funding from World Bank
  - Sri Lanka also seeking funding for additional testing facilities

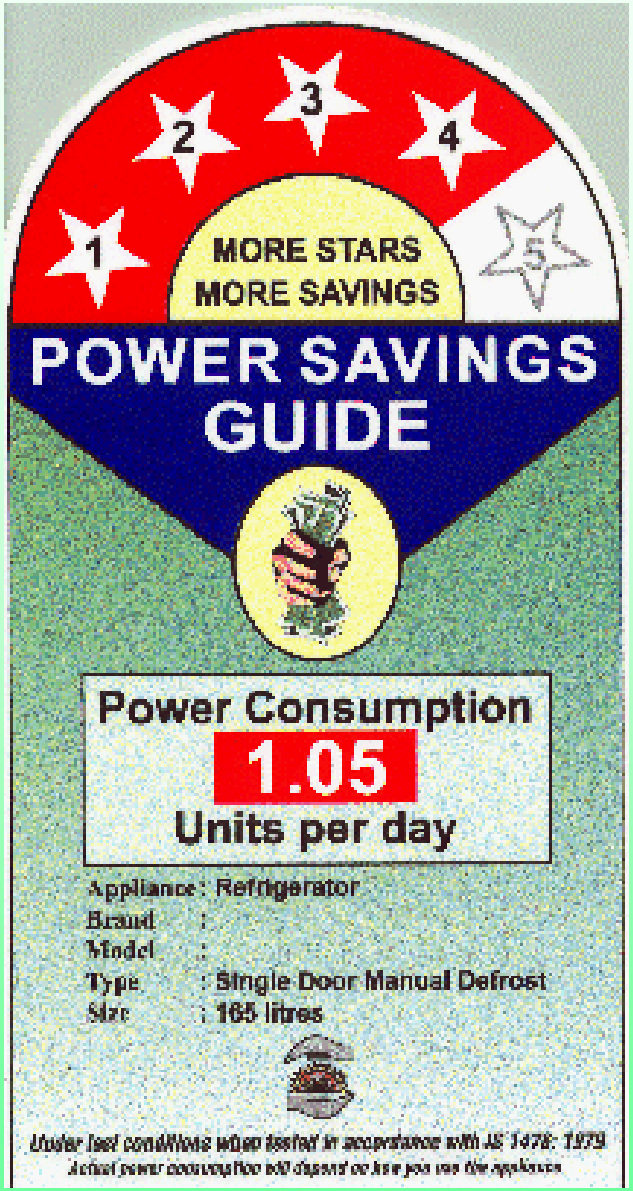


India – Label Design (1)

- Background
  - Peak demand deficit of 14.5%
  - T& D losses of 23%
  - Rapid growth in appliance ownership
    - Urban refrigerator saturation increased from 23=> 29% from 1997 to 1999
- Consumer labeling research
  - Labeling legislation stalled
  - US AID funded aggressive label development effort

India – Label Design (2)

- Label research in 3 phases:
  - Phase 1: Baseline survey on consumer attitudes
  - Phase 2: Focus groups to test label designs
    - Label designs assembled from different international formats
    - 10 focus groups to test 17 different designs
    - Basic formats tested were star (Australian), bar (Europe), sliding scale (U.S. and Canada) and number (Australian/Korean/Thai)
  - Phase 3: Focus groups with consumers and expert stakeholders



India – Label Design (3)

- Lessons learned
  - Importance of focus on consumer research
  - Adoption of phased approach
  - Cooperation with both <u>stakeholders</u> AND <u>consumers</u>

China – Certification & Labeling (1)

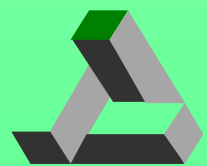
- Background
  - Saturation of refrigerators went from < 5% to 67% in urban households from 1980 to 1997
  - Sales of A/Cs went from 250,000 in 1990 to 8 million in 1997
  - China is one of world's largest producers of home appliances and lighting products
  - Residential electricity has increased 16%/year since 1985
- Mandatory standards set for many products in 1989
- New legislation set the basis for energy labeling in 1998

China – Certification & Labeling (2)

