

Environmental Defense Fund's **Investor Confidence Project**

RMAEE Monthly Meeting

January 15th, 2015



Agenda

- The Environmental Defense Fund's (EDF) Investor Confidence Project (ICP)
- Technical details
 - Baselineing
 - Savings Calculations
 - Design, Construction and Verification
 - Operations, Maintenance and Monitoring
 - Measurement and Verification



The Investor Confidence Project

What: ICP **standardizes** the EE origination process

How: Protocols, Credentialing, Program Services

Why: Because standardized *Investment Ready* projects:

- **increase** investor confidence in project returns
- **reduce** complexity in bringing projects to market

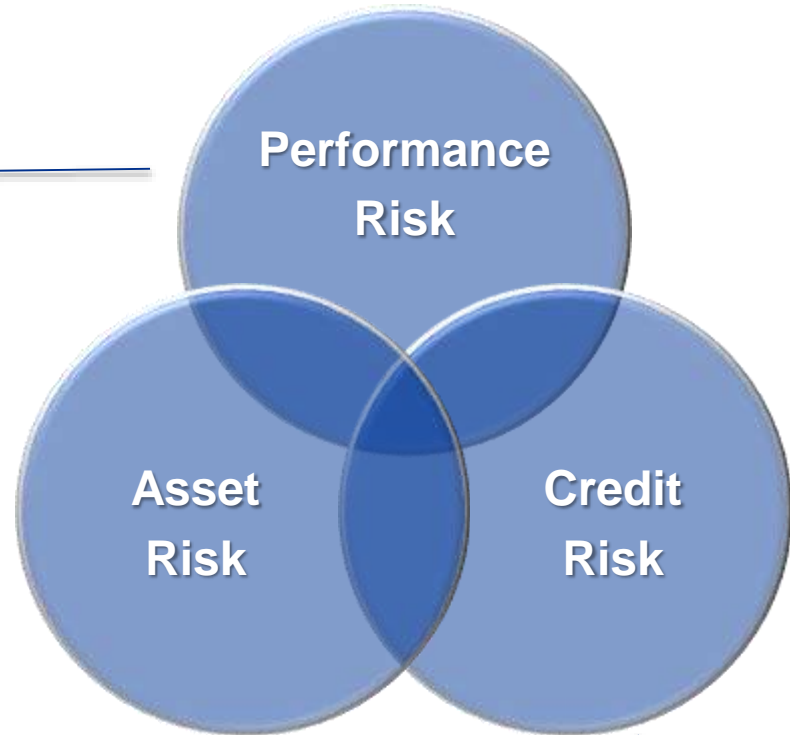


Breaking Down Barriers to EE Finance



Project Finance

Long-term financing of projects based upon the projected cash flows of the project rather than the balance sheets of its sponsors.



- Benchmarking
- Asset Labeling
- Disclosure

- On-Bill Repayment
- Commercial PACE
- Green Banks

ICP Addressing Performance Risk

- **Savings Uncertainty**

- Lots of winners and losers (variance)
- Many approaches to savings estimation, installation, commissioning

- **Project Origination Costs**

- Lack of standards puts engineering overhead on each firm
- Difficult to diligence and manage performance and operation risks

- **Lack of Actuarial Data**

- Lack of data standards and agreement on measurement approaches
- Insufficient data on financial and energy performance

