



ANNUAL REPORT
2019

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MESSAGE FROM THE CHAIRMAN



2019 was again an exciting year for EVO. When we look back, we see the many accomplishments that pushed EVO further. When we look ahead, we see many opportunities to increase our contribution and impact to meet our mission.

EVO is the home of IPMVP, and as such, is the natural guardian of international knowledge and best practices on measurement and verification (M&V). Among others, we saw that the publication of the IPMVP Core Concepts in 2016 was instrumental in increasing the dissemination of this reference document worldwide and increasing its adoption and use internationally in all market spheres.

In 2019, we continued and built on our training programs and the Certified Measurement and Verification Professional (CMVP®) program. We can be proud to have extended such activities to many new countries in Asia, Europe, and the Middle East.

We also launched the Certified Energy Savings Verifier (CESV®) program that will fill a significant gap in the market. The new certification, now thoroughly tested, is ready for deployment around the world.

On the same topic, we invested significant effort in completing the revision of our instructor program, so all the training activities we conduct around the world benefit from improved training skills and newly revised material. The feedback received has been impressive, and we know that this must remain a continuous process to enable us to go forward with our international leadership role in M&V capacity building.

Through many new publications, EVO's impact continues to grow during the year. Among others, our online magazine, M&V Focus, has been a huge success and demonstrated the interest of so many stakeholders in our contribution to the energy efficiency world.

Energy efficiency is now well recognized as the most relevant activity related to climate change mitigation. M&V must thus continue to play a central role in ensuring initiatives and actions taken will generate the expected financial and environmental benefits.

In 2019, EVO elected to expand its partnerships with different stakeholders to increase the impact of M&V in the marketplace. Indeed, the release of our new unsolicited proposal mechanism where organizations from public and private sectors can request the technical support of EVO has been an important step that will bring many benefits in the years to come.

These efforts already generated benefits in 2019, with new partnerships and initiatives:

- In collaboration with Natural Resources Canada, we launched an initiative to revamp the International Energy Efficiency Financing Protocol (IEEFP). The process will continue in 2020, with training activities scheduled in various locations in the country. Dissemination internationally in several languages will follow up soon after that.
- A new guide on Advanced M&V is currently in development with the support of the Bonneville Power Administration and Seattle City Light.
- Also, in the field of advanced M&V, we continued our collaboration with Lawrence Berkeley National Laboratory and launched our Advanced M&V Tool Testing Portal. Software developers and vendors can use the portal to benchmark against others in the industry.

In 2019, our strategic planning led to some critical discussions on EVO's long term direction:

- A significant part of the Board activities consisted of thinking about the future of EVO and how we could expand EVO's operations and increase our impact.
- We invested a lot of time assessing how we could increase our role in Europe and in the United States, where energy efficiency is central to the achievement of energy security and economic resilience. Such work should bring new actions by EVO in the years to come.
- We initiated a revision and analysis of all our internal policies and procedures. This administrative revamping is necessary to allow us to be more efficient in our management practices.
- Updated and newly created policies were needed to enhance the flexibility in our existing and emerging partnerships.

On a personal note, at the end of 2019, I completed my two-year mandate as chairman of the board. After serving the organization for 15 years, acting as vice chairman for five years, and now as chairman for two years, it is time for me to pass the torch to others.

I would like to thank fellow board members whom I had the chance to work with over the years. I am grateful to board members who, in the past few years, entrusted me to lead the organization as vice chairman and chairman. Many thanks as well to the extended EVO "family" for their support and continued contribution to developing the organization.

I will remain on the board as past chairman to support our new Chairman, Mark Lister, that I congratulate for his appointment, and I will continue to support EVO in achieving its mission in the years to come.



Pierre Langlois
Chairman

GOVERNANCE

Board of Directors

(As of December 31, 2019)

EVO's Directors are selected with the objective of securing Directors representing a geographic and demographic cross-section of users of EVO Protocols.



Chair
PIERRE LANGLOIS
President, Econoler
Canada



Vice Chair
NEIL SALISBURY
Managing Director
Point Advisory
Australia



Past Chair and Treasurer
THOMAS K. DREESSEN
Chief Executive Officer
EPS Capital
Indonesia



Secretary
MARK LISTER
Asia Clean Energy Partners
Limited
Australia



PHIL COLEMAN
Lawrence Berkeley National
Laboratory (LBNL)
United States



DONALD GILLIGAN
President of the National
Association of Energy Service
Companies (NAESCO)
United States



DR. JAN ROSENOW
Director of European
Programmes
Regulatory Assistance Project
United Kingdom



YAMINA SAHEB
Senior Energy and
Climate Policy Analyst
OPENEXP
France



LAURA VAN WIE MCGRORY
Strategic Initiatives
Alliance to Save Energy
USA

Staff

EVO's day-to-day operations are performed by staff located in Montréal (Canada), Mexico City (Mexico) and Sofia (Bulgaria) with complementary administrative, legal and accounting resources in Washington DC (United States).