- Voluntary Endorsement Label
  - China Energy Efficient Product Certification Center (CECP) established in 1998
  - Endorsement label launched in September 1999
  - Products that meet criteria receive an Energy Conservation Product Certificate

China – Certification & Labeling (3)

- Basic requirements for certification
  - Manufacturer must have a quality management system
  - Product must meet national requirements for safety and performance (in accredited test labs)
  - Product must meet technical specifications for EE set by CECP
- Current certification programs for:
  - Refrigerators, fluorescent ballasts, A/Cs, wave traps
  - Plans for many other products



China – Certification & Labeling (4)

- Goals of the China Unified Energy Labeling Program (CUELP)
  - 1. Develop a unified energy rating label
    - Avoid proliferation of different label types
    - will be applied for all appliances and equipment used throughout the economy
  - 2. Develop legislative basis and framework
  - 3. Complement the CECP endorsement label

China – Certification & Labeling (5)

- Promulgation of an energy labeling framework:
  - Develop energy labelling implementation plan
  - Develop energy performance testing infrastructure
  - Develop framework legislation for energy labelling

- Design of a unified energy label:
  - Selection target appliance types
  - Develop energy consumption and performance metrics
  - Establish energy performance test procedures
  - Determine desired informational content needed in the label
  - Determine presentational format and design of the energy label

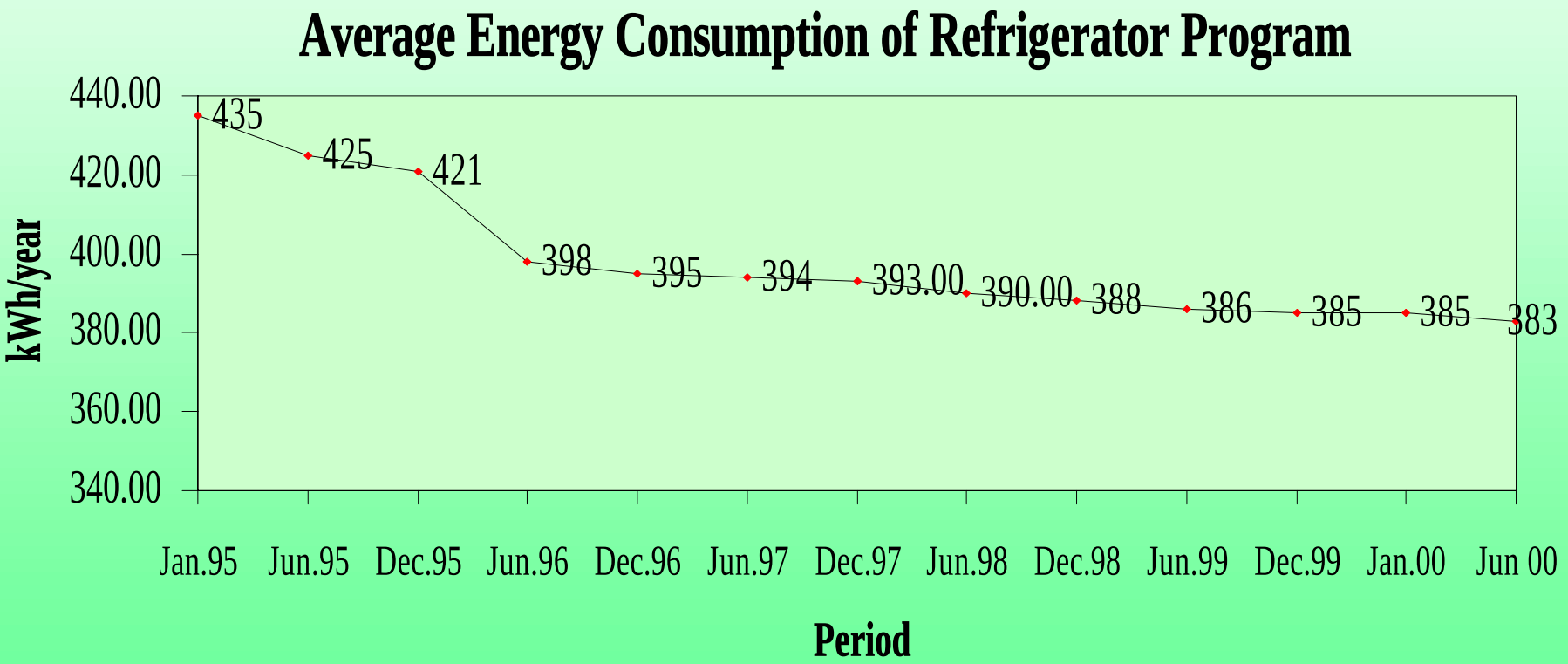
Thailand – Labeling Leads to Standards (1)

