Technical Forum Webinar - Presentation of Energy Performance Protocols

Audio instructions:
After joining the conference you must connect to an audio source by clicking on the telephone symbol at the top of the screen. You will be given two options – phone or via computer. If you choose by phone, you will find your country-specific call-in number (i.e. UK: +44.33.0088.2634) in the drop-down menu provided on your screen. Once connected please enter the ID code (107-099-016).

The presentation will start today at 15:05 (CET)
This presentation will be recorded.
Welcome to the Investor Confidence Project (ICP) Europe 2\textsuperscript{nd} Technical Forum

Agenda:

- ICP Europe – What and Why
- ICP Europe Technical Forum
- Energy Performance Protocols
- European Technical Research
- ICP Europe next steps
Outcomes

- Understanding of:
  - ICP Europe’s objectives
  - Technical Forum development
  - EPP structure and application
  - Present situation of Technical Research
  - Technical Forum timeline
  - How to comment on the EPP drafts
  - Next steps and how you can participate
If You Do Have Questions During the Webinar.....

- Please click the “chat” button at the top of the screen, in the Join.me control panel:

- Please address your questions to “@icptechteam”,

- As much as possible questions will be answered during the presentation.

This presentation is being recorded and will be posted at europe.eeperformance.org and emailed to registrants.
ICP Europe
ICP and ICP Europe

A critical mismatch has been identified locally and globally in the energy efficiency (EE) markets between project promoters and investors.

Relevant financial sector stakeholders and building owners have identified lack of project standardization as the main market barrier supporting this mismatch.

ICP is seeking to bring this STANDARDIZATION to the market, with a suite of products, implementation procedures and partners.

Europe.eeperformance.org
Lack of Standardisation = Greater Risk
Help **Governments** reduce programme process and costs

Help **Developers** deliver more bankable projects

Help **Investors** manage risk so they can invest in energy efficiency
ICP Europe Steering Group

ARUP

eu. bac
european association of energy service companies

Department of Energy & Climate Change

Osborne Clarke

BPIE

ING

Green Investment Bank

EuroACE

THE EUROPEAN ALLIANCE OF COMPANIES FOR ENERGY EFFICIENCY IN BUILDINGS

Siemens

RdA

CLIMATE SOLUTIONS

Investor Confidence Project

e.on

Plus Ultra Asset Management

CLIMATE & STRATEGY PARTNERS
ICP Europe Funding

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ICP Europe Technical Forum
Technical forum - What

Voluntary advisory group that ensures that ICP Europe staff produce relevant products and services for the European renovation markets. The Forum does this through:

1. Providing market insight and feedback on draft products;

2. Providing local, national and European knowledge on relevant standards, best practices and initiatives, and

3. Identifying projects and programmes for piloting of ICP Europe products and services.
Technical forum – Process

• Monthly 1.5-2 hour webinars
• Materials distributed before webinars
• Comments during webinars or informally after
• Edits and suggestions for ICP Europe products will be collected via direct edits to documents and emails
Technical forum – Participation Benefits

• Members will have the opportunity to shape ICP Europe products to their needs;
• Among the first market actors to have full knowledge about the system;
• Participate with a network of other industry leaders
• Learn about investors and government programmes that are adopting ICP tools first
Energy Performance Protocols
Investor Ready Energy Efficiency™
Roadmap to Investor Confidence

Origination
Energy efficiency projects will come from a range of channels, programs, and businesses.

Project Development
Certified Project Developer calculates baselines, determines savings calculations, and develops plans for construction verification, operations and maintenance (O&M), and measurement and verification (M&V) according to ICF Protocols.

Quality Assurance
Third-party Certified Quality Assurance Provider reviews project for ICF compliance.

Certification
Project is certified as Investor Ready Energy Efficiency™.

Underwriting
Building owners and investors can make investment decisions with increased confidence based on predicted savings.

Performance
Building energy performance is optimized through execution of construction verification, O&M, and M&V plans.

