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# Investor Confidence Project

Project Developer and Quality Assurance Assessor Training to GreenFlex:  
Industry and Energy Supply  
15th May 2019

Presenters:

Jorge Rodrigues de Almeida, ICP Europe Director  
Bethan Phillips, ICP Europe Technical Director

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Welcome!

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# Your Presenters

- RdA Climate Solutions Managing Director
- 15+ years in energy efficiency and sustainable finance
- Energy auditor and CMVP
- European Commission External Expert
- Portuguese ESCO Association's Board of Directors Advisor

Jorge Rodrigues de Almeida  
ICP Europe Director



# Your Presenters

- 15+ years in low energy building design and sustainable energy solutions
- Principal consultant at Verco
- Building services engineering, mechanical engineer
- CMVP accredited, ISO 50001 lead auditor
- Energy audits, feasibility studies (CHP, district heating, etc), sustainability assessments

Bethan Phillips

ICP Europe Technical Director





# European Commission Disclaimer



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# Agenda

- Housekeeping
- Strategic approach
- What is the Investor Confidence Project?
- Roles and responsibilities
- Process and tools available
- ICP Stages – requirements
- Worked examples
- Application process

**This webinar will be recorded**

# Housekeeping

- You are all muted by default to minimize background noise, but we want your participation!
- You can ask questions either using the chat box on the gotowebinar control panel anytime
- We will stop at the end of each section for QA
- We will use polls to assess comprehension and guide interaction
- At the end we will have an open QA session
- We will get back to you if there is any question we cannot answer in the course of this session
- This is part of the process towards becoming a member of the network and should take a maximum of 2 hours including Q&A
- We ask that attendees be present for the full training session in order to be eligible to take the QAA test and apply for the networks
- Attendees of the training will have two attempts to pass the test, then they must retake the course

# Strategic Approach

- All participants are knowledgeable and experienced professionals
- This training is only the beginning of a longer journey
- ICP Project Developers and Quality Assurance Assessors are crucial agents for the success of our scheme and the transformation of the Energy Efficiency market

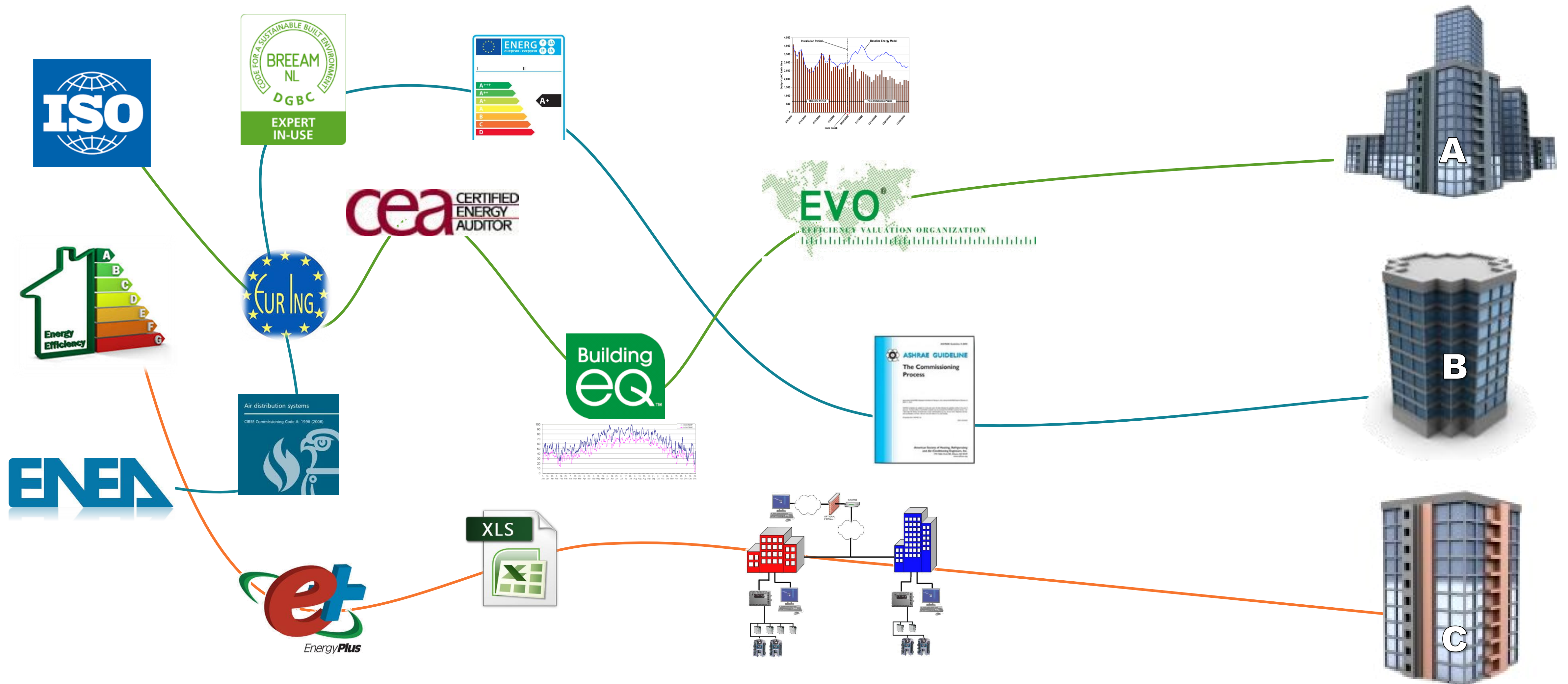


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# What is the Investor Confidence Project?

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# Lack of Standardisation = Greater Risk



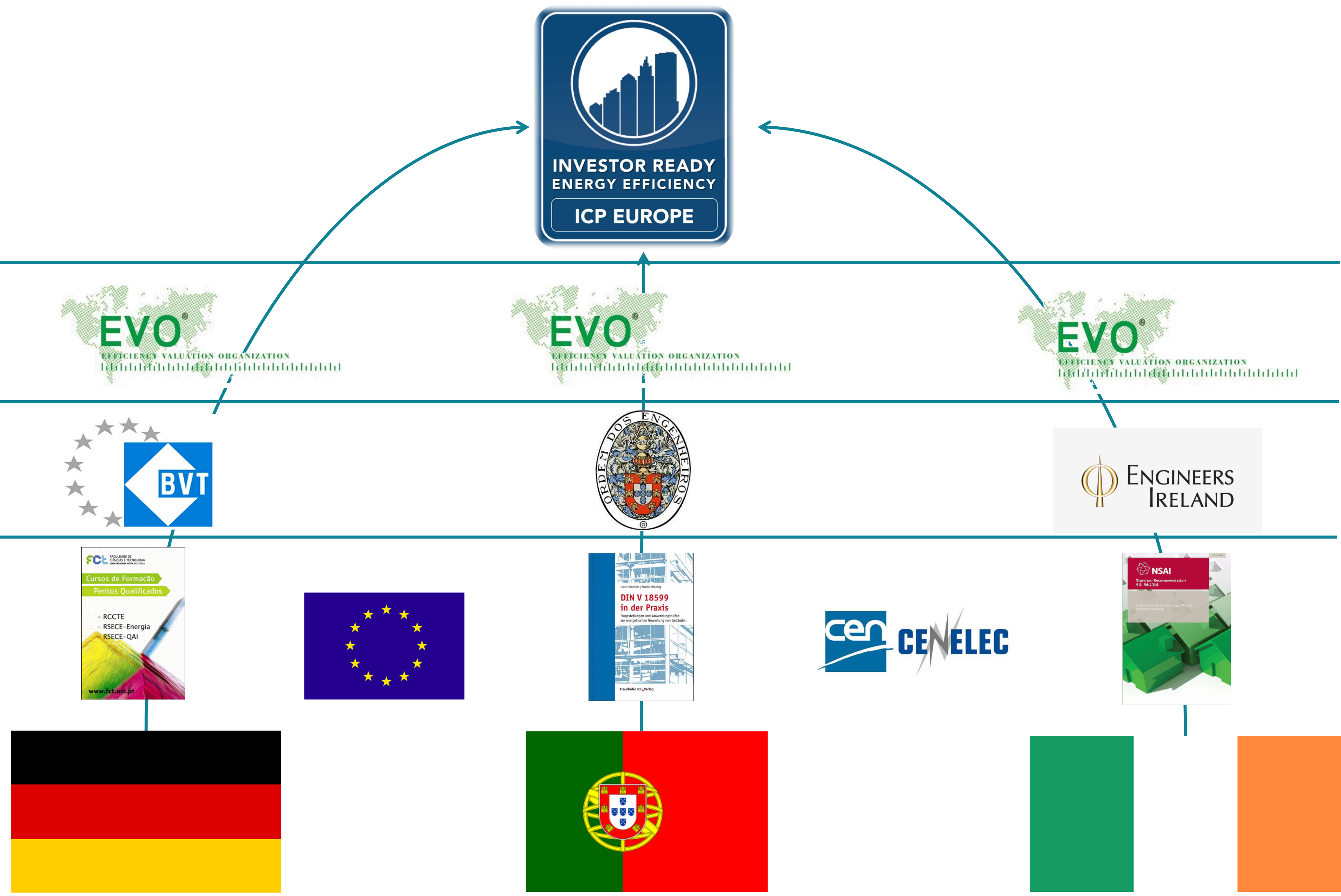
# Investor Ready Energy Efficiency Project