Near-Term: Increase Deal-Flow

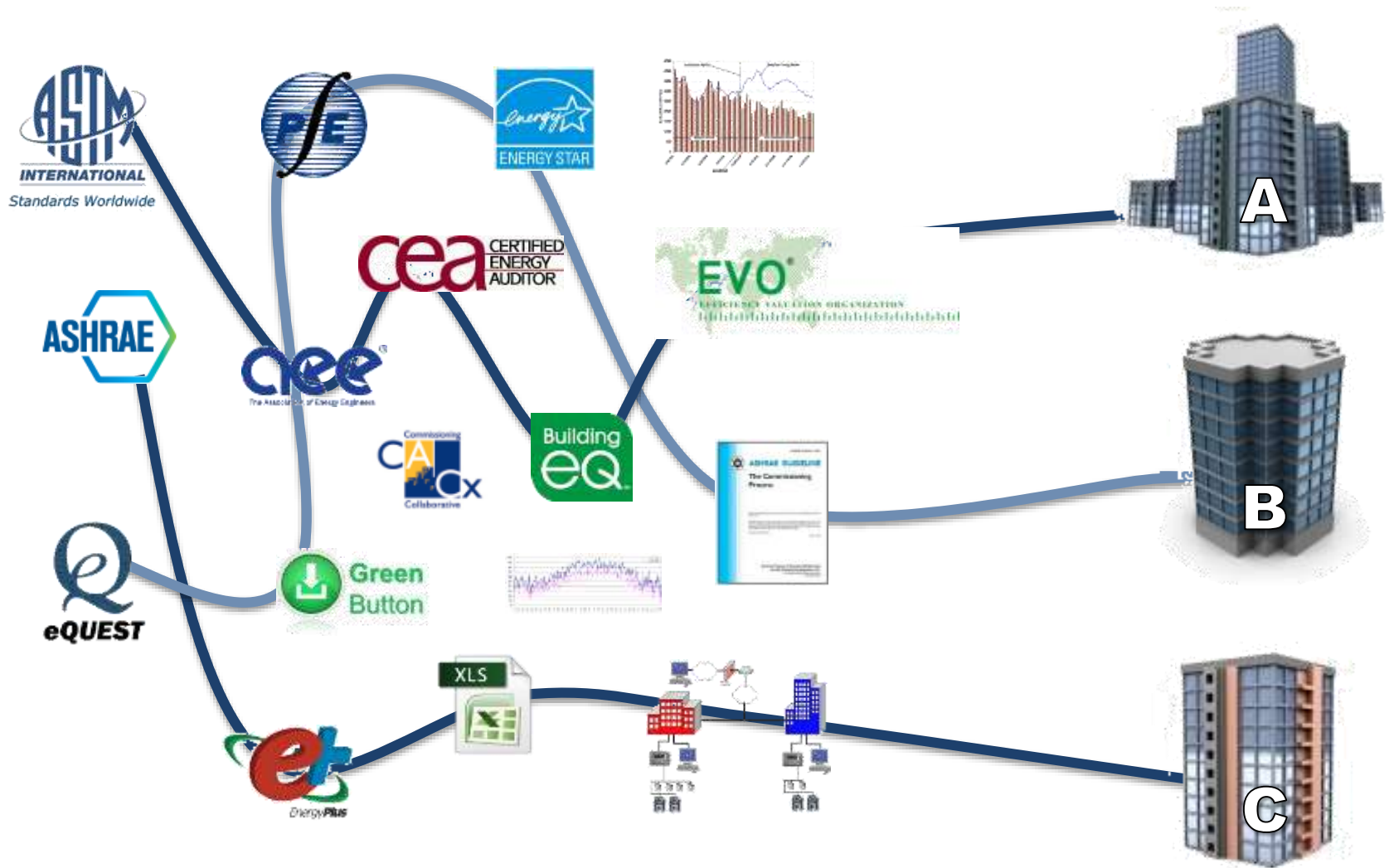
- Increase Confidence in Savings
- Reduce Transaction Costs
- Streamline Origination Process



Long-Term: Reduce Performance Risk

- Develop Data to Manage Performance
- Attract Project Finance Investors
- Enable Portfolios and Securitization

How Do You Know What Your Getting?



