Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

APEC Energy Working Group

May 2009

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EWG 03/2004

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APEC Symposium
on the Implementation of Government Energy Efficiency Programs

Kunming, China

2-3 August 2004

Day 1 (Monday, 2 August 2004)

Time	Topic/ Speaker(s)
Opening Session:	
Session chair:	*Tienan LI, China Certification Center for Energy Conservation Product (CECP)*
9:00-9:30	***Introduction to Symposium*** *Zhiqiang XU , National Development and Reform Commission (NDRC)*
	APEC address *Fanghei TSAU, Chair of APEC Expert Group on Energy Efficiency & Conservation, APEC Energy Working Group*
	CNIS address *Qing FANG, Vice President of China National Institute of Standardization*
Session 1: Introduction to Public Sector Energy Efficiency Programs	
Session chair:	*Tienan LI, China Certification Center for Energy Conservation Product (CECP)*
9:30-10:30	**Overview of the Symposium** *Peter DU PONT, Danish Energy Management*
	International Experience with Governmental Energy Efficiency Programs *Jeffrey HARRIS, Lawrence Berkeley National Laboratory, U.S.*
10:30-11:00	**Coffee Break**
Session 2: Experience and Best Practice in Specific Economies	
Session chair:	*Tienan LI, China Certification Center for Energy Conservation Products*
11:00-12:15	**Lesson Learned from the United States Federal Energy Management Program (FEMP)** *Beth SHEARER, Former Director of FEMP*
	Main Results of the Mexican Programs for Energy Efficiency in the Public-Sector *Gaudencio RAMOS-NIEMBRO, Coordinator for Electric Supply, Thermal Processes and Transportation/National Commission for Energy Conservation (CONAE)*
12:15-13:15	**Buffet Lunch**

Session 3: Experience and Best Practice in Specific Economies (cont'd)

Session chair:	*Peter DU PONT, Danish Energy Management*
13:15-14:45	**Energy-Efficiency Initiatives in Chinese Government Agencies and Overview of Current Key Programs** *Zhiqiang XU, National Development and Reform Commission (NDRC)*
	Funding Public Sector Energy Efficiency Projects in China: Alternative Considerations *Jiang LIN, Lawrence Berkeley National Laboratory, U.S.*
	Execution of Chinese Taipei Government Sector Energy Management Program *Dennis Wen-Bohr WANG, Director, Energy Conservation Technology Development Center, CTCI Foundation*
14:45-15:15	Coffee Break
Session 4: Experience and Best Practice in Specific Economies (cont'd)	
Session chair:	*Wayne WESCOTT, International Council for Local Environmental Initiatives*
15:15-16:30	**Energy Use in the Australian Government's Operations** *Anthony MARKER, Australian Greenhouse Office*
	The New Zealand Energy Wise Government Programme *Dan COFFEY, Programme Leader, Energy Efficiency and Conservation Authority*
Session 5: Panel Discussion on Public Sector Energy Management	
Facilitator:	*Peter DU PONT, Danish Energy Management*
16:30-17:30	**Topic: Ingredients for Successful Public-Sector Energy Efficiency Programs** *Panelists:* *Jeffrey HARRIS, Lawrence Berkeley National Laboratory,* ***United States*** *Tienan LI., China Center for Energy Conservation Products (CECP),* ***China*** *Wayne WESCOTT, International Council for Local Environmental Initiatives,* ***Australia***
18:00	Dinner Reception for all Participants

Day 2 (Tuesday, 3 August 2004)

Time	**Topic/ Speaker(s)**
Session 6: Energy Efficiency Investment Case Studies	
Session chair:	*Nils BORG, Borgco*
9:00-10:30	**Case Study: Energy Efficiency Management in the Russian Public Sector** *Garegin ASLANYAN, Vice-President, Center for Energy Policy*
	Case Study: Rolling Funds for Investment in Energy Efficiency Systems in Australia Local Councils *Wayne WESCOTT, International Council for Local Environmental Initiatives, Australia*
	Case Study: Low-Energy Office Building: Ministry of Energy Communications and Multimedia, Malaysia *Abdul Rahim Bin MAHMOOD, Ministry of Energy, Water and Communications Malaysia*

10:30-11:00	**Coffee Break**
Session 7: Energy-Efficient Procurement Practices	
Session chair:	*Jeff HARRIS, Lawrence Berkeley National Laboratory, U.S.*
11:00-12:15	**Public Procurement of Energy-Saving Technologies in Europe (PROST)** *Nils BORG, President of Borgco*
	Government Energy Management and Voluntary Approaches: Energy Star and Other Market Transformation Programs in the United States *Susan WICKWIRE, US EPA*
12:15-13:15	Buffet Lunch
Session 8: Energy-Efficient Procurement Practices *(Continued)*	
Session chair:	*Jeff HARRIS, Lawrence Berkeley National Laboratory, U.S.*
13:15-14 :45	**Public Procurement System for Energy Saving Commodities in Korea** *Ann CHONG-HWAN, Director of Material Certification Division, Public Procurement Service, Korea*
	Chinese Government Efforts to Promote Energy Efficiency for End Use *Minhong JIN, China Certification Center for Energy Conservation Products*
	CECP Endorsement Label and Energy Efficiency Government Procurement in China *Wenbin ZHANG, Chinese Ministry of Finance* *Tienan LI and Caifeng LIU, China Certification Center for Energy Conservation Products*
14:45-15:00	Coffee Break
Session 9: Breakout Session	
Facilitators:	*Tienan LI, Director, China Certification Center for Energy Conservation Products* *Peter DU PONT, Ph.D., Danish Energy Management*
15:00-16:30	**Breakout Groups to Develop Recommendations for Government Energy Efficiency Programs and Procurement**
16:30-17:00	Break while Communiqué being drafted
Session 10: Conference Wrap-Up	
17:00-17:30	**Presentation and discussion of Symposium Communiqué**
18:30	**Buffet Supper**

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APEC SYMPOSIUM
ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

CNIS Address

Fang Qing

Address on APEC Symposium on Government Energy Management Programme

China National Institute of Standardization

Fang Qing, Deputy President

Ladies and gentlemen,

Good morning!

Today here we are holding an APEC symposium on Government energy management programme. This symposium aims to exchange successful experience and policies on the energy efficiency in government agencies and explore effective measure to promote the energy efficiency in government agencies. I have honor and pleasure, on behalf of the China National Institute of Standardization, to express our warm welcome to the international and domestic guest, and also extend heartfelt thanks to all the member of APEC energy experts working group for your great efforts and support!

Energy efficiency is one of the long-term strategies for the economy and social development of our country, and also one of the important parts of the sustainable development strategy. Under the guidance of the policy of "realize the coexistence of energy resources development and conservation, put energy efficiency in the leading place", since the establishment of the China Certification Center for Energy Conservation Products (CECP), it has devoted itself to the energy efficiency missions, coordinated with the government to make many concrete efforts, made continual cooperation and exchanges with other countries and achieved good social benefit. The China National Institute of standardization, directly under the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), as the management unit of the CECP, paid a great attention to the standardization research of the energy resources and environment and made much basic work to advance the improvement of the utilization efficiency of the energy resources and provided constant technical supports for the CECP. The research shows that the energy consumption of the government agencies accounts for a large proportion in the total energy consumption of the society. It can save the resources, reduce the public expenditure, speed up the application of new technology, new equipments and new material and promote the energy efficiency mission of the whole society through the pilot effect of the government agencies. Therefore it is very important to widely make a deep discussion on the government energy management programme, to study and develop the strategies on how to conduct government energy management programme in China, to improve the environment and realize the aim of sustainable utilization of the resources.

From now on, under the coordination and guidance of the National Development and Reform Committee, the China National Institute of standardization will continue as always to support and promote China energy efficiency labeling system, enlarge and perfect the scope and field of the certification for energy-efficient products, and lay a stable foundation for the development and implementation of the Chinese government energy management programme to improve the resources utilization efficiency of the whole society. Meanwhile, we also hope you to provide supports and concern this issue, and explore new cooperation opportunities.

Again, I express our warm welcome to the guests, and congratulate the symposium beforehand on its success. Thank you!

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Kunming, China
2-3 August 2004

Session 1: Introduction to Public Sector Energy Efficiency Programs

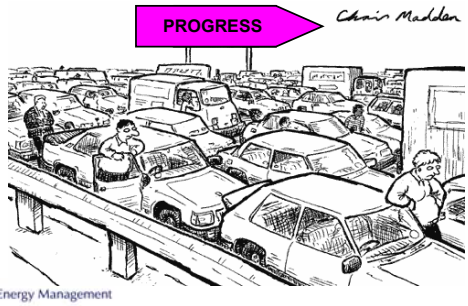
Overview of the Symposium

Peter du Pont, Ph.D.
Danish Energy Management A/S
Symposium Support and Facilitation

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Energy Policy Tip of the Day

Be Patient: Sometimes the Road to Progress Has Some Delays



APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Symposium Objectives

- **Explore Best Practices**
  - Share experience and information on implementation of government energy management programs
  - Procurement, regulatory measures, promotion and incentives in the government building sector;
- **Lessons Learned**
  - How effective are government energy-efficiency programs?
  - What are the barriers? How can they be overcome?
  - What are their impacts on the adoption of third-party energy efficiency services?
- **International cooperation**
  - What level of information-sharing and cooperation is useful?
  - What mechanisms for cooperation?
  - At regional and international levels?

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

DAY 1

- Introductions
- Foundations of Government-Sector Energy
- Efficiency Programs
- Experience from Specific Economies
- Panel Discussion on Ingredients for Success

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 1: Introduction to Public Sector Efficiency Programs

- *Jeffrey Harris, Lawrence Berkeley National Laboratory*
- "International Experience with Government Sector Energy Management"
- Foundation Presentation
  - Why the need for EE in the Public Sector?
  - Program strategies and examples
  - Lessons Learned
  - Collaborative program called PePS

Danish Energy Management

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 2: Experience and Best Practice in Specific Economies

- **United States**
  - *Beth Shearer, Former Director of FEMP*
  - "Federal Energy Management Program (FEMP)"
    - **Practical overview of strategy and key factors**
    - **Lessons learned from the U.S. program**
- **Mexico**
  - *Gaudencio Ramos-Niembro, National Commission for Energy Conservation (CONAE)*
  - "Main Results of the Mexican Programs for Energy Efficiency in the Public-Sector"
    - **Energy Efficiency programs in public buildings, public vehicles, national oil company, national utilities, and public lighting**

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APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 3: Experience and Best Practice in Specific Economies (Continued)

- **China**
  - *Xu Zhiqiang, National Development and Reform Commission (NDRC)*
  - Energy-Efficiency Initiatives in Chinese Government Agencies and Overview of Current Key Programs
    - **Overview of key initiatives and progress to date**
- **China**
  - *Lin Jiang, Lawrence Berkeley National Laboratory, U.S.*
  - "Funding Public Sector Energy Efficiency Projects in China: Alternative Considerations"
    - **Overview of ESCO development in China**
    - **Potential for alternative financing mechanisms for public sector (incl. Revolving Loan Funds)**
    - **Case studies of Loan Funds from California and Texas**

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APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 3: Experience and Best Practice in Specific Economies (Continued)

- **Chinese Taipei**
  - *Dennis Wen-Bohr Wang, Energy Conservation Technology Development Center, CTCI Foundation*
  - "Execution of Chinese Taipei Government Sector Energy Management Program"
    - **Overview of public-sector EE programs in Chinese Taipei**
    - **Their impact on energy use: govt. sector growing at 1% per year, compared to 5% per rest of economy**

Danish Energy Management

Session 4: Experience and Best Practice in Specific Economies (Continued)

- **Australia**
  - *Anthony Marker, Australian Greenhouse Office*
  - "Energy Use in the Australian Government's Operations"
    - **Importance of *measuring* what you are doing**
    - **The "Whole-Of-Government Energy Report (WOGER)**
    - **On-Line, Energy Data Gathering And Reporting (EDGAR)**
- **New Zealand**
  - *Dan Coffey, Programme Leader, Energy Efficiency and Conservation Authority*
  - "The New Zealand Energy Wise Government Programme"
    - **Achievement and lessons learned in New Zealand**
    - **Energy management assessment tools; progress reports; program monitoring; and procurement**
    - **Role of the energy services industry**

END OF DAY 1
Session 5: Panel Discussion on Public Sector Energy Management

- **Topic**
  - **Ingredients for Successful Public-Sector Energy Efficiency Programs**
- **Panelists**
  - *Jeffrey Harris, Lawrence Berkeley National Laboratory, United States*
  - *Li Tienan., China Center for Energy Conservation Products (CECP), China*
  - *Wayne Wescott, International Council for Local Environmental Initiatives, Australia*
- ***Objectives***
  - Review the day's results
  - Share ideas and recommendations
  - Brainstorming on the key lessons learned, success factors

Day 2

Case Studies of EE Investment

Public Sector Procurement

Breakout Sessions to Discuss Next Steps:

What have we learned?

Where can we go from here? And how?

DAY 2

- Case Studies of EE Investment
- Public Sector Procurement
- Breakout Sessions to Discuss Next Steps:
  - What have we learned?
  - Where can we go from here? And how?

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 6: Energy Efficiency Investment Case Studies

- **Russia**
  - *Garegin Aslanyan, Vice-President, Center for Energy Policy*
  - Case Study: Energy Efficiency Management in the Russian Public Sector
    - **Potential for EE in the public sector, with case studies on third-party financing in education and research sectors**
- **Australia**
  - *Wayne Wescott, International Council for Local Environmental Initiatives*
  - Case Study: Rolling Funds for Investment in Energy Efficiency Systems in Australia Local Councils
    - **Benefits and mechanics of establishing Revolving Energy Funds at local councils**
    - **How the funds work, with specific case studies and examples**
- **Malaysia**
  - *Abdul Rahim Bin Mahmood, Ministry of Energy, Water and Communications Malaysia*
    - **Case Study: Low-Energy Office Building: Ministry of Energy Communications and Multimedia, Malaysia**
    - **Detailed case study of how to design, construct, and monitor a high-profile, super energy-efficient building**

Danish Energy Management

APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 7: Energy-Efficient Procurement Practices

- **Europe**
  - *Nils Borg, President of Borgco*
  - "Public Procurement of Energy-Saving Technologies in Europe (PROST)"
    - **Results of a major 2-year study of public procurement. 80 million Euros per year → can save up to 12 billion Euros in energy costs!**
    - **A few Best Practice Examples; overview of the "Public Sector Toolbox"; common European databases and networks; a possible EU Directive**
- **United States**
  - *Susan Wickwire, US EPA*
  - Government Energy Management and Voluntary Approaches: Energy Star and Other Market Transformation Programs in the United States
    - **Overview of the Energy Star and other voluntary programs**
    - **Linkage and coordination with other programs**
    - **Use in government procurement and with FEMP program**

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APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Session 8: Energy-Efficient Procurement Practices (Continued)

- **Korea**
  - *Chong-Hwan Ann, Director of Material Certification Division, Public Procurement Service, Korea*
  - "Public Procurement System for Energy Saving Commodities in Korea"
    - **Public procurement in Korea; certification scheme for EE products; and GePs (e-Procurement)**
- **China**
  - *Minhong JIN, China Certification Center for Energy Conservation Products*
  - *"Chinese Government Efforts to Promote Energy Efficiency for End Use"*
    - **Technical basis for government procurement efforts: minimum energy performance standards (MEPS) and labeling programs in China**
  - *Zhang Wenbin, Chinese Ministry of Finance*
  - *Li Tienan and Liu Caifeng, China Certification Center for Energy Conservation Products*
  - Endorsement Label and Energy Efficiency Government Procurement in China
    - **The CECP endorsement label; its use as a basis for procurement; and government procurement policy in China**

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APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

END OF DAY 2
Session 9: Breakout Session

- **Topic**
  - Recommendations for Government Energy Efficiency Programs and Procurement
- **Objective**
  - Develop Symposium Communique with specific recommendations on coordination strategy and next steps
    - What did we learn? Where do we go from here? How?

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APEC Symposium on the Implementation of Government Energy Efficiency Programs
Kunming, China, 2-3 August 2004

Welcome … and GOOD LUCK!

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International Experience with Government-Sector Energy Management

Jeffrey Harris
Lawrence Berkeley National Lab

APEC Symposium on the Implementation of Government Energy Efficiency Programs
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OVERVIEW OF TALK

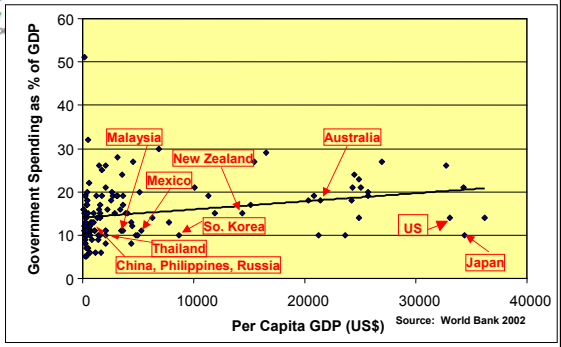
1) Why energy efficiency in the government sector?
2) Program strategies and examples
3) Lessons learned
4) Effective international collaboration
   – a challenge to this workshop

WHY ENERGY EFFICIENCY IN THE PUBLIC SECTOR?

- Large fraction of GDP (10-20%)
- Biggest energy user
- Biggest buyer of energy-using products
- Untapped savings potential
- In the past, energy prices often subsidized ("free"?)

Opportunity to lead the rest of the market!

Government Sector: 10-20% of GDP in both Industrial & Developing Countries



Government as a Market Leader

" (c) Promote public procurement policies that encourage development and diffusion of environmentally sound goods and services..."

—WSSD Johannesburg
Plan of Implementation, Chapter III. "Changing Unsustainable Patterns of Consumption and Production"

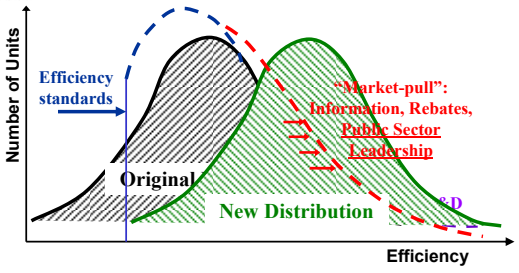
Benefits of Public Sector Energy Management

- **Lower government operating costs**
- **Example for consumers and enterprises**
- **Slower energy demand growth**
  - frees capital and electricity capacity for economic growth
  - reduces pollution and greenhouse gases
- **Market response to government demand**
  - volume + competition ⇒ lower prices
- **Job creation** (direct + indirect)
- **"Demand-pull":** new technology, products, and services

Energy and Cost Savings: U.S. Example

- **Energy use in government facilities:**
  - All levels of government spend:
    - US$16 billion/year on *energy*
    - US$60 billion/year for energy-using *products*
  - = 10-15% of all energy and product purchases (public and private)
- **Federal programs, led by USDOE/FEMP**
  - 24% energy savings/sq. meter (2000 vs 1985)
  - 35% lower utility costs (buildings and facilities)
- **Energy efficient products save 10%-50%**
  - FEMP purchasing criteria can save US$ 1 billion/ year (all public agencies including state, local)
  - Reduce greenhouse gases: 4+ million tons C/yr.
  - Stimulate market for low-standby products

Government Leadership Helps Transform the Market



PePS: Promoting an Energy-efficient Public Sector

- **Collaboration:**
  - LBNL, Alliance to Save Energy, ICLEI, IIEC …
- **Objectives:**
  - Recognition of government sector energy efficiency as a core element of energy policy (with information, incentives, standards, etc.)
  - Achieve significant, measurable energy and cost savings for government agencies
  - Use public sector buying power and leadership to transform markets
- **Focus on developing countries:**
  - Asia/Pacific, Latin America, E. Europe, Africa/Middle East

PePs (continued)

- **Address opportunities at all levels of government: national, state/provincial, municipal**
  - Government offices and vehicle fleets
  - Hospitals, schools, public housing
  - Public transport, water systems, and infrastructure (street lighting, traffic signals …)
  - Public enterprises
- **Strategy:**
  - Information and decision tools: PePS Guide, Website, savings estimation software
  - Training, workshops, conferences
  - Pilot Projects
  - [International professional exchanges]

PePS International Survey Results

Program Categories:

- **Policies and Targets**
- **Energy-Saving Capital Investments**
- **Facilities Operation and Maintenance**
- **Purchasing Energy-Efficient Products**
- **Technology Demonstrations**

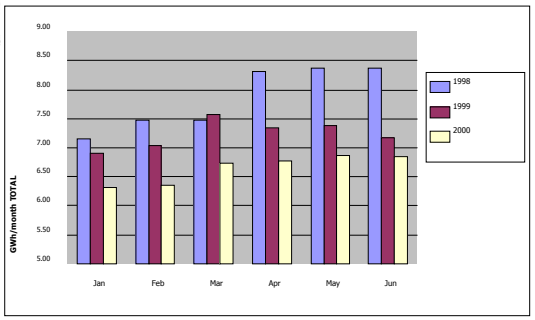
Program Examples: Policies and Targets

Policies and Targets	Country Examples
• Goals and tracking • Government organization • Budget policies	**Argentina** **Ecuador** **India** **Korea** (voluntary target) **Mexico** **Philippines** **U.S., others...**

Program Examples: Energy-Saving Capital Projects

Capital Projects	Country Examples
• Energy audits • Retrofit projects • Financing • Standards + building guidelines • Tools and training • Efficient public services (water supply + treatment, street lighting, LED traffic signals)	**Mexico:** Web-based energy audits, lighting retrofits, oil refinery efficiency **Brazil:** Building + street light retrofits, water systems efficiency **Bulgaria, Hungary, Romania:** Revolving loans, ESCO funds municipal **Canada:** ESCO-funded retrofits, O&M, employee training **Colombia + Argentina:** Street lights **Korea:** efficient new buildings + rail **Ukraine + Russia:** audits/retrofits of hospitals + other buildings **U.S.:** ESCO + utility contracting, sustainable new buildings

Mexico Case Study: Saving Energy in Federal Buildings



Mexico Public Buildings: Monthly Energy Use – 1998, 1999, 2000.

