ENVIROS

TODAY'S BUSINESS TOMORROW'S WORLD

Results from the IEE project PERMANENT

Michael ten Donkelaar

CA ESD II plenary meeting
Working Group Session
Energy service companies and monitoring and verification of energy savings

Paphos, 23rd of October 2012

INTELLIGENT ENERGY EUROPE

PERMANENT

The PERMANENT project

- Co-ordinated by ENVIROS (Czech Republic) and financed through the Intelligent Energy Europe Programme

  – Partner organisations:
    - Maicon Associates (UK),
    - FEWE (Poland),
    - HEP-ESCO (Croatia),
    - Energoeco (Romania) and
    - Eneffect & EEE (Bulgaria)

  – Duration – September 2009 – December 2011

Why PERMANENT?

- While the potential for energy efficiency is still enormous in the EU, a no. of barriers still inhibit the realisation of this potential.
- Addressing the most common barrier to deployment of energy saving projects: **disbelief that planned energy efficiency project results will be achieved and can pay back the investment in a sustainable manner**

- Main objective:
  - to educate financiers, project developers and energy users about how **measure, verify and finance energy efficiency projects**
  - Well prepared projects show permanent results thereby ***breaking the distrust barrier***.
- The **IPMVP** and **IEEFP** protocols of **EVO** formed the basis for the educational activities of PERMANENT

Main activities

- Training instructors from partner organisations in IPMVP and IEEFP who continue with training in their countries (“training the trainers”)
- Educating technical energy efficiency professionals (incl. energy service providers) and energy end-users in IPMVP
- Educating energy end users, financiers and policy makers on performance risk measurement and management techniques in energy saving projects in IEEFP

Leading to:

- Increased confidence in savings projections
- Increased awareness of performance risk management techniques for energy efficiency projects

Long-term objectives

- When an ESCO and its customer disagree over actual savings amounts, **distrust of the performance contracting** approach permeates a new market quickly, leading to general anxiety amongst potential future ESCO customers about the wisdom of using an ESCO approach.
- **Reliability, verification and transparency** of achieved energy savings makes energy saving projects more attractive and more similar to other investment projects
- Reliability and transparency of savings brought by M&V gives **confidence to financiers in energy efficiency savings generated** by EE projects

PERMANENT hoped to:

- Promote energy performance contracting by reducing the uncertainty that can arise over reports of the amount of actual savings.
- Expand the value of energy efficiency projects realised.

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IPMVP & IEEFP
A short description