Consistent  
Documentation

Third-Party Quality  
Assurance

Certified  
Professional

Best Practices and  
Standards







Ensures transparency,  
consistency and trust-  
worthiness through **best  
practice and independent  
verification.**

An international framework for reducing owner and investor risk,  
lowering due diligence costs, increasing certainty of savings  
achievement and enabling aggregation.





## Procedures

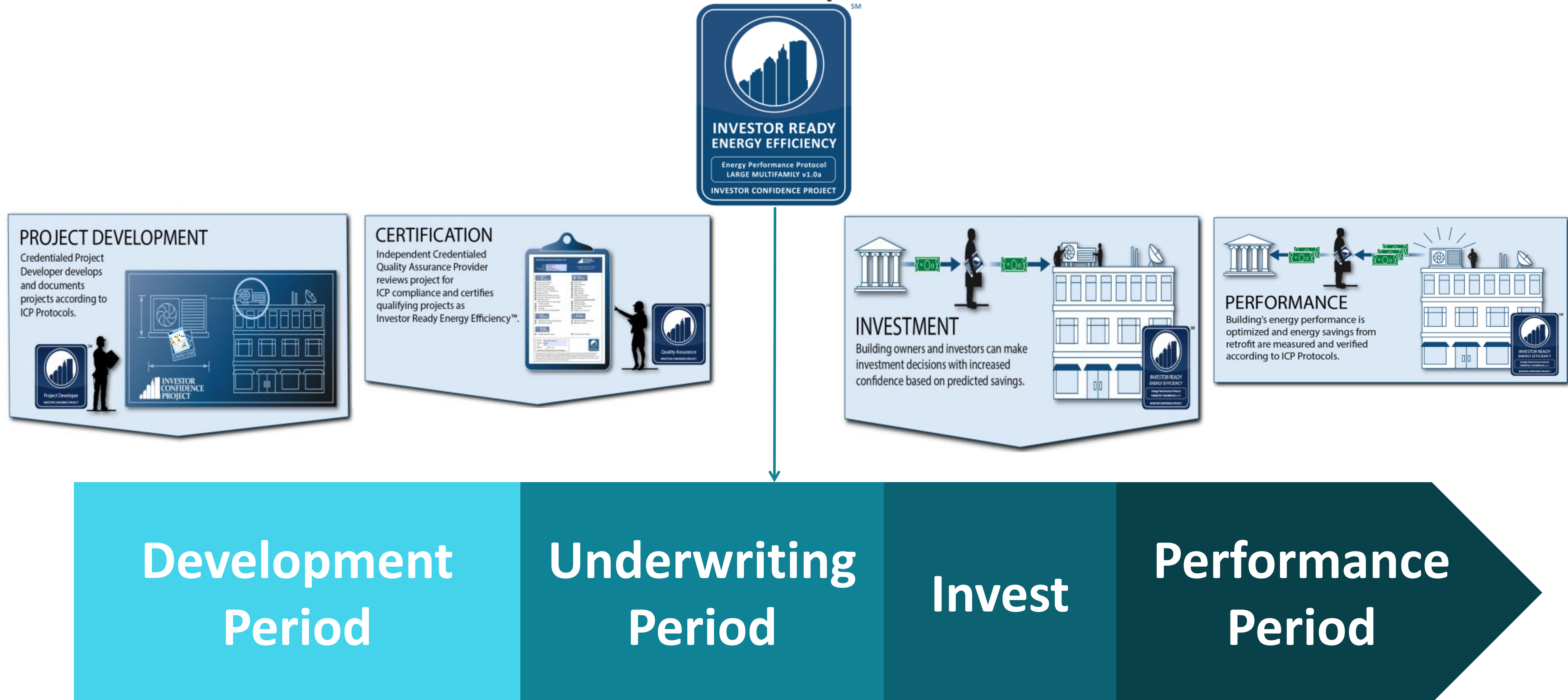
- Best Practice Workflow
- Standard Industry Practices

## Documentation

- Standard Documentation Package
- Itemized Outputs Required



# The IREE™ Certification is delivered prior to investment decision





# What project types is IREE™ designed for?





# Industry and Energy Supply Project Types



## Complex

Installation of new technology  
types or capacities/ECMs with  
variable loads



## Targeted

Installation of simple  
technologies/ECMs which are  
like-for-like replacement





# Important facts to remember

- Any EE project that follows state of the market origination processes already does “everything ICP requires” – **ICP is an overarching standardizing layer to the process**
- ICP supports best practices standards, tools or engineering methodologies already in the market place
- ICP is flexible and adaptable to different project complexity and investment levels
- There is nothing like ICP in the global market – relevance of the Performance Period for persistence of savings

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# Roles and Responsibilities

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# ICP Project Developer



- Complete training
- Meet qualification and experience requirements
- Quick and easy process to join the network
- Insurance must meet needs of project owner (reviewed by QAA on per project basis)
- Where projects include process-specific ECMs:
  - Demonstrate experience in similar process/technology
  - Involve an experienced specialist



# ICP Quality Assurance

- Energy efficiency investors lack expertise
- Multiple investors separately evaluating a project = time and money wasted
- QA Assessor
  - Independent
  - Represent the investor's interests
  - Ensures project conforms to ICP protocols
  - Can also be an ICP Project Developer



# Third Party

- Someone who may be indirectly involved with, but is not a principal party to, an arrangement, contract, deal, or transaction
- ICP requires third-parties for:
  - Measurement and Verification (third party oversight is required as a minimum)
  - Quality Assurance



# Quality Assurance 'Specialists'

- Bespoke process ECMs
- Spreadsheet calculations
- Implementation costs / investment criteria
- Commissioning (OPV)
- Measurement and verification



# Project Developer Responsibilities

- Represents project owner's interests
- Components clearly identified and organised
- Available to QA Assessor and others as appropriate
- Develop and assemble documentation (**investment**) package:
  - Select the correct protocol
  - Submit all documentation required by protocol
  - Ensure calculations are fully transparent, and all assumptions documented and explained

# QA Assessor Responsibilities

- Ensure project was developed in accordance with the *most appropriate ICP Protocol*
- Validate that all necessary *documentation* is provided and complete
- Check methodologies, assumptions, and results (*technical review*)
- Complete the ICP Checklist
- Issue the IREE™ certification

## ICP QA Checklist Qualifier

“By signing the ICP QA checklist, the ICP Quality Assurance Assessor attests to having reviewed the project development documentation and finds that the project is consistent with the ICP Protocol as deemed applicable to the project based upon the data that are available. *This Quality Assurance review and signature does not constitute a guarantee of energy savings performance, nor does it signify that the reviewer is taking professional responsibility for the required documents and engineering produced by the credentialed Project Developer.*”



# Project Team Communication

- Involve QAA early on in project development
- Maintain professional perspective and independence
- Collaborative approach
- Ask for clarifications



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# Process and tools available