Canada Example: Federal Buildings Initiative (FBI)

Program Highlights

- Performance contracting to save energy and reduce Greenhouse Gas emissions in federal government buildings
- Established 1991 – First project 1993
- 70 energy efficiency contracts in place that cover some 7,000 buildings.
- 200^{+} million private sector investments
- $27 million in annual savings
- 31% GHG reductions; 15-20% to date

Natural Resources Canada | Ressources naturelles Canada

Canada

New Public Buildings: Energy-Efficient and Sustainable

- **U.S. "LEED" rating ("Leadership in Energy and Environmental Design")**
- **Developed by US Green Building Council** (http://www.usgbc.org/Docx/LEEDdocs/LEED_RS_v2-1.pdf)
- **Over 100 buildings certified (35% government)**
- **Over 1,200 buildings registered (55 federal)**
- **10 States, 19 municipalities, 7 federal agencies have sustainable building policies using LEED**
- **Proposed policies: 30% more energy- efficient than building codes**

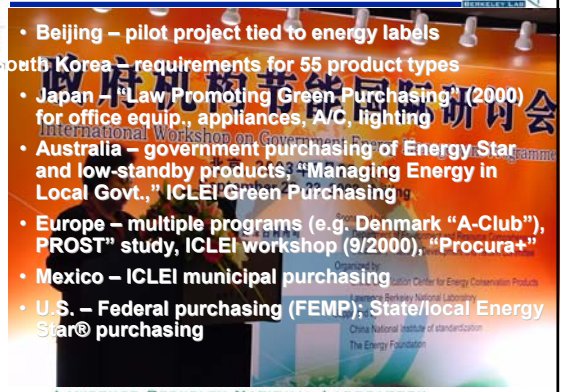
Program Examples: Operation and Maintenance

Facilities O&M	Country Examples
• Building system commissioning • Metering/monitoring, benchmarking • Facility manager training & certification • Incentives and recognition • Employee education • Vehicle fleet operation: tire inflation, ridesharing or transit, teleconferencing	**Dominican Republic:** goals, training, employee awareness **Mexico:** building O&M, operator training, 'Ports of Attention' for outreach, technical assistance **Thailand:** mandatory measures in public buildings **U.S.** + others…

Program Examples: Buying Energy-Efficient Products

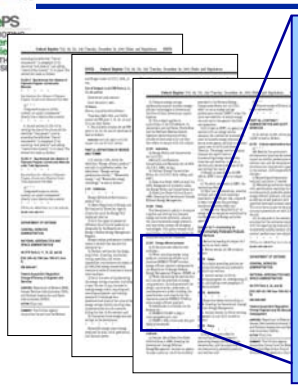
Purchasing	Country Examples
• Efficient appliances + equipment • Based on product testing + labeling • Guide specifications for construction • Government fleets • Link to environmental products + "green power"	***China:*** *pilot project + scale-up* **European Union:** coordinated purchasing (PROST) **Japan, Korea, Philippines** **South Africa:** office equipment pilot **Mexico**: proposed pilot project **U.S.:** federal, state, municipal purchasing (Energy Star labels)

Beijing International Workshop on Government Energy Management



- Beijing – pilot project tied to energy labels
- South Korea – requirements for 55 product types
- Japan – "Law Promoting Green Purchasing" (2000) for office equip., appliances, A/C, lighting
- Australia – government purchasing of Energy Star and low-standby products; "Managing Energy in Local Govt.," ICLEI Green Purchasing
- Europe – multiple programs (e.g. Denmark "A-Club"), PROST" study, ICLEI workshop (9/2000), "Procura+"
- Mexico – ICLEI municipal purchasing
- U.S. – Federal purchasing (FEMP); State/local Energy Star® purchasing

Federal Purchasing Policy



ATTENTION!!! PROCUREMENT OFFICIALS

FAR Part 23.203 now REQUIRES energy efficient purchasing:
23.203 Energy-Efficient products.
(a)If life-cycle cost effective, and available,
(1) When acquiring energy efficient products, contracting officers should purchase ENERGY STAR™ or other energy efficient DOE/FEMP designated products."
(2) When contracting for services … the specification must require that the contractor provide ENERGY STAR™ or other energy efficient products.
http://www.eere.energy.gov/femp/procurement/

Policy Adoption: New York State

Executive Order 111 - June 10, 2001

"…Effective immediately, State agencies and other affected entities shall select ENERGY STAR energy-efficient products when acquiring new energy-using products or replacing existing equipment. NYSERDA shall adopt guidelines designating target energy efficiency levels for those products for which ENERGY STAR labels are not yet available…

Setting Priorities for Government Purchasing

- **Significant energy use**
- **Large government purchasing volume**
- **Potential energy/cost savings**
  - range of efficiencies (lowest to highest)
- **Energy testing and rating method**
- **Product efficiency data available**
  - product lists
  - energy ratings/labels
  - "quality-mark" (e.g., Energy Star™)
- **Several suppliers**
  - price, availability, domestic sources (?)
- **Consistency with other programs**

Lessons Learned: Purchasing Programs

1) Needed:
- clear policy and regulations/laws
- communicated repeatedly to buyers (and sellers)

2) Make the efficient product the *easiest* to buy:
- efficiency as the default choice
- use first-cost to choose *among* efficient products

3) Keep the guidance simple: *levels, lists, labels !*

4) Coordinate purchasing with other programs:

Market transformation requires common technical criteria for energy efficiency.

5) Seek active private sector involvement
- Manufacturers, vendors, ESCOs, architects
- Clear, consistent efficiency requirements (lead-time when updating)

Overcoming Bias to Low First-Cost

Life-Cycle Cost Barriers

- **Information (energy savings *vs* price)**
- **Staff time, effort, expertise**
- **Procurement rules**
  (or "perceived" rules, common practice!)
- **Budget constraints**
- **Safest choices:**
  - **replace-in-kind or**
  - **lowest-price**
- **NIMB (= "Not In My *Budget*"!)**

Life-Cycle Cost Solutions

1) **Clear information, easy to find**
2) **Make $ savings more obvious; simplify LCC calculations**
3) **Lower the cost of efficient products:**
   - **volume + competition**
   - **common technical specs**
4) **Finance the first-cost; capitalize future savings**
5) **Reverse the burden of proof!**

Needed: A New "Rule of Thumb"

OLD (the "safe" choices):

"Buy the lowest first-cost product."

or

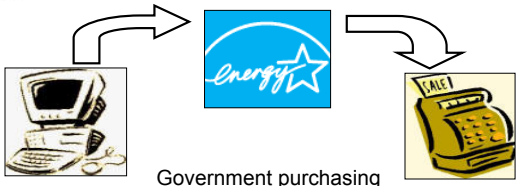
"Replace with the same product."

NEW:

"Buy the efficient product unless you can show that a less efficient product is cheaper on a life-cycle basis!"

Energy-Efficient Purchasing and Energy Labels

Labels make it easier for buyers to select efficient products



Government purchasing encourages private sector support for energy labels (adds value to labeled products!)

Summary of PEPS Results

Most common programs:

- Savings targets/goals
- Designate energy manager (or committee)
- Building energy audits, O&M
- Lighting + equipment retrofits (loans, ESCO funds)

Overlooked opportunities:

- Energy-efficient purchasing
- Energy metering + facility benchmarking
- Energy-efficient new public buildings
- Recognition and financial incentives
- Partner with private enterprise
- *Intergovernmental and international collaboration*

Building-Blocks of Public Sector Energy Efficiency

LESSONS LEARNED

Features of Successful Programs:

- **Policy Adoption**
- **Program Implementation**
- **Continuous Improvement**
- **Market Transformation**

Lessons: Policy Adoption and Program Implementation

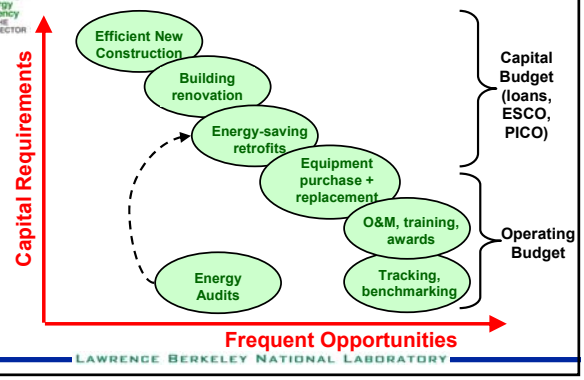
1) Policy Adoption

- Support of top officials
- Clear policy statement (law, Exec. Order, other)
- Regulations/guidelines make policy operational
- Quantified goals: energy, cost savings, CO_2 …

2) Program Implementation

- Assign responsibilities (including lead or coordination role)
- Allocate needed resources (staff & funding)
- Provide information, outreach, staff training
- Linkage: other programs, *non*-energy goals, inter-governmental cooperation

Program Portfolio Includes High-Cost and Low-Cost Measures



Lessons: Continuous Improvement and Market Transformation

3) Continuous Improvement

- Track and report progress against goals
- Create organizational incentives (retained savings) or sanctions
- Recognize "best-practice"
- Regularly review and update program criteria
- Provide for quality control; encourage technology innovation

4) Market Transformation

- Steps to broaden impact beyond public sector
- "Exit strategy"

Government Leadership and Market Transformation

"Good energy management starts from the top.

If the public sector leads, the architects, engineers, manufacturers – and ultimately the public – will follow."

– David Garman, Assistant Secretary
Energy Efficiency and Renewable Energy,
US DOE

INTERNATIONAL COLLABORATION: A Challenge to Workshop Participants

1) Why?

- Share the effort
- Test different approaches
- Share results, lessons learned
- ***Aggregate*** *demand and* ***transform*** *markets!*
  … for efficient products *and* services

2) How? (examples)

- APEC as a forum to share information
- Harmonization of government purchasing criteria to create regional markets
- Regional approach to green buildings, commissioning, designer training & certification
- Other areas where markets span national borders?

For More Information

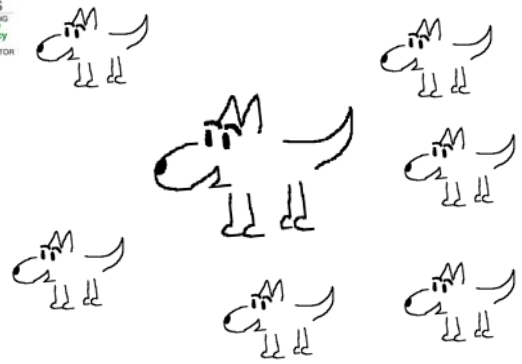
- **Promoting an Energy-efficient Public Sector**
  www.pepsonline.org
  - Country database: programs, policies, case studies, model policies/laws/ guidelines
  - PePS Program Guide [late 2004]
    "Efficient Energy Use in the Public Sector"
  - Pilot projects: technical assistance + training

Please share program information and contacts

- **Jeffrey Harris, LBNL**
  +1 202 646 7960 tel
  +1 202 646 7800 fax
  JPHarris@lbl.gov

COMMENTS AND QUESTIONS ??

Public Leadership to Transform Markets (Can the Tail Really Wag the Dog?)



Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 2: Experience and Best Practice in Specific Economies

Federal Energy Management Program (FEMP)

Beth Shearer

APEC Symposium on the Implementation of Government Energy Efficiency Program
2-3 August 2004

Why Energy Management in the Public Sector?

- Government is the largest energy user
- Lead by example
- Save energy and money
- Pull the market for energy efficient, renewable energy, and water-conserving products
- Test new technologies

FEMP Mission

FEMP increases energy security and reduces energy cost and the environmental impact of government by promoting:

- Energy efficiency and water conservation
- Use of distributed and renewable energy
- Sound utility management at Federal sites

Legislative History/Executive Directives

- Energy Policy and Conservation Act (1975)
- DOE Organization Act (1977)
- National Energy Conservation Policy Act (1978)
- Federal Energy Management Improvement Act (1988)
- Executive Order 12759 (1991)
- Energy Policy Act (1992)
- Executive Order 12902 (1994)
- Executive Order 13123 (1999)
- Executive Order 13221 (2001)

Federal Energy Snapshot

- $9.6 billion Federal annual energy bill
  - 500,000 facilities
    - Buildings: $3.7 billion
    - Energy Intensive Operations: $0.6 billion
    - Exempt Buildings: $0.4 billion
  - Vehicles & Equipment: $4.9 billion

- Federal floor space 1.4% of national residential, commercial, and industrial space

Federal Buildings

- Office Buildings
- Laboratories
- Housing
- Parks and historic sites
- High bay applications
- Post Offices
- Court Houses
- Hospitals
- Warehouses
- Space launch buildings

FEMP Model

✓**Set goals**

- Plan and implement projects
- Measure performance
- Report progress
- Reward Federal leadership

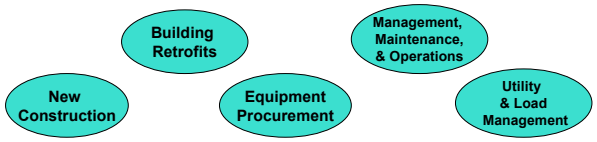
Federal Energy Management Goals

- **Reduce energy consumption**
  - Facility energy per square foot to be reduced by 30 percent in 2005 and 35 percent in 2010 relative to 1985
  - Industrial/laboratory energy to be reduced by 20 percent in 2005 and 25 percent in 2010 relative to 1990
  - Purchase energy efficient products including those that use minimal standby power
- **Expand use of renewable energy**
  - 2.5% of Federal facility electricity consumption by 2005
- Implement best management practices for **water conservation** in 80% of Federal facilities by 2010
- **Reduce greenhouse gas emissions** 30 percent by 2010 compared to 1990

FEMP Model

- Set goals
- ✓**Plan and implement projects**
- ✓Measure performance
- Report progress
- Reward Federal leadership

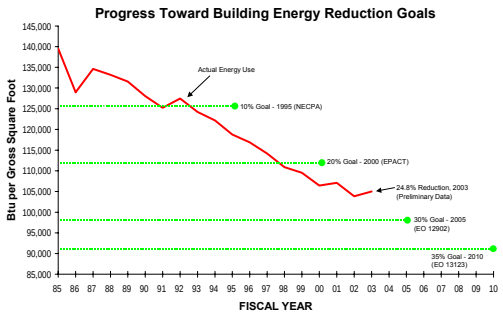
How agencies will meet the goals:
•Whole building cycle projects
• Technology breakthroughs



FEMP Model

- Set goals
- Plan and implement projects (Later)
- ✓**Measure performance**
- ✓**Report progress**
- Reward Federal leadership

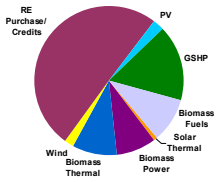
Progress To Date: Buildings



A dollar invested in energy efficiency saves about $4 over the life of a typical project.

Progress on Other Energy Management Goals (cont.)

- Renewable Energy Goal: By 2005, the equivalent of 2.5 percent of Federal facility electricity consumption
  - Agencies used almost 1,100 GWh from renewables by the end of June 2004
  - More than three-quarters of the way to the 2.5 percent goal for 2005
  - 50 percent is from renewable energy purchases; the remainder from on-site generation.



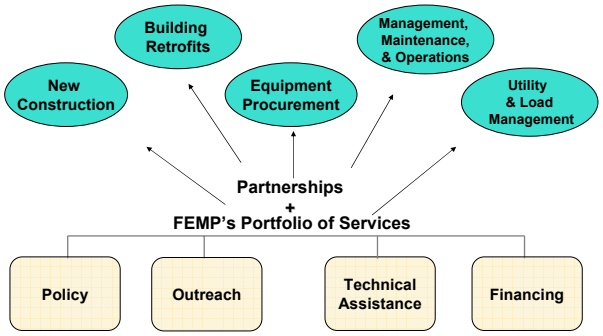
RE Purchases/Credits	551.6
Ground Source Heat Pump	178.5
Biomass Thermal	108.5
Biomass Transportation Fuels	106.4
Biomass Power	92.4
Photovoltaics	28.1
Wind	19.0
Solar Thermal	9.7
Total	1094.2

FEMP Model

- Set goals
- Plan and implement projects
- Measure performance
- Report progress
- **Reward Federal leadership**
  - **FEMP awards**
  - **Presidential awards**

2004 Presidential Awards

FEMP Support for Agencies

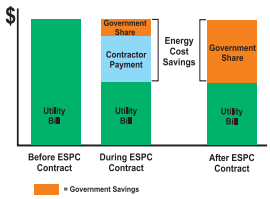


Financing

- Energy Savings Performance Contracts (ESPCs)
- Utility Energy Savings Contracts (UESCs)
- Appropriations
- Public Benefits Funds

Energy Savings Performance Contracts

- ESPCs reallocate the Government's utility bill
  - Pay a lower utility bill
  - Pay the contractor
  - Achieve cost savings for the government
- Benefits of ESPCs:
  - Sites reduce their energy use/$
  - Improves the environment
  - Saves taxpayer dollars



Utility Energy Service Contracts

- Regulated utility is the preferred provider
- Utility pays upfront costs
- Utility warrantees equipment performance
- Utility is paid from the savings

Technical Expertise

- FEMP Closely Coordinated with DOE Research Programs
  - DOE National Laboratories
- FEMP Procurement Recommendations
  - Rely on Credible Rating System Based on Significant DOE Research
- FEMP Benefits from Strong Technical Societies
  - Consensus Standards
  - Trained Architects, Engineers, ESCO's

Technical Assistance

- Assessments
  - SAVEnergy Audits
  - ALERTs
  - Industrial Assessments
  - O&M Assessments
- Design Assistance
- DER/CHP
- Renewable Energy/Green Power
- Labs21
- Operations and maintenance
- Water management best practices

Technical Information

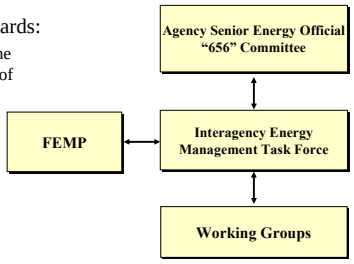
- Training
- FEMP Software Tools
  - Building Life-Cycle Cost (BLCC) programs
  - Federal Renewable Energy Screening Assistant
  - Facility Energy Decision System (FEDS)
- Energy-Efficient Product Recommendations
  - Coordination with ENERGY STAR® program
  - Low Standby Power Products List
- Technology Demonstrations
  - Technology Alerts
  - Technology Installation Reviews

Outreach and Communications

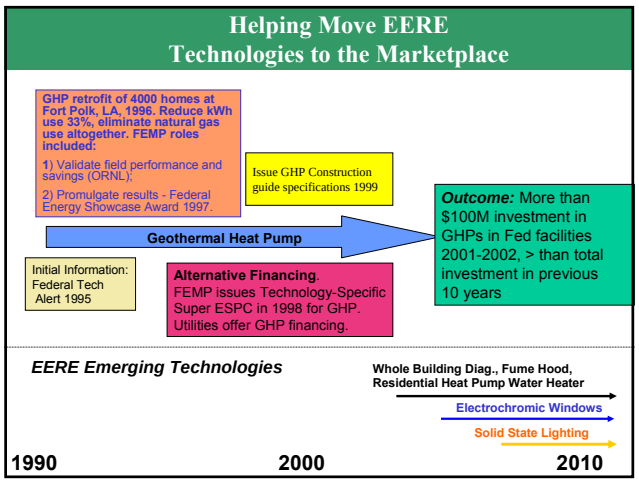
- *Periodic Newsletter: FEMP Focus*
- *You Have The Power* Campaign
- FEMP Annual Workshop & Exposition
- Annual Energy Awards
- Web Site: www.eere.doe.gov/femp
- FEMP Help Desk: 800-363-3732
- DOE Regional Offices/DOE National Laboratory Liaisons

Policy and Interagency Coordination

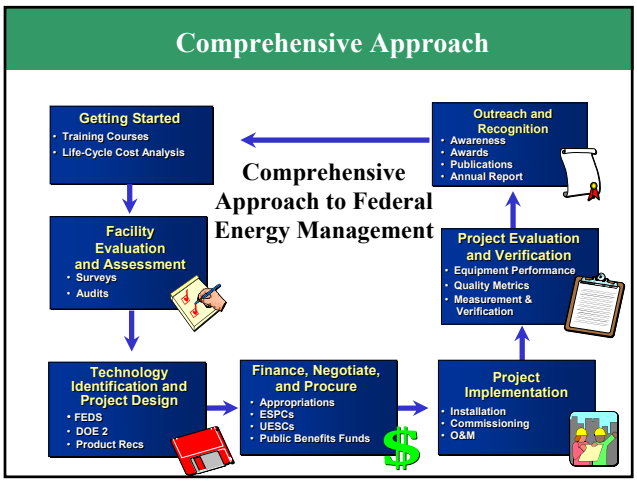
- Annual Report to Congress and the President
- Agency Energy Score Cards:
  - Top-level interest from the White House and Office of Management & Budget
- Policy Guidance
- Federal Energy Management Advisory Committee



Helping Move EERE Technologies to the Marketplace



Comprehensive Approach



Conclusion

- Federal energy management
  - Great opportunity to lead by example
  - Actions within government's control
  - Market transformation
  - Technology demonstration and deployment
- Needs involvement of senior management
- Outreach targets all levels of employees
- Needs a coach and cheerleader (FEMP) that won't go away

Main results of the Mexican institutionalizing energy efficiency policy

Dr. Gaudencio Ramos Niembro
National Commission for Energy Conservation (Conae)
MEXICO

International Symposium on the Implementation of Government Energy Management Programs
Kunming, China
2-3 August, 2004