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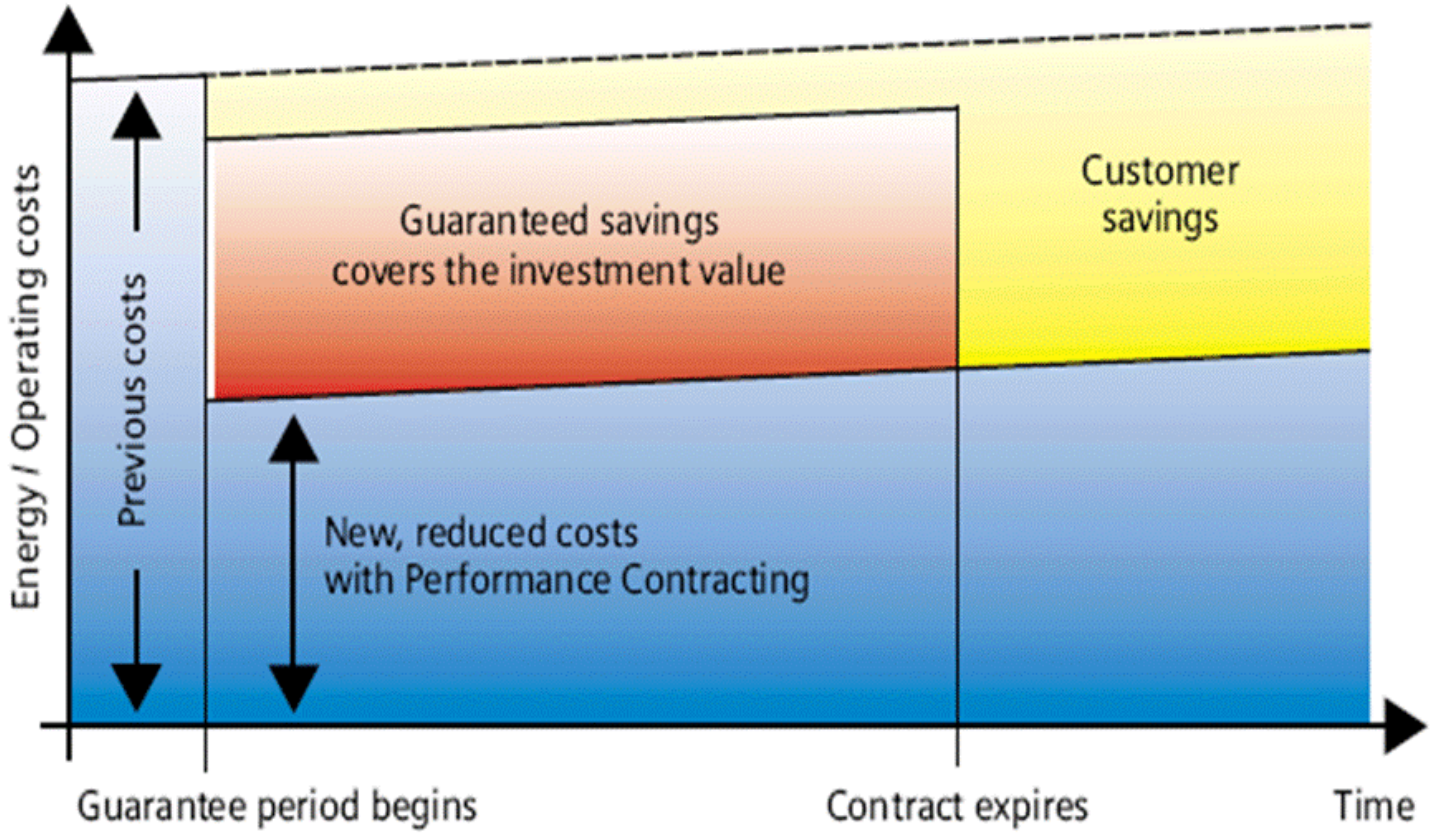
IPMVP & IEEFP