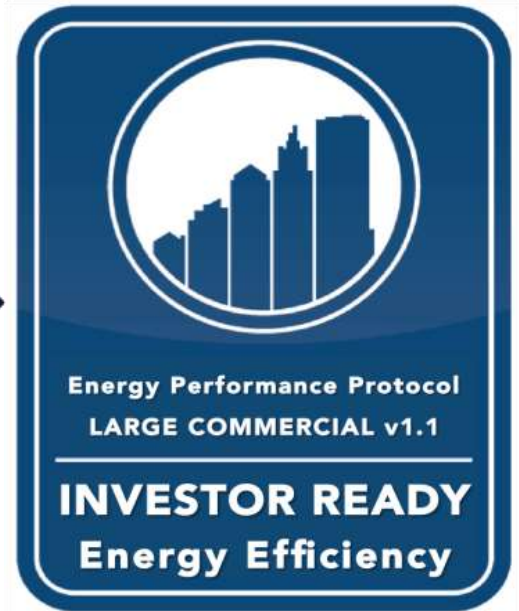
ICP Credentialing System Workflow



Project
Development



Third-Party
Verification



ICP Project Development



Project
Development



Documentation
Package



ICP Project Development



Project
Development




Credentialed Project Developer

- Project developers include ESCOs, Engineering firms, facility managers, building owners, etc.
- Credentialed Project Developers are qualified to develop IREE™ projects
- Only credentialed Project Developers can designate an IREE™ project
- Must have a PE or CEM, 5+ years relevant experience
- Professional references and minimum insurance required



Credentialed Quality Assurance Provider



**INVESTOR
CONFIDENCE
PROJECT**

Energy Performance Protocol
Large Multifamily v1.0
www.performance.org/large-multifamily.html

Client: _____
Project: _____

BASELINE CORE REQUIREMENTS

- 14-36 mos utility data
- Utility baseline period
- Weather data - related baseline
- 12 mos occupancy - related baseline
- Building asset data
- Baseline operational/performance data
- Normalized / regression-based baseline
(if Demand Charges or Time of Use (TOU))
- Annual load profile
- Average daily load profiles
- Peak usage
- TOU summary by month

\$ SAVINGS CALCULATIONS

- Software (DOE-2, Trace)
- Modeler credentials
- Weather file
- Model input files
- Model output files
- Model calibration
- Model process description
- Model key metric benchmarks
- Reports
- Energy Conservation Measures (ECMs)
- Investment criteria
- ECM model variables
- ECM results, and package results
- ECM Report
- Cost estimates
- Quality assurance statement

DESIGN, CONSTRUCTION, AND VERIFICATION

- Operational Performance Verification plan
- OPV authority credentials
- OPV statements
- OPV report
- Training
- Systems manual

OPERATIONS, MAINTENANCE, AND MONITORING

- Ongoing management regime
- Monitoring points list
- Training on OM&M procedures
- Plan for remediation of issues
- Maintenance plans and service log
- Tenant outreach


MEASUREMENT AND VERIFICATION

- Measurement and Verification plan
- MSV credentials
- Routine adjustments
- Utility rates
- Non-routine adjustments
- Routine/non-routine adjustment methods
- Energy data (12 months)
- Hourly ambient data
- Regression-based energy model
- Risk and uncertainty assessment
- Project Developer Engineering Certification

Professional Engineering Seal

QA Firm: _____
Engineer: _____
License: _____
Date: _____
Signature: _____

- Independent and documented verification of project compliance for IREE™ designation
- QA Tools provide step by step compliance methodology for developers and QA providers
- Specialized experience required
- Coming soon...



**INVESTOR
CONFIDENCE
PROJECT**

Credentialed Software Provider

- Streamlines ICP compliant development
- Creates standardized documentation with easy access to all information
- Managed workflow and access for relevant parties
- Automate documentation process means:
 - Lower transaction cost
 - Ease of use
 - Ability to scale



NECAECAP
ENERGY FINANCING & GUARANTEED PERFORMANCE

**SUSTAINABLE
REAL ESTATE
SOLUTIONS™**

noësis
ENERGY / FORWARD

**PERFORMANCE SYSTEMS
DEVELOPMENT**

encentivenergy
REWARDING ENERGY EFFICIENCY

HELIOS
Building Efficiency®

**INVESTOR
CONFIDENCE
PROJECT**

INVESTOR READY ENERGY EFFICIENCY™

Investor Ready Energy Efficiency™ energy efficiency retrofit projects that conform to the requirements of the ICP Energy Performance Protocols, and have been originated by a credentialed Project Developer and verified by a credentialed Quality Assurance Provider.