- Thailand was first Asian country to develop comprehensive DSM Master Plan (in 1991)
- DSM program had voluntary labeling for 2 products: refrigerators and air conditioners
- Labeling for refrigerators began in 1995
- Labeling for A/Cs began in 1996

Thailand – Labeling Leads to Standards (2)

- **Rating system**
  - # 3 rating is from 10% below to 15% above average
  - # 4 is 15-30% better than average
  - # 5 is > 30% better than average
- **Labels made <u>mandatory</u>**
  - for single-door refrigerators in 1998
- **Label "<u>upgraded</u>"**
  - 20% more efficient in 2001

Thailand – Labeling Leads to Standards (3)



Thailand – Labeling Leads to Standards (4)

- Program Impacts
  - Refrigerators
    - Peak demand reduction of 84 MW (compared to 27 MW target)
    - Share of high-efficiency refrigerators (# 5) increased from 12% in 1995 to 96% in 1998
    - Label made mandatory for single-door refrigerators in 1998
  - Air Conditioners
    - Peak demand reduction of 84 MW (compared to 22 MW target)
    - Share of high-efficiency A/Cs (# 5) increased from 19% in 1996 to 38% in 1998

Thailand – Labeling Leads to Standards (5)

- Lessons Learned
  - Voluntary labels can transform a market if accompanied by massive PR and advertising
  - Voluntary labels have limitations if the market is not homogenous (e.g., Thai A/C industry)
  - Extremely cost effective
    - < US$60/kW – cost of avoided peak
    - ~ 1.1 US cents/kWh -- cost of saved energy (CSE)
  - Energy label (and DSM programs) paved the way for MEPS in Thailand

Republic of Korea – Effective MEPS and Labeling (1)

- Background
  - Energy use increased more than 4-fold over past 20 years
  - 97% of country's energy is imported
- Legislation on standards and labels set in 1992
  - refrigerators and refrigerator-freezers
  - room air conditioners
  - incandescent lamps
  - T-10 fluorescent tube lamps
  - fluorescent lamp ballasts
  - passenger cars
- 3 new products regulated in 1999
  - screw-based compact fluorescent lamps (CFLs), clothes washers, and household gas boilers.

Republic of Korea – Effective MEPS and Labeling (2)

- Phasing of legislation
  - Year 1: mandatory energy labeling effective and minimum energy performance standards (MEPS) announced
  - Year 2: mandatory MEPS go into effect
  - Year 3: target energy performance standards (TEPS) go into effect

Republic of Korea – Effective MEPS and Labeling (3)

Fluorescent ballast label

- Opposite of Thai ranking: #1 is the most energy-efficient
- #1 products can save ~30-40% compared to #5 products
- #5 is usually basis for MEPS

Republic of Korea – Effective MEPS and Labeling (4)

Impact of the program

Appliance Type	Measurement units	1993 energy use (market average)	2000 energy use (market average)	% improvement in efficiency
Refrigerator-freezers	KWh/mo/liter	0.113	0.065	74%
Air conditioners	Coefficient of performance	2.4	3.7	54%
Incandescent lamps	Lumens/W	10	11	10%
Fluorescent lamps	Lumens/W	65	90	39%

Conclusions

- There is a wealth of experience in S&L in Asia
- Multiple opportunities for for “tech transfer”
  - Horizontally across Asia
  - From Asia to Europe, U.S., and Latin America
- Consumer research and label design is important
- Voluntary labeling can be effective in certain cases
- Endorsement labeling programs can complement mandatory labeling or MEPS programs
- Labeling can be a good first step toward MEPS