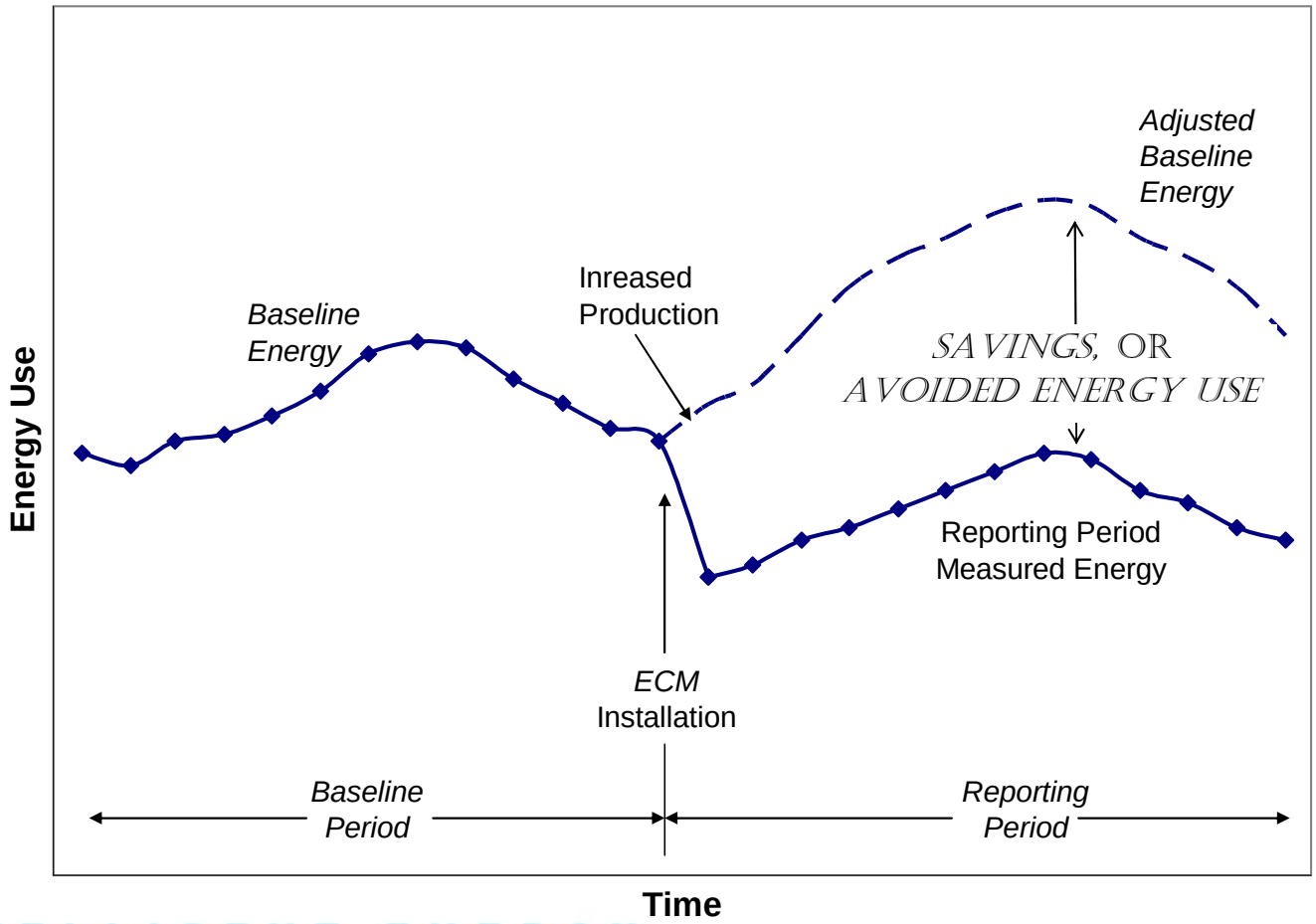
- The **IPMVP** provides an overview of ***current best practice techniques available for verifying results of energy efficiency***, water efficiency, and renewable energy projects in commercial and industrial facilities.
- It may also be used by facility operators to assess and improve facility performance.
- It is especially used in energy performance contracts where savings must be reported to a client and form the basis of a payment to an ESCO.

- The **IEEFP** provides guidelines for Financial Institutions ("LFIs") around the world to ***evaluate and finance energy efficiency and savings-based renewable projects*** ("Energy Savings Projects").
- Its objective is to create a better understanding on how energy savings generate financial savings from existing operating expenses of end-use consumers, and how this leads to additional cash flow.

