Diverse Opportunities for Public Sector Energy Efficiency Financing

Alexander Filippov
Senior Program Manager
International Programs

ALLIANCE TO SAVE ENERGY
Creating an Energy-Efficient World

What is the Alliance?

ALLIANCE TO SAVE ENERGY

- Mission: To advance energy efficiency world-wide through policy, education, research, technology deployment, market transformation and communication initiatives.
- Headquartered in Washington, D.C. with operations in Mexico, Eastern Europe, South Africa, Mexico, India and across the U.S.
- Chaired by Senator Mark Pryor (D-AR) and James Rogers (CEO, Duke Energy) with strong bi-partisan congressional, corporate & public interest leadership.

What is the Alliance?

- NGO coalition of more than 125 prominent business, government, environmental and consumer leaders who promote the efficient and clean use of energy worldwide
- Catalyst for partnership and coalition building to undertake policy, education and outreach and programmatic work that advances energy efficiency in every energy end use sector and the power supply sector.

What do we do?

- Unique structure with expertise in five programmatic areas:
  - Buildings and Utilities
  - Municipal and Market Transformation
  - Education
  - Industrial
  - Transportation
- And four crosscutting areas:
  - Policy
  - Research & Analysis
  - Communications
  - Special Events




Current Programs and Countries of The Alliance's International Team*

- **WATERGY:** India, Sri Lanka, South Africa, Mexico, Brazil
- **MUNEE:**
  - Armenia
  - Urban Heating Study
  - Residential Utility Affordability Study
- **Ukraine Industrial EE Initiative:** Ukraine
- **ECO III:** India
- **Manual for Development and Financing of Municipal EE projects:** India
- **EEIP:** Dominican Republic
- **REEEP:** Ukraine, Russia
- **Web-based DB on Public Sector EE Financing:** APEC
- **Clean Energy Financing:** ASEAN-APEC, Indonesia

WATERGY: A Quick Snapshot

Helping cities distribute water and treat wastewater efficiently, saving energy, water and money.

WHY IS THIS IMPORTANT?

- Every liter of water that passes through a system has a significant energy cost, compounded by the money invested to produce it.
- Water sector efficiency leaves more funds for crucial and often underfunded public services.
- Water supplied that is lost in developing countries:30-50%

AND IT'S COST EFFECTIVE…

- Rapid Payback: generally ranges from immediate to 2 years
- Huge Savings: at least 20% shaved from energy costs; much higher possible
- Reduces the need for new infrastructure

WATERGY:

Water Supply is Energy-Intensive

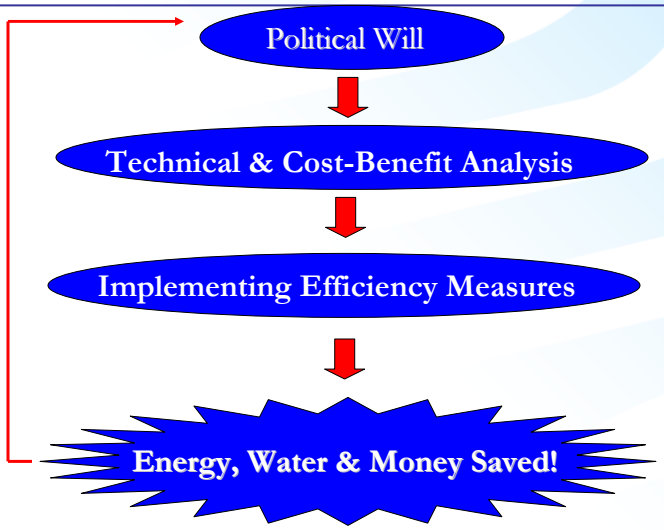
WATERGY: Challenges

- Whenever water is lost to leaks, also lost are the energy and cost of energy embodied in that water
- Watergy often focuses on bulk water supply, even pre-network
- Energy and water efficiency can defer and in some cases eliminate the need for additional infrastructure investment
- Incorporating efficiency into water supply, including the design of water infrastructure systems, is a critical means of controlling costs while expanding access
- By 2020, over 50% of the population in developing countries will live in urban areas
- An increasing strain on governments to provide water AND energy
- The cost of using traditional approaches to water infrastructure is well beyond the means of most communities.
- For financial viability of water provision over the long-term: consumption-based pricing (politically sensitive!).