Institutions related to energy

- Energy Secretariat (SENER)
- National Commission for Energy Conservation (Conae)
- Energy Regulatory Commission (CRE)

- Electricity Savings Trust (Fide)
- Electric Research Institute (IIE)
- Mexico´s Petroleum Institute (IMP)

- National Oil Company (PEMEX)
- 2 National electric utilities
  - Comisión Federal de Electricidad (CFE)
  - Luz y Fuerza del Centro(CLyF)

Conae

- Created in 1989

- The Conae mission is both, design and promotion activities related with energy efficiency and energy saving to any sector who ask for it (public, private and social); and also to implement energy efficiency standards and to promote renewable energy

Main Energy Efficiency Programs

- Energy efficiency in Public Buildings
- Energy efficiency in Public Vehicles
- Energy efficiency Program in the National oil Company: Pemex
- Energy efficiency programs in national electric utilities
  - Comisión Federal de Electricidad –CFE-
  - Luz y Fuerza del Centro –LyFC-

- Technical assistance to municipalities
  - Public lighting

Energy Efficiency in Public Buildings: APF Buildings Program

Key elements

- **Mandatory for administrative-use buildings**
  - Buildings with more than one thousand square meters
  - annual consumption index of 75 kWh/m2-year or more
- **Strategy in its 5th stage of development**
- **First stage (1992-1996): "Isolated buildings"**
  - 120 energy studies and audits performed on federal buildings
  - Learning process
  - Large potential for energy savings on lighting systems

APF Buildings Program -1-

- **Second Stage (1996-1998): "One hundred public buildings"**
  - Voluntary Pilot Program
  - Building operators' involvement in the design and implementation
  - Training and technical assistance provided by Conae
  - 90% of building officers were able to perform their own data gathering
  - 1998 assessment – 21% demand reduction could be achieved (19GWh / year and 3.5 MW avoided generating capacity)
  - Investment US$1.5 million could be recovered in 17months

APF Buildings Program -2-

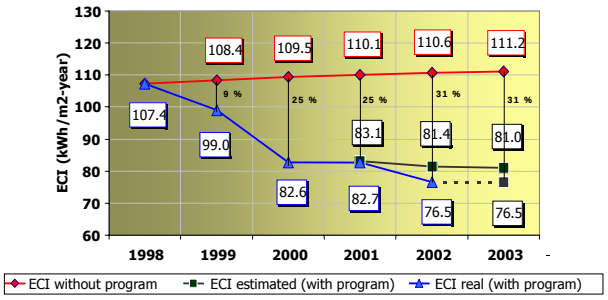
- **Third stage (1999): "Mandatory energy audits"**
  - Link local building operators with analysis tools provided on *Conae's Web Site*
  - Executable system to evaluate lighting systems and identify energy-savings measures
- **Fouth stage (2000): "Mandatory energy savings of 20%"**
- **Fifth stage (up to 2001): "Mandatory internal energy efficiency programs"**

APF Buildings Program -3-

- **Main results:**
  - Mandatory since 1999
  - More than 900 buildings registered under the APF program, 4.8 million square meters of floor space

Year	Savings		
	%	GWh	Millons ($ US dlls)
1999	9%	24	1.7
2000	25%	104	7.3
2001	25%	104	7.3
2002	31%	175	30.7
2003	31%	178	31.2
Total		**585**	**78.2**

Electric Consumption Index



Energy Efficiency in Public Vehicles: APF Vehicle fleets

APF Vehicle fleet actions -1-

- **Technical committee since 1998**
  - **45 Dependencies of the Federal Government**
- **Official fleet: 120 000 vehicles**
- **8-12 technical meetings per year**
- **15 MM of fuel consumption reduction (2003)**
- **Computer vehicle system management**
  - **4 Biggest dependencies: CFE -18 000-; Pemex -18 000-; CNA -5 000-; and INEGI -5 000**

APF-Vehicle fleet actions -2-

- **Main Activities -technical committee-**
  - **Technology evaluation**
  - **Vehicle selection**
  - **Training on economic driving**
  - **Maintenance**
  - **Fleet management**
- **Mandatory fleet control system**
  - **To be developed during 2005**
  - **To be implemented: 2005 & 2006**

Energy efficiency Program in the National oil Company: Pemex

Main activities

- **Largest public sector company in Mexico**
  - One of the world´s ten biggest oil companies
- **Is responsible for**
  - Exploration
  - Exploitation
  - Commercialization of oil and associated gas in the country
- **Largest energy user**
  - 118 million barrels oil equivalent per year
    - Total national consumption: 730 million barrels

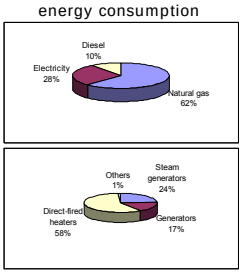
Main energy efficiency activities -1-

- **During 25 years Pemex has carried out several energy efficiency related activities**
  - Integral, scattered, and isolated
- **In 1999 an "Energy efficiency and Environmental Protection Campaign" started**
  - Objective: consumption reduction by 5 %
- **Pemex established since 2001 the "Energy-Efficiency Institutional Program"**
  - Objective: reduction of the energy consumption index between 1.5% to 5%

Main energy efficiency activities -2-

- **First stage (1995-1997): energy audits**
  - Creation of working groups:
    - National
    - Any Installation –plants-
  - Identification of technical and operative Energy Saving Opportunities
  - Energy conservation potentials
    - *Cooling Towers (15%)*
    - *Direct Fire Heaters (10%)*
    - *Heat recovery (20%)*
    - *Steam generation (5%)*
    - *Insulation (30%)*
    - *Lighting (40%)*

Typical distribution of energy consumption



Main energy efficiency activities -3-

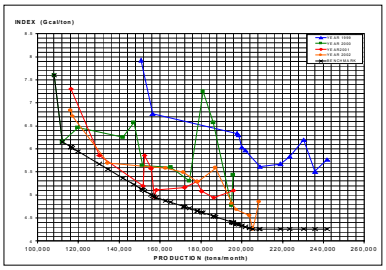
- **Second stage (1998-2000): bottom-up and Internet assistance**
  - **Design of simplified analytical software tools**
    - *Identification of energy saving opportunities*
    - *Recommendations for energy efficiency*
    - *Most energy using systems*
    - *Operated by Internet*
  - **Scope of the program**
    - *208 installations*
    - *9 office buildings*
    - *Training for more than 600 engineers and technicians*

Main energy efficiency activities -4-

- **Third stage (2001-2003): Energy Performance Index Approach**
  - **The tools and protocols for Energy Indicators Control and Follow-up System was established for**
    - *Processing plants*
    - *Systems*
    - *Equipment*
  - **Main activities**
    - *Compilation of annual and global energy-consumption production data*
    - *Implementation of energy audits*
    - *Integration of energy-efficiency benchmark curves*
    - *Elaboration of energy distribution diagrams*

Main energy efficiency activities -5-

- **Evolution of the energy-efficiency benchmark in "Cangrejera" petrochemical center:**

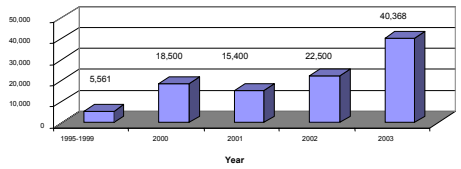


Main energy efficiency activities -6-

- **Main results: 1995 -2003**
  - More than 100 millions of cubic feet of natural gas (150 millions of equivalent oil barrels)

Energy savings in Pemex

(millions of cubic feet of natural gas)



Energy efficiency programs in the National utilities: CFE and LyFC

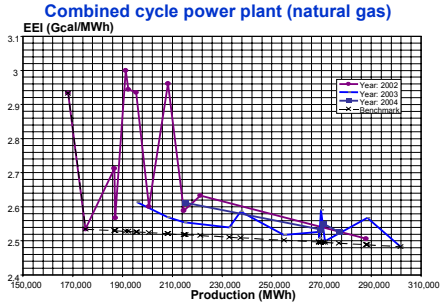
CFE: main energy efficiency activities

- **CFE**
  - **Main electrical utility in Mexico**
  - **70 % of the customers**
  - **54 thermal power plants**
- **CFE - Conae program started in 2004**
  - **Thermoelectric power plants:**
- **Actions in 2004:**
  - **Operators training**
  - **Determination of energy consumption index**

CFE: main energy efficiency activities

- **Energy efficiency index:**

Combined cycle power plant (natural gas)

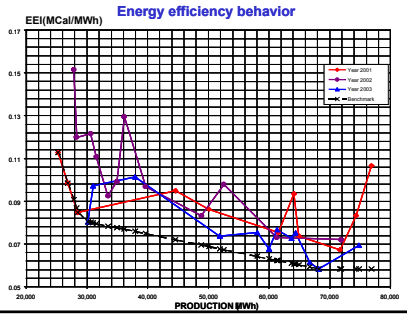


LyFC: main energy efficiency activities

- General overview:
  - 2nd. electrical utility in Mexico
  - 30 % of the customers
  - Main activity: distribution
- LyFC - Conae program started in 2004
- 2 generation power plants
- Actions in 2004:
  - Operators training
  - Determination of energy consumption index

yFC: main energy efficiency activities

- Energy efficiency index:



Technical assistance to municipalities: Public Lighting

Energy efficiency in Public lighting –1-

- Evaluation of 401 municipalities -over 2,400- (1997-2003)
  - Potential:
    - Energy savings = 182 GWh
    - Economic saving = 22 Millions US dlls/year
    - Investment required = 42.7 millions Us dlls
  - The implementation depends on municipality budget availability
- Financing committee
  - Fide – Banobras - Conae

Energy efficiency in Public lighting –2-

Year	Municipalities (# of studies)	Annual savings		Investment (US dlls)
		GWh	Millions (US dlls)	
1997	27	10	0.85	1.08
1998	94	22	2.09	2.70
1999	103	57	6.23	15.96
2000	20	12	1.74	3.97
2001	13	11	1.43	2.92
2002	68	35	4.60	8.21
2003	77	35	5.05	7.81
Total:	402	182	21.99	42.65

Conae´s strategy

Conae´s strategy

- **Conae Website - www.conae.gob.mx -**
  - **In operation since April, 1997**
  - **An average of more than 100,000 hits/month (different sections)**
  - **Organized by user categories**
  - **Contents:**
    - Computer analysis tolls to identify energy saving potential
    - Recommendations
    - Information
      - *Energy prices*
      - *Directories of products and services , etc.*
    - Technical Assistance (Email)
    - Links to other interest sites
- **Committee integration –institution-**
- **Technical assistance**
  - Training, energy diagnostics, etc.

Conclusions

Conclusions

- Mexico has had results because it has institutions which design, implant and operate programs
- EE potentials are still high
- We need to reinforce what we have
- We need to promote the development of decentralized institutional capacities
- We need to tie private financing with existing opportunities
- We need to widen our training and information efforts

www.conae.gob.mx

Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 3: Experience and Best Practice in Specific Economies (cont'd)

中国节能工作进展情况
Progress of energy efficiency work in China

国家发展改革委环资司节能处　徐志强处长

Xu Zhiqiang, Director
The Energy Efficiency Division,
Department of Environment and Resource Conservation,
National Development and Reforms Commission

一、我国节能基本情况
Basic conditions of energy conservation in China

（一）能源消费特点
Characteristics of energy consumption

●能源消费以煤为主
Coal takes the dominant position in China's energy consumption

●石油、天然气、水电等能源比重上升
The percentage of petroleum, natural gas and hydraulic power has increased

●工业用能为主导
The percentage of industrial energy consumption is high.

（二）节能进展情况
Progress of energy conservation

1．节能宏观管理得到进一步加强
The macro-administration of energy conservation has been further strengthened

（1）完善节能法规，加强监督管理取得很大进展
China has achieved great progress in improving the laws and regulations on energy conservation and in strengthening supervision and management.

- 1998年1月《中华人民共和国节约能源法》颁布实施
The Law of the People's Republic of China on Energy Conservation enacted on January 1998.

- **22个省区市制定了节能法实施办法等70余项地方法规**
  22 provinces, regions and municipalities have formulated more than 70 relevant local rules and regulations
- **上海、云南、甘肃等地方建立了节能监察中心开展节能执法监察和节能监测，依法进行节能监督管理。**
  Shanghai, Yunnan and Gansu have set up energy conservation supervision centers to carry out energy conservation law enforcement and energy conservation monitoring and conduct energy conservation supervision and administration according to law

（2）制定了主要用能产品强制性能效国家标准

China has f ormulated com pulsory na tional st andards of energy efficiency for the main energy-consuming products.

（3）建立了节能产品认证制度

The endorsement labeling system has been established.

（4）研究建立能效标识制度

The study of information labeling system is underway.

（5）研究探索基于市场的节能新机制

China is exploring various market-based new energy conservation mechanisms.

- **节能技术服务机制**
  Energy conservation technology service mechanism
- **推行节能自愿协议机制**
  Mechanism of voluntary agreement for energy conservation
- **节能信息传播传播机制**
  Energy conservation information propagation mechanism
- **强制性能效标识制度**
  Compulsory energy efficiency identification system
- **电力需求侧管理(DSM)**
  Power demand side management (DSM)

（6）开展节能宣传和国际交流与合作

China has carried out publi city and i nternational e xchange and cooperation in respect of energy conservation.

（7）开展政府机构节能工作

Government energy management program was launched.

2. 能源利用效率明显提高

- **万元产值能耗大幅下降。2002年每万元GDP能耗2.68吨标准煤。** The energy consumption per RMB10,000 of output value has dropped drastically
- **主要产品能耗降低，缩小与国际先进水平差距**
  The energy consumptions of main products have dropped and the gap with the advanced international levels has narrowed
- **节能效益显著**
  The benefits of energy conservation are remarkable
- **重大节能技术示范和推广取得成效**
  The demonstration and popularization of key energy conservation technologies has produced remarkable effects

二、目前正在采取的主要节能措施

Main measures currently taken for energy conservation

（一）促进结构节能和能源结构优化
Promotion of structural energy conservation and optimization of energy structure

（二）发展重点节能技术
Development of key energy conservation technologies

（三）完善节能法规和政策
Improvement of the laws, regulations and policies on energy conservation

（四）进一步加强能效标准、标识和认证工作
Further enhancement of the work of energy efficiency standard, endorsement label and information label

二、目前正在采取的主要节能措施（续）

Main measures currently taken for energy conservation (continued)

（五）积极推广符合市场经济要求的节能新机制
Active popularization of the new energy conservation mechanisms that meet the requirements of market economy

（六)推动政府机构节能
Facilitate Government Energy Management Program

祝大会圆满成功！

Success to the Conference!

Thanks!

Funding Public Sector Energy Efficiency Projects in China: Alternative Considerations

For APEC Symposium on the implementation of government energy management programs

Jiang Lin
Lawrence Berkeley National Lab
Kunming, China
August 3-4, 2004

Outline

- ESCO development in China
  - Experience from the World Bank/GEF project
  - Barriers/risks analysis
- Difference in funding EE projects in Public and Private Sectors
- Financing Mechanisms for Public Sector
  - ESCO
  - Revolving Loan Fund
  - Internal Fund
- Capacity and Infrastructure Building
  - Project finance
  - Project Design, Integration, Installation, and Commissioning
  - Performance Verification and Monitoring

ESCO Development in China

- World Bank/GEF China Energy Conservation Project
  - Started in 1997, with $26 million grant and $65 million loan pool, plus Chinese government contributions
  - Set up three Energy Management Companies (Beijing, Liaoning, and Shandong)
  - Performance contract as core business model (shared savings model)

ESCO Development in China

- Since 1997
  - Over 300 EC projects have been implemented
  - Over RMB 450 million investment
  - Over 90% of projects with paybacks < 2 years
- Phase II
  - Develop Loan Guarantee Facility, $26 million GEF grant
  - Facilitate the scaling up of the ESCO industry

Key Barriers

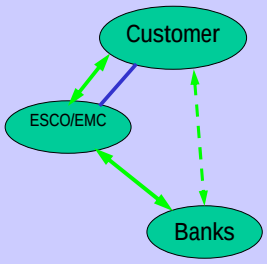
- Energy cost is only a small part of overall cost;
- Lack of understanding of energy efficiency technologies among technical and management staff;
- Priority of capital investment focused on expanding their market and production, not on improving energy efficiency;
- Unaware of energy efficiency opportunities;
- Cost-savings are not directly apparent in corporate accounting;
- Lack of financing from local banks for energy efficiency projects.

Barriers to EE project financing

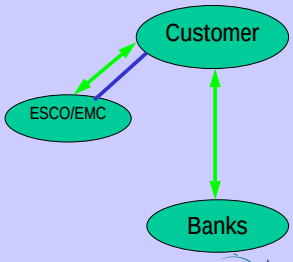
- Bank lending practice: asset-base financing, little experience with project financing
- EMC not credit worthy
- Small project sizes leading to high transaction costs
- Banks do not understand the energy efficiency technologies

Shared vs Guaranteed Savings Models

- Shared Savings



- Guaranteed Savings



Advantages of Government Markets

- Customer is stable
  - A university isn't going anywhere
- Customer is a good credit
  - Government isn't going anywhere
- Customers have long time horizons
- Strong public interest in energy efficiency – saves public operating money

Advantages of Government Markets

- Most opportunities are in government buildings
  - HVAC, Lighting, Motors/Fans/Pumps, Commissioning
  - Technology risks better understood than those in industrial processes
  - High replication potential due to heterogeneous technologies
- Government leadership in this area will help build critical capacity and infrastructure for promoting ESCO in private sector
  - Project financing
  - Performance Verification and Monitoring, Commissioning

Alternative Financing Mechanism

- California Energy Commission (CEC)
  - Energy Efficiency Financing Program
- Texas State Energy Conservation Office (SECO)
  - Texas LoanSTAR Program

CEC Energy Efficiency Financing Program

- Initiated in 1979, $10 million revolving loan
- Subsequent funding includes $50 million in 2001 as part of response to energy crisis
- Total equity about $76 million in 2001
- Total loan: about 160 million,
- Over 370 applicants
- Average about 300k

CEC Program Eligibility

- Schools (public or *non-profit*)
- Hospitals (public or *non-profit*)
- Cities
- Counties
- Special districts
- Public care institutions (public or *non-profit*)

What Types of Projects are Eligible for Loans?

- Energy audits
- Feasibility studies
- Lighting
- Motors or variable frequency drives and pumps
- Building insulation
- Heating and air conditioning modifications
- Automated energy management systems/controls
- Energy generation including renewable energy projects
- Streetlights/LED traffic signals

Key Terms and Conditions

- How Much Is Available?
  - The maximum loan amount is $3 million per application.
- Criteria For Loan Approval
  - Energy efficiency projects must be technically and economically feasible. Projects must have a simple payback of 10 years or less based on energy costs savings.
  - Loans for energy projects must be repaid from savings within 15 years.
- Interest Rate - 3.95 percent currently

Texas LoanSTAR program

- Loan for Saving Texas Resources – *LoanSTAR*
  - started in 1989 by Texas Legislature as a revolving loan fund at about $98 million,
  - the saving streams from the EE projects are used to pay back the loan (capital and interests)
  - Low interest: 3% at present,
  - Long payment term: maximum 10 years
- Outstanding for its monitoring and verification requirement, able to prove energy savings through metering data

Texas LoanSTAR program

- LoanSTAR program has distributed more than $200 million in loans to 169 public institutions over the years.
- program has saved Texas more than $144 million in energy costs, and savings grow every year.
- Over the next 20 years, Texas's SECO estimates that Texas LoanSTAR will save state taxpayers $250 million.
- Currently, about $25-30 million per year of loan is made
- Emission reductions
  - CO2 1.5 million ton
  - NOx 5418 tons
  - SO2 3563 tons

Leveraging the purchasing power of Government to improve EE

- Major energy using equipment are part of government procurement
  - Room AC, Lighting, Office Equipment
  - Little incremental cost
- Retrofit of Government Facilities
  - Small incremental cost
- New Government Buildings
  - Little incremental cost

Other funding sources

- Funding often available to deal with energy crisis – 2001 California, and 2004 selected provinces in China
- However, focus on short-term loan management, often little devoted to reduce long term load
- Creating a Public Benefit Charge to pay for energy efficiency improvements

Summary

- Government sector is a good candidate for ESCO business model
- Government leadership in this area will help build critical capacity and infrastructure for promoting ESCO in private sector
- Government could also set up revolving loan funds for its agencies for EE projects
- Energy efficient procurement can reduce the long-term energy use

Execution of Taiwan Government Sector Energy Management Program

Director, Dr. Dennis Wen-Bohr Wang

Energy Conservation Technology Development Center
CTCI Foundation

August 2-3 , 2004

Contents

I Preface

- How To Implement Energy Saving ?
- How Much Energy Can We Save ?
- Where Does The Money Come From?
- How To Verify Energy Saving ?

II Concepts of Energy Saving

Annual Budgets for Energy Saving in Gov't Sector

↓

Energy Saving Engineering and Process

↓

One Dollar Saved, One Dollar Earned

III Energy Consumption in Chinese Taipei

1. Electricity Consumption in Chinese Taipei Annual Energy Stats

	Electricity Consumption	2001	2002	2003
National Totals	(M kWh)	175,909	186,408	195,964
Annual Growth	%	-	+5.97%	+5.13%
Commercial Sector	(M kWh)	19,062	19,907	20,855
Annual Growth	%	-	+4.43%	+4.76%

Source：Energy Bureau, Ministry of Economic Affairs of Chinese Taipei

III Energy Consumption in Chinese Taipei (Cont'd)

2. Government Consumption of Electricity

Public Sector		(1)2002/02~2003/01		(2)2003/02~2004/01		Change			
						Annual Total kWhs		Number Recorded	
User Type	Category of Public Users	Annual Total kWhs (1)	Number Recorded(2)	Annual Total kWhs (3)	Number Recorded(4)	(3)-(1)	Change (%)	(4)-(2)	Change (%)
1	Central Gov't	3,325,142,832	8,737	3,357,197,584	8,825	32,054,752	1.0	88	1.0
2	Local Govn'ts	3,319,167,456	37,918	3,329,337,284	40,857	10,169,828	0.3	2939	7.2
3	Financial Institutes	628,732,999	4,224	618,191,315	4,159	- 10,541,684	-1.7	-65	-1.6
4	Public Enterprises	6,271,185,572	18,344	6,350,530,694	18,385	79,345,122	1.2	41	0.2
Sum		13,544,228,859	69,223	13,655,256,877	72,226	**111,028,018**	**0.82**	**3,003**	**4.34**

Note:Total Electricity Consumption Growth in 2003 is 111M kWhs, or 0.82% , Total number reported increase by 3,003(4.34%).