When to use IPMVP – example of EPC project – project financing from savings



IPMVP – how to determine energy savings

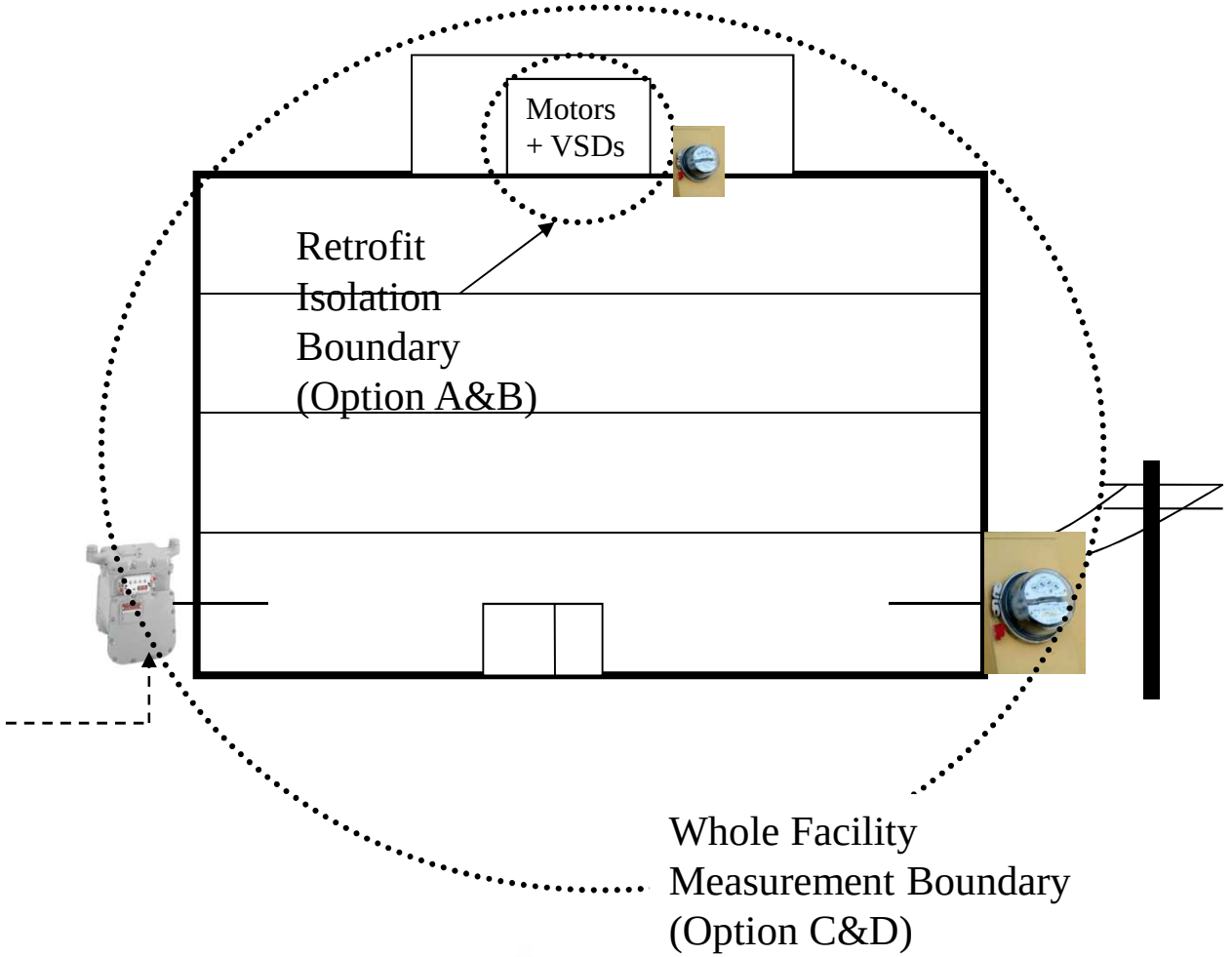


How to determine energy savings

Energy (cost) savings = (Baseline energy – Reporting Period Energy) ± Adjustments

- The term “adjustments” distinguishes proper savings reports from a simple comparison of cost or usage before and after implementation of an energy saving measure.
- Simple comparisons of utility costs without such adjustments report only cost changes and fail to report the true performance of a project. To properly report “savings,” adjustments must account for the differences in conditions between the baseline and reporting periods.
- Examples:
  - Energy saving project in an industrial facility where production before project implementation was higher then afterwards
  - Reconstruction of a heating system, annual consumption depends on fluctuations in outside temperature

IPMVP – determining the measurement boundary



IPMVP – four options for determining savings

- OPTION A – Retrofit isolation – Key parameter measurement
- OPTION B – Retrofit isolation – All parameter measurement
- OPTION C – Whole facility
- OPTION D – Calibrated simulation

- To manage savings at the whole facility level, Option C or D are needed.
- For more detail on the performance of an individual retrofit, a retrofit isolation would be used (Option A or B).