WATERGY: Opportunities

- Watergy makes the best use of two valuable, limited resources: water & energy
- Watergy: technical and managerial improvements in water and wastewater systems that…
  - provide quality service with a minimum of water & energy;
  - generate significant energy, water and monetary savings; and
  - improve O&M and service at lower cost.
- Watergy: a valuable resource waiting to be tapped…
  - cost-effective: paybacks generally from a few months to ~2 yrs
  - the savings leave more funds for critical public services
  - one of the few cost-effective options available for meeting
  - growing demands for electricity, water & wastewater treatment.

WATERGY: Approach



WATERGY CASE STUDY:
Water Pre-Payment; Reducing Leakag
SOWETO, Johannesburg, So. Africa

ISSUES - Leftover from apartheid

- **Most water pumped to households is lost**

  Leaking network but much through toilets

- **Arbitrary billing not linked to use (or waste) - no meters**
- **Attitude of ownership is lacking - for fixtures & water use**

  Has a historical basis; politically sensitive

☆ **Problems are cultural & political as well as technical** ☆

WATERGY CASE STUDY:
Water Pre-Payment; Reducing Leakag
SOWETO, Johannesburg, So. Africa

APPROACH
~ Operation Gcin'amanzi (Operation Save Water) ~

A program of the public water utility, Johannesburg Water

- First: public awareness campaign
- Second, all at once…
  1) Fix residents' plumbing for free
  2) Install water meter (6 kL/mo free)
  3) Give them their pre-payment card

Results So Far:
- ✓Acceptance of pre-payment at 96%!
- ✓Water pumped per household went from 67 kL/mo to 10 kL/mo
- ✓JW saved almost $7 million during 6 months

WATERGY CASE STUDY:

Water Pre-Payment; Reducing Leakag
SOWETO, Johannesburg, So. Africa

APPROACH

- **Annual savings** once all phases completed:

~ Energy: 175 million kWh
~ Costs: US$45 million
~ Water: 97 million kL

- 1500 temporary **jobs created**
- Improved **reliability** of water service
- **Responsibility** for consumption
- **Transferred** to the consumer

WATERGY CASE STUDY:

Performance Contract Financing
Emfuleni, South Africa

ESCO Model of Shared Savings & Risk Reward

~ APPLIED TO WATER ~

PROBLEM

- 80% of water flowing to homes in Sebokeng/Evaton was lost through leaking plumbing fixtures!
  - 80% of the water supplied at night entered the wastewater system
- Exacerbated by high bulk pressure through two co-located, parallel spur-fed pipelines:
  - makes existing leaks worse
  - causes pre-mature failure of plumbing fixtures
  - in this low-income area.

WATERGY CASE STUDY:
Performance Contract Financing
Emfuleni, South Africa

The water lost is enough to fill two Olympic swimming pools every hour!

WATERGY CASE STUDY:
Performance Contract Financing
Emfuleni, South Africa

- TECHNICAL SOLUTION: Pressure Management
- FINANCING SOLUTION: Performance Contracting
  - Water pressure management firm acting as ESCO
  - Build-Operate-Train-Transfer to municipality after 5 years
  - Fees: firm gets 20% of savings
  - Payback period: <3 months!
- ALLIANCE ROLE: Trusted third party
  - Pitched idea to water utility & municipality; convinced them
  - Wrote RFP, putting onus on bidders to find funding
  - Helped negotiate contract

WATERGY CASE STUDY:
Performance Contract Financing
Emfuleni, South Africa

RESULTS

- Payback period: <3 months
- Annual Cost Savings: US$ 3.8 million
- Annual Water Savings: 8 million kiloliters (kL) – a reduction of >30%!
- Annual Energy Savings: >14 million kWh
- Annual GHG Emissions avoided: 12,000 tonnes
- Performance contracting applied to water supply