Source：Energy Bureau, Ministry of Economic Affairs of Chinese Taipei

IV Energy Saving Policy

1. Requests on Energy Savings in Gov'tal Offices.
2. Energy Efficient Appliances and Energy Efficiency labeling.
3. Energy Efficient HVAC and Lightings.
4. Public Sector Energy Consumption Filings on Internet.
5. Optimal Temperature Control in Office.
6. Energy Efficiency in Green Building Projects.

IV Energy Saving Policy(Cont'd)

1. Requests on Energy Savings in Gov'tal Offices

"Governmental Offices Energy Saving Measures" Based on "Action Plan on National Energy Conference" Implemented by the Executive Yuan in 2000 to Set up Energy Management System and Energy Saving Goals:

(1)Energy Saving Goals: No Annual Growth in Electricity Consumption (by kWh/m^2) and Per Capita Oil Consumption (by Liter/per person) as Minimum Requirement.

(2)Based on Green Products Procurement Priority Ordinance, Products with Energy Efficiency labeling as First Choice in Gov't Procurement.

(3)Energy Consumption on Building's Outer Shell of New or Renewing Constructions Must Meet the Construction Tech. Codes Requirements: Lower than 80, 90, 115 Respectively in Northern, Central and Southern Chinese Taipei (by kWhs/m^2 per year).

IV Energy Saving Policy(Cont'd)

2. Energy Efficient Appliances and Energy Efficiency labeling

(1)Energy Efficient Appliances and Energy labeling Promotion by the National Sustainable Development Action Plan.

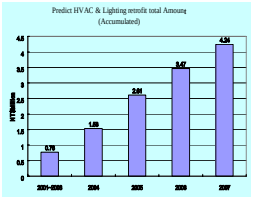
(2)Energy labeling System Launched Since the End of 2001 Has Saved Energy 15% on Labeled Appliances such as HVAC, Refrigerators, Dehumidifiers, TV Sets, Cloth Washers, Electric Fans and Fluorescent Lights, for 18 Firms and 152 Products.

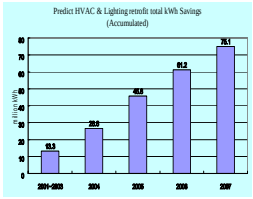


IV Energy Saving Policy(Cont'd)

3. Energy Efficient HVAC and Lightings

Promotional Committee For Nuclear-Less Home in 2003 Has Launched a Retrofit Program for Energy Efficient HVAC and Lightings in the Public Sector Finished by Dec. 2007.





IV Energy Saving Policy(Cont'd)

4. Public Sector Energy Consumption Filings on Internet

To Add Accuracy to Energy Statistics and for the Setting up of Energy Standards and Total Consumption Control, Internet Filings on Energy Consumption by the Public Sector are Required since March 2003.


4. Public Sector Energy Consumption Filings on Internet(Cont'd)

Item	Time	Topic	Venues	Number of Meetings	Attendants
1	2003.01.15~ 02.24	Introductory Exhibits on Government Internet Filings of Energy Consumption	Taipei, Taoyuan, Taichung, Chiayi, Tainan and Kaohsiung	15	1,465

IV Energy Saving Policy(Cont'd)

5. Optimal Temperature Control in Offices

Ordinance on Optimal Temperature Control in Govn'tal Offices, Launched in July 2003：

(1)Room Temp. No Lower Than 26^0C in Gov'tal Offices and Meeting Rooms.

(Relative Humidity at 50~60%，Room Air Velocity at 0.2~0.3 m/s)

(2) Zero Annual Growth on Electricity.

(3) Annual Budgets for Retrofitting HVAC of 8-Year Older and Room Air Conditioners of 5-Year Older, with Low Energy Efficiency (Power Consumption Per RT Higher than 1.2kW).

IV Energy Saving Policy(Cont'd)

6. Energy Efficiency in Green Building Projects

(1) National Sustainable Committee Est. in 1996 Adopted "Green Building" as the Main Action Plan in the Sustainable Development Policy.

(2) Green Building Project Promoted in White Papers on Buildings by the Interior Ministry, as Sustainable Green Buildings Adopted by the EPA's White Papers on Environmental Protection Administration.

(3) "Green Building labeling System"Aimed for Ecological, Energy Efficient, Waste Reduction and Healthy Buildings,Initiated in Aug.1999.

6. Energy Efficiency in Green Building Projects (Cont'd)

(4) Nine Evaluation Indicators for Green Buildings

i. Ecological Diversity
ii. Magnitude in Greenizing
iii. Water Conservation in Earth Base
v. Daily Energy Saving
vi. CO_2 Reduction
vii. Waste Reduction
viii. Indoor Quality
ix. Water Resource
x. Improvement on Sewerage and Garbage

6. Energy Efficiency in Green Building Projects (Cont'd)

(5) Review Process

Green Building Labeling System in Two：

i. Green Building Label Award: For Green Buildings Passing the Above Nine Evaluation Indicators with Usage Permit.

ii. Candidature Green Building Certificate: For Newly Unfinished Construction with Construction Permit, but Passing the Above Nine Evaluation Indicators, Deemed as "Semi-Green Building".

6. Energy Efficiency in Green Building Projects (Cont'd)

(6) A Case of Energy Efficiency labeling
(National Test Building of EPA)

i. Out Shell Energy Saving : To Avoid North-East Wind and Sunlight from West, the Design of the Building with Multiple Heat Insulating Structures Creates Enough Shade, Features in Significant Energy Efficiency and Considered as Masterpiece in Outer Shell Loading.

環檢大樓東西向剖面圖

(6) A Case of Energy Efficiency labeling
(National Test Building of EPA) (Cont'd)

ii. Ice-Storage System Design :
With Ice-Storage System to Make Ice at Off-Peak Night Hours and Melt-ice at Daytime, Significantly Reduce Peak-Hour Electricity.

Ice-Storage System

iii. Energy Saving Design on Lightings :
Using High Efficiency Lightings with Electronic Ballast (E.B.T). Has Significantly Saved Power Consumption.

High Efficiency Lightings

V. Energy Saving Programs

1. Comprehensive Energy-Savings Technical Services
2. Training Courses for Energy Managers
3. Promotion and Diffusion
4. Energy Saving Tactics

1. Comprehensive Energy-Savings Technical Services

(1) Central Air-Conditioning Systems

i. Air Conditioners Accounts for 40%~60%of Total Power Consumption in Offices.
ii. To Reduce Power Consumption by the Load Variation on Air Conditioners is the Main Target of Energy Saving.
iii. Optimal Control System to Operate HVAC at Highest Efficiency in Line with Loading Factors can Reasonably Reduce Power Consumption.

1. Comprehensive Energy-Savings Technical Services (Cont'd)

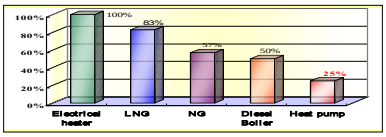
(2) Heating Systems

i. System Features :

COP (Coefficient of Performance) of Heating Equipment, Diesel Boiler, Gas Boiler or Power-Heated Boiler, Average around 0.80 ~ 0.95。

COP of Heat Pump Water Heaters Increased to 2.0 ~ 5.0 Can Reduce Energy Consumption and Money Spent on Heating Equipment 50~75%.

Heat Pump Can Also Provide Other Benefits such as Cool Air,Dehumidifying, Air Purifying, Safety, Ease At Installing and Operation, as well as Environment Friendliness.



1. Comprehensive Energy-Savings Technical Services (Cont'd)

ii. Application :

Heat Pump System Very Useful in Schools, Hotels, Restaurants, Hospitals, Swimming Pools, SPA, Villa Mansions, Dormitories, of which Water Heating Accounts for about 1/3 of Energy Consumption.

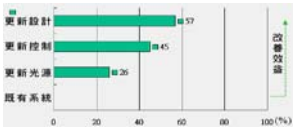
1. Comprehensive Energy-Savings Technical Services (Cont'd)

(3) Lighting Systems

i. Electricity Bill is a Main Fixed Cost, Accounts for about 20%-35% of Total Power Consumption.

ii. Applying High Efficiency Lighting Systems Can Reasonably Reduce Power Consumption.

iii. Energy Conservation Center in Chinese Taipei Introduces Green Lighting Technology Has Saved Electricity Consumption over 30%.



2. Training Courses for Energy Managers

Based on Energy Management Law and "Action Plan on National Energy Conference Resolution" in 1999 :

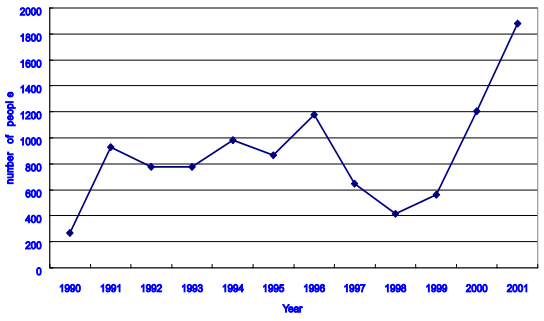
(1) Set up Advisory, Inquiry and Data Base Management System.

(2) Skilled Worker Training Course.

(3) Activities on Research and Promotion.

(4) Top-Down Promotion of Energy Saving Concepts by Training Class for Energy Managers, Combining Technology with Work Experience.

Total Trained 1990~2001: 10,495 Skilled Workers



3. Promotion and Diffusion

(1)Tactics in Promotion

i. Automatic Energy Saving Measures by the Gov'nt Sector as a Role Model for the Private Sector to Follow Suit.

ii. Public Awareness Program on Energy Saving.

iii. Accomplishing the Maximum Energy Saving with the Minimum Costs in Promotion.

3. Promotion and Diffusion (Cont'd)

(2)Main Tasks in Promotion

i. Energy Saving Logos on Cup Saucers :

a.Focus on "Energy Saving Targets in Government Offices".

b.Inducing the General Public to be Aware of Gov't Measures on Energy Saving.

c.Putting Energy Saving Ideas into Daily Life: Mindful of Energy Saving through Tea Drinking in Office.

ii. Pencil Box with Energy Saving Slogans :

a.Implementing Governmental Energy Saving.

b.Public Awareness in Energy Saving while Using Pencil Box.

3. Promotion and Diffusion (Cont'd)

iii. Spread of Energy Saving Advertisements :

a. Promotion of Energy Labeling Products.

b. SMART Consumer Education : Informing People to Save Money while Saving Energy.

c. Tips on Energy Saving with Easy Methods.

3. Promotion and Diffusion (Cont'd)

(3) Energy Saving Tactics

i. Matching Grants from Energy Management Funds to Subsidize Those Gov't Institutes Filing Budgets for Energy Saving Retrofits.

ii. For Others Short of Money in Retrofitting, Recyclable Fund Loaned for Future Repayment.

iii. Promoting ESCOs: Joint Forces with ECTDC and Other Research Institutes, Experts, Scholars and Private ESCOs, to Engage in the Retrofitting Programs and to Foster the ESCO Industry.

IV Successful Case

1. Taichung County Government :

Energy Saving Program between 2001 & 2003 Has Cut Electricity Bills by 2.36 Million NT$, or 20%; Demonstrative Exhibits Held for County-Affiliates Afterwards to Promote Energy Saving Downwards.

2. Items Engaged :

(1) Power System Improvement

i. Control of HVAC Chillers at Peak Hours: Peak Load Down 22kW.

ii. Power Factor Increase to 0.96.

(2) Lighting System Improvement

i. High Efficiency Electronic Ballast Widely Used.

ii. Mandatory Lights Off Measures at Noon-Rest Hours.

iii. Sunlight for Lightings at Central Opening Area; Lightings by Window Half Off.

IV Successful Case (Cont'd)

(3) HVAC System Improvement

i. Installed Electronic Temp. Control to Cooling Tower.

ii. Indoor Temp. Set to 26~28°C to Cut Electricity Consumption by HVAC.

(4) Office Equipment

i. Elevator Usage Control For Lower Floors.

ii. Large Water Heating Equipment with Time-of-Use Switch.

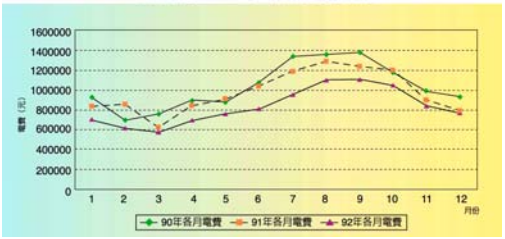
iii. Running Hours Control for Air Circulating in Underground Parking Lots.

iv. Gasoline use Control on Vehicles.

IV Successful Case (Cont'd)

3. Performance of Energy Savings :

Electricity Bill Cut by NT$ 2.36 Million in 2003, around 20%.



IV Successful Case (Cont'd)

4. Demonstrative Effects :

(1)Leading Role by Some Local Gov't Facilitates Future Follow-Ups in the Same Sector.
(2)Top-Down Policy from the Highest Administration with Energy Saving Consciousness Help Public Awareness in Energy Saving.
(3)Financial Support from the Central Gov't Enhance the Incentives for Public Sector Energy Saving Programs, and Set Role Models for Private Sector.

VII Conclusion

Annual Energy Stats of Chinese Taipei Has Shown the Primary Effect of Gov'ntal Electricity Saving at Annual Growth Rate at 1%, Compared with the National Avg. at 5%. This also Meets the Resolution by the 1998 National Energy Convention Which Mandates the Govn't Sector to Initiate Energy Saving Programs and Lead the Private Sector to Follow Suits.

Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 4: Experience and Best Practice in Specific Economies (cont'd)

Australian Government
Australian Greenhouse Office

Energy Use in Australian Government Operations

Leyden Deer, Catriona Johnson, Dr Tony Marker

Australian Greenhouse Office

Outline of Presentation

- Acknowledgement to colleagues in AGO
- "Tale of Two Acronyms" – WOGER, EDGAR – more details later
- Two messages
  - publication is critical
  - reporting can be simplified
- Reports publicly available on AGO web site

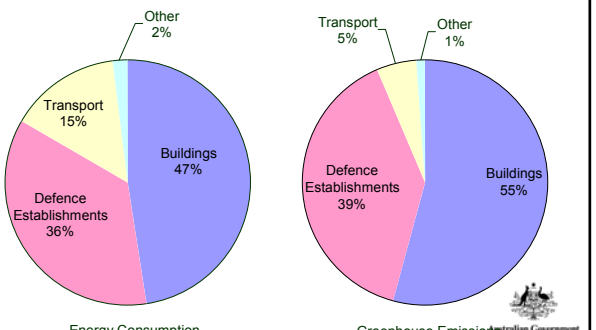
WOGER

- The Whole-Of-Government Energy Report
- Tabled in parliament annually
- Encourages accountability through public scrutiny
- Data presented in comparison tables and summarised by agency
- Provides useful benchmarking data

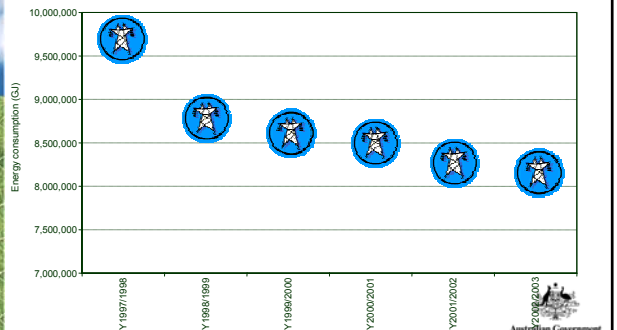
Energy Efficiency in Government Operations

- Introduced in 1997
- Performance targets 2002-03
  - Based on aggregate performance of energy intensity in individual end-use categories
- A number of required measures including:
  - Minimum standards for new buildings
  - Gross leasing agreements
  - Regular performance audits
  - Minimum standards for appliances and equipment

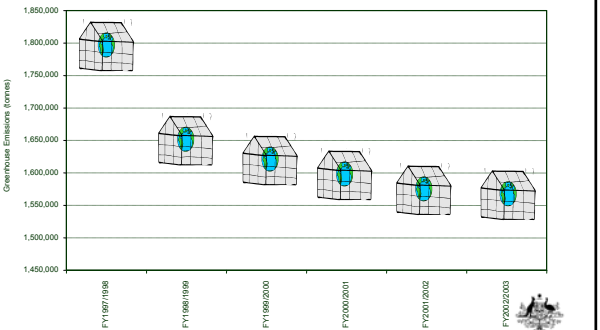
Energy Use and Greenhouse Gas Emissions



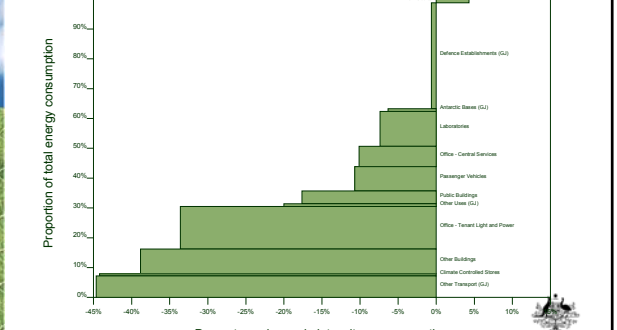
Energy Consumption Trend



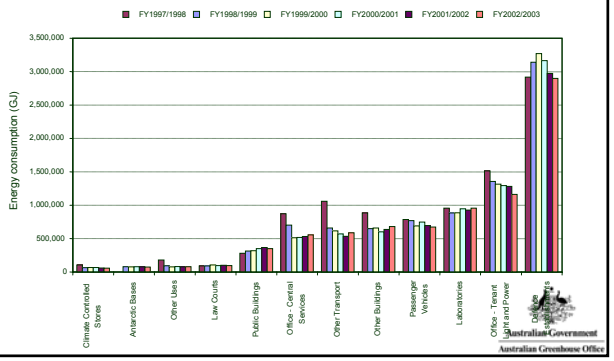
Greenhouse Emission Trend



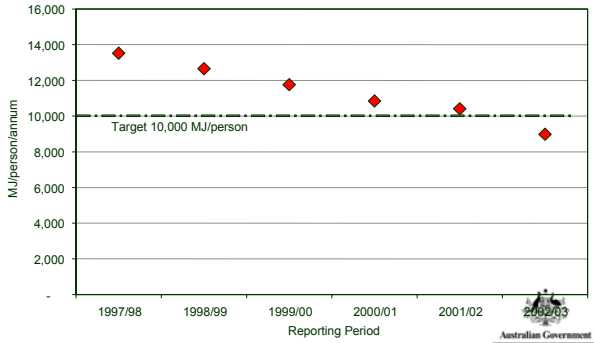
Performance change



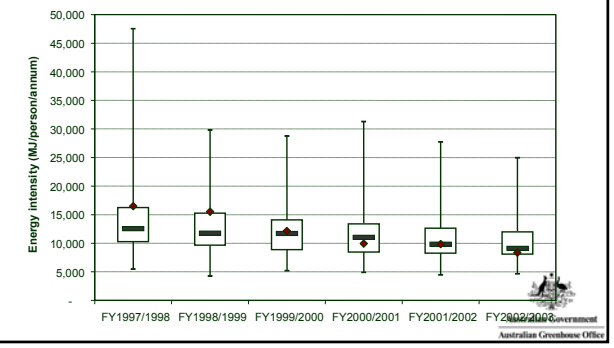
Energy Consumption Moves



Tenant Light & Power Intensity Trend



Tenant Light & Power Trends

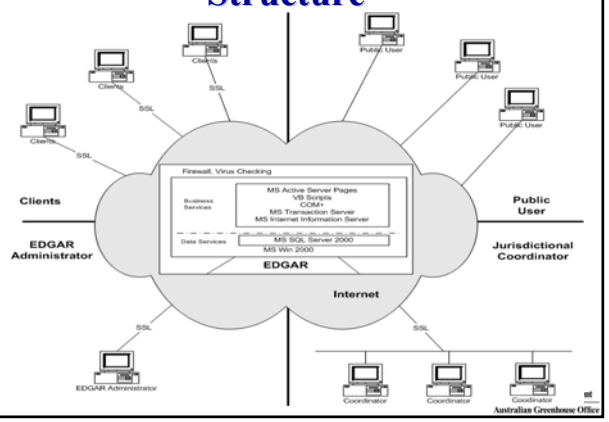


What is EDGAR?