DENIS TANGUAY
Executive Director
Canada



DESLAVLA BORISOVA
Training Director
Bulgaria



MONICA PEREZ ORTIZ
Director of Programs
Mexico

EVO'S COMMITTEES

IPMVP Committee

The IPMVP Committee serves as EVO's authority on state of the art in M&V and acts as the guardian of the IPMVP Core Concepts. It is responsible for all technical aspects of EVO publications and educational materials in the field.

Committee members have technical credentials in energy efficiency and M&V. The committee's makeup reflects a balance of energy users, energy suppliers, energy efficiency service suppliers, verifiers of energy savings reports, measurement equipment suppliers, and academics.

Specifically, the IPMVP committee:

- updates the IPMVP Core Concepts and related application guides;
- helps maintain all M&V related EVO publications and EVO technical materials on the website;
- responds to requests for clarifications changes or additions in EVO's technical documentation;
- obtains external review of EVO M&V publications as needed;
- recommends M&V related documents for publication;
- supports appropriate programs and procedures to promote the continued development and dissemination of good M&V practice;
- reviews and approves M&V related training materials used by EVO;
- participates in M&V associated forums on the EVO website;
- monitors publications by others and public discussions on M&V topics;
- recommends listings of any relevant resources of interest to the M&V community on the EVO website; and,
- identifies and implements the development of new M&V materials for inclusion in the EVO family of documents and the EVO web site.

EVO's Flagship protocol is the IPMVP Core Concepts that provides the general M&V framework and structure. It gives the general direction to select the IPMVP options that best fit an energy efficiency project, and to prepare and deploy the relevant IPMVP adherent M&V plans.

In 2019, the IPMVP Committee's work was noticeable through nine subcommittees, each of them engaged in the development or improvement of application guides, companion documents to the IPMVP Core Concepts. These application guides take a more in-depth look at specific M&V issues and provide additional guidance to M&V professionals.

The following sub-committees were particularly active in 2019:

- M&V for Energy Performance Contracting
- Statistics and Uncertainty for IPMVP
- Non-Routine Adjustments
- Advanced M&V
- M&V Plans
- IPMVP and Water Application
- Evaluation Measurement & Verification
- IPMVP and Renewables
- CMVP Exam and Training

The IPMVP committee welcomed Phil Combs as a new member in May 2019. A revised version of the Statistics and Uncertainty application guide was released in July. The purpose of the revision was to harmonize the terminology and equations with the *M&V Fundamentals and IPMVP for Energy Managers* course.

The Non-Routine Adjustments and the Advanced M&V sub-committees were created in 2019 to engage in a more in-depth discussion on a new and rapidly developing

M&V practice area spurred by the recent widespread adoption, in specific markets, of advanced metering infrastructure. The work of these committees will be presented in a white paper to be published in early 2020 and followed by one or two application guides later during that year.

Training Committee (TC) and Extended Training Committee (ETC)

The training committee is mostly responsible for establishing procedures to help in the day to day management and delivery of M&V training and certification. More specifically, and in cooperation with EVO staff, the TC coordinates EVO's training development and operations.

The TC establishes and maintains procedures for the mentoring of new M&V instructors. It maintains qualification criteria for EVO instructors and has the final authority to select suitable instructor candidates. The TC reviews training event evaluations and responses from trainees, clients, and instructors.

The ETC was formed in 2015, and it is composed of a group of EVO instructors. The primary role of the ETC is to assist the TC as EVO's training program is growing and discussing the best approach to incorporate changes made in the IPMVP core documents into the training material. The ETC is also very active in creating complementary learning tools and guidelines to assist instructors and trainees during training delivery.

The TC and the ETC identify the need for new M&V training products or services and recommend to the EVO board of directors any proposed contract to develop such. They review and discuss exam results to determine whether any changes are needed in the training or examination materials.

Members of the TC and the ETC were very proactive throughout 2019 with the deployment of many capacity-building activities.

TC members mentored three new L4* instructors in 2019:

- Sandeep Dahiya, from India, was approved in January
- Agenor Gomez Garcia, from Brazil, was approved in May
- Bruce Rowse, from Australia, was approved in October

The following L3 instructors were also mentored and approved in 2019:

- Thamer Alquthami and Abdullah Alabdulkarem, from Saudi Arabia, were approved in January
- Nadège Richard and Vanessa Tirado Lopez, from Mexico, were approved in September
- José Eduardo Nunes da Rocha and Fabio Antonio Filipini, from Brazil, were approved in December.