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# Project Development Tasks









STAGE	Develop Baseline	Savings Calculations / Investment Package	Design, Construction & Verification	Operations, Maintenance & Monitoring	Measurement & Verification	Key
PROJECT TASKS	Work with the M&V specialist to define the measurement boundary	Develop a set of recommended ECMs	Appoint an Operational Performance Verification resource	Select and document ongoing management regime e.g. SCADA / aM&T	All Options: Develop M&V plan	
	Establish the baseline period	Perform model / spreadsheet calculations	Develop OPV plan	Develop OM&M plan	Option A/B: Collect post-retrofit energy / performance data	All protocols
	Collect energy source data, production, weather and other significant variable data, and utility rate schedules	Develop costs / constructability	Develop systems manual (if one does not exist)	Develop operator's manual (if one does not exist)	Option A/B: Performance data analysis	Targeted protocol has adapted / less stringent requirements as detailed in the protocol document
	Develop energy balances	Develop investment package	Update systems manual (if one already exists)	Update operator's manual (if one already exists)	Option A/B: Verified savings calculations	Complex protocol only
	Calendarise the independent variable data	Develop ECM report	Perform facility/network operators training	Develop and perform facility/network operators training	Option C: Post-utility data	Applicable for targeted protocol. Only applicable for complex protocol if IPMVP Option B is selected.
	Establish the energy-use characteristics of the equipment or system which are within the measurement boundary				Option C: Identify / quantify non-routine adjustments	
	Develop the baseline energy consumption model and test accuracy				Option C: Regression based analysis	
	Establish peak demand and pricing					
	Chart average daily demand					

# Quality Assurance Tasks

STAGE	Develop Baseline	Savings Calculations / Investment Package	Design, Construction & Verification	Operations, Maintenance & Monitoring	Measurement & Verification	Key
QUALITY ASSURANCE TASKS	Review and approve selected baseline period	Review and approve ECM report including baseline, facility/network and/or systems and ECM descriptions, savings calculations, performance and cost analysis	Review and approve credentials of individual responsible for OPV	Review and approve OM&M plan, setting out procedures	Review and approve credentials of individual responsible for M&V	All protocols
	Review and approve utility data and rates, significant variable data and energy baseline	Review and approve credentials of individual responsible for energy model/savings calculations	Review and approve OPV plan	Review and approve selected ongoing management regime	Review and approve M&V plan	Targeted protocol has adapted / less stringent requirements as detailed in the protocol document
	Review and approve energy consumption model	Review and approve savings spreadsheet calculations, including supporting data	Review and approve systems manual (if one exists)	Review and approve operator's manual (if one exists)	Option C: Review and approve performance- period utility data (12 months), regression based model, and adjustment calculations	Complex protocol only
	Review and approve energy balances	Review and approve supporting costs / constructability information	Review and approve training (interview facility/network operators)	Review and approve training (interview facility/network operators)	Option A/B: Review and approve monitored data files, data analysis results, and revisions to savings calculations	Applicable for targeted protocol. Only applicable for complex protocol if IPMVP Option B is selected.
	Review and approve load profiles and interval data	Review and approve investment package	Option A/B: Ensure pre- retrofit energy / performance data collected		Review and approve adjustments and proper application	

# Project Acceptance

- Descriptions of deficiencies and issues
  - Documentation requirements
  - Methodologies, assumptions, and results
- Reasonableness
  - Document how items were resolved, or why they were left open
- Complete and sign the QA Checklist
- Project certified as IREE™

ICP Quality Assurance Checklist v1.0		 INVESTOR CONFIDENCE PROJECT
Client: XYZ Property LLC Project: 123 Main St Project Developer: Energy Efficiency Inc. QA Provider: Assured Quality Assurance		Energy Performance Protocol Large Commercial v1.2a
 <b>BASELINING CORE REQUIREMENTS</b>	 <b>SAVINGS CALCULATIONS</b>	
<input checked="" type="checkbox"/> 14-36 months utility data <input checked="" type="checkbox"/> Utility baseline period <input checked="" type="checkbox"/> End-use energy use estimates <input checked="" type="checkbox"/> Weather data - related baseline <input checked="" type="checkbox"/> 12 mos occupancy - related baseline <input checked="" type="checkbox"/> Building asset data <input checked="" type="checkbox"/> Baseline operational/performance data <input checked="" type="checkbox"/> Normalized / regression-based baseline <input checked="" type="checkbox"/> Utility rate structure <i>(if Demand Charges or Time of Use apply)</i> <input checked="" type="checkbox"/> Annual load profile <input checked="" type="checkbox"/> Average daily load profiles <input checked="" type="checkbox"/> Peak usage <input checked="" type="checkbox"/> TOU summary by month <i>(if applicable)</i>	<input checked="" type="checkbox"/> Software type <input checked="" type="checkbox"/> Modeler credentials <input checked="" type="checkbox"/> Weather file <input checked="" type="checkbox"/> Model input files <input checked="" type="checkbox"/> Model output files <input checked="" type="checkbox"/> Model calibration <input checked="" type="checkbox"/> Model process description <input checked="" type="checkbox"/> Energy Efficiency Report <u>Energy Conservation Measures (ECMs)</u> <input checked="" type="checkbox"/> Investment criteria <input checked="" type="checkbox"/> ECM model variables <input checked="" type="checkbox"/> ECM results and package results <input checked="" type="checkbox"/> Cost estimates <input checked="" type="checkbox"/> Quality assurance statement	
 <b>DESIGN, CONSTRUCTION, AND VERIFICATION</b>	 <b>MEASUREMENT AND VERIFICATION</b>	
<input checked="" type="checkbox"/> Operational Performance Verification plan <input checked="" type="checkbox"/> OPV authority credentials	<input checked="" type="checkbox"/> Measurement and Verification plan <input checked="" type="checkbox"/> M&V agent credentials	
 <b>OPERATIONS, MAINTENANCE, AND MONITORING</b>		
<input checked="" type="checkbox"/> Ongoing management regime	<input checked="" type="checkbox"/> Project Developer Credential	
<div>QA Firm: Assured Quality Assurance Reviewer*: John Doe Date: 1/1/15 Signature:  <small>*Reviewer must be qualifying individual per ICP QA Application</small></div>		
<small>By signing this ICP QA checklist, the ICP Quality Assurance Provider attests to having reviewed the project development documentation and certifies that the project substantially follows the ICP Energy Performance Protocols and the ICP Project Development Specification. This Quality Assurance review and signature does not constitute a guarantee of energy savings performance, nor does it signify that the reviewer is taking professional responsibility for the required documents and engineering produced by the Credentialed Project Developer.</small>		



# ICP Project Registry

Project Name \*

Protocol \*

Large Commercial

Protocol Version # \*

Project Description \* ?

Quality Assurance Provider \* ?

QA Reviewer Name \*

QA Reviewer Email \*

QA Reviewer Phone #

QA Reviewer ICP Credentialed?

☐ Yes

Project Developer \*

Project Developer ICP Credentialed?

☐ Yes

Building Owner Organization/Name \*





Questions and polls

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# ICP Stages - Requirements

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**1. Baseline Development**

2. Savings Calculations

3. Design, Construction & Verification

4. Operations Maintenance & Monitoring

5. Measurement & Verification

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Baseline Development

Procedure	Complex	Targeted
Normalised baseline (energy consumption equation)	✓	Maybe
Energy end-use consumption	✓	✓
Weather data	✓	✓
Production data	✓	✓
Site asset, operational, performance data	✓	✓
Retrofit isolation baseline	-	Maybe
Load shapes (when interval data available)	✓	✓
Interactive effects	✓	✓

Where relevant  
to the ECMs

# Data Collection

- Collect historical energy use and cost data
  - Define measurement boundary
  - At least one full energy-use cycle (where Option C is used, usually minimum 12 months)
  - Electricity, on-site fuel for heating and cooling, district steam, and hot water or chilled water, renewable energy
  - Calendarise if necessary
  - Energy balances for systems associated with proposed ECMs

**PDS section 4.2.1**

**EN 16247-1 Energy audits – General requirements**  
**EN16247-3 Energy Audits – Processes (for industrial projects)**  
**ISO 50002 Energy Audits – Requirements with guidance for use**  
**PDS section 4.2.5**

# Regression-based model

- Develop an energy-use equation
  - Achieve an appropriate goodness of fit of energy data variability to independent variables
  - Perform regression analysis
    - For any project type, initial check on R-squared – in some industrial cases it may be hard to achieve a high R-squared value
  - Model should be evaluated on the basis of predicted savings: must be **greater than twice the standard error of the baseline value**
  - Uncertainty analysis not required, but recommended
  - Proprietary tools may be available