Investor Confidence Project Protocols

- **Large Commercial**

- Larger Project (over \$1MM), Whole-building retrofits

- **Standard Commercial**

- Smaller projects (under \$1MM), Lighter engineering requirements

- **Targeted Commercial**

- Single Measure or Non-Interactive Retrofits

- **Large Multifamily**

- Larger Project (over \$1MM), Whole-building retrofits

- **Standard Multifamily**

- Smaller projects (under \$1MM), Lighter engineering requirements

- **Targeted Multifamily**

- Single Measure or Non-Interactive Retrofits

- **Project Development Specification**

- **Checklists**

Energy Performance Protocol Framework



ICP Project Development Specification

- Integrated with protocols
- Detailed coverage of topics, methods, best practices
- Comprehensive and interactive resource list
- Value for developers, QA providers, investors, etc.



Website Resources

- Protocols
 - All six protocols; PD Specification
- Technical Forum
 - Resource links
 - QA Checklists
 - Call recordings; technical forum notes
 - Definitions



Baseline Development

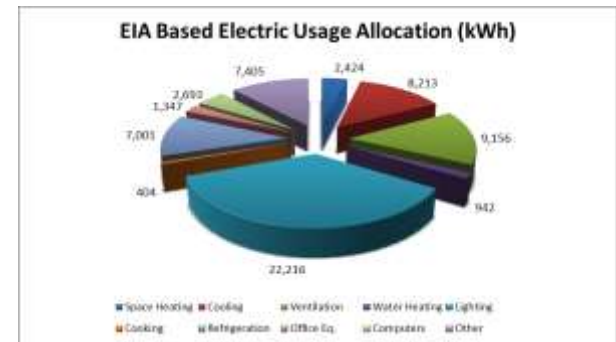
- 12-36 months of utility data
 - Account for 100% of building's energy use
 - Raw data files
 - Utility rate structures
- Develop 12 month baseline
 - Regression analysis: energy-use equation (determine independent variables)
 - Normalized, R-squared > 0.75; CVRSME < 0.2
 - Include 12 month weather data (typically HDD, CDD)

ASTM E2797-11 BEPA

ASHRAE Guideline 14-
2002
Inverse Modeling Toolkit

Baseline Development

- End-use energy use
 - Measured, calculated or estimated
- Building asset, operational and performance data
 - Drawings, equip inventories and specs, field survey results, monitored data, spot measurements
 - Occupancy adjustments (vacancy rates)

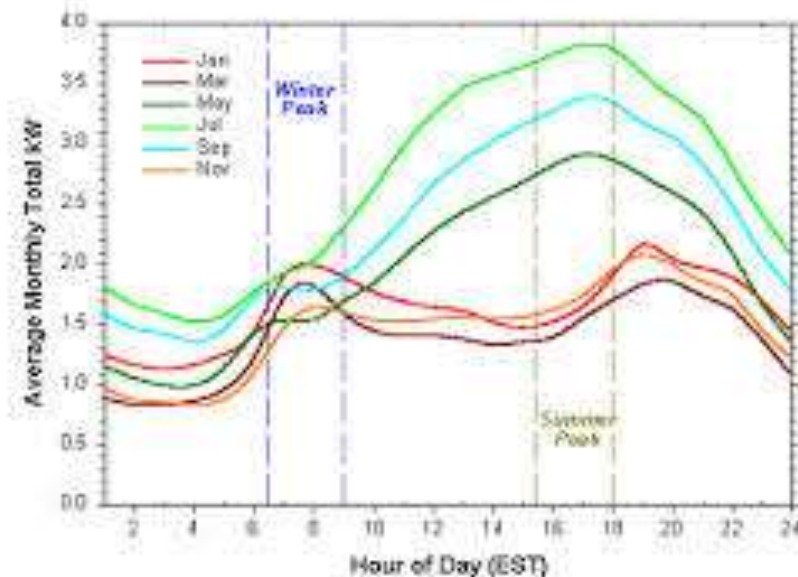


**BEPA Standard
Appendix X8**

**ANSI/BOMA Z65.3-
2009**

Baseline Development – Load Profiles

- Annual load profile
 - Showing monthly consumption and peak demand
- Average daily load profiles
 - Use 15-minute interval data, to develop profiles for weekday / weekend day types, all four seasons
- Time of Use summaries by month (if applicable)