Members of the ETC and TC committees, in cooperation with instructors from around the world, completed a full review of the *M&V and IPMVP for Energy Managers* course material. Updated references to newly published application guides were also highlighted, as well as the need to harmonize terminology and equations with different application guides. The training material will be revised accordingly in early 2020.

The ETC continued its work to develop advanced training material and masterclasses on a variety of topics. In 2019, three sub-committees on *Option C*, on *Uncertainty*, and on *Best Practices for Metering* were active with members drawn from the L3 instructors' pool.

Responding to a repeated demand from our training classes participants, the ETC developed a series of 60 general M&V knowledge questions. This new learning product aims at helping training participants self-assess their understanding of the theoretical content of the IPMVP Core Concepts but also the application of the IPMVP's four options in real-life situations.

Webinars and masterclasses presented in 2019:

- M&V for Chiller Replacement
 - 2nd session — by Sandeep Dahiya (January)
- Instructor Webinar — by ETC Members (May)
- Making Baseline Adjustments
 - by Todd Amundson (May)
- Direct rebound effects in industrial M&V applications — by Eric Mazzi (September)
- Delivering a Quality Performance Contract and Project — by Jim Bradford (October)
- The Great Energy Predictor Competition III — by Chris Balbach (October)
- RETScreen and the IPMVP — by Stéphanie Nour (December)

* Please see page 22 for a description of the L3 and L4 requirements.

TC/ETC – IPMVP Discussion Group

The TC/ETC – IPMVP Discussion Group was established in 2017 to create a channel between the TC and the IPMVP committees mostly to address common issues and concerns emerging from the changes and additions to the IPMVP Core Concepts and various application guides.

EVO's instructors deliver an average of 60 classes per year and reach out to 800-1000 trainees annually. Through their interactions with trainees, instructors receive a multitude of comments and questions regarding various technical aspects of the IPMVP Core Concepts. To ensure that the training material reflects well the technical content of the IPMVP Core Concepts, the TC wanted to have an official viewpoint from the authors of the protocol, hence the establishment of the discussion group.

In 2019, the group discussed a variety of topics such as uncertainty, static factors, non-routine adjustments, M&V Plans template, CMVP exam questions, etc. The discussion on uncertainty led to the revision of the *Uncertainty Assessment for the IPMVP* application guide to match the training material – an essential improvement to EVO's documentation.

The group also discussed the opportunity to create a sub-committee on Sensitivity Analysis and Auto Calibration. There seems to be an appetite in the international M&V community for an in-depth discussion on this topic and potentially the development of a white paper and an application guide. The idea will be further discussed in 2020.

Training Committee



Chair
DANIEL MAGNET

M&V Expert and Facilitator
EPC and DSM projects
France



Vice Chair
ANTONIO MIRANDA

M&V Expert, Commercial
and Industrial Sectors
Spain



STEVE KROMER

Energy Efficiency Consultant
Chairman of CMVP Board
USA

A sincere word of thanks!

EVO is the world's only organization solely dedicated to a mission of providing tools to quantify energy efficiency business transactions.

EVO's Vision is to create a world that has confidence in energy efficiency as a reliable and sustainable energy resource. The Vision is translated into EVO's Mission to ensure that the savings and impact of energy efficiency and sustainability projects are determined through appropriate measurement and verification.

All the words in the above paragraph are important. But there are three that stand out: confidence, reliable, and appropriate. EVO's success is based on the fact that stakeholders, globally, are confident that the appropriate M&V framework and methods contained in the IPMVP and related products are reliable.

The IPMVP is recognized as the "mother" of all M&V protocols. The IPMVP is a living document, maintained and adapted by volunteers. In addition, knowledgeable instructors teach IPMVP technical content in many different languages around the world.

Without the commitment of all the individuals whose names appear in the following pages, EVO would not be able to deliver its mission.

In my name, and in the names of my work colleagues, Desi and Monica, I wish to express a big collective **Thank You!** to all volunteers who contribute their time and their in-depth knowledge of M&V to make EVO a successful organization.