WATERGY CASE STUDY:
MONCOLOVA, MEXICO

ISSUES

- Desert (15" or 38 cm rain/yr)
- Water provided only 6 hours every 3 days!
- 48% losses from system

APPROACH

- Managerial & operational improvements
- Leak detection
- Variable speed drives
- Managing pumping systems during peak demand periods, e.g., alternating the operation of pumping stations

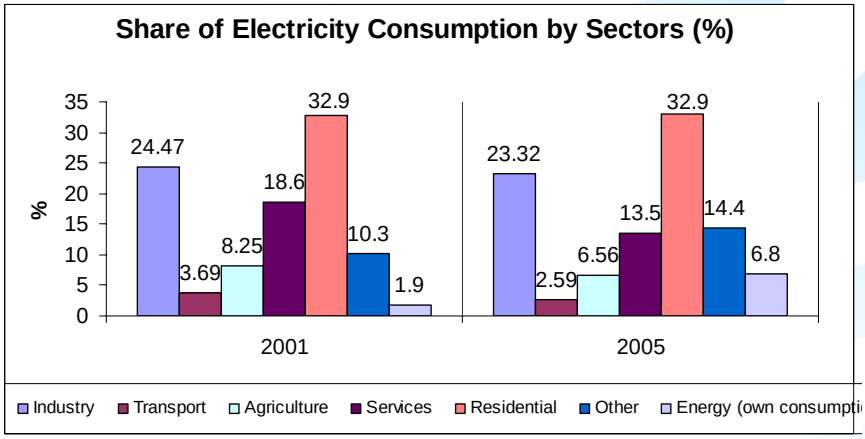
WATERGY CASE STUDY: MONCOLOVA, MEXICO

RESULTS

- 20% in water losses
- Service in pilot area now 24/7!
- Water Saved:10 million m3/yr
- Energy Saved: 6.5 million kWh/yr
- Cost Saved (energy): $1.2 million/year

- Water Utility signed 2 contracts with the Alliance during 2006: audit of Southern Sector and audit of 3 remaining sectors
- Utility pays 70% of the audit; 30% is cost shared by USAID

Armenia: Current sectoral electricity consumption

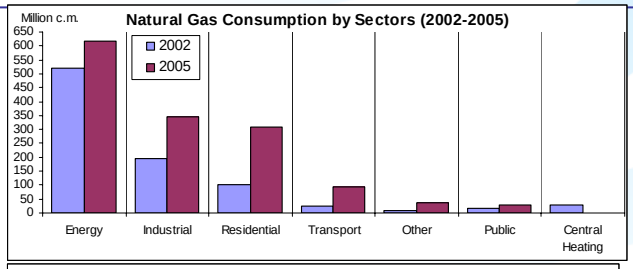


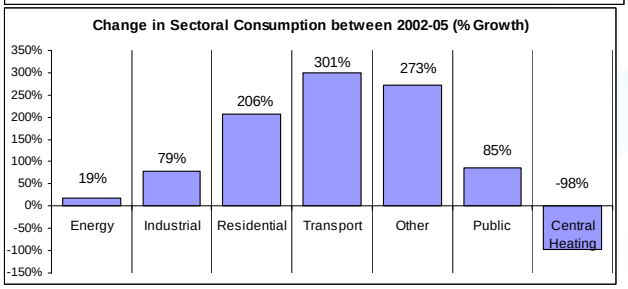
Residential sector is consistently is the largest electricity consumer

Armenia: MUNEE

- Create a strong understanding of flexible financing mechanisms for energy efficiency and heating projects with municipalities and housing associations
- Mobilize communities to initiate residential energy efficiency and heating projects
- Train municipalities and heating companies to design and seek financing for energy projects
- Bring together disparate energy stakeholders from all sectors to start energy policy dialogue and promote energy efficiency reform