**IPMVP: Statistics and Uncertainty for  
IPMVP 2014 section 1**

# Energy end-use consumption/Weather/Production/Occupancy

- Estimate or measure energy end-uses
  - Calibrate baseline energy model
  - Calibrate energy savings estimates
- Collect weather data and production data corresponding to the baseline period
  - At least one full energy-use cycle (where Option C is used, usually minimum 12 consecutive months)
  - e.g. production quantities, production rate, raw material composition
- Collect occupancy data where available and where relevant to explaining variation in energy use within the measurement boundary
- Other independent variables e.g. raw material moisture content



# Asset, Operational, Performance Data

- Collect asset, operational, and performance data
  - Drawings, equipment inventories, surveys, tests, etc
  - Facility or network performance tracking
  - Analysis of ECMs
  - ECM implementation
  - ECM performance tracking
- Provide a summary of activities and processes





# Retrofit Isolation Baseline

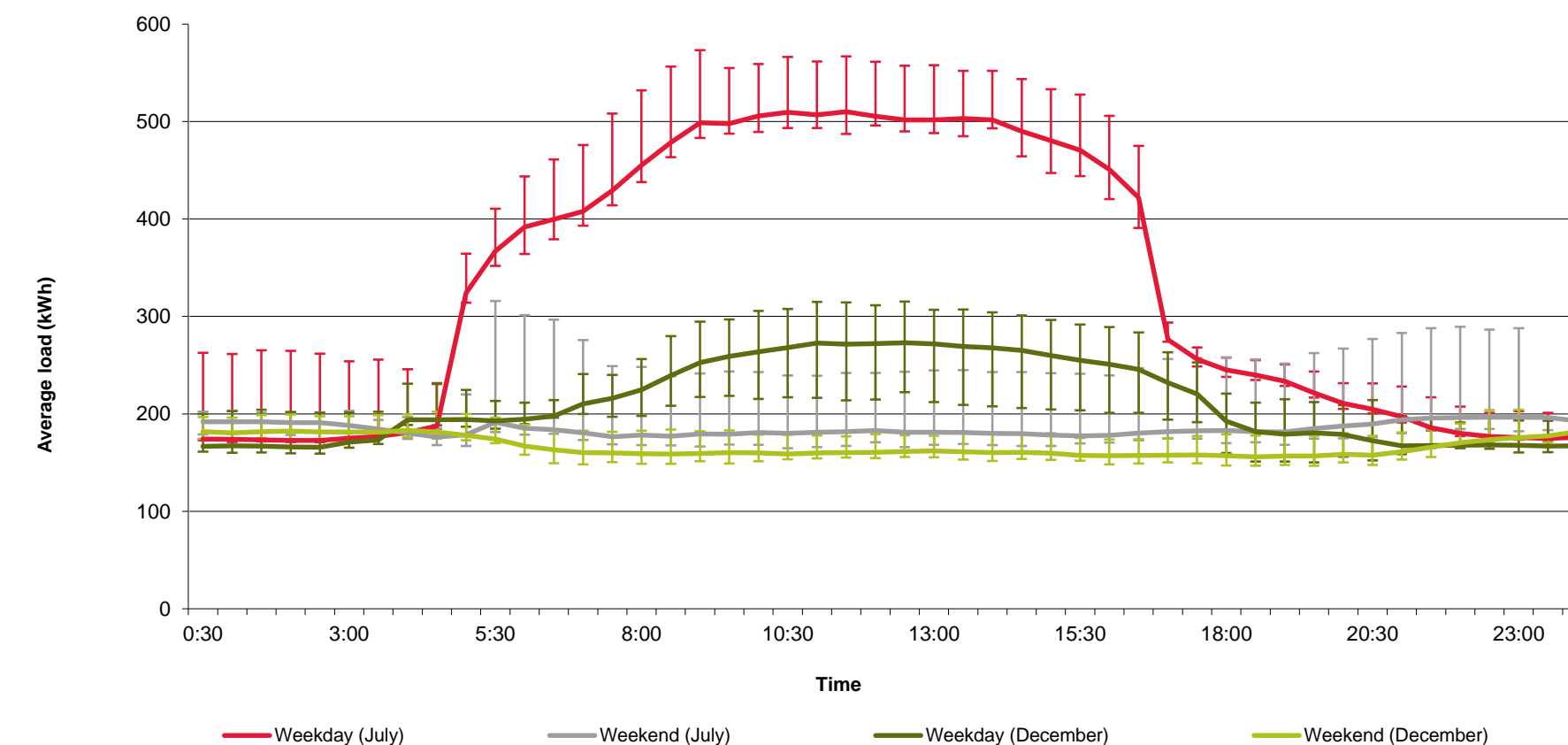
- ECM specific baseline
  - IPMVP Option A or B M&V approach
  - Same approach as whole facility/network baseline development
  - Define measurement boundary
    - Specific piece of equipment
    - Facility/network subsystem
    - End-use
  - Define
    - Constant / variable load
    - Constant / variable schedule

**IPMVP Core Concepts  
2016  
Section 5.1**



## Load Profiles – if demand charges/time of use pricing are in effect

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



# Interactive effects

- **Secondary energy effects occurring as a result of ECMs** – usually associated with heating and cooling
- Estimate interactive effects with ECMs and between measures **where significant** compared to ECM energy savings, and either:
  - Adjust savings; or
  - Expand measurement boundary

PDS Section 2.4



Baseline Development

# Documentation

Protocol	Documentation
All	Baseline period (start and end dates)
All	Energy data
All	Access to all asset, operational and performance data
All	Utility rate structure
If applicable:	
All	Production & weather data (if relevant to project)
All	Interval data; sub-metered data; load profiles; monthly peak demand





Questions and polls

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1. Baseline Development

**2. Savings Calculations**

3. Design, Construction & Verification

4. Operations Maintenance & Monitoring

5. Measurement & Verification

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# Savings Calculations

Procedure	Complex	Targeted
ECM descriptions	✓	✓
ECM savings calcs – models/spreadsheets	✓	✓
Investment criteria	✓	✓
Interactive effects	✓	✓
Fixed prices for each ECM	✓	✓
Investment package	✓	✓
Reporting	✓	✓



# ECM Descriptions; Cost Estimates

- ECM descriptions
  - Present condition, proposed measure
- Cost estimates
  - At the feasibility stage, direct quotes or past experience can be used
  - **Final investment package must be based on fixed costs**
  - Must include:
    - Construction feasibility review
    - Labour and materials
    - Line items for professional fees, engineering, commissioning, construction management, permitting, M&V, overhead and profit, contingency
- Long term financial analysis is optional