- On-line energy data gathering and reporting
- Manages client relationships
- Used for the last three government energy reports
- Used by NSW, VIC, SA, WA and ACT
- Supports nearly 4 000 entities and 2 700 users
- Secured by password access

Australian Government
Australian Greenhouse Office

Structure

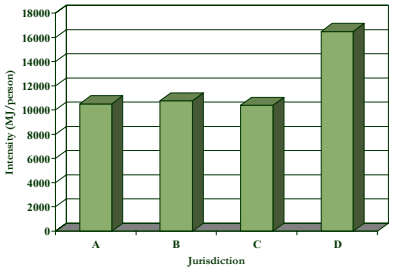


Experience with EDGAR

- Helped us better understand reporting, data and software development issues
- Facilitated collaboration between Commonwealth, state and territory governments
- Allowed us to collect and analyse data in very short time frames
- Showed us that every new system creates unforeseen opportunities
- Shown us that reporting drives change

Australian Government
Australian Greenhouse Office

Comparison of Tenant Light and Power Intensity



Australian Government
Australian Greenhouse Office

Benefits of reporting

- Awareness of energy and greenhouse issues
- Measures relative performance
- Provides a benchmarking tool
- Tracks changes and trends over time
- Identifies high intensity areas
- Transparency encourages improvement

Australian Government
Australian Greenhouse Office

Extension of EDGAR for Greenhouse Challenge

- Improved data collection efficiency
- More accurate data
- Greater data usability
- On-line operational experience
- Add value to the reporting process
- Potential to promote nationally and internationally consistent reporting

Compatibility

- Consistent with existing National Greenhouse Gas Inventory approaches
- Contributes to improved projections and assessment of Challenge impact
- Promote bottom up reporting
- Can input into a wider data warehouse
- Aligns government and industry reporting

Data collection efficiency

- Data directly into the database
- Workflow management reduces redundant work
- Conversion factors and coefficients are preset
- Different hierarchical levels of reporting
- Structured and specific reporting templates

Data accuracy

- Anomaly identification
- System generated conversion factors, coefficients and calculations
- Calculation assumptions are controlled within the system
- Bulk quality checks focussing on exceptions

Reporting tools

- Provides faster, more accurate response to ad-hoc queries.
- Promotes performance improvement by showing year-on-year trends and relative performance.
- Assist members prepare progress reports

Australian Government
Australian Greenhouse Office

Issues

- Going on-line won't fix a flawed process
- Reporting is not everyone's favourite pastime
  - Avoid duplicating requirements
  - Clearly understand what you want to measure
  - Ask for the minimum information required to measure effectively
- Confidentiality
- All tools have a useful life

Australian Government
Australian Greenhouse Office

Conclusions

- Measurement is critical for all energy efficiency programs – if you don't know where you started, or where you are going, you have no idea of policy and program effectiveness
- Measurement costs money, but it can become more effective through well-designed and adequately resourced programs such as EDGAR

Australian Government
Australian Greenhouse Office

Thank you

- www.greenhouse.gov.au
- www.energyrating.gov.au
- www.yourhome.gov.au

Australian Government
Australian Greenhouse Office

Energy Management in New Zealand

APEC Symposium 2004
Government Energy Management Programmes

Dan Coffey
Government Account Manager

New Zealand

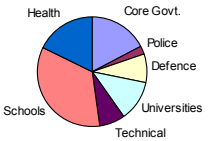
- Land of 36 million sheep
- 4 million people
- $100 billion GDP (US$65b)
- $9 billion energy spend (US$6b)
- Energy efficiency promoted by the Energy Efficiency and Conservation Authority (EECA)

Energy Expenditure

Total expenditure
$35 billion (US$23b)

Direct expenditure
$20 billion (US$13b)

Energy expenditure
$130 million (0.65%)
(US$85m)



Government Energy Management programmes

1989 – Government Energy Management Programme (GEMP) - $20M
– Mandatory participation through CE Performance Agreement
– Results patchy

1993 – Government Energy Efficiency Leadership Programme (GEELP) - $20M
– Voluntary
– Demonstrated savings of $550,000 p.a.

2000 – EnergyWise Government Programme - $100M
– 15% reduction target over 5 years to June 2005
– Accounts of > $100,000 p.a. (85)
– Voluntary

EnergyWise Government Programme Operation

Voluntary

- Strong ministerial endorsement…but…not compulsory
- Memoranda of Understanding (MOU) with participants (51/85)
- Continue to work with the remaining organisations

Participants

- Designate energy manager
  - Committed person
- Run energy management programme
- Report progress annually to EECA

EnergyWise Government Programme Operation

EECA Support

- Mentoring and advice
  - Account Managers (0.4 – 0.6 FTE)
  - Personal contact - phone, email, fax, conferences, visits
- Audit grants - audit subsidy up to 50%
- Loans - low cost loans (Max 5 yr payback)
- Information and referrals www.emprove.org.nz
- Training
  - EECA seminars (up to 1 day)
  - Support for other providers
  - Marketing and promotion
    - Direct mail
    - Account Managers

Energy management assessment tools

Energy Achiever

- Presentation based

Energy Management Progress Report (EMPR)

- Paper based report format

Based on the UK Energy Efficiency Office, General Information Report No.12 Energy Management Guide 1993

Energy Achiever

Presentation based

- 15 key areas
- 3 levels / area

Include appropriate people at all levels

- Finance Manager
- Property Manager
- Energy Manager
- Maintenance person

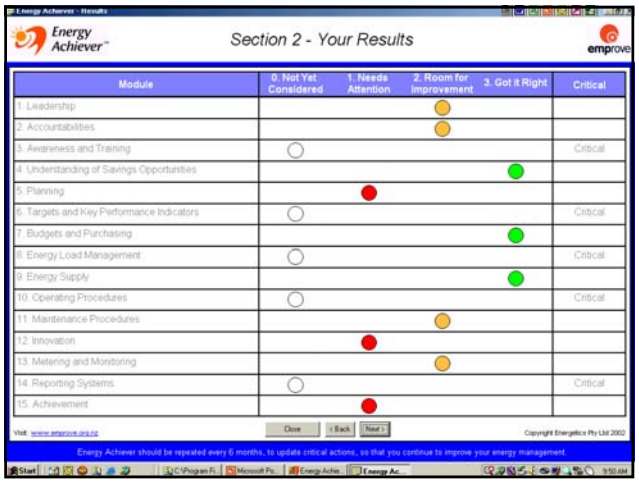
Client's session - EECA just facilitates

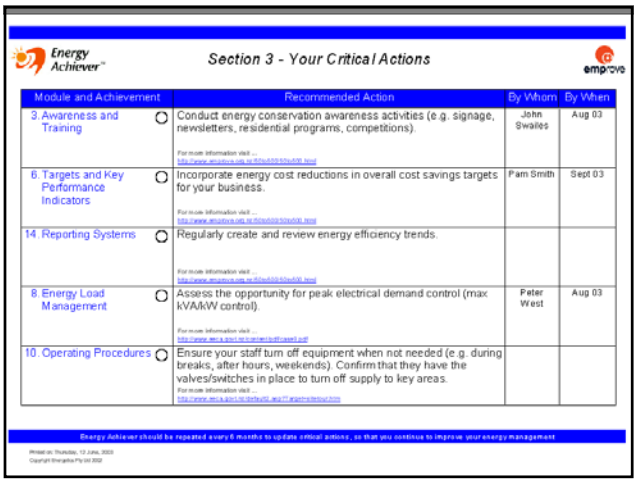
Software generates

- Report
- Action plan

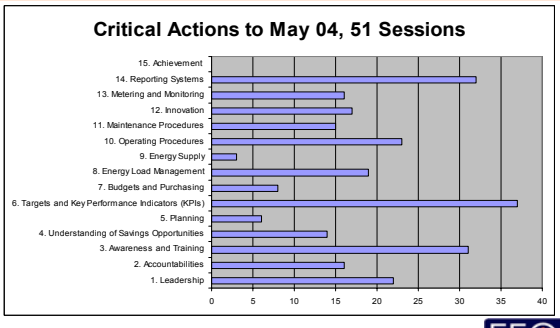
Identifies common areas of concern

Repeat every 12 months





Energy Achiever Results



EECA

Energy Management Progress Report (EMPR)

Why should they bother?

- Internal reporting template
- Company report profile
- Internal assessment tool

Provides feedback to EECA on:

- kWh & cost (All fuels), Budget ($), Area ($m^2$) & Staff Nos.
- Initiatives (last year & next year)
- Vehicles (Qty & fuel consumption)
- Management procedures

Return rate 40% – 70%

Depends on relationship - Account Manager/Client

EECA

Programme monitoring

1994 – kWh & cost (All fuels)

- Budget $, Area ($m^2$) & Staff Nos.
  - Accounts sent to local branches
  - Energy use data (kWh, GJ etc.) unreliable
  - Area leased & owned

1996 – Gave up on kWh – Cost only

1997 – Started collecting (projects) savings data

2000 – Expanded programme

2002 – EMPR – Recorded 4.2 % improvement

2003 – EMPR – Lots of activity ….but…recorded no improvement

2004 – EMPR – More emphasis on project savings data

Procurement

Currently no dedicated government initiative

Regulated Minimum Energy Performance Standards (MEPS)

- Tubular fluorescent lamps
- Ballasts

Provide purchasing advice

- EECA design briefs
- Office equipment (EPA Energy Star)
- Database of Service Providers

Investigating syndicated procurement

Leases

- Get the pricing signals right
- Make sure the energy user pays the bill

Energy Services Industry

Government an attractive target

- Prepared to accept longer payback periods
- Aware of Government target
- Successful companies have emerged
- EECA Promoting
  - Energy Performance Contractors - provide savings guarantee
  - Energy Management consultants - Run energy management programmes
  - Design Audits - Build it right to start with

Achievements

–High levels of awareness

–Most organisations have energy managers

–High attendance at energy management courses

–Energy Achiever being used with most accounts >$500,000 p.a.

–Most have done energy audits

–Most have implemented some energy savings initiatives

–Up to 70% EMPR return rate

–Savings?

Lessons learned

nergy Management must be demand driven
- Empower committed people (Champions)

Provide effective support
- Personal contact
- Management diagnostic tools - Energy Achiever

Energy audits - only get the easy stuff

Get it right to start with:
- Buy right: Buildings, Equipment, Vehicles
- Promote Performance Contracting

rogramme monitoring
- Demonstrate value for the organisation
- Collect project data
- Encourage the use of consultants

EECA

Improving energy choices

www.eeca.govt.nz

EECA
Energy Efficiency and Conservation Authority
Te Tari Tiaki Pūngao

Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 6: Energy Efficiency Investment Case Studies

Energy Efficiency Management in the Russian Public Sector

Garegin Aslanyan
Centre For Energy Policy, Moscow

APEC International Symposium on

The Implementation of Government Energy Efficiency Programs

Kunming, China
2-3 August, 2004

1

Perspectives of the Russian Economy

- Since 2000 after a decade of recession the Russian economy indicates a steady economic growth followed by higher energy demand
- National forecast envisages 4-5% average annual economic growth that would result to 2,5 -3,3 GDP growth by 2020 against 2000
- The Russian energy sector – as the major economic driver contributing 28% value added to GDP and 50% budget income-must be very efficient for meeting growing energy demand

2

The Main Targets of the Russian Energy Strategy by 2020

The strategy envisages by 2020 changes in TPES:

- Share of natural gas will decrease from current 50% to 42-45%
- Coal will gain share from 16% to 21-23%
- Nuclear energy will rise from 5% to 6%
- Energy investments needed during 2002-2020 range from $550 billion to $700 billion

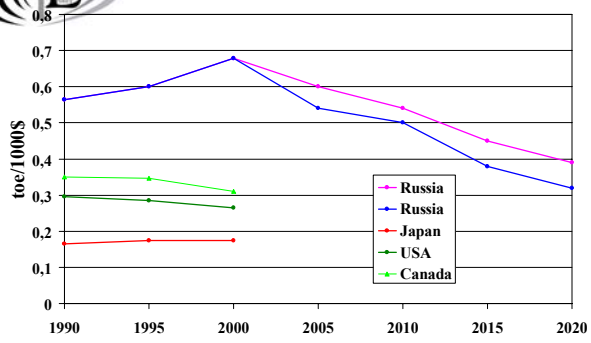
3

The challenges of energy sector

- High energy losses and low energy efficiency at both supply and demand sides in the all economic sectors
- The shortage of investment, limiting the scale of compensating for the loss of productive assets in the FEC, modernizing and refurbishing the basic plants and equipments, and EE implementation
- Inefficient functioning of the energy monopolies, namely gas and power utilities
- Slow pace of market reforms and restructuring

4

Higher Russian Energy Intensity versus OECD countries is a obstacle for economic growth



GDP energy intensity has to be reduced 2 – 2,5 folds by 2020

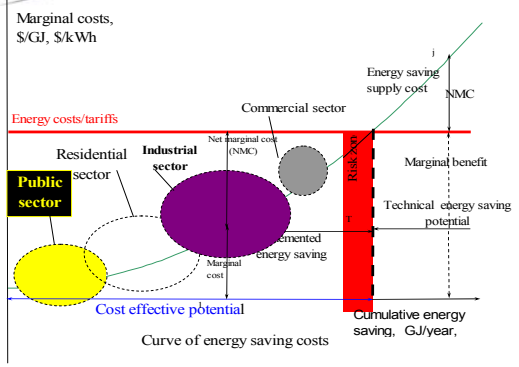
Source: The Russian Energy Strategy and IEA

Energy conservation technical potential

Sector	Power, bln kWh	Heat, mln Gcal	Fos. Fuel, Mtoe	TPES	
				Mtoe	%
Energy supply	29-35	70-80	69-77	84-94	33-31
Industry	110-135	150-190	34-44	77-98	31-37
Resident&public	70-74	120-135	36-42	66-77	27-26
Transport	7-11	-	15-18	16-21	6-7
Agriculture	4-5	5	6-8	8-10	3
Total	220-260	345-410	160-189	251-300	100

Source: The Russian Energy Strategy

Where the cost-effective energy measures are to be tackled?



Heating efficiency is a prior cost-effective measure in public and residential sectors

- Heat supply in Russia represents more than 30 percent of total energy demand (excluding transport)
- Large set of cost effective measures to save 25– 40% of heat consumption payments in buildings is available by:
  - Better metering and accounting
  - Installation of individual heating boilers
  - CHP deployment
  - Installation of controlling and regulating systems
  - Improvements of building's envelope through insulation of walls, roof and basement

Energy Efficiency Legislation

The Federal Law "On Energy Conservation" of 1996:

- Called for more accountability of producers and consumers and the inclusion of EE requirements in federal standards for equipment, materials, buildings and vehicles
- Requested the introduction of standardization, certification, and labeling of energy consuming technology and equipment
- Made energy audits obligatory for large companies and set a target for metering energy consumption
- Identified some mechanisms to promote EE investments
- Called for differentiated energy tariffs
- Relieved consumer of obligatory payment for contracted energy supplies if it due to EE consumed actually less

9

Federal Energy Conservation Programme

- In 1998 the the Government adopted the federal programme "Energy Conservation in Russia" that:
- Calls for reducing GDP energy intensity by 13.4% by 2005
- Refocuses the energy efficiency management efforts to regions and municipalities and calls their administrations to develop local programmes and projects
- Recognizes $9.2 billion investment needs to be funded by private equity financing (47%), bank credits (30%), local budgets (20%) and only remaining 3% by the federal budget
- Focuses on voluntary energy-efficiency investment

However due to existing barriers in particular lack of funding and motivation of all the players the program's goals have not been fulfilled

10

The Federal Program "Energy Efficient Economy"

- The "Energy Efficient Economy" is the latest EE federal programme to be implemented up to 2010
- It has sub-programmes focused on various sectors, both supply and demand sides, public sector in particular
- Programme facilitates EE implementation through:
  - Managements and monitoring mechanism
  - Legal and institutional frameworks
- Programme investment needs amounts $3 - $5 billion in 2001- 2005 with very low budget funds allocated for end-use efficiency, in particular in public sector

11

Why energy in public buildings is used so inefficiently?

- Imperfection of legal and regulation frameworks
- Weakness of administrative structures
- and financial mechanisms
- Lack of incentives at both suppliers and consumers sides
- Aged and deteriorated of energy equipment used
- Lack of qualified specialists on EE

12

What is lacking for EE promotion in public sector?

- Metering, accounting and controlling systems
- Motivation of energy conserving and thereby saving public expenditures
- Means to control quality of provided energy services (e.g. inadequate heat supply at lower outdoor temperatures, and in contrary excess heat provision at warm days)
- Low price elasticity
- Public and private investment sources
- Guarantees for investments reimbursement, in particular in case of third party financing
- Guaranties for fulfilling legislations and regulations
- Justified and consistent energy pricing and tariff policy

13

Prospects of EE in federal public buildings

- Federal expenditures on energy and water supply amount to around $2 billion
- The mayor public energy consumers are Ministries for:
  - Defense,
  - Education and Science
  - Health Care
  - Internal Affairs
- EE implementation would be allowing to reduce energy and water supply expenditures up to $1 billion
- According to available experience and assessments the pay back period of budget investments in the most cost-effective EE measures is around 1-2 years

14

Regional and Municipality buildings

- High energy supply budget overburden is a common problem not only at the federal but at the regional and municipal levels
- For instance, Rostov regional budget expenditures for energy and water provision amounts to $ 35 M, and for Norilsk city – $2 M
- Many regional and municipality programs are targeted at public sector

15

What should be done for EE implementation in the public buildings?

- Establishment of the justified limits and norms for public energy and water consumption
- Strict government observance of obligations regarding public payments for energy services consumed
- Obligatory instrumentation of all public buildings with meters and controlling devices
- Allocation of public funds (federal, regional, municipal) for financing efficiency investments
- Motivation of consuming organizations in reducing energy payments, in particular allowing them using saved public expenditures for further EE implementation

16

What is done for energy management at the public building so far?.

Consumption Limitation:

By the governmental decree № 5 of 5 01 1998 "On provision on energy carriers and power of public organizations funded from the federal budget" a limitation of energy consumption is imposed

Thus, each budgetary entity should justify its annual energy demand based on average consumption of the last years taking into account result of energy audits of the similar type buildings and using available norms for energy consumption

Budget ensures funding the energy bills according to established limits

Hence, energy and water consumption that exceed the prescribed limits have to be paid from non-budgetary sources

17

Results of limitation

- For justification of energy limits a wide series of energy audits were conducted at the some representative buildings of various public sectors
- Limitation invokes a large scale company for installation of heat and water meters at the public buildings at the public expenses
- As a result of the limitation and meters installation substantial nominal saving in energy expenditures was achieved since factual heat and water consumptions were much less that established norms
- Reduced energy expenditures allows to fulfill the ongoing budgetary payment commitments and to refund previous non-payments

18

Motivating energy efficiency

By the governmental decree № 588 of 15 06 1998 " On additional energy efficiency measures in Russia" incentives for energy efficiency implementation were ensured through development of sectoral, regional and municipal programmes

In particular, the federal authorities were prescribed:

- After the establishment of energy limits in physical and monetary terms setting up for public organizations energy saving targets to be fulfilled
- Sustaining the basic level of public funding of energy provision during a period one year exceeding the investment payback time since EE measures are implemented

19

Energy Saving Program of the Russian Ministry of Education for 1999-2005

- The first large scale energy management program in public sector is under implementation by the Ministry of Education with participation of Ministry of Fuel and Energy, regional authorities and educational organizations
- The program covers 307 organization of 1000 total ones publicly funded while targets all levels of educational organizations - primary, secondary and high schools, colleges, universities and institutes
- Higher education institutions took the lead as downstream promoters of the Energy Saving Program

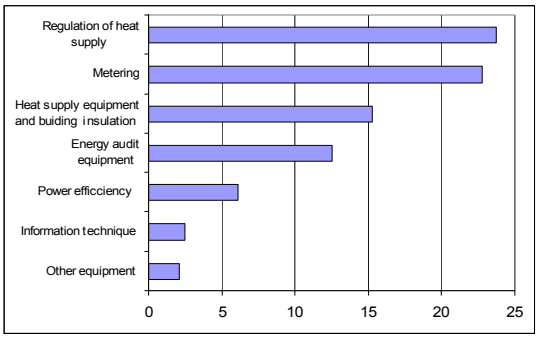
20

Mayor directions of EE program in educational sector

1. Developing legislative and normative documents facilitating realization of program
2. Developing typical accounting and reporting forms for energy consumption
3. Conducting energy audits, justification of consumption limits, identification of cost-effective measures
4. Preparing guidelines and recommendations on EE implementation based on the best practice and available experience
5. Manufacturing effective energy metering, accounting and controlling means and equipments
6. Creating centers for EE, certification and exploitation of energy equipment
7. Educating and preparing personnel, capacity building
8. Disseminating information

21

Structure of EE investments in the Russian education sector in 2000, MRub (25Rub=&1)



Source: CENEf

22

Results of energy management in the educational sector: lessons learned

- Limits become corresponding to established norms
- Budgetary energy non-payments trends to diminishing
- EE investments during 1999-2001 grows up from $1 to 9B
- Budgetary EE financing attracts additional non-budgetary and private investments in a ratio 1 to2,5
- Each Ruble of budgetary investment results to 5 Rubles saving of budgetary energy expenditures during the first five years of implementation only
- Reliability of energy system has been improved
- Saved financial sources allows to enhance a salary of employees and improve material and equipment provision

23

EE project for the Health Care Sector

- Under a grant of the UN ECE and with support of the Ministry for Energy an EE project have been launched in 2000-2001
- 13 hospitals of the federal, regional and municipal subordination were identified as a case objects to demonstrate EE prospects
- NGO Centre for Energy Policy and private ESCO “Negawatt” were nominated by ECE secretariat to be in charge of the project

24

Objectives of the ECE EE project in HCS

The mayor objective of the project were the following:

- Identifying a range of the typical no-cost and low-cost EE measures in the Health Care organizations based on result on the conducted audits and feasibility studies
- Developing EE investment project proposals in the HCS
- Demonstrating health care officials and senior hospital managers perspectives and benefits of EE
- Providing hospital managers a basic knowledge of technical and financial engineering features of EE project development and business planning
- Introducing mechanisms of using public budgets and attracting external third party funds for financing EE investments in the HCS