Armenia: Current Structure of Gas Consumption





Residential gas consumption is rapidly growing

Armenia: Role of municipalities

- Reduce space heat losses in buildings / building energy efficiency
  - Reduction potential: Weatherization can cut residential heat energy consumption by 30% (or 3.35 mln GCal in residential and 0,67mln GCal in public buildings)
- Improve efficiency of urban heating
  - DH has predominantly collapsed
  - Promote rehabilitation of centralized heating instead of individual heating solutions
- Improve efficiency of street-lighting
  - Potential: 470 mln kWh/year
- Improve efficiency of water supply
  - Watergy

Armenia: Alliance program for Building EE

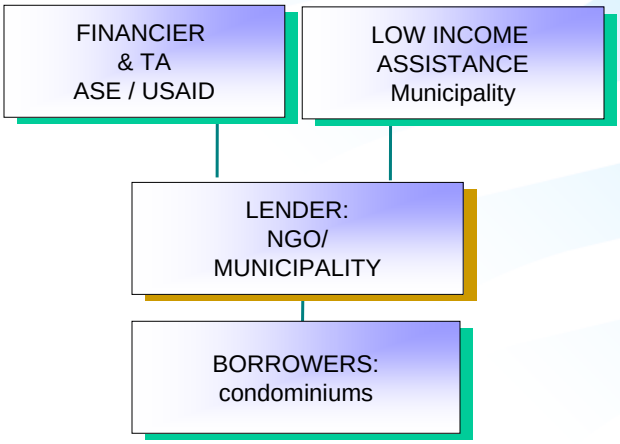
Support the energy efficiency in buildings based on common space renovation & maintenance projects:

- Insulation and optimization of building's heating system;
- Weatherization of entrance doors and windows;
- Repair of roofs;
- Leak reduction and insulation of water supply and sewerage systems;
- Improved efficiency of electrical lighting: automated regulation, efficient replacement of inefficient light-bulbs;
- Implementation of other energy efficiency measures in the common use areas of the building.

Armenia: Residential Revolving Fund

- Involvement of nation-wide and/or local public groups dealing with building conservation and condominium capacity building issues (local NGOs)
- Own advance contribution to the investment costs by beneficiaries (>10% investment cost)
- Commitment from municipality to cover the share of low-income households in capital investment costs (up to 20%)
- Small size of projects ($500-600) with 6-12 month repayment

Armenia: Residential Revolving Fund



Armenia: Residential Revolving Fund

Outcomes include:

- Increased building energy efficiency, improved comfort and maintenance of buildings,
- Extended building lifespan
- Improved payment discipline of the residents
- Increased capacity of condominiums in building maintenance and management
- Long-term availability of the Revolving Funds
- Increased attractiveness of the city for future larger-scale investments
- Building credit history of borrowers

Energy Efficiency Global Forum & Exposition

- **What:** The Alliance to Save Energy's inaugural Energy Efficiency Global Forum & Exposition (EE Global)
- **When:** November 11-14, 2007
- **Where:** The Washington D.C. Convention Center
- **Web:** www.eeglobalforum.com

Asia Clean Energy Forum: Regional Policy and Finance Solutions

- **What:** The three-day event will be jointly sponsored by the Asian Development Bank (ADB) and the U.S. Government (US Agency for International Development, U.S. Department of State, and U.S. Department of Energy).
- **When:** June 26-28, 2007
- **Where:** Manila, Philippines ADB Headquarters
- **Web:** http://www.ase.org/content/article/detail/3703
  www.usaid.eco-asia.org/programs/cdcp/
- **Contact:** afilippov@ase.org ; peter@cleanenergyasia.net

The ***Asia Clean Energy Forum*** will provide a unique opportunity for project developers, the financial community and government representatives, to share information, exchange best practices in clean energy financing, and to devise strategies to scale up clean energy investments.

Thank You!

For more information:

Alexander Filippov

afilippov@ase.org

202-530-4345