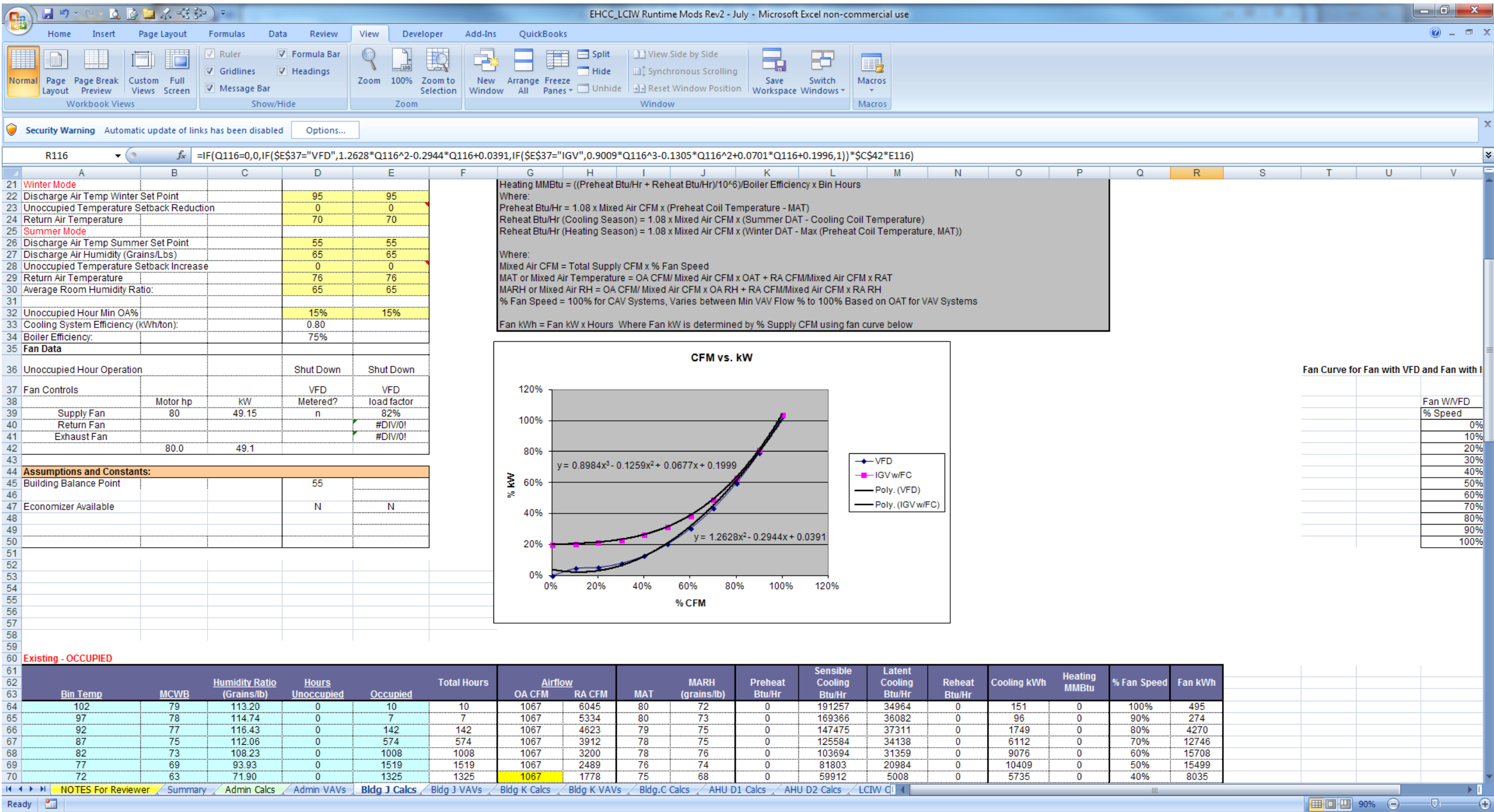
# Investment Criteria

- Programmes and projects have individual criteria
  - ICP does not specify investment criteria to be used
  - Job of PD is to ascertain and inform preferred financial metrics
    - Implementation costs
    - Estimated savings
    - Available incentives
    - Effective useful life
    - Escalation rates
    - Interest rates
    - Discount rates
    - Cost of capital
    - Lease terms
    - Other appropriate financial inputs

Savings Calculations

Spreadsheets and tools

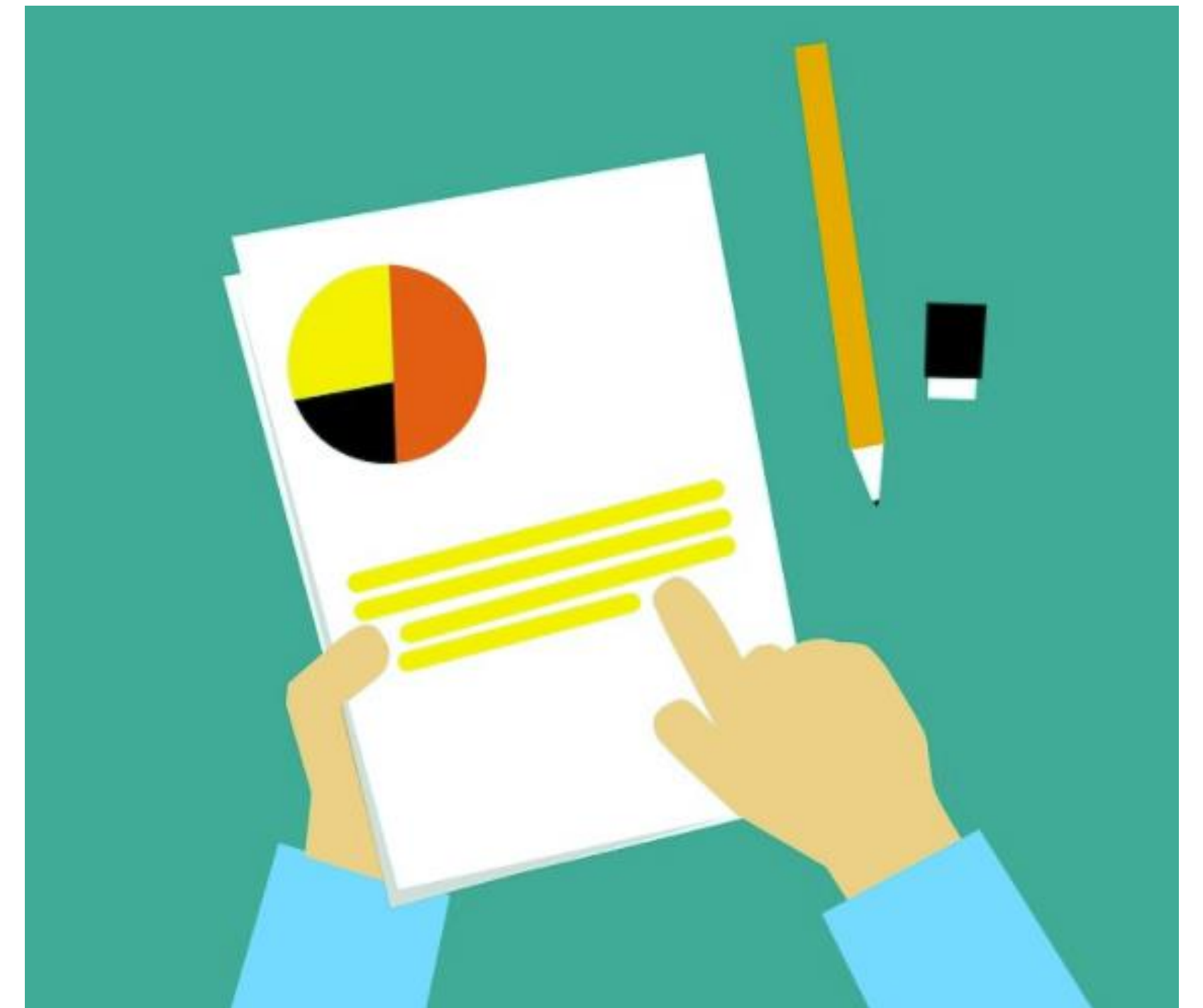
- Analysis methods
  - Spreadsheet-based
  - Regressions analysis
  - Proprietary tools
- Interactive effects
- Weather file
- Assumptions and inputs
  - Documented
  - Never embedded
  - Reasonable





# Report

- Summary report: industry-accepted format
  - Results
  - Methods used
  - Data
- Pricing for each ECM and package of ECMs
- Predicted energy savings by fuel type: energy consumption, % volume, cost savings



# Documentation

Protocol	Documentation
All	Energy modeller/consultant qualifications
All	Process specialist experience
All	Where proprietary or third-party software has been used: input files; output files; weather file
All	Where open-book calculations have been used: calculation process description, workbooks, calculation tools; weather file
All	Basis for ECM costs
All	Summary report – including annual predicted energy savings by fuel type