25

List of investigated hospital of federal regional and municipal subordination

1. The Moscow Medical Academy after Sechenov
2. The Moscow City Clinic Hospital N1
3. The Central district hospital in the Asino City of the Tomsl Oblast
4. Central medical and sanitarian department N 15 in the City of the Snezhinsk
5. The Russian State Medical University in the MC
6. The Moscow City Clinic Hospital № 4
7. The "Sevryba" Hospital in the Murmansk City
8. Republican Hospital for War Veterans in the Ulan-Ude (Bashkiria)
9. Regional Clinic Hospital after Semashko in the Nizhny Novgorod
10. The Central Medical and Sanitarian Department of the Zheleznogorsk City of the Krasnoyarsk Region
11. The R&D Institute for Physiopulmonology in the St-Petersburg
12. The Russian Cardiology Centre of the MC
13. The Research Centre for Cardiovascular Surgery after Bakulev,MC

26

Case of Moscow Medical Academy

	Heat, TJ	Power, MWh	Water, tcm
Consumption, 1997	445	5600	405
Share in payment, %	74	19	7
Saving cost-effective potential, %	40%	2	13

Total E&W payments in 2000 $50 M. Source: ESCO Negawatt

27

EE third party financing case at the MMA

- ESCO "Negawatt" in 1999-2001 has implemented in the MMA a series of low cost energy saving measures using its own capital under an energy performance contract
- Following $ 200 000 third party investments during a heating period of 2000-2001 has ensured savings of 190 000 USD in heat supply payment only
- Invested capital was reimbursed by the MMA administration from its lease revenues

28

EE Measures at the MMA to be Implemented

	Measures	**Investment need,** USD	**Annual saving,** USD
Central Clinical Building	Installation of heat meters and plate heat exchangers Equipping operation and reanimation facilities with EE appliances	280 000	90 000
Central Heat Supply Unit	Installation of a heat metering unit and automated heat management system	85 000	100 000
Central control point	Control and management for heat consumption	50000	15000
Total		**415 000**	**205 000**

29

ECE' EE Project of Sevryba Hospital, Murmansk

Measure	**Investment,** USD	**Savings,** USD/year
Installation of double glazed windows	56 000	14 500
Modernization of heating system	44 800	9 500
Reconstruction of the hot water supply system	25 400	8 500
Reconstruction of the ventilation system	13 800	3 500
Total	138 000	27500

30

Case of the Russian Academy of Sciences

- RAS is a core of the Russian R&D
- Total staff 7500
- Floor area – 3, 6 M sq.m
- Heat consumption – 2,2 Million GJ
- Power consumption – 225 BWh

31

EE activity in the RAS

- Since 1999 EE program is under implementation
- In 1999-2004 series of audits were conducted to adjust limits and identify cost-effective measures to be implemented
- Since 1999 a database on energy consumption and EE potential is functioning for energy management of 250 institutes involved
- Based on identified potential the RAS each FY allocates funds for implementing EE measures

32

Leasing scheme for decentralized heating and CHP

- Assessments justified the feasibility of installation of decentralized heating and CHP systems based at the modular gas boilers as a real tool for saving public expenditures
- Payback of investments into autonomous heating boilers is 4-5 years
- Boiler leasing scheme in promoted due to lacking own budget sources
- The first 9 MW boiling house financed by a leasing company is under implementation in the Pushino academic center 100 km far from MC

33

Energy management project in Petrozavodsk city

A project for energy management in public buildings is under implementation comprising 3 phases:

I. Installation of 113 meters in all the schools and kindergartens with $ 190k investments and $163k annual budget saving due to nominal energy saving

II. Heat supply control and regulation with $ 30k investments and $11 k annual saving

III. Implementation of energy conservation measures financed through revolving find with initial equity capital of $220k and total 10 years investments of $740k

34

Conclusion

- The "Energy Efficient Economy" programme and the New Russian Energy Strategy up to 2020 identify EE as a key priority for all economic sectors for securing future sustainable socio-economic development
- However in general a little is done to fulfill the EE targets established in both documents, in particular regarding public sectors
- Some positive results and experience gained at some sectors (e.g. Ministry of Education, Russian Academy of Science) have to be disseminated with extended scale of EE implementation

35

Conclusion (cont)

- Following the Ministry of Education there is a need to create in the other Russian sectors (Health Care, Defense, Foreign Affairs, the RAS) EE revolving funds and to attract additional third party financing
- A strong government will is needed to realize EE potential available in public sectors and thereby save budgetary expenditures
- More substantial public funding is necessary to trigger EE implementation and demonstrate that EE is not a declared but a real national priority
- Development and implementation of new EE investment financing schemes with involvement of local authorities and financial institutions are needed

36

Revolving Energy Funds:

Experiences from Australia

Wayne Wescott

Chief Executive Officer

ICLEI-A/NZ

wwescott@iclei.org

ICLEI Summary: International and Regional

- Focused on building capacity of local governments to achieve practical environmental improvements
- Headquarters is based in Toronto; offices in Melbourne, Tokyo and Seoul in the Asia Pacific region
- In ANZ, four offices (Melbourne, Adelaide, Perth and Wellington, NZ) totalling 32 staff
- International base of nearly 500 members with 76 member Local Governments and their associations in Australasia

Local Greenhouse Action in Australia

- 190 Councils in Australia with almost 60 at Milestone 5
- 7 years of Australian Federal government support
- 75% of the Aust population
- In Australia, 95 Councils involved in Cities for Climate Protection™ from July 99 - June 03 have:
  - Saved a cumulative total of 1.8 million tonnes of greenhouse gas emissions (equivalent)
  - Invested $3.3 million in greenhouse jobs
  - Invested $67 million in greenhouse abatement
- Through such projects as building retrofits, purchase of green -energy, methane gas extraction, changes to vehicle fleets, street lighting measures, energy efficiency in new sub-divisions and walking school buses.

The challenge: funding energy projects

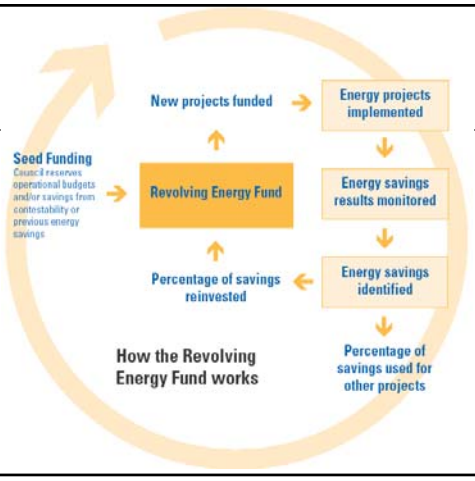
- Internal competition for funds
- Bias against efficiency
- One year budgeting systems
- Often not seen as “core” business for local governments

Financing Projects through Revolving Energy Funds

- Numerous councils have established Revolving Energy Funds including
  - **Newcastle (NSW),**
  - **Rockingham (WA)**
  - **Manly (NSW),**
  - **Moreland, (Vic) and**
  - **Melville (WA)**

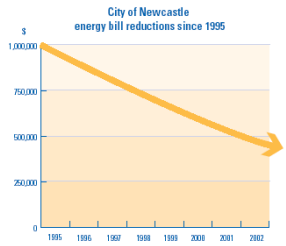
Rationale for Revolving Energy Funds

- Provides a long term stable fund
- Reduces internal competition for funds
- Provides an incentive for staff involvement in energy conservation if some funds are reinvested in the area that made the saving
- Focuses on data management systems which can have a powerful impact on energy reduction



City of Newcastle, New South Wales

• reduced its annual bill from $1 million in 1995 to $597 000 by June 2001 and placed the savings into REF



Manly

- Developed an internal loan that was paid back through energy savings
- Froze 1998 energy expenditure for five years and used real savings for new projects

Moreland

- Council resolved to invest $250,000 saved in the contestability process for public lighting
- Operational savings are re-invested, with a proportion to the business unit involved
- Finance department manages the Fund

Melville

- 80% of all energy savings are allocated to this fund
- Actual savings are calculated after the fact
- Tend to focus on projects with a longer than one year payback

Corporate Actions

- Lighting retrofits
- LPG passenger fleet
- Dual fuel heavy vehicle fleet
- Lighting timing and sensors
- Water heating – reduced temperatures
- Air conditioning – temperature adjustments
- Water audits
- Staff awareness and training programs

Retrofitting of fluorescent light fittings in the City Administration Centre (CAC).

Corporate actions - Activating Energy Star

Willoughby Council - 55 computers, saved $8,000 and just under 100 tonnes per year

Adelaide City Council - 370 computers, 45 copiers, 30 printers, saved $25,000 and 177 tonnes per year

Corporate actions - Public Lighting Efficiency

City of Port Phillip

Hi tech /energy efficiency foreshore and public lighting:

- Cost reduced by $36 000/yr-3.5 yr payback
- 110 tonnes CO2
- Reduced maintenance costs

Corporate actions - Water Heating

Frankston City Council (Vic) Arts Centre

Renewable energy project through solar hot water heating:

- $6200 year saved in 1.8 year payback
- 42 tonnes CO2

North Sydney Pool Refurbishment

- Through solar hot water, timers, heat pumps, pool blankets
- Saving $80 000/ year operating costs
- 500 tonnes CO2/year

Low-Energy Office Building: Ministry of Energy, Water & Communications, Malaysia


Abdul Rahim Bin Mahmood
Energy Manager
Ministry of Energy, Water & Communications, Malaysia
01 August 2003

MALAYSIA'S ENERGY POLICY

The following policies constitute Malaysia's energy policy:-

i. **National Petroleum Policy (1975);**

ii. **National Energy Policy (1979);**

iii. **National Depletion Policy (1980);**

iv. **The Four Fuel/Diversification Policy (1981); and**

v. **Fifth Fuel Policy (2001).**

NATIONAL ENERGY POLICY OBJECTIVES

1. Supply Objective : Adequate, secure & cost-effective supply
2. Utilisation Objective: Efficiency and productive use
3. Environment Objective: Minimise negative impacts

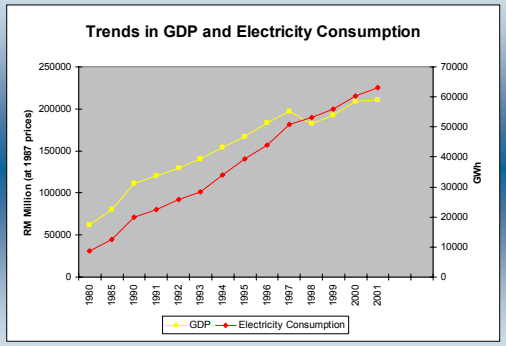
Main Thrust Under 8MP

Sustainable development of the energy sector aimed at contributing towards enhancing the nation's competitiveness and resilience

Strategy Under 8MP

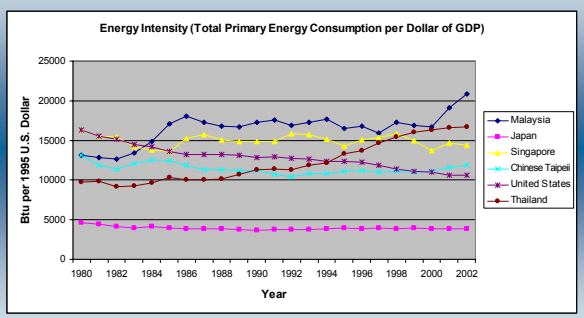
Encourage efficient utilisa tion of energy in industrial and com mercial sectors

Why Energy Efficiency?



Source : National Energy Balance Malaysia 2001

Malaysia's Energy Intensity vs. Other Countries

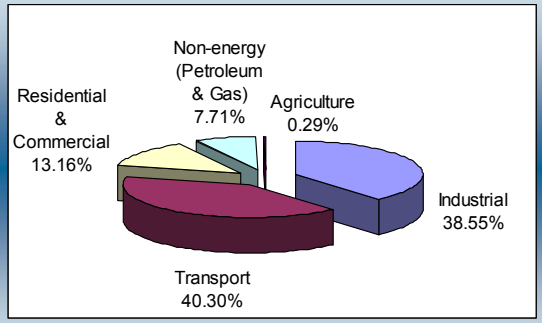


Source: Table E1g – World Primary Energy Consumption (Btu), 1980-2002, Energy Information Administration, USA http://www.eia.doe.gov

Malaysia's Future Without EE

- **Net importer of oil by th e end of the decade**
- **Increase in emission of GHG through burning o f fossi l fue ls for power generation**

FINAL ENERGY USE BY SECTORS



Source: National Energy Balance Malaysia, 2002

Three-Pronged Approach

Legislative
Drafting EE Regulations
Propose EE in UBBL
MS 1525 :2001

Fiscal Incentives
Pioneer Status
Accelerated Capital Allowance
Tax Exemption

Programs & Projects
LEO Building
MIEEIP
CETREE
DSM
IRP-2
CDM
MESITA - Audits in Buildings

MEWC-LEO Building: A Case Study

MEWC-LEO Building Project

Background:

- A demonstration project of Energy Efficiency in Buildings
- A project by the Gov. of Malaysia with technical input on Energy Efficiency from DANIDA (Danish International Development Assistance)
- Commitment of the Government on "Leadership by Example"
- Base Building Cost: RM 50 Million (USD13.16M)
- Construction Start Date: March 2004
  Expected Completion Date: September 2004

Initial Constraints in MEWC-LEO Building Project

- Energy Efficiency features must be easily replicated in other Malaysian buildings
- Additional investment in Energy Efficiency should not exceed 10% of the base building cost
- Relevant authorities need to be convinced on the estimated cost savings.
  - Using simulations on Energy-10[1] software shows which EE parameters were critical and the estimated ROI.

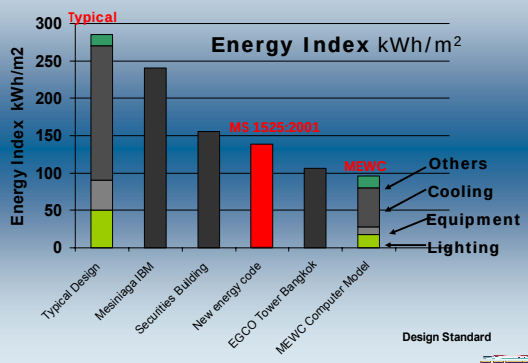
[1] *developed by U.S. NREL*

Objectives of MEWC: LEO Building Project

- An Energy Efficient, Intelligent Showcase Building Without Compromising User Comfort
- A Study and Research Opportunity for Professionals and Academics
- Enhance awareness on EE building design
- Increase local capacity in EE building design
- A Demonstration on the feasibility of EE design standards as stated in MS1525 :2001 Code of Practice on EE & Use of RE for Non-residential Buildings*, 136kWh/m² vs. 200-300 kWh/m²

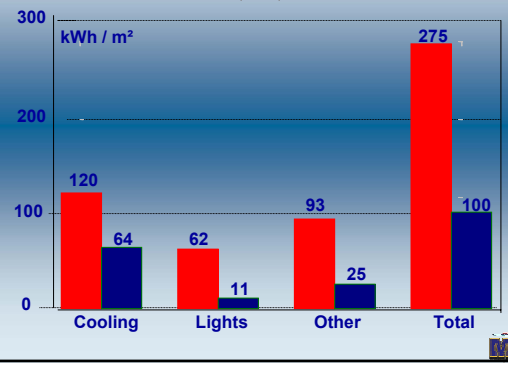
* *with reference to Guidelines for Energy Efficiency in Buildings, MEWC (1989)*

Objective of MEWC-LEO Building Project



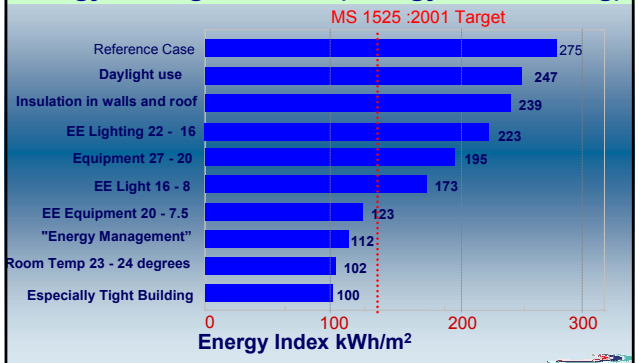
ENERGY-10 Optimisation

Conventional ⟷ MEWC-LEO



Summary of Energy Savings

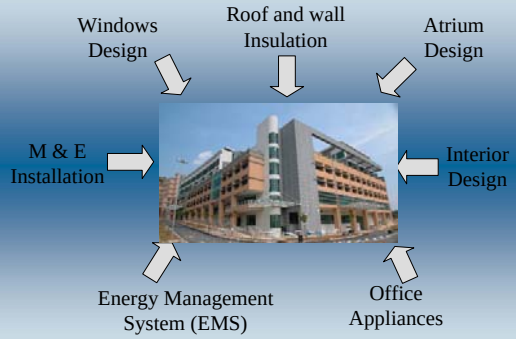
Energy Saving Features (Energy-10 modeling)



Local Environment

Location of MEWC Building in Putrajaya with green and water areas as shown

DESIGN ELEMENTS



Energy Efficient Design Features

- **Passive Design Elements.**
  - Building Orientation.
  - Building Envelope.
  - Natural Air Ventilation.
  - Interior Space Layout Design.
- **Active Elements**
  - Air Conditioning & Mechanical Ventilation.
  - Innovative Lighting System.
  - Energy Efficient Office Appliances
  - Plug loads.
  - Comprehensive Energy Management System.

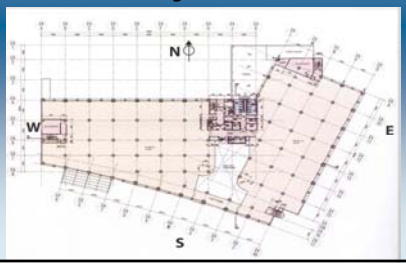
Energy Efficient Design Features (Passive Design)

- Building Envelope:

Orientation along the East-West direction
Since the sun rises up from the east and sets in the West, less direct sunlight will heat the building façade.

To minimise heat gain from the sun radiation:

- **Most windows/glazing facing North and South**
- **Less windows facing East and West**

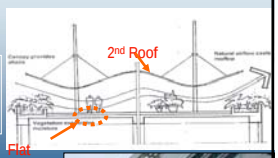


Energy Efficient Design Features (Passive Design)

Building Envelope:

INSULATIONS OF WALLS AND ROOF

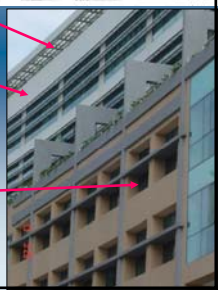
Concrete Roof
Above - metal deck canopy
Under - 100 mm mineral wool
(normal 25 mm.)



Walls:
200 mm aerated concrete brick
(normal 115 mm brick)
OTTV - 34 W/m² (normal: 43 W/m²)

Punch Hole Windows: (600 - 1000 mm)
-Better shading effect - deeper penetration of daylight

All glazing near façade-12 mm light green glass.
-Provides more diffuse daylight but less heat -
Visible light trans. = 65%.
Solar Heat only 31% pass through



Energy Efficient Design Features (Passive Design)

Building Envelope – cont'd

Overall Thermal Transfer Value (OTTV)

OTTV is a calculation to measure the level of heat absorb into the building

-Max. Base Building OTTV : 45 W/m² (Malaysian Standard - MS1525)

-Max. tender spec., OTTV : 35 W/m²

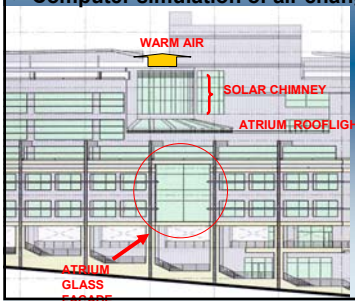
-Actual calculated OTTV : 31.4 W/m²

MEWC

Energy Efficient Design Features (Passive Design)

Use of Natural Ventilation at the Atrium:

- ✓ Natural Ventilation Assisted by a Solar Chimney
- ✓ Provides Daylight Deep into the Building
- ✓ Computer simulation of air change of 6 to 10 ach



Energy Efficient Design Features (Passive Design) -Interior Space Layout Design:

- ➢ Less intensive work area at the centre floor area.
- ➢ Most intensive work area near the façade.
- ➢ To maximise penetration and utilisation of daylight
- ➢ Effective zoning of interior spaces to minimise energy consumption
- ➢ Creating a comfortable ambience – bright and spacious interiors

MEWC

Energy Efficient Design Features (Active Design)

- Innovative Lighting Design:

- **Two circuit lighting system (room near the façade),**
  - **All lights in the room controlled by occupancy sensor.**
  - **Lights near the windows controlled by photo sensor which maximise the use of daylight**
- **System integrated with Building Energy Management system.**
- **Design luminance level in Offices : 350 lux**
  - Proposed by MS 1525:2001* : 300 – 400 lux.
  - Base design requirement : 500 lux.

Energy Efficient Design Features (Active Design)

- Air conditioning System:

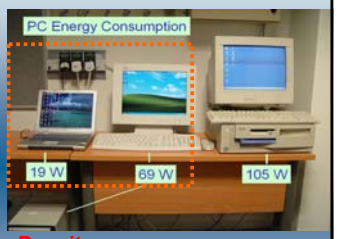
- **Zoning of cooling and control according to occupancy and load.**
  - **-VAV boxes.**
  - **-Variable speed drives (VSDs)**
  - **-Room temperature control sensors**
- **CO2 Sensors & Heat Recovery Heat Wheel**
  - **Helps to reduce cooling load of fresh air intake.**
- **Temperature control set point : 24°C.**
  (Acceptable comfort level)
  -Base design requirement : 22°- 23°C.
  -Proposed by MS 1525:2001* : 23°C – 26°C
- **Low Friction Losses design**
  - **Reduce installed CHW pump and Fan capacity and less energy consumption.**

Energy Efficient Design Features (Active Design)

- Energy Efficient Office Equipment:

- **Plug Loads**
  - •Computer, Monitor, Printer
  - •Copier, Fax

Advantages with EE equipment :
- Reduced electricity load.
- Reduced cooling load



- **Achieved Total Small Power Density,**

Base design requirement = 20.0 W/m2
Calculated small power density = 11.5 W/m2

Recommended by *"Energy Efficient Office Equipment Procurement Guideline" by DANIDA*

Energy Efficient Design Features

- Building Energy Management System:

- **A comprehensive Energy Management System**
  - **•Individual Monitoring of cooling, Lighting, Equipment per floor**
  - **•Continuous monitoring and optimization**
- **An Energy Manager has been employed**

Conclusions

- The building and the system design were analyzed and optimized using *Building Integrated Design Concept*.
- A comprehensive list of EE features were integrated in the project tender
- Seminars have been successfully conducted to promote the awareness of EE in Buildings using the MEWC-LEO building as a reference
- Increased interest on EE among the Professionals and Academia due to MEWC-LEO building as many visits have been conducted while the building is still being constructed

Conclusions (cont'd)

- Low Energy Offices (based on the Malaysian Standard, MS1525 : 2001) is economically feasible as proven by the MEWC-LEO building project. It is estimated that with 10% extra cost investment on the EE features, 50% energy savings and less than 10 years payback can be achieved.

