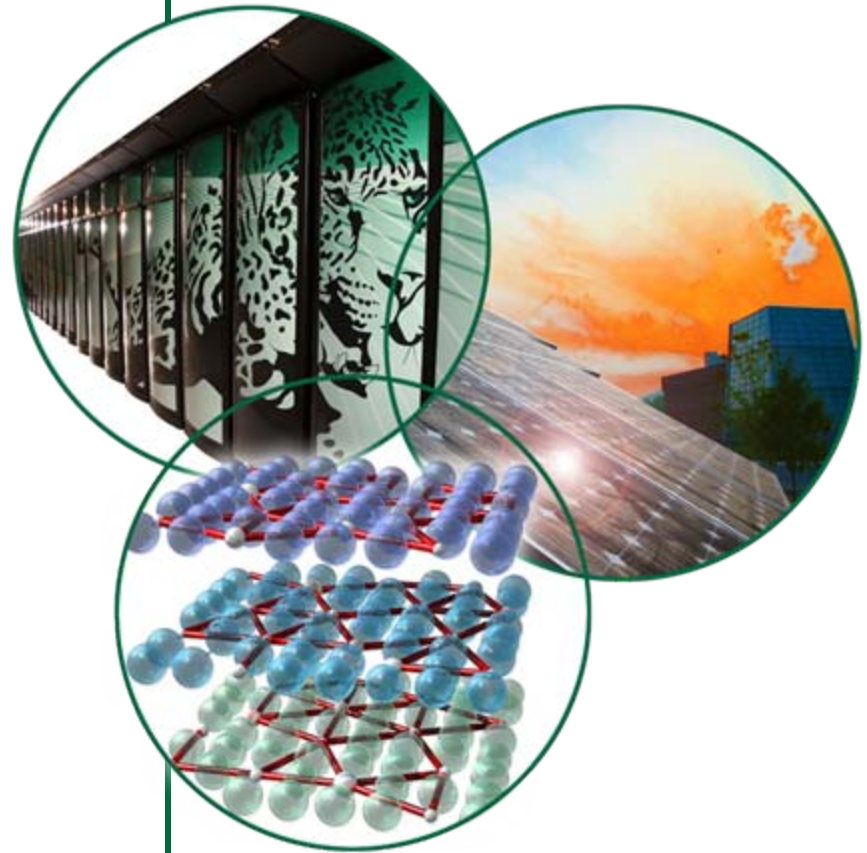


# Overview of “Best Practice Guidelines” for Innovative Energy Performance Contracts

John Shonder

Energy Efficient Retrofit Measures for Government Buildings

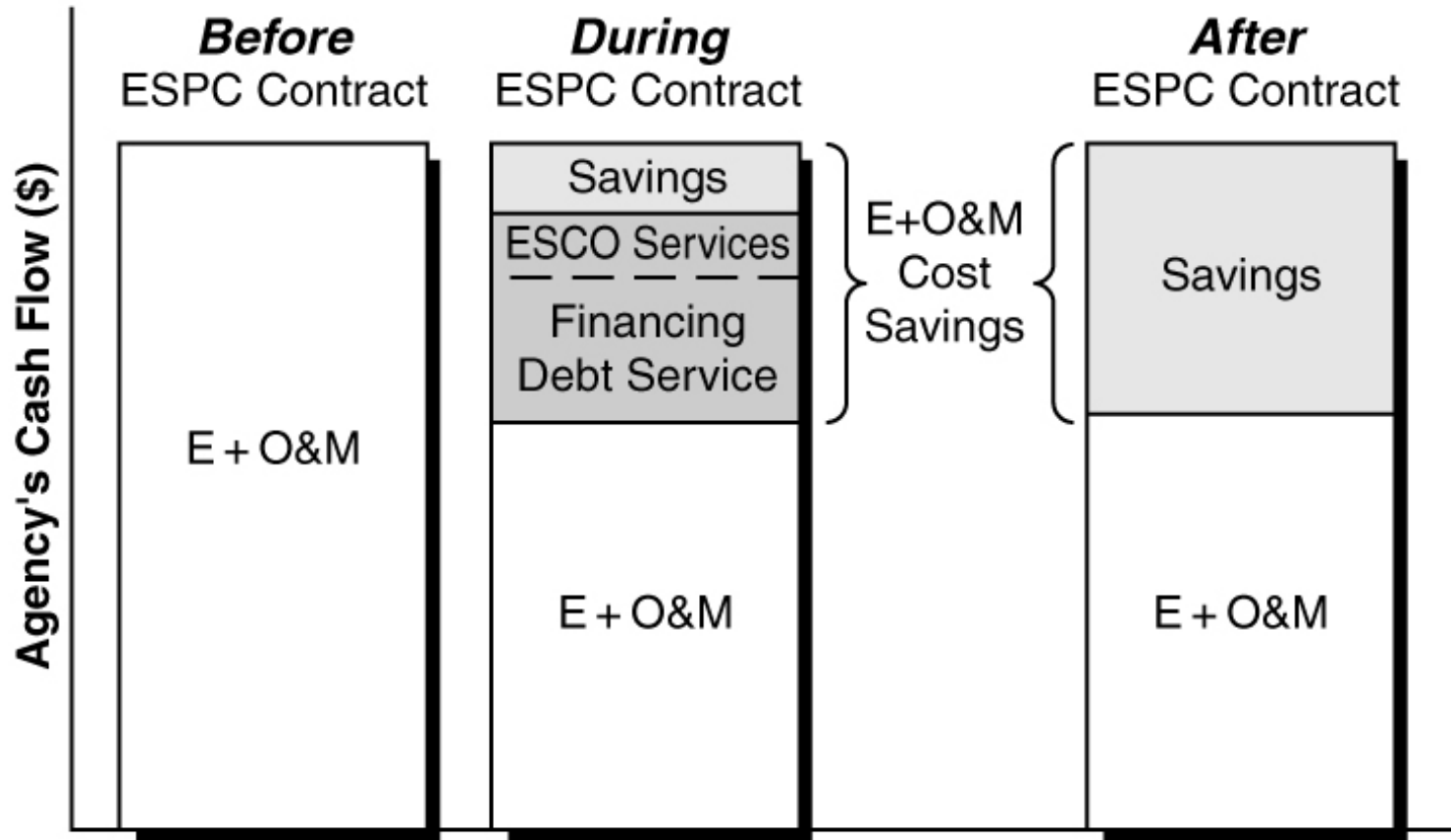
Aug. 14, 2010



# Subtask C of IEA Annex 46

- Identify and document approaches countries have used to implement successful EPC projects at government facilities
- Develop a set of consensus recommendations that can be used to
  - improve existing EPC programs
  - implement new programs in countries that currently lack them
- Compile recommendations in a Best Practices Guide for Innovative Energy Performance Contracts

# Structure of an ESPC Contract



# How the report was developed

- Each participating country wrote a country report detailing its ESPC best practices/lessons learned: Canada, Denmark, Finland, Germany and United States
- Country reports were analyzed to compare and contrast the processes and best practices of each country
- Final report presents a set of consensus recommendations

# Final Report on EPC

- Two main audiences
  - Government managers who want to implement EPC *contracts* in buildings they control/operate
  - Officials at higher levels of government who wish to develop and/or improve EPC *programs* that can be used to establish EPC contracts at many different sites