Denis Tanguay
Executive Director

Extended Training Committee



Chair
BRUCE ROWSE
Consultant
8020Green
Australia



CHRIS BALBACH
VP of R&D
Performance Systems
Development
USA



PAUL CALBERG-ELEN
Energy Engineer
Biomasse Normandie
France



MARCO CORREIA
Senior Technician
Agência para a Energia
(Portuguese Energy Agency)
Portugal



SANDEEP DAHIYA
Freelance Energy Engineer
India



KAR KIT CHU (GARY)
Energy Consultant
New Vector Engineering Design
& Consultancy Co., Ltd.
Hong Kong



DANIELE FORNI
Chief technical officer
Federazione Italiana per l'uso
Razionale dell'Energia
Italy



AGENOR GOMEZ PINTO GARCIA
Technical Director
CTC Experts
Brazil



RAJVANT NIJJAR
Principal
iVEES
United Kingdom

IPMVP Committee



Chair
TRACY PHILIPS
7th Gen Energy
Solutions
USA



Vice Chair
MARGARET SELIG
Siemens Government
Technologies
USA



TODD AMUNDSON
Bonneville Power
Administration
USA



JIM BRADFORD
Mesa Point Energy
USA



ELLEN FRANCONI
Pacific Northwest
National Laboratory
(PNNL)
USA



DAVID JUMP
kW Engineering
USA



SAMI KHAWAJA
Cadmus Group Inc.
USA



BILL KORAN
Quality Energy
Analysis
USA



DAVID KORN
Ridgeline Energy
Analytics
USA



KEN LAU
BC Hydro
Canada



CHRISTIAN LEMIEUX
Econoler
Canada



GREGORY BONSER
Independant Electricity
System Operator (IESO)
Canada



LUIS CASTANHEIRA
ICP Europe
Portugal



PHIL COMBS
Trane Energy Services &
Controls
USA



SHANKAR EARNI
Lawrence Berkeley
National Laboratory
USA



ERIC MAZZI
Mazzi Consulting
Services
Canada



SCOTT NOYES
iEnergy
New Zealand



CHRISTOPHE RODRIGUEZ
dalkia smart building –
Groupe EDF
France



JESSI SMITH
Demand Side
Analytics
USA



KEVIN WARREN
Warren Energy
Engineering
USA



JIM ZARKSE
Nexant
USA



LIA WEBSTER
Facility Energy
Solutions
USA

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graph TD; IPMVP[IPMVP COMMITTEE] --> TC_ETC_IPMVP[TC/ETC – IPMVP]; IPMVP --> IPMVP_SC[IPMVP SUB COMMITTEES]; TC_ETC_IPMVP --> TC[TRAINING COMMITTEE]; TC_ETC_IPMVP --> ETC[EXTENDED TRAINING COMMITTEE]; TC_ETC_IPMVP --> TC_ETC_SC[TC /ETC SUB COMMITTEES]; IPMVP_SC --> TC_ETC_IPMVP; IPMVP_SC --> TC_ETC_SC; TC_ETC_IPMVP --> INSTRUCTORS[INSTRUCTORS]; INSTRUCTORS --> TC_ETC_SC;
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The diagram illustrates the organizational structure of the IPMVP program, organized into three vertical columns: Blue (left), Orange (center), and Grey (right).

- Blue Column:**
 - IPMVP COMMITTEE** (top circle)
 - IPMVP SUB COMMITTEES** (bottom circle, containing a list of sub-committee areas):
 - M&V FOR EPC
 - STATISTICS AND UNCERTAINTY
 - NON ROUTINE ADJUSTMENTS
 - ADVANCED M&V
 - M&V PLANS
 - WATER APPLICATIONS
 - CMVP EXAM AND TRAINING
 - EM&V
 - RENEWABLES
- Orange Column:**
 - TC/ETC – IPMVP** (center circle)
- Grey Column:**
 - TRAINING COMMITTEE** (top circle)
 - EXTENDED TRAINING COMMITTEE** (middle circle)
 - INSTRUCTORS** (bottom circle)
 - TC /ETC SUB COMMITTEES** (bottom circle, containing a list of sub-committee areas):
 - OPTION C
 - UNCERTAINTY
 - BEST PRACTICES FOR METERING

Flow and Relationships:

- The **IPMVP COMMITTEE** (Blue) has arrows pointing to the **IPMVP SUB COMMITTEES** (Blue) and the **TC/ETC – IPMVP** (Orange).
- The **IPMVP SUB COMMITTEES** (Blue) has an arrow pointing to the **TC/ETC – IPMVP** (Orange).
- The **TC/ETC – IPMVP** (Orange) has arrows pointing to the **TRAINING COMMITTEE** (Grey), **EXTENDED TRAINING COMMITTEE** (Grey), and **TC /ETC SUB COMMITTEES** (Grey).
- The **TRAINING COMMITTEE** (Grey) has an arrow pointing to the **EXTENDED TRAINING COMMITTEE** (Grey).
- The **EXTENDED TRAINING COMMITTEE** (Grey) has an arrow pointing to the **INSTRUCTORS** (Grey).
- The **INSTRUCTORS** (Grey) has an arrow pointing to the **TC /ETC SUB COMMITTEES** (Grey).