  - Base Building Costs: RM50 Million
  - Investments : RM 5.0 mil. (10% of building costs)
  - Costs Net Savings : RM 0.60 mil. /year
  - Pay-back : 8 years
    - *Equipment life : 15+ years
    - *Building life : 50+ years

- Thus, energy-efficient buildings make sense not only in terms of savings on bills but also on the environments which is priceless.

For more details, visit our website:
http://www.ktkm.gov.my/
or
http://www.mecm-leo.gov.my/

THANK YOU

Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 7: Energy Efficiency Procurement Practices

Harnessing the Power of Europe's Public Purse €12 billion is just the start!

Nils Borg, Borg & Co

APEC symposium

Kunming, 2-3 August 2004

- Two-year European study completed 2003
- PROST– public Procurement of Energy Saving Technologies in Europe
- Expanded to a more general "energy efficiency in the public sector" (buildings and products)
- Energy Service Directive (proposed) mentions public procurement
- Green procurement is becoming an issue for local, regional and national governments – make it energy efficient!

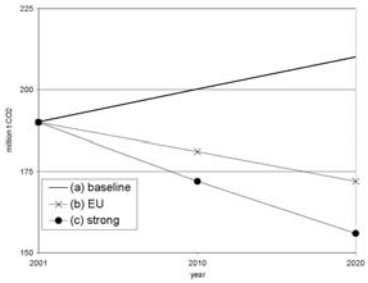
We looked at Europe and beyond

17 (+2) countries studied

Countries covered in detail	Also in the synthesis	Countries studied
Austria (EU)	Japan (non-EU)	Estonia (NEW member)
Finland (EU)	Switzerland (non-EU)	Greece (EU)
France (EU)	UK (EU)	Hungary (NEW member)
Italy (EU)	USA (non-EU)	Ireland (EU)
Germany (EU)		Slovakia (NEW member)
Netherlands (EU)		Korea (non-EU, very limited)
Poland (NEW member)		Belgium (EU, very limited)
Sweden (EU)		

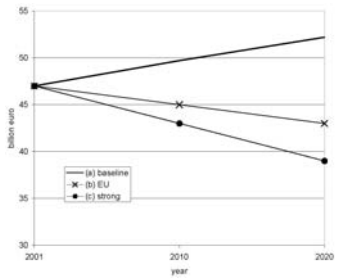
Why bother about the public sector and its energy use?

Fulfilling the Kyoto commitment



- 5-10 % of national energy use
- 20 % savings potential in energy (heat and electricity)
- European goal of 1,5%/year efficiency increase
- Additional 0,5%/year efficiency improvement (**NB**: Also proposed by the new Energy Services Directive)

12 billion Euro/year – in the pubic sector alone!



- 47 billion Euro electricity bill/year
- 12 billion Euro can be saved annually
- Additional annual investments of only 80 million Euro needed

The opportunity for wider market transformation

- Computers are an example
- Difficult to change consumer purchasing behaviour (of these products) with labels and information.
- 13% of public sector electric savings could come from IT equipment
- 600 000 PCs purchased every year by the European public sector, or 12 million computers in 20 years
- They are worth ~1 billion Euro/year
- …so, common criteria would help to create one "virtual buyer"
- **It works!** Compare with the US example! (1W stand by)

Summing up the "therefores"

- The government should lead the way "leadership by example"

MARKET TRANSFORMATION OPPORTUNITY

- Public sector has a large share of total procurement.

KYOTO COMMITMENT

- Large savings potential

SAVE MONEY:

- Efficient use of resources: taxpayer's money - in effect OUR money

Why isn't this happening?

"It is not allowed,
I must buy the cheapest product"

WRONG

It is OK to buy best value for money!

It is happening now

- We found "islands" of good examples
  - Danish A-Club and public sector commitments
  - UK has ambitious policy
  - A number of municipalities:
    - (e.g., City of **Pori**, **Finland**, cities in **Germany, France**
    - **Sundsvall (Sweden)** - replaced all street lighting
  - Also good energy management examples
    - **Germany, Sweden, Finland, France, Italy**

When is it working?

- Political leadership is strong and clear
- Committed staff
- Budgetary routines that allow investment
- Public procurement legislation was understood.

Danish A-Club

- Set up in 1999 by the Danish Electricity Saving Trust
- Name "borrowed" from the EU energy label
- Purpose: To make it simple, secure and cheap primarily for government organisations to buy energy efficient.
- A number of tools are offered:
  - Network
  - Support
  - Specifications
  - Special offers
- Four-year commitment to follow two-page guideline: (GEEA, A/A+ rated appliances)

www.a-klubben.dk

- 190 member organisations
  - 9 central government ministries/agencies (20%)
  - 7 County administrations (54%)
  - 71 municipalities (26%
  - Public housing companies
  - Private companies

= 20% of Danish public sector electricity use

- New services and tools for systems have been developed
  - Lighting
  - HVAC
  - Server rooms
  - Electricity consumption feedback systems

Use existing tools and databases!

- A-club is good example:
- GEEA label almost invisible. But database is used
- EU label (but is mandatory label)
- Homespeed for appliances is can be linked to public purchasing regimes.
- Energy Star (For ITand office equipment only in EU)

What's in the public building toolbox?

BUILDINGS (Components and systems)

- Concrete recommendations, specific levels
- LCC analysis vs purchase guidelines (Simplify!)
- Minimum building performance standards (kWh/year/m^2, etc)
- Building component purchase recommendations
  - 13 products
  - Detailed prototype fact sheets for windows and ballasts

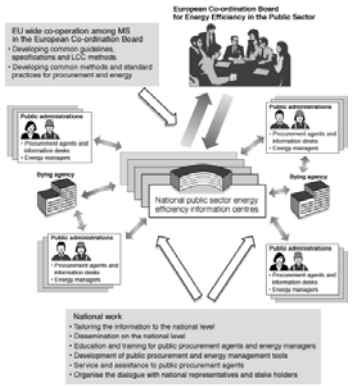
What's in the public product purchasing toolbox?

ENERGY USING PRODUCTS
(APPLIANCES AND CARS)

- LCC analysis vs. purchase guidelines (Make it simple!)
- Product lists and recommended levels
  - cold and wet appliances
  - ITC equipment
  - lighting
  - cars

Creating a European structure

- Setting policy targets
- Define **common** criteria and specifications for products
- Define **common** criteria and specifications for buildings
- Creating a structure where this can happen
  - Advice
  - Develop guidelines
  - Coordinating efforts
- Bring in national buying agencies into the system



A Directive will not be ready now, so what can we do meanwhile?

- Move forward on local or national level
- Voluntary co-ordination programmes can start now (to develop common criteria)!!!
- Some barriers can be removed by local decisions
- The government shall provide leadership by example
- Use existing work (databases etc)

Leadership by example :

- European authorities shall do what they ask other agencies to do. (especially European Commission).

The full PROST report can be found at:

www.eceee.org
(see library and links)

Government Energy Management and Voluntary Approaches: Energy Star and Other Market Transformation Programs

Susan Wickwire, U.S. EPA
International Symposium on the Implementation of Government Energy Management Programs
Kunming, China
3 August 2004

Presentation Overview

- Background on Energy Star and other Voluntary Programs
- Why These Programs Work
- Coordination of Voluntary Programs and Public Sector Energy Management
- Lessons Learned

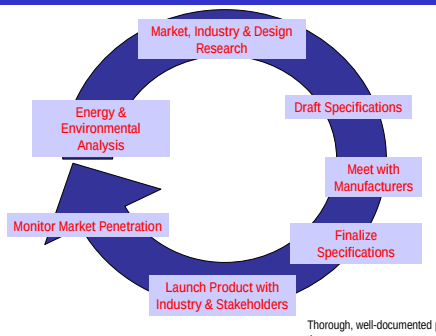
ENERGY STAR- A Comprehensive Program

- Joint program - EPA and the Department of Energy
- Started small and expanded
- Covers over 40 products (e.g. refrigerators, DVD players) as well as new homes and a range of building types
- Requires substantial resources to manage complex program
- Label provides a common national "platform" used by state and local governments, utilities, etc. - use their own resources to promote the program
- Has become global symbol of EE

ENERGY STAR Labeled Products - Some Examples

- CFLs / residential light fixtures
- Commercial refrigerators and freezers
- Consumer electronics
- Exit signs
- Heating and cooling equipment
- Household appliances
- Office equipment
- Roof products
- Traffic signals
- Transformers
- Windows, doors, skylights

Product Development Cycle



Thorough, well-documented process…takes time

Voluntary Approaches and Government Energy Management

Energy Performance Benchmarking Is a New Cornerstone for Efficiency

- National building energy rating system ('99)
  - Overcomes major market gap :
    - Can't manage what can't be measured
    - Now have system like mpg for cars; scale of 1 to 100
    - Measures how key building systems work together
- Great success in short time
  - 19,000 buildings benchmarked
    - 19% of office building space benchmarked
    - 18% schools; 20% supermarkets; 33% hospitals; and 5% of hotels
  - 1,400 buildings labeled for excellence
- Used to mark leadership and in market transactions
  - Leasing

CHANGE FOR THE BETTER WITH ENERGY STAR

Office buildings
Schools
Grocery stores
Hospitals
Hotels
Universities

Voluntary Approaches and Government Energy Management

ENERGY STAR Now a Broad EE Platform

- Sizable results in 2003
  - Offset more than 20 million kW of peak demand (=20 million homes)
  - Prevented GHG emissions of 27.8 MMTCE (102 Tg. CO2 Eq.) (Over 18 million automobiles)
  - Prevented emissions of nitrogen oxides (NOx) of 175,000 tons
  - Reduced energy consumption by 115 billion kWh, providing net savings to consumers and businesses of $9 billion on energy bills
- Overall
  - 1 billion products purchased
  - 200,000 new homes constructed
  - 19,000 commercial buildings benchmarked
- Results are growing -- goal is to double by 2010

Voluntary Approaches and Government Energy Management

ENERGY STAR's Effectiveness - Makes Efficiency Easy for Consumers

- Turns energy efficiency into real products and services
- National definitions for efficient products, homes, and buildings
- Provides objective, clear information
- Very high brand recognition among public (56% nationally)

Voluntary Approaches and Government Energy Management

ENERGY STAR's Effectiveness - Benefits to Manufacturers

- Offers Clear National Specification
- Offers Competitive Advantages
- Marketing Tools and Financing
- Demonstrates Corporate Stewardship
- Meets Corporate Client Preferences
- Associates Company with Label
- EPA recognition of manufacturer efforts with annual awards

ENERGY STAR's Effectiveness - Multiple Societal Benefits

- Environmental - can assess "co-benefits":
  - GHG reductions
  - Air pollutants
- Economic - for every $1 in Federal Funds:
  - Savings to businesses and consumers of more than $75 on their energy bills
  - Creation of more than $15 in private sector investment
  - The addition of over $60 into the economy

Examples of Other Voluntary Programs

- Combined Heat and Power Partnership
  - Assisting CHP projects across industry (assisted 58 projects totaling over 850 MW)
  - Providing permitting guidance and regulatory innovation outreach to recognize efficiency of CHP
- Green Power Partnership
  - Lowers transactions costs and increases value of buying renewable energy
  - Over 230 Partners have committed to buy over 1 billion kWh of new renewable energy

Benefits of Coordinated Programs

- Key components of energy technology market transformation - each valuable on its own merits
- Can complement and support each other
- Realize program efficiencies - common specifications, tools, training programs
- Effectiveness - Combined incentives = market penetration and competition = lower cost = more rapid market transformation
- Stakeholder interest – simpler for manufacturers, greater incentive to participate
- Government budget, economic, environmental benefits

And Some Costs...

- Requires effort to ensure institutional coordination - Environment, Energy, Finance ministries, etc.
- Different levels of government involved
- Can slow implementation

Energy Star and Government Energy Management - Making Practical Linkages

- Product specifications – can go either direction
- Tools and training – benchmarking, financial analysis, energy management systems
- Stakeholder processes – manufacturers, technical institutions
- Increased incentives for product improvement, market penetration, cost reduction

ENERGY STAR and the Federal Energy Management Program (FEMP)

- FEMP recommends that ES products be purchased for labeled product categories where appropriate
- For many product categories for which ES labels are not available, FEMP has own EE "product energy efficiency recommendation"
- When ENERGY STAR is adding new product categories that are that are not already labeled but that are covered by FEMP, will review the FEMP recommendations when starting to develop own
- FEMP has adopted U.S. EPA's energy performance rating system for buildings

ENERGY STAR in Federal Buildings

- The Executive Order (E.O.) 13123 requires:
  - All U.S. government agencies must use the U.S. EPA's energy performance rating for buildings
  - Government buildings must achieve a score of 75 or better where cost-effective
- The ENERGY STAR rating uses a 1 to 100 scale to compare energy performance to similar buildings, normalizing for climate, weather, and building characteristics
- When selecting leased facilities, E.O. gives preference to buildings scoring at least 75
- New construction of government buildings can require at least a 75 score that is maintained over time

ENERGY STAR at the State & Local Levels

- Many state and regional programs incorporate voluntary programs
  - Procurement of ENERGY STAR products
  - ENERGY STAR Buildings
- For example,
  - California Title 20 -- makes ENERGY STAR a mandatory minimum
  - New York Energy $mart - promotes ENERGY STAR products
  - Seattle City Light - public utility endorsement

Role of Other Voluntary Programs

- State, local and federal Agencies cooperate with CHP Partnership, non-CO2 greenhouse gases, DOE's Motor Challenge and other voluntary programs
- Green Power Partnership
  - Voluntary program definitions/specifications used by FEMP
  - U.S. Defense Dept is one of the largest buyers of green power in the U.S.; also U.S. EPA, U.S. Park Service, USDA, NASA and other federal Agencies
  - Includes states of New Jersey, Maryland, Illinois and Utah
  - Includes cities of Chicago, Portland (OR), and San Diego

Lessons Learned

- Well designed and managed Government-sponsored programs can be a powerful tool for promoting EE, environmental improvement and economic growth
  - Programs – voluntary or public sector - require substantial up-front resources to be successful (in terms of program management and incentives for consumers and manufacturers)
  - Investment pays for itself many times over in savings and in program efficiency and effectiveness
  - Coordination of programs, agencies and stakeholders takes time and staff resources
- Set ambitious goals but start with manageable scale
  - Pilot programs very helpful (e.g., EPA Green Lights, then computers, scaled up over time to over 40 product categories currently)
- Public sector includes provincial and local government
  - Also key partners in voluntary programs

Lessons Learned (cont.)

- Programs must pay attention to non-energy performance attributes
  - Consumers (private or government) tend to be skeptics of green products and do not want to trade functionality for environmentally sound products
- Make participation easy/painless
  - Many technology fixes have been invisible to the consumer
  - Simple messages, education, outreach and training are very important
- Cooperation and harmonization can have great benefits
  - On a regional and sometimes global scale depending on product markets, manufacturers, etc.
  - Testing procedures, specifications, outreach/training materials, tools
  - For both voluntary and public sector programs

Role of APEC EE Expert Group

- Promote information sharing, e.g., ESIS website
- Sponsor conferences and meetings to encourage the exchange of experiences and to develop best practices
- Facilitate coordination/harmonization of programs within the region

Thank You for Your Attention !

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Voluntary Approaches and Government Energy Management

Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 8: Energy Efficiency Procurement Practices (cont'd)

Public Procurement Service

Asia-Pacific Economic Cooperation

Public Procurement System for Energy Saving Commodities

AUG 2004

CONTENTS

※GePS: Government e-Procurement System

1. Present Energy Situation of the Korea

A. Present Income Condition

- 97% of national energy for income dependence
  - World 4th largest oil importing country (73% coming from Middle East)
  - Annual import value for energy : USD 38 billion (21% of total import value)
  - 10th largest energy consumption country in the world
    - Daily oil consumption volume : 2,090,000 barrel

B. Extension of Independent Supply

- long-term basis attending foreign countries' exploitation of energy resources project

1. Present energy situation of the Korea

- Independence development (Y2003 → Y2010)
  - Oils : 3.1% → 10%
  - Gas : 3.4% → 30%
  - (East Sea gas deposit : 5 million tons/ USD 1.2 billion Income effects)
- Foreign countries resource development
  - . Myanmar (deposit : 0.8 ~ 1.2 hundred million tons)
  - . Enduring Caspian Sea gas development
  - . Introduction route and price negotiation of Irukeucheukeu gas

C. Governmental Energy Policy

- People-government combination forum」operation
  - Civic group and expert participation
  - . Opinion reflection of people
  - . Continuance possibility development committee's policy

1. Present Energy Situation of the Korea

- Nuclear energy development facilities emphasis application

• Fair and competitive energy base furtherance

D. New and Renewable Energy Supply Plan

• Supply target: 3%(2003) → 5%(2011)

New and Renewable Energy Supply Plan by Field

(Unit: 1,000 toe)

Field	Y2003		Y2006		Y2011	
	Amounts of Supply	Rate(%)	Amounts of Supply	Rate(%)	Amounts of Supply	Rate(%)
Solar heat	41	0.93	102	1.45	318	2.39
Bio energy	197	4.43	495	7.07	1,050	7.87
Waste energy	3,080	69.2	5,050	72.13	7,540	56.54
Solar photovoltaics	2.7	0.06	22	0.31	341	2.56
Wind force	13	0.29	126	1.8	1,311	9.83
Small Hydroelectric power	50	1.12	111	1.59	446	3.34
Fuel cell	-	-	0.4	0.01	147	1.10
Earth heat	0.8	0.02	12	0.17	161	1.21
Ocean energy	-	-	0.7	0.01	432	3.24
Hydrogen	-	-	-	-	1.3	0.01
Use to Coal	-	-	-	-	375	2.81
Sum	3,385	76.05	5,919	84.54	12,122	90.9
Hydroelectric power	1,066	23.95	1,082	15.45	1,213	9.1
Total	4,451	100.0	7,001	100.0	13,335	100.0
Rate of New and Renewable energy	2.06		3.0		5.0	

2. Purchase Relevant Law and Regulation of High Effectiveness Energy Product

A. Relevant law

• Act on the Contracts to Which the State is a Party and enforcement decree of the Act on the Contracts to Which the State is a Party

• Act on the promotion of saving and recycling of resources

B. Governmental Purchase standard

• Public official shall determine the participant in the tender according to not only the price but also the quality

• Standard detail operation of “Multi-estimation”

• Standard purchase operation system of consumption product

3. Multi-Estimation Program of Public Procurement Service

A. Sorts of energy consumption product

• high efficiency energy products(30 Kinds)

→ Certification System

※ Electric motor, Fluorescent lamp, Gas-fired boiler, Pump, Transformer, Thermo Regulator, Ventilation fan etc.

• Efficiency management products(15 Kinds)

→ Indicate efficiency grade

※ Washing Machine, Light bulb, Dish washers, Electric rice cooker, Vacuum cleaner etc.

• Energy saving products(17 Kinds) → “e-Mark” grant

※ Computer, Monitor, Printer, Facsimile, Copying machine, Scanner, TV, Microwave oven, etc.

Present Purchase of the latest 3 Years

Unit : US$1,000

	Y2001	Y2002	Y2003
Transformer	11,750	9,918	8,743
Generator	942	2,091	716
Motor and pump	6,247	4,357	12,067
Escalator	9,471	21,221	49,886
Elevator	801	2,734	570
Refrigerator	452	2,205	2,777
Blower	-	904	-
Boiler	806	193	696
Electricity room cooler	-	147	-
Humidifier	172	-	-
Total	30,639(1.38%)	43,753(1.65%)	75,377(2.47%)

3. Multi Estimation Program of Public Procurement Service

B. Operation Characteristic

- Selection method of Products
  - Public Procurement Service request special Research that recommend high efficiency products
  - Need to Performance Data
  - Measuring factor: energy wear and tear expenses, operating time, efficiency etc.
- Bidding form
  All bidder who want the bidding must submit that lower part refers ; for example energy efficiency, energy wear and tear expenses, etc. about bidding commodities.
  - Warranty of product quality
  - Test result issued by institute
- Bidders' estimate should be written with bidding price and quality level.