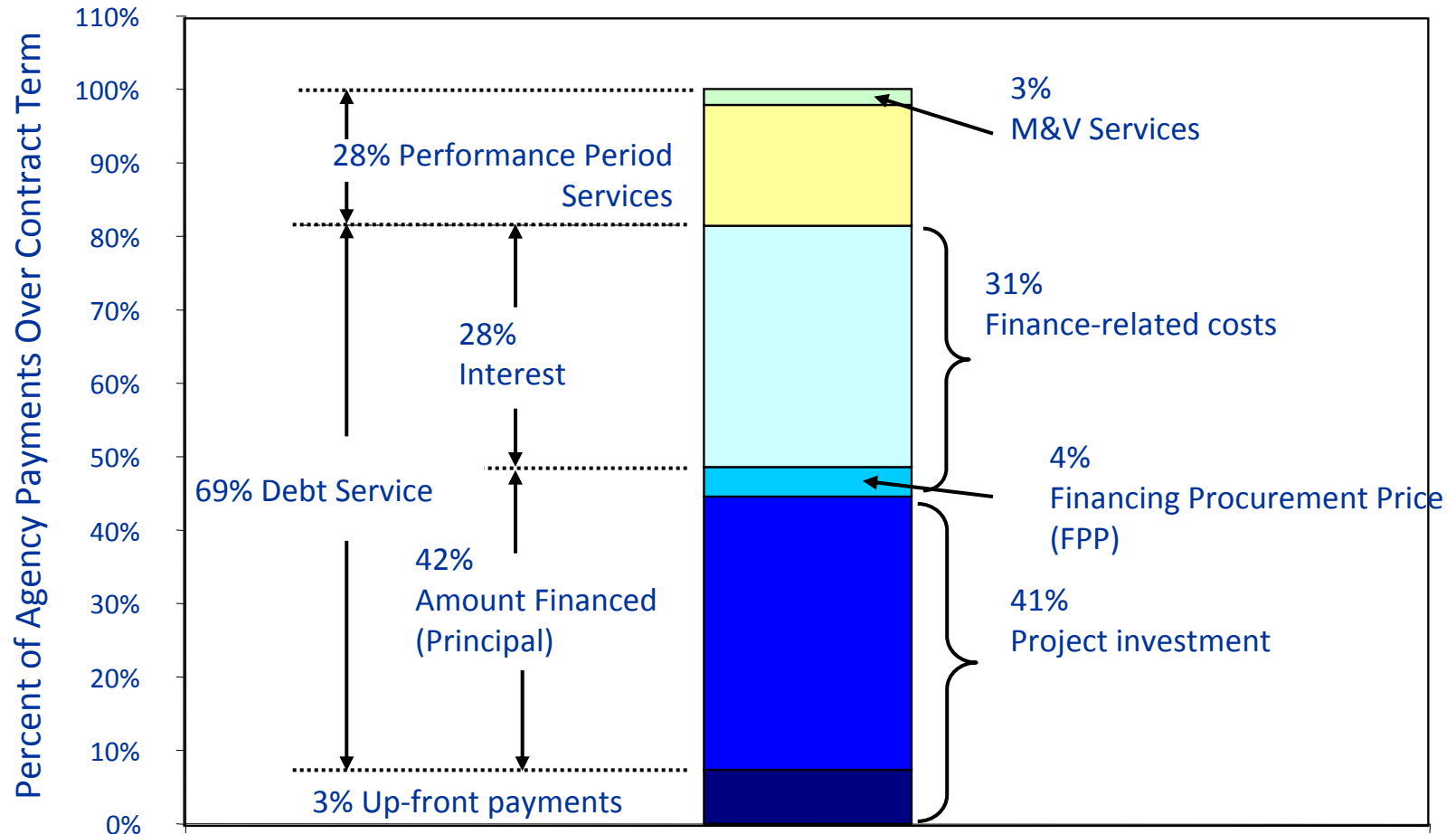
# Outline of Report

- **Description: What is an EPC and how is it used in the participating countries**
- **Motivation: Why do governments use EPC?**
- **Most Common Efficiency Measures**
- **EPC Implementation Process**
- **EPC Best Practices**

# Why do governments use ESPC?

- Funding may be unavailable for necessary upgrades
  - Executive Orders and legislation require US federal building to make steep cuts in energy use
- Governments may lack expertise to design and implement comprehensive upgrades
  - Level of expertise varies widely among government agencies
- Governments may lack personnel (and expertise) to operate and maintain new equipment
  - ESPCs often require the ESCO not only to install the equipment, but to maintain it during the life of the contract (at a fixed price)