Savings Calculations – Large

- Energy modeling software – DOE-2, Trane Trace, etc
- Modeler credentials
 - ASHRAE BEMP, AEE BESA, PE, 5+ years experience
- Supporting model files
 - Weather file; input / output files
- Model calibration
 - Normalized mean biased error (NMBE) of 5%
 - CV(RMSE) of 15% relative to monthly calibration data
 - Section 5.2.11.3 of ASHRAE Guideline 14 contains details regarding calculation of these indices

ASHRAE Standard 140

Savings Calculations – Large

- Model process description
 - Non-ideal operation, malfunctioning systems, space descriptions, etc.
- Key metric benchmarks
- ECM model variables
- Individual savings results, and packaged results
 - Key parameters and assumptions
 - Compared to whole building and end-use energy



Savings Calculations – Standard/Targeted

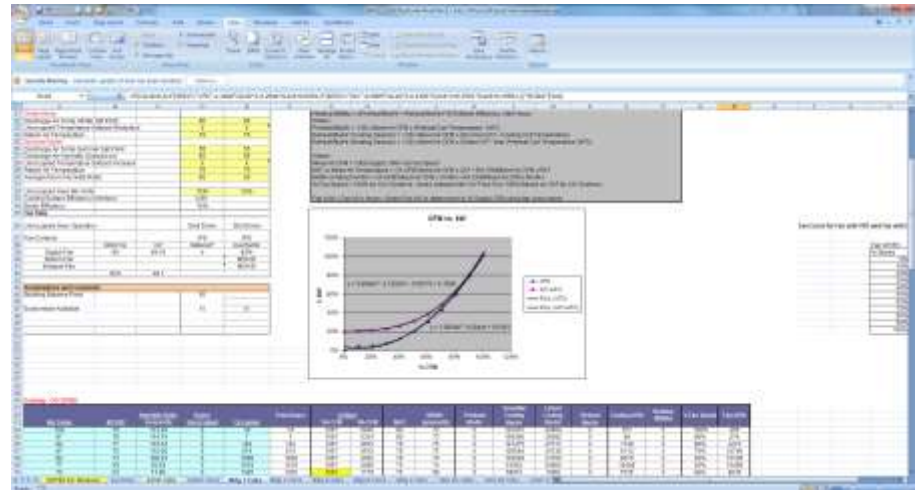
- Non-energy modeling methods

- Temperature bin analysis
- Regressions analysis
- Proprietary tools

Uniform Methods Project
US DOE FEMP Tools

- Calculations

- Never “embed” assumptions or values
- Unprotected workbooks
- Sufficient descriptions
- Interactions
- Perform “sanity checks”



Savings Calculations

- Cost estimates
 - Direct quotes, past quotes, RS Means, estimates
- Investment criteria
 - Up to the project or program (SPB, IRR, NPV, SIR)
 - Provide: costs, savings, incentives, EUL, escalation rates, interest rates, discount rates, cost of capital, lease terms
- Report
 - ECM descriptions: existing versus proposed
 - Savings estimates (express as a percentage of total energy use, and potentially end-use energy use)
- Savings estimate checks
 - Previous experience, reasonability, simple estimation methods, comparison to end-use or total building energy use

Design, Construction and Verification

- Operational performance verification (OPV) Plan
 - Preconstruction
 - Verification activities
 - Target energy budgets; key performance indicators
- OPV Effort
 - Consultation with energy auditors
 - Monitoring of designs, submittals and project changes
 - Inspections of implemented changes
 - Means of reporting deviations from design
 - Help the customer / PD team fully install the measure properly and then re-verify its performance; or
 - Work with the PD team to revise the ECM savings estimates using the actual post-installation data and associated inputs.