Questions and polls

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1. Baseline Development

2. Savings Calculations

**3. Design, Construction & Verification**

4. Operations Maintenance & Monitoring

5. Measurement & Verification

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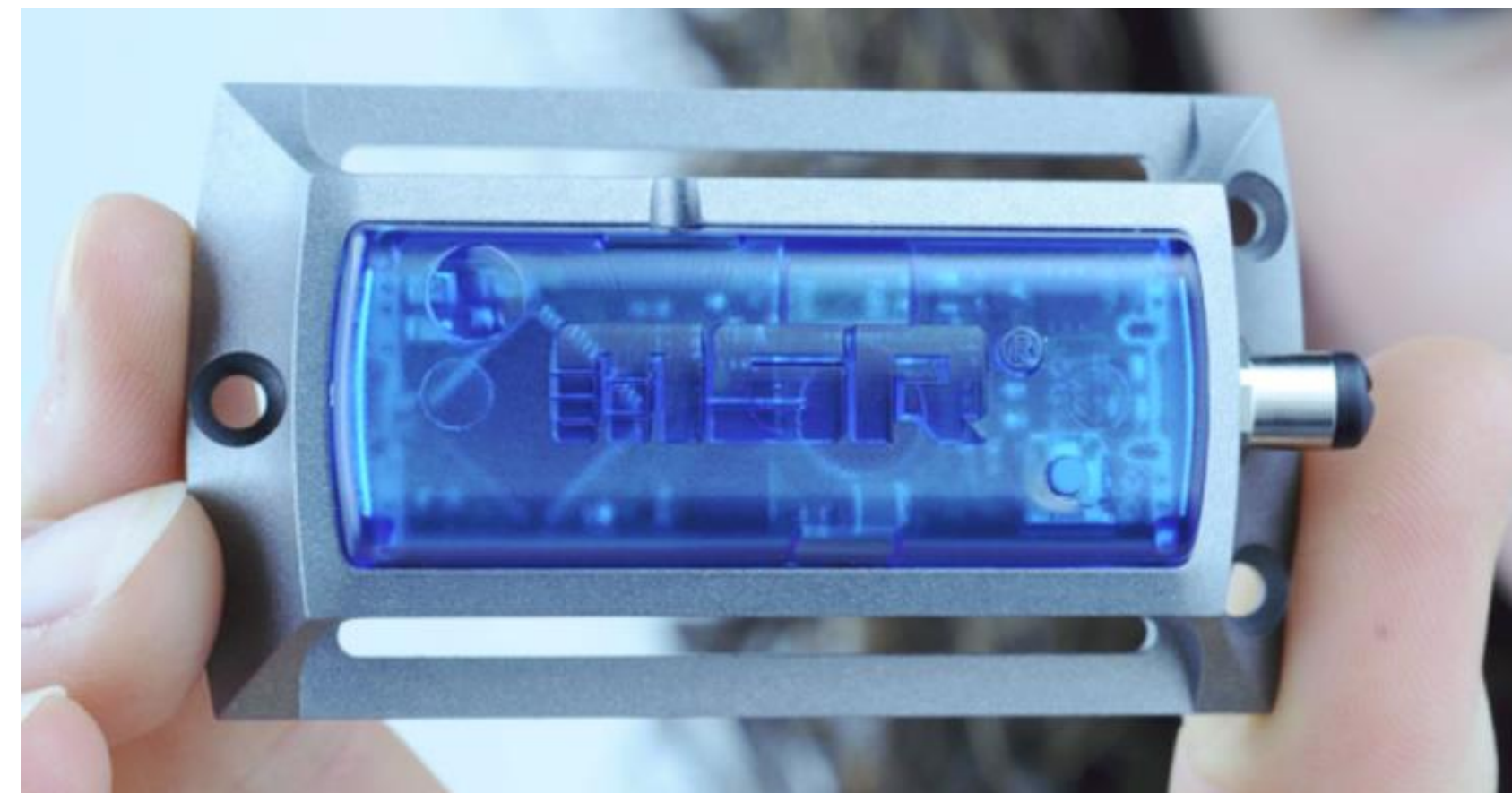
Design, Construction & Verification

Procedure	Complex	Targeted
Appoint an Operational Performance Verification (OPV) resource	✓	✓
Operational Performance Verification (OPV) plan	✓	✓
Operational Performance Verification (OPV) report	✓	✓
Training	✓	✓
Systems manual	✓	Maybe



# Operational Performance Verification

- OPV approaches
  - *Visual inspection* - verify the physical installation of the ECM
  - *Spot measurements* - measure key energy-use parameters for ECMs or a sample of ECMs
  - *Pre-functional checklist / functional performance testing* - test functionality and proper control
  - *Trending and data logging* - setup trends or install data logging equipment and analyse data, and/or review control logic



# Operational Performance Verification

- 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 client / 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.

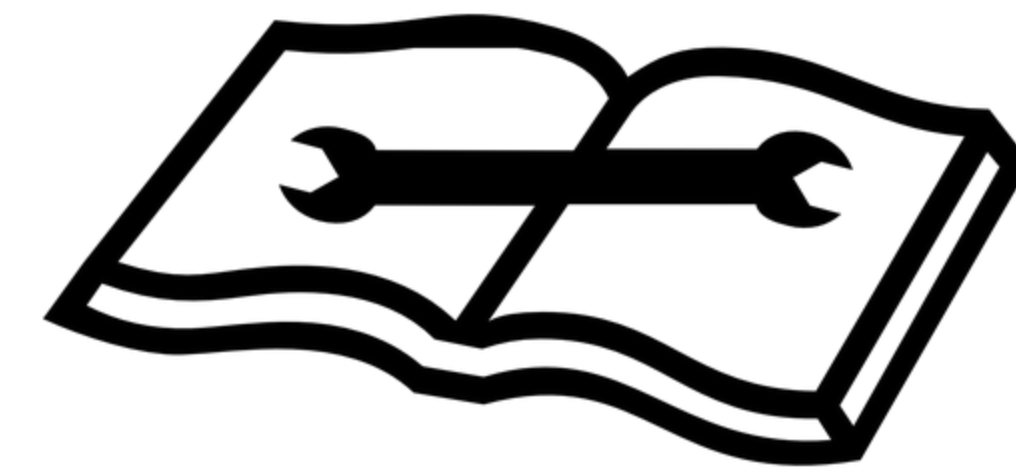
# Operational Performance Verification

- OPV plan
  - Developed preconstruction
  - Verification activities: design review, etc...
  - Systems involved; roles and responsibilities
  - Target energy budget
  - Description of OPV report (Targeted: where appropriate to nature/scale of project)
  - Provisions to:
    - Use approved installers (where national certification schemes exist)
    - Develop training plan for operators (ECM descriptions, target performance, etc)
    - Update or develop Systems Manual



# Systems Manual – Complex (Targeted: update if one exists)

- Systems manual
  - Facility or network design and construction (owner's project requirements, current facility/network requirements, basis of design, construction/project record documents)
  - Operational requirements
  - Maintenance requirements and procedures
  - Commissioning process report: OPV plan, testing reports, issue and resolution logs
  - Training



# Documentation

Protocol	Documentation
All	Qualifications of the OPV provider
All	OPV Plan



Questions and polls

- 
1. Baseline Development
  2. Savings Calculations
  3. Design, Construction & Verification
  - 4. Operations Maintenance & Monitoring**
  5. Measurement & Verification
-



Operations, Maintenance & Monitoring

Procedure	Complex	Targeted
OM&M plan (ongoing management regime)	✓	✓
Training on OM&M procedures	✓	✓
Operators manual	✓	Maybe
Staff outreach	✓	✓