# "Cost Stack" for DOE Super ESPCs\*



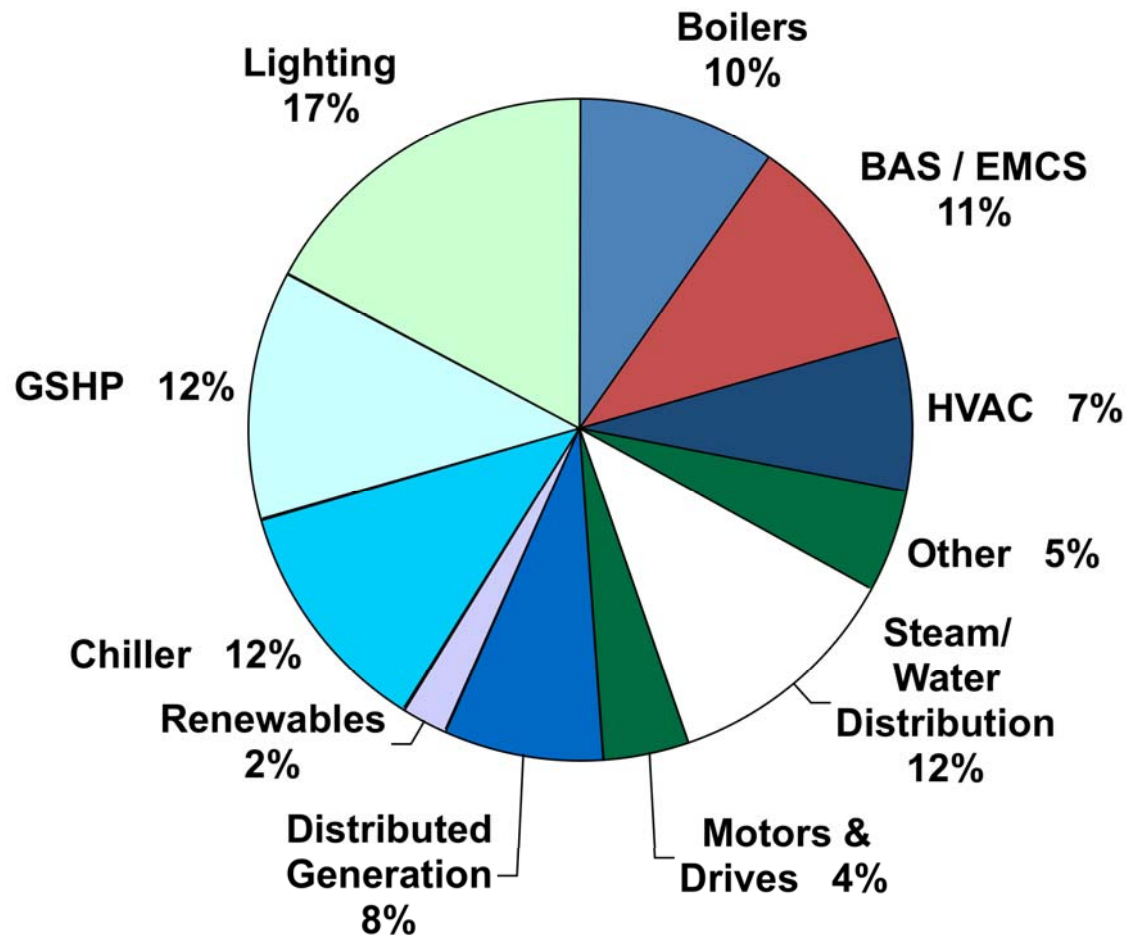
\*Figures may not add to exactly 100% due to rounding.