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IPMVP & IEEFP
Training activities within PERMANENT

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Promoting energy efficiency projects

WP3: Training of Trainers
Training of trainers using EVO training materials for IPMVP and IEEFP training

EVO training

WP4: Scheduling and promotion of Training and Awareness Programs

WP5: Delivering Training and Awareness

Technical / financial instructors	Technical instructors	Technical instructors	Financial instructors
Short presentations	**End users' training**	**Training energy efficiency professionals**	**Financiers and bankers**
Conferences or seminars run by others	(half-day, one-day 2-day) Public sector, industry, commercial sector	(half-day, one-day 2-day) suppliers, engineers, ESCOs	Half-day Financiers and bankers, government (grant) agencies

EVO supervision

Content of the training sessions - IEEFP

- **proposed risk assessment of EPC projects / energy efficiency projects**
- **allocated responsibility for financial operational performance**
- **introduced key performance risk management techniques**
- Increased confidence in savings projections and project investments
- raised interest for investments in energy efficiency in the role of a Third Party.
- increased understanding of services of ESCOs (Energy Service Companies)
- **Explaining the basic principles of Energy Performance Contracting (EPC)**
- raised awareness of guidance documents on savings estimation and savings measurement and verification techniques
- presented financing strategies and structures for energy efficiency projects

Content of the training sessions - IPMVP

- Basic concepts of measurement and verification (energy savings and how to measure them)
- Examples of M&V of specific energy saving projects (and **use of the four M&V options**)
- **Planning of M&V**:
  - setting the **measurement boundary**, independent variables influencing the level of energy savings, setting the **measurement baseline**, measurement equipment
  - **Data analysis and statistical analysis**
  - Applying Energy Prices to Value Savings, Uncertainty
  - **The M&V plan**
- Hot topics - Missing Data, M&V Budget, **Baseline Adjustments**, Verification
- Details of the four M&V options
- Summary - Adherence to IPMVP, Selecting an Option

Trainings: some reactions

- Participant reactions:
  - "Trainings of good quality"
  - "Would like to learn more" (*reaction at one of the shorter trainings*)
  - "Quality of the training was good, and it was clear that the trainer also practically understood the issue"
  - "Would be good to have more practical examples"
  - "Training was on a very high level, but I missed an example of an implemented EPC project in *the Czech Republic*"
  - "Measurement and verification is a key evaluation tool of energy management. The gained information is not only useful for EPC, but gives a good basic knowledge about energy savings in general"
  - "It would be good to continue to present this further to the key stakeholders, clients of ESCOs"

Trainings: general results

- IPMVP trainings
  - Very useful for stakeholders responsible for investments in public sector (with little experience in energy efficiency) – learned how these projects work, how to look at offers from ESCOs
  - M&V is an opportunity for energy professionals wishing to offer a new product (especially for energy auditors)
  - Some ESCO experts, however, emphasized the difference between theory (IPMVP) and practise

- IEEFP trainings
  - Financiers see M&V as a form of quality control for proposed projects
  - Financiers showed great interest in the mechanisms of Energy Performance Contracting (and current practise)
  - Suggestion to include M&V in evaluation of projects financed through Structural and Cohesion Funds (Operational Programmes for energy savings projects)

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Results and lessons learned from the PERMANENT project

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Key project results

– About 1500 energy efficiency professionals, energy end-users and financiers received training in measurement and verification and performance risk management. An additional 1500 persons attended awareness presentations on measurement and verification and performance risk management