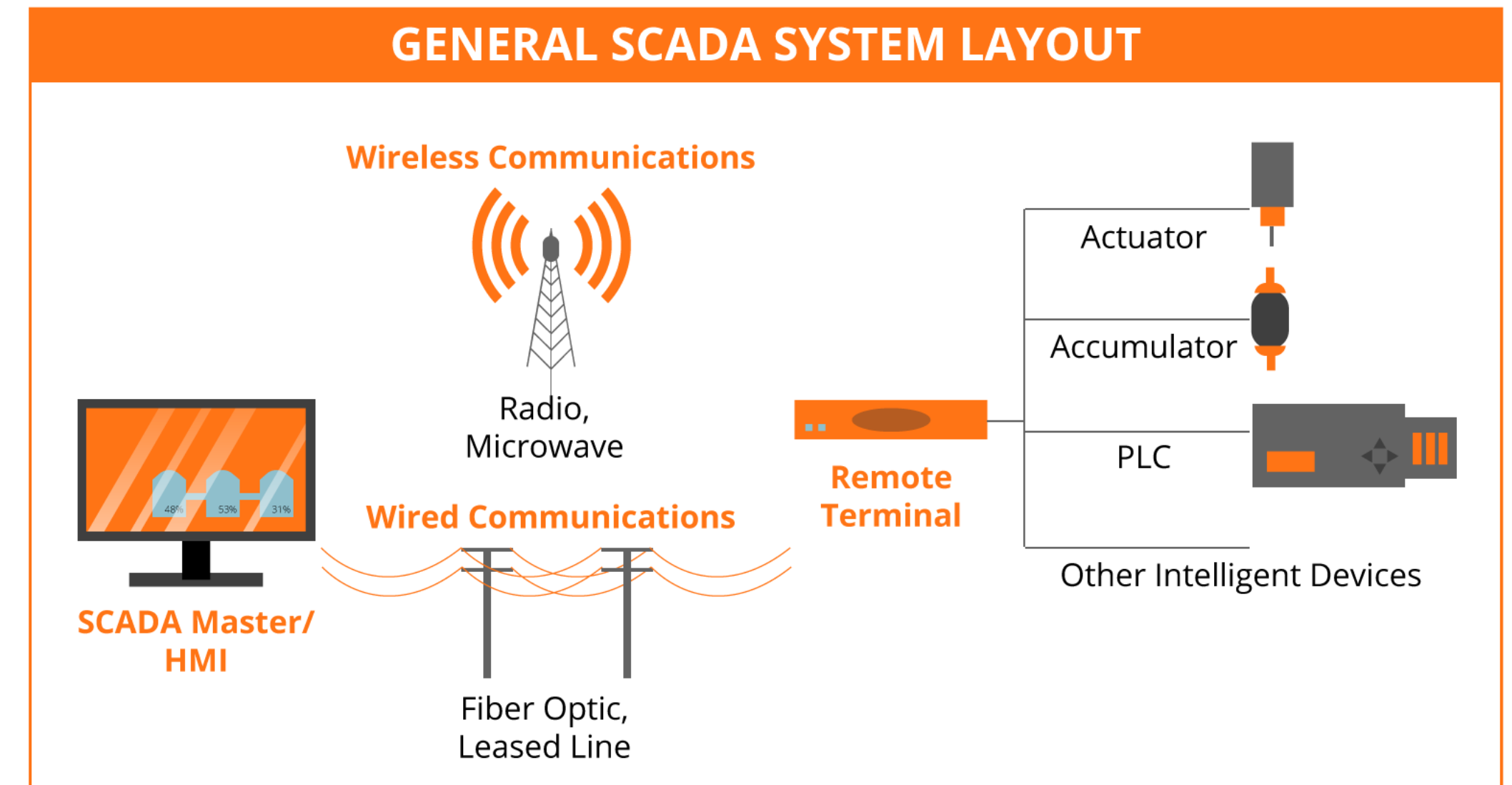
# OM&M Plan

- OM&M procedures

- Continuous improvement and monitoring
- Tracking, analysing, diagnosing issues
- Resolving issues
- Maintain production levels/energy supply levels

- Methods include:

- Periodic inspections
- Automatic Monitoring and Targeting Reporting (aM&T)
- Automated fault detection and diagnostic tools
- Periodic data analysis
- Supervisory Control and Data Acquisition (SCADA)
- Periodic Recommissioning



# OM&M Plan

- OM&M Plan: framework for ongoing management regime

- Process and intent

- Manual or automated tools or processes to use

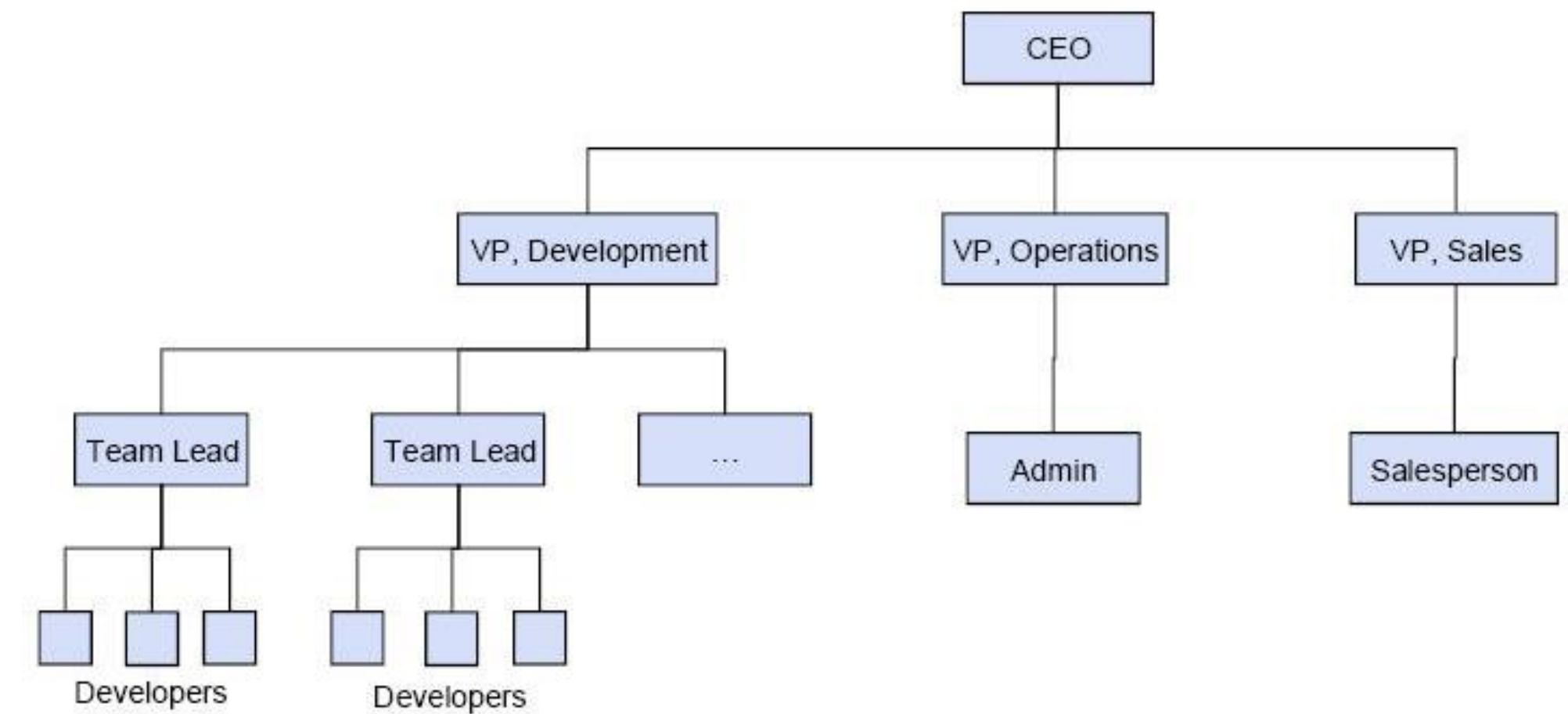
- Resources and established roles / responsibilities

- Organisation chart
    - Technical qualifications for O&M

- Quantifiable performance goals (based on performance indicators)

- Provisions to:

- Develop training plan for operators (ECM descriptions, target performance, issue resolution, etc)
    - Update or develop Operator's Manual
    - Develop instructions for facility/network staff on ECMs



# Operator's Manual – Complex (Targeted: if one exists)

- Operator's Manual
  - Often combined with Systems Manual
  - Photographs
  - Reduced-size as-built drawings and schematics
  - List of major equipment
  - Invoices for major equipment purchases and repairs
  - Balance reports
  - Equipment locations
  - Control system logic
  - O&M instructions
  - Training materials



# Documentation

Protocol	Documentation
All	OM&M Plan (ongoing management regime)
All	Organisational chart



Questions and polls

- 
1. Baseline Development
  2. Savings Calculations
  3. Design, Construction & Verification
  4. Operations Maintenance & Monitoring
  - 5. Measurement & Verification**
-

Measurement & Verification

Procedure	Complex	Targeted
Appoint an M&V resource	✓	✓
M&V Plan	✓	✓
Whole facility (Option C)	✓	-
Retrofit isolation – all parameters (Option B)	✓	✓
Retrofit isolation – key parameters (Option A)	-	✓
Collection of energy data	✓	✓
Verified calculations and Report	✓	✓



# Option C

- Whole Facility

- Option C: Utility bill analysis
- Complex protocol
- Savings estimates  $> 10\%$  facility energy use
- Whole facility; interactions included
- Energy use equation/regression analysis
- Routine and non-routine adjustments
- Statistical evaluation
  - $R^2 > 0.75$
  - $CV[RMSE] < 15\%$
  - $T\text{-stat} > 2.0$

# IPMVP Core Concepts 2016

[illegible]