Calculation Factor According to Commodities

Commodities	Calculation Factor
Transformer	Electric power unit cost, Year operating hour, No-load year operating hour, Peak load , Rated capacity load factor and reverse load factor
Motor	Electric power unit cost, Year operating hour, Rated power
Pump	Electric power unit cost, Year operating hour, Liquid specific gravity, Discharge Volume, Total head
Boiler	Year operating hour, Evaporating volume per hour, Low calorific power, Water enthalpy, Steam enthalpy of using pressure, Fuel specific gravity
Refrigerator	Sales price per Kwh, Target Consumption amount per month

3. Multi estimation program of Public Procurement service

C. Problems and Improvements Plan

- Problems
  - Low purchase activity
    - Only 1.38 ~2.47% of Total purchasing amount
    - Applied item is little
  - Not enough for low consumption commodities
  - Low Public information
- Improvements Plan in the future
  → Extension of applicable commodities
  - Standard of commodities selection
    - Energy efficiency rate
    - Technical renovation
    - Using the public sector
  - Selection method
    - Test for standardization and submission of the test results
    - Public sector opinion

4. GePS Development

A. Overview of the Public Procurement

- Combines centralized and decentralized procurement systems
  - **Centralized** : Procurement by central and local government agencies over a certain threshold must be assigned to PPS
  - **Decentralized** : Procurement under the threshold and state-owned enterprises' procurement are conducted by themselves

- May use PPS' GePS for decentralized procurement

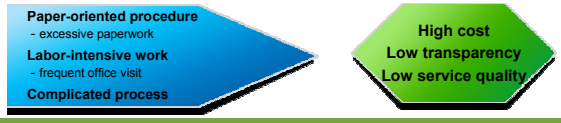
PPS is a centralized procurement agency that was organized in 1949 with total of 935 employees.

(PPS as a centralized procurement agency was organized in 1949 and 935 employees are working for the public procurement.)

4. GePS Development

B. Understanding of Public Procurement

- Importance of public procurement
  - Eases the burden of taxpayers' by reducing national budgets
    - Most of public expenditures are distributed by procurement
  - Sharply increasing public confidence through the transparent process
    - Eliminates common suspicions of corruption
  - Plays the role as a tool for fiscal policy
- Traditional characteristics of public procurement



4. GePS Development

C. Need for Enhancing Performance of Public Procurement

- To respond for changing procurement environment

- E-Commerce ; the Best Way to Innovation
  - To sharply increasing transparency and efficiency by online transactions
  - To maximize(=optimize) the return on investment by using the one system
    - No need to establish another e-procurement system by each agency

4. GePS Development

D. Strategic Approach to Adopting e-Commerce

- To become a professional organization by differentiation
  - Transformed our organization with the use of IT
- Took initial steps for e-procurement
  - Started with PPS' own business (centralized procurement)
    - Exchanged e-documents by using EDI and opened e-mall (1997-1999)
    - Provided e-bidding and e-payment services (2000)
  - Facilitated e-Commerce in the entire public sector including decentralized procurement
- Initial operational capability : September 2002
  - GePS is a single window for public procurement which digitalized the entire processes from order to payment

5. Function of GePS

A. Single Window for Public Procurement

- Single point-of-entry for public procurement opportunities
  - – All bids are legally required to be announced on GePS
  - – Examples of bid information : end-user, project size, estimate cost, technical specification, and award criteria
- Centralized business registration
  - – With just a one-time registration with GePS, businesses can participate in all government business opportunities
  - – Repository of vendor data for the public sector

5. Function of GePS

B. Digitalized the Whole Procurement Cycle

- Automate end-to-end procurement process from requisition to payment

e-Bid	e-Mall	e-Contract	e-Payment
Bid documents preparation and posting	One stop shopping source – search products, compare price, submit P/O to vendor	Support electronic contract documents form	Submission of invoice
Invitation for bid	25,000 off-the-shelf products such as office supplies through framework contract	Buyers and sellers sign contract documents using digital signature	Electronic Payment Transfer
Secure submission and storage of bids		Storage of contract documents	Fast payment within 4 hours after receipt of invoice
Opening of bids		Submission of inspection request and inspection certificate	
Posting of award decision			

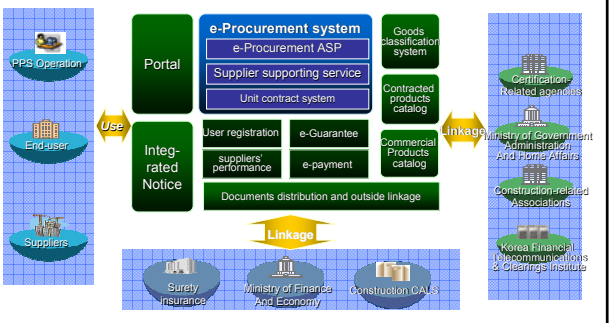
5. Function of GePS

C. Integrated and Shared Service

- Provides one-stop service by linking GePS with 53 external systems including :
  - Korea Financial Telecommunications & Clearings Institute for internet banking, National Finance Integrated System by Ministry of Finance and Economy for government financing, etc
  - 11 guaranteed corporations for warranty of transactions, 6 construction related associations for obtaining business credits, etc
- Provides e-procurement services for all public organizations
  - Joint use by all agencies from the central and local governments to state-owned enterprises by logging on to GePS

5. Function of GePS

D. Internal & External System Architecture



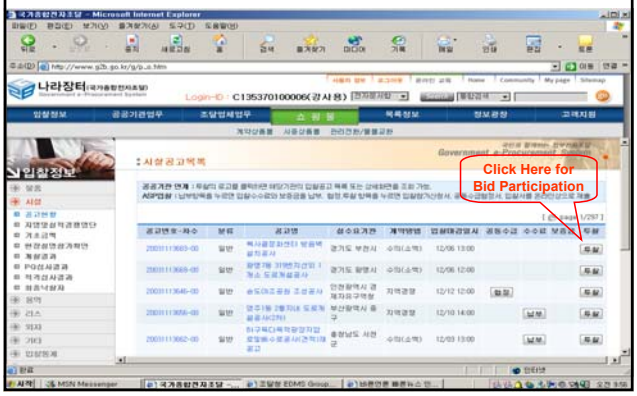
5. Function of GePS

E. Technology Base of GePS

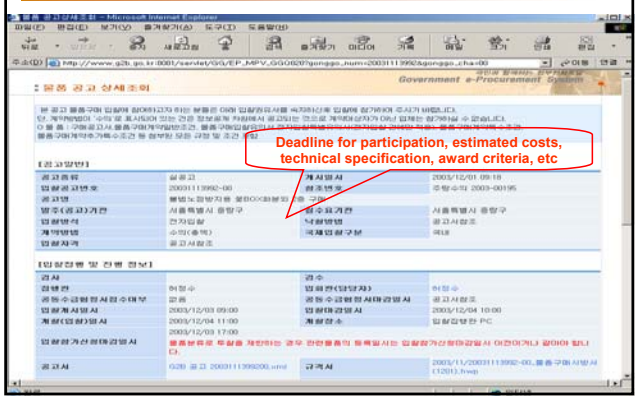
Combination of Information Protection Technology and the new e-Commerce Model

- Adopting encryption technology based on public key infrastructure and digital signature
- Based on the world-wide standards of e-document (XML, SOAP, EBMS, etc)
- TSS (Time stamp service) and authentication

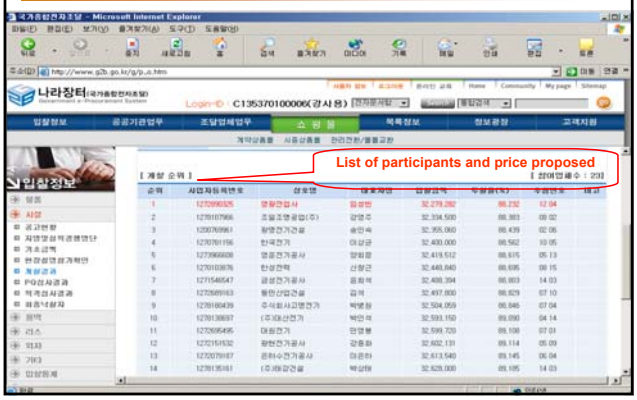
Demo : List of invitation for bids & Click on e-bid



Demo : Detailed information for each bid



Demo : Bid results on a real-time basis



Public Procurement Service

Asia-Pacific Economic Cooperation

Thank You!!

Chinese Government Efforts to Promote Energy Efficiency for End Use

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APEC Kunming Symposium

Why to promote energy efficiency for end use

Dual pressures

Energy security and environment pollution

•1303 million tce energy consumption in 2000

Ranking 2nd in world in term of energy consumption and GHGs emission

•Severe environmental pollution and ecological crisis

Why to promote energy efficiency for end use

Transformation of government function

• Switching from the management of energy consumption process to end-use energy consumption.

• Standards, information label and endorsement label are priority tools to enhance end-use energy efficiency.

Efforts from Chinese government

•To develop and enforce energy efficiency standards
•To promote energy conservation product's label
•To launch a new information label
•To conduct "green" procurement
•To promulgate energy conservation product lists
•To offer information, training and demonstration

The history of China energy efficiency standard

•The first phase: from 1989 to 1994

In 1989, the first round energy efficiency standards were developed. the 9 standards covered household appliance such as TV, fan, room air condition, refrigerator, washer.

key technical index is mandatory MEPS.

The principle of setting MEPS mainly depends on distribution of product's energy efficiency in market.

The major methodology is statistics.

The history of China energy efficiency standard

•The second phase: from 1995 to 2001

The evaluation value for energy conservation was added to new product standards and revised standards for implementing voluntary endorse label.

Energy efficiency standards covered some lighting products.

Standards for room air condition and refrigerator were revised in 1999 and 2000,respectively.

The engineering and economic analysis was introduced in seting MEPS and evaluating value for energy conservation.

The history of China energy efficiency standard

The third phase: from 2001 to present

The product list stretched to industry equipment such as heat pump, fan, motor and boiler, transformer and commercial product such as central air condition.

The energy efficiency categories were considered in the standards for information label scheme.

Conducting research on product's energy saving potential to identify priority candidate product for standards and label program.

A new approach of energy efficiency Standards

In the past, when China set standards, the standards would take effect within a year of being issued(normally after half year).

As a result, when the standards are set, they need to be at levels that most manufacturers can meet, which results in only modest energy savings.

On the other hand, such standards can be revised fairly frequently. For example, China set a new refrigerator standard in 1999, and a revised standard was issued in 2003.

A new approach of energy efficiency Standards

Reach standard is coming!

A “reach” standard is a more stringent standard that some manufacturers will have to stretch in order to reach it.

In exchange, manufacturers are generally given multiple years to reach such standards.

Thus, a reach standard provides manufacturers with a medium-term target that they have several years to achieve.

A new approach of energy efficiency Standards

China has begun moving in this direction.

A new refrigerator standard was finalized. It includes a modest first standard (10% savings relative to the 1999 standard), to take effect in 2003 , and then a more stringent second standard (an additional 10% savings) to take effect in 2007.

The reach standard approach is also being considered for other residential standards and will stretched to lighting products and industrial equipment in the very near future.

Contents of energy efficiency Standards

•MEPS (mandatory)

—— to eliminate low efficiency products

• Evaluating values of energy conservation (voluntary)

——to implement energy efficiency endorsement label

• rating criteria (mandatory)

—— to implement energy information label.

lists of energy efficiency Standards

Household appliances:

- **Refrigerators**
- **Room air conditions**
- **cloth washing machines**
- **Electric irons**
- **Electric rice cookers**
- **Color TVs**
- **Electric fans**
- **Gas water heaters**

Lists of energy efficiency Standards

lighting products

- Ballasts for tubular fluorescent lamps
- Double-capped fluorescent lam ps f or general light ing service
- Single-capped fluorescent lamps
- Self-ballasted f luorescent lamps f or general light ing service
- High-pressure sodium lamps
- Magnetic ballast for high-pressure sodium lamps
- Metal-halide lamps (under development)
- Ballast for metal-halide lamps (under development)

lists of energy efficiency Standards

industry and commercial equipment

- Small and medium three-phase asynchronous motors
- Displacement air compressors
- Industry fans
- Centrifugal pumps for fresh water
- Center air conditions (heat –pump) (under development)
- Unitary air conditioners (under development)
- Electric transformations (under development)
- Adaptors (under development)

Endorsement label

China Certification of Energy Conservation Products (CECP) set up in 1998 is responsible for conducting energy conservation product certification

Information label

To implement the label in a mandatory way under a new legislation which will be issued soon.

Covered products:

domestic appliances and Lighting products.

Refrigerators as the first product will be enforced to attach the label next year.

Information label

Implementation Model:

Manufactures self declaration

+ Manufactures report the energy efficiency data (test reports) to a government agency

+ Market supervision

Thank for listening

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Asia-Pacific
Economic Cooperation

APEC SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFICIENCY PROGRAMS

Kunming, China
2-3 August 2004

Session 10: Conference Wrap-Up

INTERNATIONAL SYMPOSIUM ON THE IMPLEMENTATION OF GOVERNMENT ENERGY EFFCIENCY PROGRAMS

2-3 August 2004, Kunming, China

Communiqué

INTRODUCTION

Forty-five (45) participants from 12 economies attended an APEC workshop in Kunming, China to discuss lessons learned and prospects for increased international cooperation in government energy management programs.

WORKSHOP OBJECTIVES

- **Explore Best Practices**
  - Share experience and information on implementation of government energy management programs
  - Procurement, regulatory measures, promotion and incentives in the government building sector
- **Share Lessons Learned**
  - Discuss the effectiveness of government energy-efficiency programs
  - Describe the primary barriers and how they can be overcome
  - Share experience with third-party energy efficiency and finance services?
- **Promote International cooperation**
  - Discuss the level of information-sharing and cooperation that would be useful
  - Discuss current and proposed mechanisms for cooperation
  - Discuss effectiveness of regional and international cooperation

GENERAL FINDINGS

Range and diversity of activity. The participants were impressed by the amount and range of activity in government energy management programs. Speakers from the 12 participating economies presented results from a diverse range and number of programs covering building design and energy management; EE procurement; and EE in the transportation sector.

Significant opportunities for cooperation. Even though many of the participants had significant implementation experience, all of the participants said they learned about new programs and approaches from the sharing of information at the Symposium. It was agreed that significant opportunities exist for sharing information and best practices, and in some cases program coordination. These opportunities exist both between levels of government and

agencies within a country; as well as regionally and internationally.

Demonstrated program benefits. The presentations at the Symposium provided concrete evidence that government-sector programs have achieved significant energy reductions in many economies. In addition, participants stressed that the benefits were not merely energy cost savings, but also include additional benefits such as pollution reduction, greenhouse gas reductions, increased employment and worker productivity, and improved energy security.

RECOMMENDATIONS

The consensus recommendations are organized into three categories:

- Policy Leadership and Framework
- Implementation: Mechanisms for Program Delivery
- Coordination and Information Sharing

1. Policy Leadership and Framework

Policy must be linked to action. While the participants agreed upon the need for a strong policy framework, they also stressed that all policy should be linked directly to implementation, and that the results of the implementation should continually be used to convince decision-makers and improve and develop the policy framework.

Build support among top policymakers. There is a need for advocates (government officials, NGOs, consultants) working in this field to develop a simplified and coherent message explaining the rationale for, and benefits of, government energy management programs. The best way to build long-term support among decision-makers is to implement practical programs, develop compelling case studies, and aggressively market the case studies and benefits to policymakers and decision-makers. To sustain program effectiveness (and support among policymakers), it is important to ensure ongoing monitoring and measurement and monitoring of program impacts.

Governments must lead by example. This point is critical to the success of all energy-efficiency efforts throughout the economy. If the government leads by example (i.e. implementing EE procurement), it will improve the effectiveness of its programs throughout the private sector. But if the government fails to implement energy-efficiency practices itself, then this will undercut the government's efforts to promote energy management throughout the economy.

Highlight the multiple program benefits. Instead of focusing only on the energy cost savings,

government energy management programs should be recognized for the multiple benefits that they yield. The benefits include not only reduced energy costs, but also reduced environmental impacts (e.g., reduced pollution and greenhouse gas emissions) and also social benefits (e.g., increased employment or worker productivity).

Recognize that the programs improve energy security. Government energy management programs can have a significant and measurable impact on energy use. An important benefit to these programs, which should be recognized by policymakers, is that they can improve the long-term energy security of the economy by reducing the need for investment in new energy sources and reducing dependence on imported energy.

Framework for Implementation. The following five-point framework can be used for officials to plan implementation of government energy management programs: (1) policies, targets and reporting; (2) existing and new public buildings; (3) energy-efficient procurement; (4) public transport, water, and other public utilities; and (5) training, information, and recognition.

Assign central responsibility for government-sector energy management. There is a need for a central focal agency to direct and track efforts. In addition, the central agency acts as a coach and supporter to the government agencies and facilities.

2. Implementation: Mechanisms for Program Delivery

Build capacity for implementation. It is critical to have staff and facility managers involved in conceptualization and design of the programs. This should be part of a process for building capacity of the agencies to implement and manage programs and projects. This point is particularly important for international agencies that are providing technical assistance to develop government energy management programs.

Implementation guidelines and checklist. A number of the participants felt that it would be useful to have guidelines for model program development. Implementers could use these guidelines as inspiration and also a checklist as they develop and implement their programs. Such model guidelines could also help them to benchmark their programs against other economies.

Assign Accountability and reward performance. Facility energy managers need to view energy savings as an opportunity and also a priority in their work. This can be supported and enhanced by recognizing superior performance through awards, presented by high-level government officials or politicians.

Measurement and feedback is critical. Participants stressed the importance of monitoring and measuring the results of projects. This begins by ensuring adequate budgetary resources are

allocated for monitoring; that effective processes are set up to collect and manage the data; and that the data are regularly provided to program managers and higher-level decision-makers.

Use success stories and case studies as marketing tools. It is critical for committed individuals managing effective programs to compile and use the results of their implementation to convince decision-makers and improve and develop the policy framework.

Tailor the message to management. It was agreed that outreach efforts (e.g., initial marketing and energy audit reports) need to convince top management that energy management can produce real benefits and be a priority. The participants noted that EPA of the United States and EECA of New Zealand have developed effective methods for supporting framework for energy management decision-making.

Clear criteria and bidding specifications. Participants agreed that for EE procurement efforts to succeed, the government must have a transparent procurement process, and set clear technical criteria (i.e. qualifying EE levels or calculation methodologies) for product selection. Government agencies should clearly specify the Standard Operating Procedure that they use for developing performance specifications and carrying out procurement bidding.

Shift from First Cost to Life Cycle Cost. Procurement processes that only account for the first cost of purchasing energy-using equipment are a major barrier to the procurement of energy-efficient equipment or facilities. Participants agreed that is essential to factor in the long-term energy operating costs for products and equipment when making a procurement decision.

Start with easy products. It was recommended that government procurement programs should start with products that are easier to implement, and that the program design should be kept simple, to maximize the chance of initial successes.

Promote innovative uses of the web and ICT. The participants agreed on the benefits of using the Internet and information and communications technologies (ICT) to assist in benchmarking and tracking progress in improving government energy management. As an example, notable projects from Australia were mentioned including the Whole-Of-Government Energy Report (WOGER) and on-line Energy Data Gathering And Reporting (EDGAR) in Australia; the Government e-Procurement System (GePS) in Korea; and software and calculation tools available through the government energy management program operated in Mexico, and through the Cities for Climate Protection Campaign coordinated by the International Council for Local Environmental Initiatives (ICLEI). However, it was noted that the processes have to be in place and working properly before the ICT approach will help.

Review available mechanisms for raising funds. Participants discussed various mechanisms and models for financing energy efficiency in the public sector, for both capital investment and operating and maintenance (O&M) of energy-using equipment.

ESCOs and third-party finance. A number of participants discussed the use of energy service companies (ESCOs) to guarantee energy savings and performance and to facilitate financing of energy-efficiency projects in government facilities. The primary mechanisms for third-party project finance are shared savings (in which the ESCO assumes the technical and credit risk) and guaranteed performance (in which the ESCO assumes the technical risk and a bank assumes the credit risk). Additional third-party mechanisms include leasing (equipment and office space); and manufacturer up-front financing of the incremental costs of EE products.

Revolving Funds. The use of revolving funds, in which the budget savings generated through energy-efficiency projects can be set aside for a revolving fund, which can be accessed by the local agency to reinvest in energy management projects.

3. Coordination and Information Sharing

APEC as a forum for information sharing. APEC is a good foundation for sharing information and experience among economies on formulation and implementation of government energy management efforts.

International trade frameworks. It is important to design government EE procurement efforts to be consistent with frameworks for free trade promotion; and also to explore whether these frameworks can be used to facilitate coordination or harmonization of EE procurement specifications.

Technical standards are an important foundation. The technical specifications for energy performance test procedures, product energy labeling requirements (and in some cases MEPS) are an essential technical foundation for setting targets in government energy management programs.

Explore regional trade benefits from common EE specifications. Participants agreed that it could be useful to explore the possibility of alignment energy performance test procedures, and in some cases the MEPS and endorsement levels for high-efficiency products. Such alignment can increase the impact on manufacturers by increasing demand for procurement of energy-efficient equipment.

Long-term goal of an international standard. It could be an eventual goal to work toward an international standard specifying guidelines and best practice for government energy management programs.

NEXT STEPS

Participants agreed on a set of next steps that should be pursued in order to build on the interest and momentum generated at this Symposium and continuing to share information and coordinate government energy management programs across APEC economies.

1. Post information from the Symposium on APEC ESIS web site. The first follow-up step will be the posting of workshop documents and information on the APEC Energy Standards Information System web site (www.apec-esis.org). Information could include the workshop summary report; workshop presentations; reference documents provided by participants; and links to web sites and tools used by individual economies in their government energy management programs. A link should also be placed to the extensive information on government energy management programs that can be found on the web site of the PePs (Promoting an Energy-efficient Public Sector) initiative (www.pepsonline.org).

2. Comparative study of government energy management across APEC economies. Such a study would entail compiling and comparing information on programs in APEC economies; gather and organize documentation (e.g., source documents and procurement specifications) on the APEC ESIS web site; and compiling or referencing software and calculations tools that have been developed for use in government energy management programs.

3. Explore possibility for a biannual international conference on government energy management. While the participants agreed that information sharing through e-mail and the Internet would be important to build on the momentum from this Symposium, it was also agreed that it would be important to have periodic (perhaps biannual) face-to-face meetings bringing together practitioners of government energy management programs.

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