For more information please visit www.EEperformance.org

For more information please visit www.EEDF.org

A project of
EDF
Environmental Defense Fund
Finding the ways that work
ICP Energy Performance Protocols

**Baselining**
- Existing Building
- Drawings
- Weather File
- Energy Usage
- Energy Rates
- Occupancy

**Savings**
- Model File
- Calibration Data
- Bid Packages
- Certifications

**Design, Construction, Commissioning**
- Cx Plan
- Cx Authority
- Test Procedures
- Facilities Req.

**Operations, Maintenance, Monitoring**
- BMS Points
- Fault Plan
- Maintenance Plan

**Measurement & Verification (M&V)**
- M&V Model
- Regression Model
- Adjustments
- Impact
- Baseline Adjustments
ICP Europe Protocols Structure

Large Tertiary
Project capex > €1m, whole building retrofit

Standard Tertiary
Project capex < €1m, whole building retrofit

Targeted Tertiary
Single or limited number of EE measures
Energy Performance Protocol Framework

Baselining

Savings Projections

Design, Construction, Verification

Operations, Maintenance, Monitoring

Measurement & Verification (M&V)

Elements
- Standards
- Data Elements
- Qualifications

Procedures
- Best Practice Workflow
- Standard Industry Practices

Documentation
- Standard Documentation Package
- Itemized Outputs Required
ICP Europe Product Structure

Protocols do NOT:
• invent new standards
• attempt to impose national standards in another country
• restrict engineering solutions
• define a set level of energy savings
Energy Performance Protocols
Components
1. Baseline Development

Baselining provides a reference regarding energy use of a certain system, allowing for prediction of energy consumption in different utilization contexts, which in turn allows for energy savings calculations.

- 12-36 months of utility data
- Develop 12 month baseline
- Determine end-use energy use
- Collect building asset, operational and performance data
- Weather data
- Occupancy data
2. Savings Calculations – Large (& Standard)

Savings calculations provide utmost relevant information for project valuation, demanding for the determination and modelling of the Energy Conservation Measures to be implemented.

- Energy modeling software
- Modeler credentials
- Supporting model files
- Model calibration
- Model process description
- Key metric benchmarks
- ECM model variables
- Individual savings results, and packaged results
3. Design, Construction and Verification

Design, Construction and Verification are all crucial phases, consequently proper procedures and documentation of these processes is a key element of the entire ICP structure.

- Operational performance verification (OPV) Plan
- OPV Effort (targeted commissioning)
- OPV approaches
  - inspection, spot measurements, data logging, BAS trends, FPTs
- Training
- Systems manual
4. Operations, Maintenance & Monitoring

The way systems are operated and maintained are key elements of their energy performance, and only by having crucial information about these elements we may guarantee performance.

- OM&M plan
- OM&M process
  - Inspections, RCx, ongoing Cx, monitoring-based Cx
- OM&M management framework
- Operator’s manual
- OM&M training
5. Measurement & Verification

Proper Measurement and Verification procedures validate the reliability and effectiveness of the foreseen energy savings.

- M&V provider credentials
- Options A and B: Retrofit Isolation
- Option C: Utility Bill Analysis
- M&V report
Energy Performance Protocols (EPP)

Example on Elements section of Savings Calculations on the Large Tertiary Buildings (LTB) and Standard Tertiary Building (STB) protocols:

**LTB**
- ECM descriptions
- Model Data
- Model Calibration
- Modelling Process Description
- Reporting

**STB**
- ECM descriptions
- Calculation Data
- Measure Calibration
- Calculation Process Description
- Reporting

- **Reporting:** Use of an industry-accepted format for reporting of results and for compilation of methods and underlying data used for individual ECM calculations as well as for the package of recommended measures. At present, the industry standard for report presentation of ECM, building, and energy use data is ISO 50002:2014 Energy audits — Requirements with guidance for use (section 5.8, and Annex A.3 following Type 3). Additionally, annual energy savings by fuel type shall be documented in terms of energy units, a percentage of the total volume of each fuel, and as cost savings using the correct marginal rate for that energy type.
## Energy Performance Protocols (EPP)