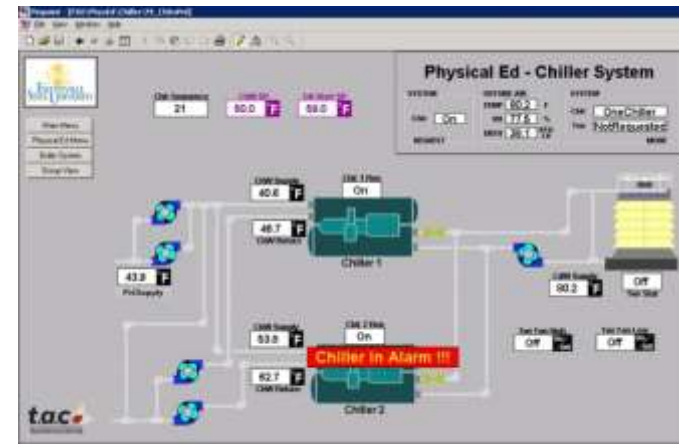
Design, Construction and Verification

- OPV approaches
 - Visual inspection
 - Spot measurements
 - Functional performance tests
 - Trending and data logging
- Training
- Systems Manual
 - Update existing or new
 - Describes ECM operational requirements, maintenance


Operations, Maintenance & Monitoring

- OM&M Plan

- Process of continuous improvement and monitoring
- Tracking, analyzing, diagnosing issues
- Resolving issues
- Maintain indoor conditions
 - Temperatures
 - Humidity levels
 - Ventilation
 - Lighting



Operations, Maintenance & Monitoring

- OM&M process
 - Data collection and performance tracking
 - Detection of performance issues
 - Diagnosing issues and identifying solutions
 - Resolve issues and verify results
 - Methods include
 - Periodic inspections
 - FDD
 - Monitoring-based Cx
 - Ongoing Cx
 - Recommissioning
- 

Operations, Maintenance & Monitoring

- OM&M management framework
 - Manual or automated tools or processes to use
 - Resources and established roles / responsibilities
 - Quantifiable performance goals
 - Accountability
- Operator's Manual
 - Create or update existing
- OM&M Training

ASHRAE Handbook 2011 –
Chapter 39
ASHRAE/ACCA Standard 180

Measurement & Verification

- M&V provider credentials
 - AEE CMVP or 5+ years experience
- M&V plan
 - Conforming to IPMVP **IPMVP Volume I, Chapter 5**
 - Options A, B or C
- Revised calculations (Options A and B)
 - Assumptions and documentation
- Option C regressions
 - Adjustments

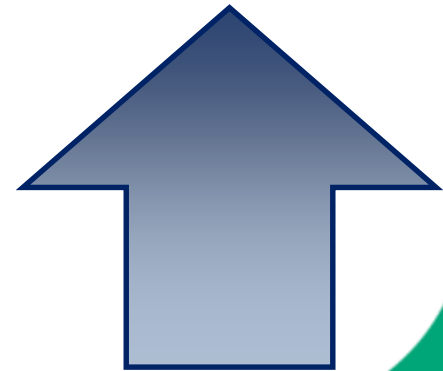
ASHRAE BEPA
ASHRAE Guideline 14
FEMP M&V Guidelines
Section 4.2.2

Measurement & Verification

- Third party involvement
 - Either as the M&V provider, or to provide oversight
- Define baseline and post-retrofit periods
 - Collect data covering both periods
- Options A and B
 - When to apply Options
 - Stipulated parameters and their significance
- Measurement
 - Metering methods
 - Data handling

ICP - Building Momentum

- **Texas PACE in a Box** adopts ICP as required technical protocol
- Market demand and ICP interest drives **ICP Europe** expansion
- **San Francisco Department of the Environment** recommends ICP as best practices and partners for quality control and market development
- **Pacific Gas and Electric OBF Pilot**
- Over 100 members of the **ICP Ally Network**



ICP in New York State

Harmonizing NY Energy Efficiency Efforts



ICP - Europe

- **Goal: slash carbon emissions from buildings by 90% by 2050**
- **The fundamental process of developing an EE project are the same globally**
- **Europe has different engineering standards and protocols, even on a regional basis**
- **ICP Europe supported by:**
 - **EE Finance Investors Group (created by the European Commission)**
 - **United National Environment Programme Finance Initiative**
 - **International Energy Agency**



Become an ICP Ally



Become an ICP Project Developer

Questions?

Investor Confidence Project

www.EEperformance.org

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