– Adaptation of IPMVP to European and national circumstances and adding national Annexes (for Czech Republic, Poland, Romania, Bulgaria and Croatia).
– Translation of IPMVP and IEEFP into five European languages (Czech, Polish, Romanian, Bulgarian and Croatian)
– No. of trainers from PERMANENT are now CMVP (Croatia, Bulgaria), others will soon follow

Main project achievements

- Recognition amongst energy users, financiers and emerging ESCOs of the need for measurement and verification (M&V) of energy efficiency projects.
  - *Increased credibility and transparency of these projects.*
  - *Participants commented that trainings have helped them to understand why M&V is important*
- Increased interest in ESCO mechanism and/or the wisdom of following IPMVP in public buildings, in specialised EE funds, and in National Energy Efficiency Action Plans. Also in countries with little knowledge in EPC (such as Poland)
- In the Czech Republic, the coordinator´s country, the Association of ESCOs decided to ***adopt IPMVP as the official methodology*** for measurement and verification of Energy Performance contracts results.
- The project actively promoted an independent view and discussion forums for both private and public players to learn about IEEFP and IPMVP methods, created awareness from an unbiased source and raised understanding

Lessons learned

- M&V is a relatively new topic, awareness raising needed before training towards all stakeholders (EE experts, energy users, etc.)
- Getting commitment from the key country stakeholders before the trainings proved to be of key importance. Each partner set up a LAG (Local Advisory Group).
    - E.g. ENVIROS has involved the Czech APES from the beginning that commented on the Czech language version of IPMVP and also committed to send their staff to the 2-day IPMVP training. ESCOs finally agreed that an M&V plan should become part of the EPC model contract.
- Level of knowledge of target groups differed among countries. In some (e.g. Czech Republic) ESCOs were reached and their staff was trained. In others, such as Poland, Romania, the trainings were more about raising awareness.
- Focus of each partner was on slightly different target groups and not all target groups recognised the need for M&V (both in technical and financial sector)

Lessons learned – technical issues

- Interesting interaction with technical experts, recognition that IPMVP is useful, but at the same time seeing a lot of practical problems that makes it difficult to apply IPMVP exactly as the protocol mentions.
- Examples of practical problems raised:
  - How to calculate the baseline, this is time demanding, especially when not all data are there (e.g. some parameters are not measured)
  - Accuracy, deviation and other statistical parameters. This becomes difficult, especially when there are more parameters to take into account.
  - Complex projects regarding IPMVP are especially in industry, hospitals are another example of complex projects
  - In schools and recreational facilities like hotels it is easier to apply IPMVP.
- Experts recommend detailed processing of M&V plan even if it is more expensive („more certainty“ of energy savings and thus saver investment), investors more care about initial costs.

PERMANENT – example of success story – Czech Republic

- Standard Energy Performance Contract and its Annexes are being updated in 2012 in the Czech Republic, the annexes will accommodate IPMVP and its M&V Plan.
- IPMVP training continuation will be needed in the Czech Republic in order to educate new members of Association and also new clients to energy services.
- Czech Banks would also welcome existence of CMVPs (Certified Measurement & Verification Professionals) for external evaluation of energy efficiency and renewable projects.
- Efforts are being made by the Association of energy service companies to extend Energy Performance Contracting and use of energy services in the state budgetary organisation, verification of savings being based on IPMVP.

Discussion

- Can M&V decrease the distrust barrier in energy saving projects?
- Where can we expect demand for M&V?
- M&V to be included as mandatory tool in grant programme evaluations?
- Are all requirements of IPMVP acceptable for ESCO firms (accuracy of measurements and mandatory measurements in all cases)?
- Including M&V means increased costs for project preparation (and what cost increase is acceptable)?
  - ***Need to find the optimal balance between increased accuracy and cost increase***

Thank you for your attention!

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