IPMVP COMMITTEE

Tracy Phillips, Chair
Maggie Selig, Vice Chair
Bill Koran
Christian Lemieux
Christophe Rodriguez
David Jump
Dave Korn
Ellen Franconi
Eric Mazzi
Jesse Smith
Jim Bradford

Jim Zarske
Ken Lau Kevin Warren
Lia Webster
Luis Castanheira
Sami Khawaja
Shankar Earni
Todd Amundson
Phil Combs
Greg Bonser
Scott Noyes

IPMVP SUB COMMITTEES

M&V FOR EPC

Christian Lemieux
Shankar Earni
Jim Zarske
Luis Castenheira
Christophe Rodriguez
Phil Combs
Scott Noyes

STATISTICS AND UNCERTAINTY

Sami Khawaja
Kevin Warren
David Jump
Bill Koran
Dave Korn
Eric Mazzi
Jesse Smith

NON ROUTINE ADJUSTMENTS

Todd Amundson
Eric Mazzi
Bill Koran
Maggie Selig
Tracy Phillips
Steve Kromer
Chris Balbach
Shankar Earni
Andrew Cressman
Ken Agnew
Jessica Granderson
Pete Jacobs
Dan Bertini
Hassan Shaban

ADVANCED M&V

Lia Webster
David Jump
Maggie Selig
Sami Khawaja
Kevin Warren
Bill Koran
Jim Bradford
Shankar Earni
Ellen Franconi
Todd Amundson

M&V PLANS

Shankar Earni
Christian Lemieux
Jim Bradford
Christophe Rodriguez
Scott Noyes

WATER APPLICATIONS

Jim Zarske
Jesse Smith
Steve Cofer
Phil Combs

CMVP EXAM AND TRAINING

Luis Castenheira
Tracy Phillips
Bill Koran
Eric Mazzi

EM&V

Kevin Warren
Jim Bradford
Ken Lau
Christophe Rodriguez
Todd Amundson

RENEWABLES

(Currently in reformation)

TC/ETC — IPMVP

(TC/ETC)

Daniel Magnet
Steve Kromer
Chris Balbach
Daniele Forni
Gary Chu
Paul Calberg-Ellen

(IPMVP)

Tracy Phillips
Todd Amundson
Maggie Selig
Lia Webster
Bill Koran
Eric Mazzi
Luis Castanheira

TRAINING COMMITTEE

Daniel Magnet
Antonio Miranda
Steve Kromer

INSTRUCTORS

See page 23

EXTENDED TRAINING COMMITTEE

Bruce Rowse
Sandeep Dahiya
Daniele Forni
Agenor Gómez García
Gary Chu
Rajvant Nijjar

TC ETC SUB COMMITTEES

OPTION C

Sandeep Dahiya
Chris Balbach
Paul Calberg-Ellen
Marco Correia

UNCERTAINTY

Agenor Gómez García
Sandeep Dahiya
Gary Chu

BEST PRACTICES FOR METERING

Daniele Forni
Sandeep Dahiya
Marco Correia
Bruce Rowse

HIGHLIGHTS

EVO in Action — 2019 Timeline



FEBRUARY

- Release of a new IPMVP application guide:
Measurement & Verification — Issues and Examples, IPMVP EVO 10300: 1:2019.

The application guide presents a variety of project types and discusses the key M&V design issues arising from the described situations.

MARCH

- Announcement of the creation of an IPMVP application guide on non-routine events (NRE) and non-routine adjustments (NRA). A sub-committee was pulled together in the second half of 2018 in response to significant interest from the industry in NRA and NRE and their role in individual projects as well as program-scale efforts such as pay-for-performance applications.
- EVO and the Association of Energy Engineers (AEE) signed two multi-year agreements covering training and CMVP certification activities, reconducting their cooperation on the international deployment of the CMVP program. The CMVP program was established with the dual purpose of recognizing qualified professionals and to raise the professional standards within the measurement and verification field.