### ISO 50002 Annex A.3

**Table A.1 — Indicative details of energy audit types**

<table>
<thead>
<tr>
<th>Type</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical application</td>
<td>Facilities / processes or fleets.</td>
<td>Single site / process or fleet.</td>
<td>Whole site, process, system or fleet.</td>
</tr>
<tr>
<td></td>
<td>Suitable as:</td>
<td>Detailed energy audit.</td>
<td>Comprehensive energy audit with significant input from the organization.</td>
</tr>
<tr>
<td></td>
<td>- energy audit of smaller organizations or facilities, or</td>
<td>Generally not cost effective for organizations with smaller energy budgets.</td>
<td>Generally only cost effective for organizations with high energy spends or institutions with targeted capital investment grants.</td>
</tr>
<tr>
<td></td>
<td>- preliminary audit for larger organizations or facilities.</td>
<td></td>
<td>Also applicable at the system level (e.g., compressed air).</td>
</tr>
<tr>
<td>Business need addressed</td>
<td>Indication of potential savings and benefits that could result from undertaking more detailed investigations, such as a Type 2 or Type 3 energy audits.</td>
<td>Identification and evaluation of a range of coherent and specific opportunities with quantified costs and benefits.</td>
<td>Identification and evaluation of a range of coherent and specific energy performance improvement opportunities with identified costs and benefits, including quantification of “non-energy” gains.</td>
</tr>
<tr>
<td></td>
<td>Identification of focus areas for energy management resources.</td>
<td>Identification of opportunities for further or more detailed investigation.</td>
<td>Auditors should have appropriate technical, managerial and professional experience and skills, and familiarity with the specific energy uses being audited.</td>
</tr>
<tr>
<td></td>
<td>Improved awareness of energy costs and the potential benefits of energy management.</td>
<td>Auditors with appropriate professional skills and expertise analyse energy and process data to identify and evaluate opportunities.</td>
<td>More detailed investigation of opportunities.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Consideration of business strategies in the audit.</td>
</tr>
</tbody>
</table>
### Energy Performance Protocols (EPP)

| Data collection | Basic engineering or technical training with a general understanding of energy sources and systems. Facility energy data, including sub-meters and daily load profiles (where available). Appropriate data on relevant variables (e.g. production data, occupancy data) to establish overall EnPIs. Site equipment lists to include nameplate energy data, equipment description, operating schedules, duty factors and estimates of load factors. | Overall available energy data, including daily load profiles. Appropriate relevant variable data (e.g. production data, occupancy data) to establish EnPIs for significant energy uses. Sub-meter data. Full use to be made of available site data; it is not necessary for the auditor to take additional measurements as part of the audit unless the need for additional data is required to fulfil the requirements of the audit scope. Energy data and information to be collected in the audit could include: - detailed data on energy consuming systems, processes and equipment, including known relevant variables; - monitoring equipment configuration, and analysis information; - design, operation and maintenance documents; - energy audits or previous studies related to energy and energy performance; - future plans that affect energy use; - production and process data for evaluating performance. | Operating/load profile of the site or fleet. Appropriate relevant variable data (e.g. production data, occupancy data) to establish EnPIs for significant energy uses. Sub-meter data, evaluated down to load profile level for significant meters. Energy consumption data for the key site processes, systems and equipment. Full use to be made of available site data, including metered interval data; installation of additional sub-meters for monitoring or conducting of specific logging exercises should be considered. Data should be collected for a sufficient period to account for the expected range of values for the relevant variables and system demands. Energy data and information to be analysed in the audit could include: - detailed data on energy consuming systems, processes and equipment, including known relevant variables; - monitoring equipment configuration, and analysis information; - design, operation and maintenance documents; - energy audits or previous studies related to energy and energy performance; - future plans affecting energy use; - information on how the organization manages its energy performance; - supplier quotes for improvement opportunities. |

Also addresses...analysis, opportunities identification, opportunities evaluation and outputs.
This ICP Project Development Specification (PDS) represents a comprehensive resource designed for project developers, third-party quality assurance providers, and investors to ensure that projects are developed in full compliance with the ICP Energy Performance Protocols.