# How do governments use ESPC?

- Lighting systems
- HVAC systems
- Improvements to the building envelope
- Central heating/cooling plant measures
- Comprehensive operator training
- Employee awareness programs
- Variable speed drives for motors
- Water efficiency measures
- Energy management control systems
- Cogeneration
- Integrated systems
- Fuel conversions
- Recommissioning

# Relative investment for each ECM category



Based on ECM prices in the U.S. DOE Super ESPC program

# How governments implement ESPC

- **Wide variety of procedures**
  - ESCO financed
  - Site financing
  - Utility financing
- **Widely varying levels of activity**
  - US and Canadian governments use ESPC extensively
  - Germany is using ESPC to a lesser extent, but has a very active market
  - Finland and Denmark use ESPC to a lesser degree

# Identified EPC Best Practices

- Policy and Legal Framework
- Use of Pre-Negotiated/Model Contracts
- Training and Assistance
- Measurement and Verification
- Quality Assurance
- Continuous Program Improvement

# Policy/legal framework

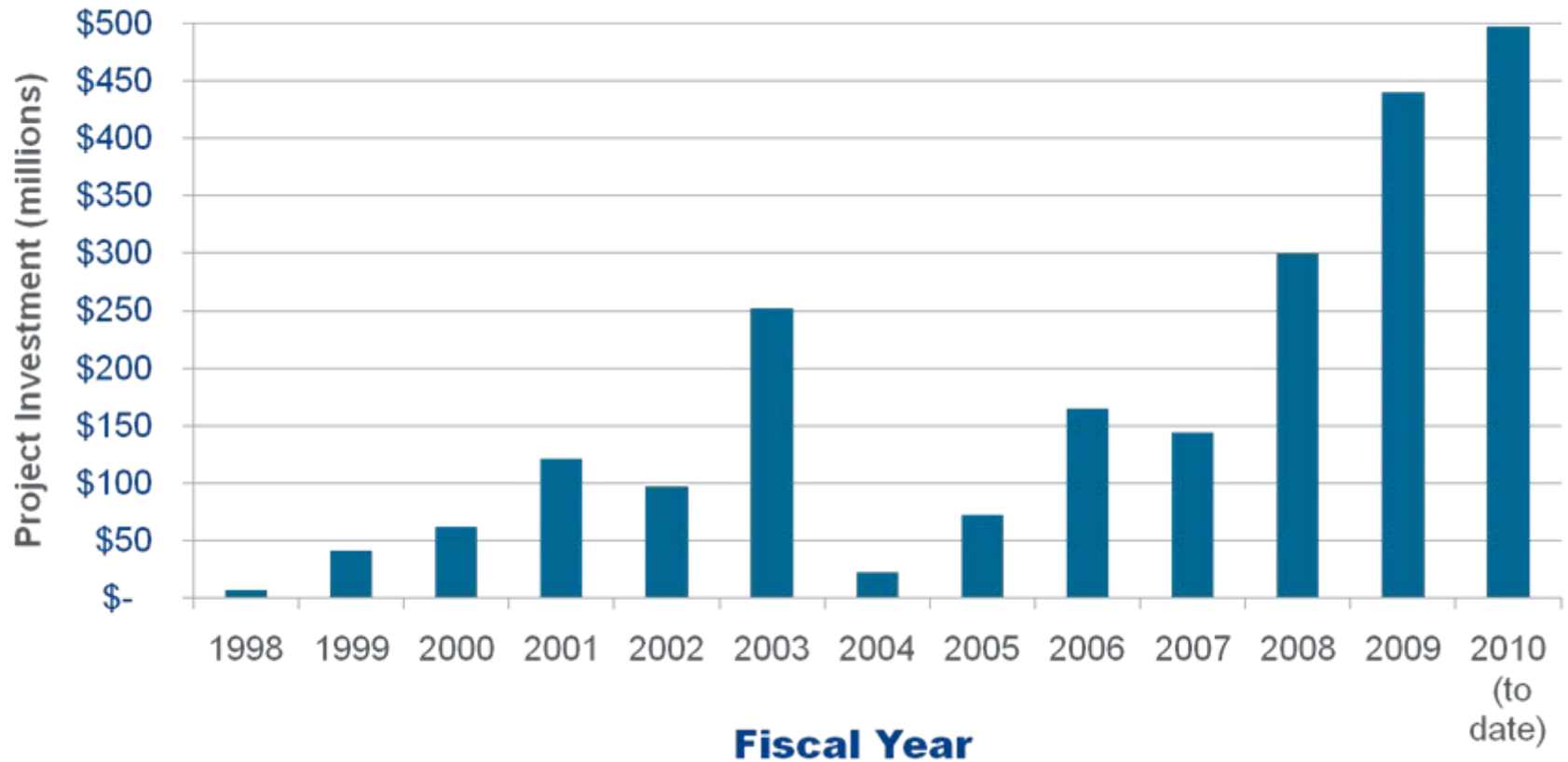
- Regular utility billing
- Site ownership of utility bills and energy consuming equipment
- Legal infrastructure permitting ESPC
- Legal recourse to back savings and performance guarantees