APRIL

- Signature of an international contribution agreement with the Government of Canada's Department of Natural Resources to update the **International Energy Efficiency Financing Protocol (IEEFP)**. An important part of this revision process includes the creation of a Canadian Annex which will reflect the current Canadian banking and financing practices of financial institutions and energy services companies (ESCOs), among others.
- Official launching of a self-service online test portal for commercial advanced M&V tools (i.e. M&V tools/methods applicable to commercial buildings' hourly consumption data). The portal is being licensed from Lawrence Berkeley National Lab.
- EVO's Executive Director participated in the 5th Retrofit Tech MENA Summit in Dubai. He made a presentation on examining the different spectrum of financing solutions for retrofitting programs and participated in the conference opening panel.
- EVO's Executive Director met with representatives of KAESCO (the Korean ESCO Association) to discuss enhancement of the CMVP training program in Korea. KAESCO has been EVO's national Training Partner in Korea since 2016. The organization has been instrumental in promoting M&V in Korea. KAESCO translated the IPMVP Core Concepts in Korean language in 2017 and the **M&V Fundamentals and IPMVP for Energy Managers** course material.
- EVO and the Korean Foundation for Quality (KFQ) signed an MOU in Seoul. The purpose of the MOU is to establish mutual cooperation towards meeting the UN Sustainable Development Goal through disseminating energy efficiency M&V as defined in the IPMVP. More specifically, the MOU establishes areas of cooperation in various areas of measurement and verification including: sharing knowledge on energy M&V trends, joint research with the purpose of documenting case studies and methodologies and education and training.

MAY

- Nomination of Dr. Jan Rosenow, Director of European Programmes at the Regulatory Assistance Project (RAP), and of Donald Gilligan, President of the US National Association of Energy Services Companies (NAESCO) to the EVO Board of Directors. Patty Fong, who has been serving on the Board of EVO over the past year, resigned from the Board of EVO. Before leaving the Board, Patty accepted to lead a stakeholder survey and to initiate the discussions leading to EVO's next three-year strategic plan.

JUNE

- EVO co-organized a deep dive workshop on M&V during the Asian Clean Energy Forum. The objective of the session was to provide take-home solutions to the global M&V barrier on energy efficiency projects. Mark Lister, EVO's Board Secretary presented an overview of the IPMVP and Thomas Dreessen, EVO's Past-Chair and Treasurer provided details on the **Certified Energy Savings Verifier** program.
- EVO and other European partners worked together to organize a panel on energy performance contracting during the 2019 European Sustainable Energy Week. The purpose of the event was to demonstrate that EPC represent one of the most cost-effective tools for the reduction of energy consumption and CO₂ emissions in buildings. EVO's chairman, Pierre Langlois, closed the panel discussion with a presentation on the key role of M&V in demonstrating real savings in EPCs and other EE programs to give them credibility and the importance of using a reliable and recognized protocol, developing experts' capacity to use it.
- EVO committee members, Board members and staff met in Washington during EE Global. EVO also held a side event with participation from the EVO US M&V Task Group with conference participants also in attendance. EVO committee and Board members presented an update of various IPMVP application guides currently in preparation.
- A consultation workshop is held in Toronto to discuss update of the IEEFP and define the general framework of the accompanying Canadian Annex.

JULY

- Release of a revised version of the application guide ***Uncertainty Assessment for IPMVP (EVO 10100: 1:2019)***. The purpose of this updated publication was to harmonize its content with EVO's three-day course on ***M&V Fundamentals and IPMVP for Energy Managers***.
- EVO's new Training Organizer in Korea, the Korean Foundation for Quality, organized its first CMVP course. Participants in the session included a professor, researchers, energy consultants, an ISO auditor, a building energy evaluator and energy managers from large companies.

AUGUST

- EVO awards a contract to translate the ***IPMVP Core Concepts*** and the ***M&V Fundamentals and IPMVP for Energy Managers*** course into Dutch language.
- EVO launches a beta version of its EVO Course Management System (ECMS).

OCTOBER

- Publication of a new protocol on third-party equipment certification. Third-party certification represents an extra tool to performing operational verification in confirming the potential for the equipment to perform and generate energy savings. Equipment whose performance is third-party certified offers an additional risk reduction guarantee that can potentially prevent numerous problems that could undermine productivity, the lifeblood of a plant or factory. Consistent and efficient operational performance can reduce operational issues and energy consumption.
- Two workshops are organized in Toronto and Montréal to discuss the first draft of the revised IEEFP and of the Canadian Annex. Participants from financial institutions, energy services companies, private and public investment funds, and insurance companies provided valuable comments.
- Publication of an EVO position statement on deemed savings. The statement was issued to clarify that deemed savings is not a measurement and verification method, and that it should not be relied upon to reflect an energy efficiency project's achieved savings.