This document will provide information about the protocol’s requirements, best practices, quality management tasks, and references to ensure that all stakeholders are operating from a common set of requirements and practices.
European and international standards
Tertiary protocols

- IPMVP Volume 1: 2012
- EN 16247-2 Energy Audits – Part 2: Buildings
- EN ISO 13790:2008 Energy performance of buildings – Calculation of energy use for space heating and cooling
European and international standards
Tertiary protocols

• EN ISO 13790:2008 Energy performance of buildings – Calculation of energy use for space heating and cooling
• EN 15265:2007 Energy performance of buildings – Calculation of energy needs for space heating and cooling using dynamic methods – General criteria and validation procedures
• ISO 50002:2014 Energy audits – Requirements with guidance for use
• IPMVP Volume 1: 2012
• ISO 15686-5:2008 Buildings & constructed assets – Service life planning - Part 5: Life cycle costing
European and international standards
Tertiary protocols

- EN 16212:2012 Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods
European and international standards
Tertiary protocols

• EN 13460:2009 Maintenance – Documents for maintenance
European and international standards
Tertiary protocols

- EN 15331:2011 Criteria for design, management and control of maintenance services for buildings
European and international standards
Tertiary protocols

- IPMVP Volume 1: 2012
- EN 16247-2 Energy Audits – Part 2: Buildings
Cross protocol MS National resources reference document

ENERGY PERFORMANCE PROTOCOL

ANNEX A: INDEX OF NATIONAL STANDARDS

VERSION EU 0.1 — SEPTEMBER 2015

This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 649836. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission are responsible for any use that may be made of the information contained therein.
On MS National Resources

UK example:

<table>
<thead>
<tr>
<th>Protocol stage</th>
<th>Applicable protocols</th>
<th>Protocol component</th>
<th>European Reference Provision</th>
<th>Relevant European reference (where available)</th>
<th>National equivalent standard: tertiary</th>
<th>National equivalent standard: residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
<td>Accurate total floor area</td>
<td>How to calculate total conditioned floor area (e.g. measured from inside, outside or middle of walls)</td>
<td>EN ISO 13790-2008 (Section 3.2.6)</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Occupancy data</td>
<td>Different occupancy (number of people) times/patterns, extended hours behaviour and internal loads. Also includes information such as previous energy audits, details on when the building was built and refurbished, set points and occupant behaviour.</td>
<td>EN 16247-2 Energy audits buildings - Part 2: Buildings (Section 5.3.2)</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Material specifications/inventories</td>
<td>Detailed checklist of information to collect during a survey (e.g. light fitting type, heating system type, controls information etc.), including by building type e.g. industrial, multi-family</td>
<td>EN 16247-2 Energy audits - Part 2: Buildings (Section 5.3.2 and Annex D)</td>
<td>CIBSE Guide F: Energy Efficiency in Buildings, Table 18.2</td>
<td>CIBSE Guide F: Energy Efficiency in Buildings, Table 18.2</td>
</tr>
<tr>
<td>All</td>
<td>All</td>
<td>Data calendarisation</td>
<td>How periods are consolidated to the integer years/months periods applied. Determine average daily usage during each partial month covered, and summing the daily average usage over the number of days in the calendar month.</td>
<td>ISO 16346:2013 Energy Performance of Buildings – Assessment of Overall Energy Performance (section 8.2.2)</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
<td>CIBSE TM47: Operational Ratings and Display Energy Certificates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accuracy (appropriate goodness of fit of energy data to independent variables)</td>
<td>Explains Uncertainty Analysis, including how to calculate CV (RMSE).</td>
<td>IPMVP vol1 2012 (Appendix B)</td>
<td>CIBSE Guide F: Energy Efficiency in Buildings (Section 19)</td>
<td>CIBSE Guide F: Energy Efficiency in Buildings (Section 19)</td>
</tr>
<tr>
<td>Residential and targeted only</td>
<td></td>
<td>Baseline energy use characteristics of the equipment</td>
<td>Summarises how to estimate energy savings based on energy use characteristics i.e. load and hours-of-use, and the significant of whether components are constant or variable.</td>
<td>IPMVP vol1 2012 (section 4.7.1)</td>
<td>CIBSE TM22 - Energy Assessment and Reporting Methodology</td>
<td>CIBSE TM22 - Energy Assessment and Reporting Methodology</td>
</tr>
<tr>
<td>All</td>
<td>All</td>
<td>Commercial benchmarking of energy end use</td>
<td>Database which can be filtered based on building type and country. Outputs total energy consumption data and energy end use data (heating, cooling, lighting and total) to give a reality check against estimates.</td>
<td>Buildings Performance Institute Europe’s Data Hub for the Energy Performance of Buildings (see <a href="http://www.buildingsdata.eu/">http://www.buildingsdata.eu/</a>)</td>
<td>CIBSE TM46 - Energy Benchmarks</td>
<td>CIBSE TM46 - Energy Benchmarks</td>
</tr>
</tbody>
</table>
ICP Europe Technical Research
National Standards Research