# Option A and B

- Retrofit Isolation
  - Option A: Key parameter measurement
  - Option B: All parameter measurement
  - Targeted protocols, and sometimes Complex using Option B
- Specific to each ECM
- Develop measurement boundaries
- Estimated parameters

# Process

- Follow IPMVP M&V process

1. Document baseline
2. Plan and coordinate M&V activities

Pre-construction

3. Verify operations
4. Gather data
5. Verify savings
6. Report results

Post-construction

# M&V Application – Pre-construction

- M&V Plan

- Compliant with IPMVP
- Select appropriate Option(s)
- Define routine and non-routine adjustments
- Define measurement boundary
- Define measurement period
- Meter locations, accuracy
- Collect baseline and post-construction data
- Option A: estimated parameters

**Section 7.1**  
**IPMVP Core Concepts 2016**



## Performance Period Effects



# Documentation

Protocol	Documentation
All	Qualifications of the M&V provider
All	M&V Plan
All	Routine adjustments
All	Pre-retrofit collected data (baseline period)



Questions and polls



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Certified Project Case Study: Denkstatt & Enertec



# First industrial energy efficiency project certified

- Project owner: GOURMET (Austria)/ PD: Denkstatt Enertec/ QAA: Verco
- Waste heat recovery from two fast cooling plants for heat exchange to ventilation
- €156k capex with funding of 30%
- Predicted annual savings: 635MWh gas, 135MWh elec (6.3yr SPB)
- Complex protocol
- Combination of IPMVP Option C (natural gas savings) and B (electricity savings from two fast cooling plants)



*“...ICP...gives the project owner even more robust, independently verified savings calculations and an additional level of quality assurance. Moreover, it puts more focus on proper project implementation in addition to project development.”*

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# Worked Examples

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## Example 1: Motor replacements on packaging lines in manufacturing plant

- Discrete measure - simple to estimate savings
- ECM is not bespoke, process-specific
- Measurement boundary to be drawn around each motor
- IPMVP Option A or B likely to be most appropriate
- **Targeted Industry and Energy Supply Protocol**
- Only the baseline associated with the motors needs to be developed
- A sampling approach can be adopted to energy audit, provided representative sample is selected



## Example 2: Industrial site upgrade

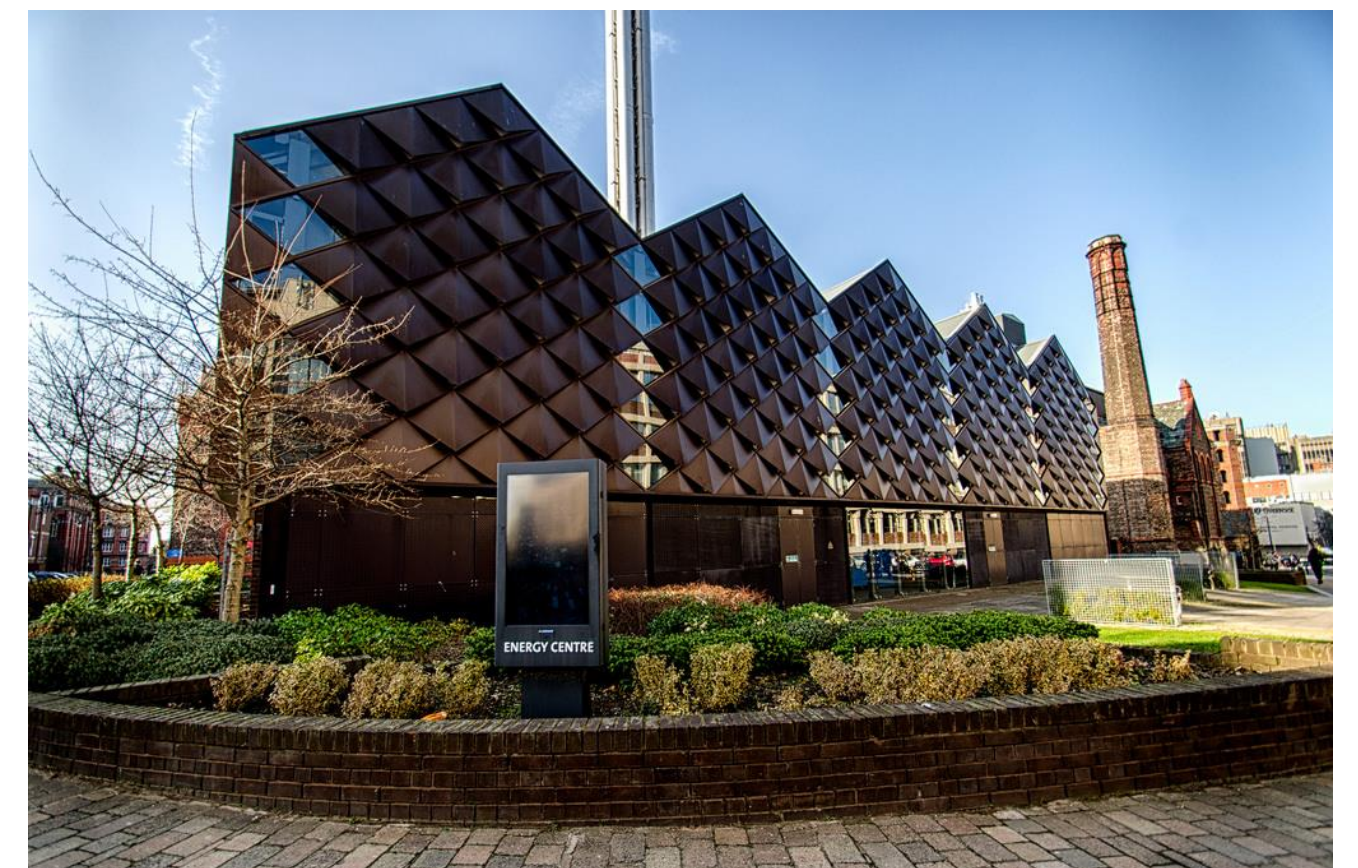
- ECMs consist of lighting retrofit, upgrades to BMS, air handling unit improvements, installation of variable speed drives
- IPMVP Option C likely to be most suitable
- **Complex Industry and Energy Supply Protocol**





## Example 3: Upgrading equipment in the Energy Centre

- Like-for-like replacement of motors, pumps etc
- ECMs are designed to improve system efficiency
- Measurement boundary to be drawn around equipment in Energy Centre only - IPMVP  
Option B likely to be most appropriate
- Baseline associated with equipment to be upgraded only
- **Targeted Industry and Energy Supply Protocol**







Questions and polls

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# Application Process

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# Application timeline

- Straightforward process!
- A link to the PD and QAA applications will be sent to attendees of today's training
- We ask that attendees be present for/watch the full training in order to be eligible to take the PD/QAA test and apply for the networks
- A link to test for QAA applications will also be sent
- Applications must be submitted within two weeks
- We will contact you if we require additional information or clarifications on your submission
- Once our review is complete, we will notify you to confirm your official status as a member of the ICP PD/QAA network

# Project Developer requirements

- List of individuals who will oversee ICP projects and their credentials - option 1 (**professional engineer**) or option 2 (**engineering/science degree plus additional certification**) – describe relevance of qualification
- Sign **Declaration of Honour** confirming **PD experience** across 5 ICP stages:
  - Baselineing
  - Savings calculations
  - Design, Construction and OPV
  - Operations, Maintenance and Monitoring
  - Measurement and Verification
- **Acknowledge** ICP T&Cs and to information being correct
- **Company** logo and brief details
- **If training was taken via a recording, take PD test – online, 20 questions, 15 mins**
- Insurance on a per project basis

# QA Assessor requirements

- List of individuals who will oversee ICP projects and their credentials - option 1 (**professional engineer**) or option 2 (**engineering/science degree plus additional certification**) – describe relevance of qualification
- Sign **Declaration of Honour** confirming **QA experience** across 5 ICP stages:
  - Baselineing
  - Savings calculations
  - Design, Construction and OPV
  - Operations, Maintenance and Monitoring
  - Measurement and Verification
- **Acknowledge** ICP T&Cs and to information being correct
- **Company** logo and brief details
- **Take QAA test – online, 40 questions, 30 mins**
- Insurance on a per project basis





Pilot Projects



# ICP Europe Network Members





Thank You

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# Investor Confidence Project

[europe.EEperformance.org](http://europe.EEperformance.org)

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