NOVEMBER

- The Federazione Italiana per l'uso Razionale dell'Energia (FIRE) presented the fourth edition of their M&V conference organized in parallel with Key Energy 2019 in Rimini, Italy. The event was a true success. This year, the event took on an international dimension, with the participation of the executive director of EVO, Denis Tanguay, who presented the results of an international survey on measurement and verification and current updates of the IPMVP and development of new application guides. Daniel Magnet, chairman of EVO training committee, presented four energy efficiency projects completed in Geneva, Paris, Lyon, and Brussels, which required M&V based on the IPMVP.
- EVO awards a contract for the development of a new training course on ***M&V Planning***. This new two-day course expands current training material to include practical examples on how to prepare an M&V Plan adherent with the ***IPMVP Core Concepts 2016***.

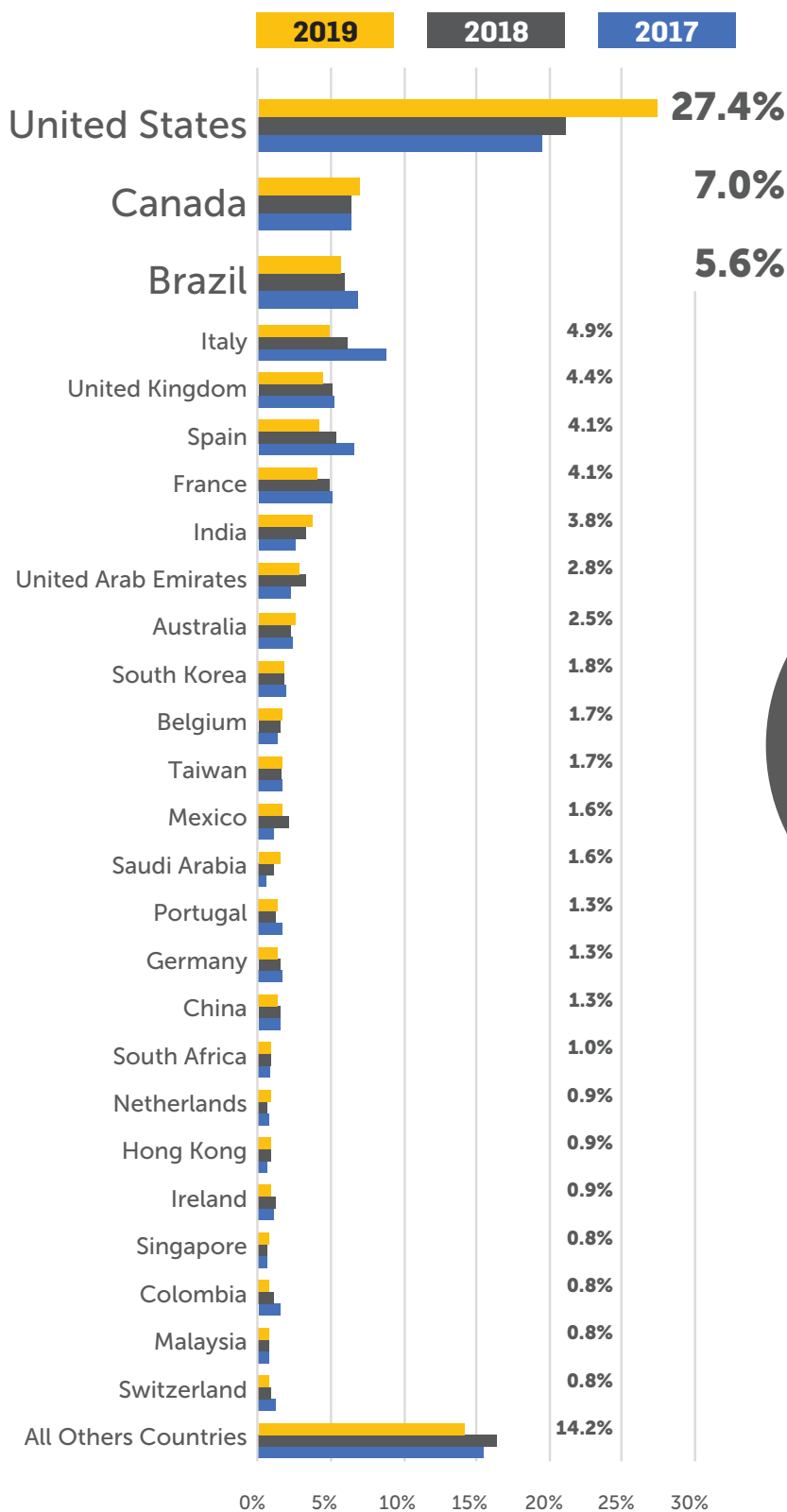
DECEMBER

- EVO issued an international request for expression of interest to identify new training partners and to expand the delivery of its training programs in new countries and in new languages. EVO's training activities are currently delivered in English, French, Spanish, Portuguese, Italian, Korean, Dutch, Mandarin and German.
- Training Organizer Agreement signed with PECO Energy for delivering of CMVP trainings in Egypt, Tunisia and Morocco.