europe.eeperformance.org/standards-research
Help Us Identify the Right National Standards

europe.eeperformance.org/standards-research

luis.castanheira@eeeperformance.org
Next Steps
ICP Europe Protocol Timeline – 2015-16

- Large Tertiary Protocol
  Standard Tertiary Protocol
  Targeted Tertiary Protocol
  Targeted Apartment Block Protocol
  Large Apartment Block Protocol

- August 2015
- October 2015
- December 2015
- March 2016
How can you help:

• Tell us if these drafts fully respond to the needs and specificities of your markets – please comment;
  
  http://europe.eeperformance.org/protocols-under-development.html

• Deploying application on your projects – we are here to support you;

• Help us reaching experts to identify best practices;
  
  http://europe.eeperformance.org/standards-research.html

• Get in touch with us on a one to one basis, through myself if you would like to address any particular issue or just to discuss;
  
  luis.castanheira@eeperformance.org
Welcome to the ICP Europe Technical Forum

The next Technical Forum meeting will take place on Thursday 24th September at 1500 CET (Brussels).

Webinar call-in details: Join.me/icpeurope [ID code 107-099-016].

The ICP Europe Technical Forum is an industry leading technical advisory group that assists the ICP Europe staff in the development and maintenance of the ICP Europe Energy Performance Protocols. The Forum is an open attendance, transparent group that meets periodically via webinar and incorporates the broad range of interests, input, and skills in this diverse marketplace - please feel free join the discussion by registering below.
Technical Forum Call - 30 June, 2015


PLAY RECORDING
Protocols Under Development

Below you will find the Investor Confidence Project Europe Energy Performance Protocols that are currently under development. The development process involves research and drafting by the ICP Europe staff, a series of review of drafts and comments by the ICP Europe Technical Forum and then a release to the market place with training on the use of the protocols.

The Technical Forum is a free to join group of industry experts drawn from finance, engineering, government, academia and other sectors interested in the financing of building energy renovations. The Technical Forum meets once a month via webinar for 1.5 hours to review protocols and offer feedback. If you would like to join the Technical Forum please feel free to do so at this link.
ICP Europe Ally Network Members

EMVC Solutions
AECB
Climate & Strategy Partners
ICP
Green Investors
Decarbon Capital
Energy Efficiency in Industrial Processes
Lenders Commercial Finance
Alpheon energy
abundance
Green Investment Bank
ECOCAPITA
RdA Climate Solutions
Lavery/Pennell
CO. Estates
PORTO VIVO
EnergyPro
the CARBON & ENERGY FUND
SMARTWATT
CO2 Management
Ives Independent Verifiers of Energy Efficiency Savings
Investor Confidence Project
british energy efficiency federation
KEA
Huber Dixon Insurance Services LTD
Powered by EON
Iris Surveys
Contawatt
SureSense Technologies
Abrafo Nega Joule
Verco
EcoProsperity Capital Ltd
Zesco Zimmermann Energy Services
Sea
Ren ESCO
Klimaschutz und Energieagentur Iaden-Wartenberg GmbH
THANK YOU ALL FOR YOUR TIME AND
WELCOME TO ICP EUROPE TECHNICAL FORUM

TOGETHER WE WILL UNLOCK THE EUROPEAN EE INVESTMENT MARKET!
If You Have Questions

• Please click the “chat” button at the top of the screen, in the Join.me control panel:

• Please address your questions to “@icptechteam”,

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Investor Confidence Project Europe
www.EEperformance.org

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