# Use of Pre-Negotiated/Model Contracts

- ESPCs are complicated technical and financial contracts, and require a great deal of time to negotiate
- Two solutions to this problem
  - Pre-award broad ESPC contracts to a specific group of qualified ESCOs; Agency can then issue a delivery orders against the contract
  - Model contracts
- US example: ESPCs only entered the mainstream when “umbrella” type contracts were implemented

# US ESPC investment grew considerably after IDIQ contracts placed

## Super ESPC Investment



# Advantages of pre-negotiated/model contracts

- Avoids re-inventing the wheel for each project
- Customer's contract (not the ESCO's)
- Efficiencies of standardization



# Training and Assistance

- ESPCs are complicated technical and financial contracts
- Successful government ESPC programs include a strong training/assistance component
- Training courses for site personnel/contracting officers involved in project implementation
- Assistance in putting contract in place: project facilitators

# Most successful ESPCs use IPMVP M&V Guidelines

M&V Option	How savings are calculated
Option A: <b>Based on <i>measured</i> equipment performance, measured or <i>stipulated</i> operational factors, and annual verification of '<i>potential to perform.</i>'</b>	<b>Engineering calculations.</b>
Option B: <b>Based on <i>periodic or continuous measurements</i> taken throughout the term of the contract at the device or system level.</b>	<b>Engineering calculations using measured data.</b>
Option C: <b>Based on <i>whole-building</i> or facility level utility meter or sub-metered data adjusted for weather and/or other factors.</b>	<b>Analysis of metered data.</b>
Option D: <b>Based on <i>computer simulation</i> of building or process; simulation is calibrated with measured data.</b>	<b>Comparing different models.</b>

# Quality Assurance is important in ESPC

- Problems/disputes unique to ESPC may arise during the performance phase
- Sites may be poorly equipped to handle these issues, requiring assistance
- Long contract terms may create gaps in site's institutional memory as personnel change jobs
- A quality assurance program, providing performance period training/assistance may alleviate some of these issues

# Continuous Program Improvement

- Programs must adapt to changing circumstances
- Lessons learned during project development and performance should be used to design better future projects
- Data collection is important in this respect
  - How many active projects are there?
  - How much energy and cost savings are being generated per year?
  - What interest rate premiums are being charged
  - etc.

# Central Organizations are key to success

- Repository of knowledge forming “corporate memory”
- Allow lessons learned to be applied on new projects
- Provide training and standardization
- Assist in project development and quality assurance during performance phase
- Examples: FEMP (US), National Resources Canada, Motiva (Finland)

# Other Subtask C products

- Developed a calculator to assess ESPC financial details for inclusion in electronic workbook
- Compiled case studies of successful ESPCs (also for workbook)

# EPC Calculator

- **Inputs**
  - Cost of project
  - Interest rate
  - Capitalized construction period interest
  - Annual payment (guaranteed savings), and inflation rate
  - Cost of performance period services, and inflation rate
- **Outputs**
  - Term of project (time until debt is retired)
  - Breakdown of payments (interest, principal, services)
- **Incorporated into IT Toolkit**

# Conclusions

- Objective was for the five participating governments to learn from each other, and for others to learn from our combined experience
- Final report is unique, in that it is written from the perspective of government, provides best practices for contracts and programs
- Case studies provide good information on the types of projects done through ESPC
- Calculator can perform basic calculations to assess financial viability of ESPC



Thank you

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