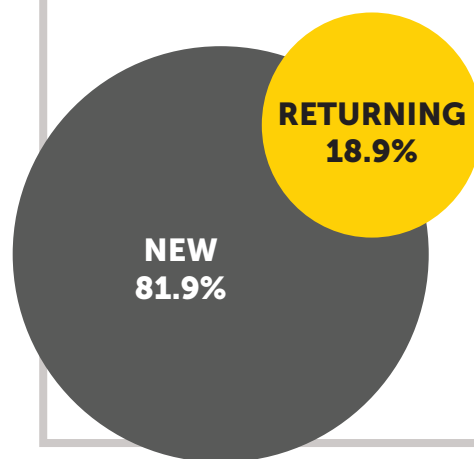


EVO Website Visitors

Website Visitors by Region



Website Visitors by "New" & "Returning Visitors"



Website KEY FACTS

Visitors from **176** countries

425,897 pageviews –
up **22.5%**

Number of users up **18.7%**

Number of sessions up **15.5%**

New users up **19.3%**

M&V Focus

EVO's Measurement & Verification Magazine

After the successful introduction of our online magazine, M&V Focus, in 2018, we published two more issues in May and October 2019. Following strong demand from our readership, EVO presented its first multilingual issue of M&V Focus in May with articles in English, French, Spanish, and Portuguese (Brazil).

EVO sought to publish innovative and original articles that address various issues related to measurement and verification of energy efficiency projects, water savings applications, renewable energy production, climate change claims, and other related topics.

Because of our extensive outreach to various stakeholders interested in different aspects of M&V, we consider various types of articles for publication in M&V Focus, including case studies, research results, academic and education-oriented, feature, opinion, interviews, and debates.

In 2019, our magazine content came from Australia, Brazil, Canada, France, Spain, the United Kingdom, and the United States.



Issue No. 4 — February 2019



**EVO M&V Industry Survey -
Some Key Findings**
Data reported by EVO Staff



RETScreen — A Powerful Tool for M&V

*Kevin Bourque, Natural
Ressources Canada - RETScreen
International*



Fronteira de Medição - Parte 1

*Agenor Garcia, CTC Experts.
Bruce Rowse, 8020Green*



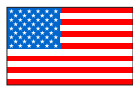
Perspective on M&V Behavioral Change Programs in Commercial and Industrial Facilities

*Eric Mazzi, Mazzi Consulting
Services.*



¿Cuál es la mejor opción del IPMVP? Opción C vs Opción A y 1.500 Mwh de diferencia en ahorro

*Maria I. Cubillo, SinCeO2
Consultoría Energética*



The Role of Real Time Data in Monitoring & Verification

Eric Oliver, 2RW



Coupler le comptage «intelligent» à la M&V

*Antoine Gubanski, Laura Salez,
Christophe Rodriguez et Jean-
Benoit Lafond, Dalkia Smart
Buildings.*



Establishing Measurement Boundaries in M&V Projects - (Part II)

*Agenor Garcia, CTC Experts.
Bruce Rowse, 8020Green*



Issue No. 5 — October 2019



**EVO Position Statement on
Deemed Savings**
Presented by EVO Board



Why r2 Doesn't Matter

Mark Stetz, Stetz Consulting LLC



Modeling Relative Occupancy

Greg Anderson, Gridum



A Two-Tier Approach to Affordable M&V

*Colin Granville, Erebus
Environment Ltd..*



M&V for Deep Retrofit Projects in Europe

Alex Rathmell, EnergyPro



Évaluation du coût du risque pour le maître d'ouvrage et le fournisseur de services dans le cadre d'un contrat avec garantie de résultats énergétiques – Article de synthèse

*Paul Calberg Ellen, Biomasse
Normandie*



Fronteira de Medição (Parte 2)

*Agenor Garcia, CTC Experts.
Bruce Rowse, 8020Green.*



Advance M&V Testing Portal

There are a growing number of software tools offering advanced M&V capabilities for commercial applications, using interval data. Many use sophisticated modeling techniques, and some vendors want to keep their modeling methods proprietary.

Until now, the target audience for these tools — utilities, for example — have had no way to compare the accuracy and quality of these tools. On the flipside, tool vendors have had no basis for objectively showing the quality of their tool compared to other alternatives.

To fill this gap, Lawrence Berkeley National Lab (LBNL) developed a test procedure to answer the following questions: *how accurate is the tool, and how does it compare to other similar tools?* After many months of development work, EVO took that procedure to market by offering an online testing service as of April 2019.

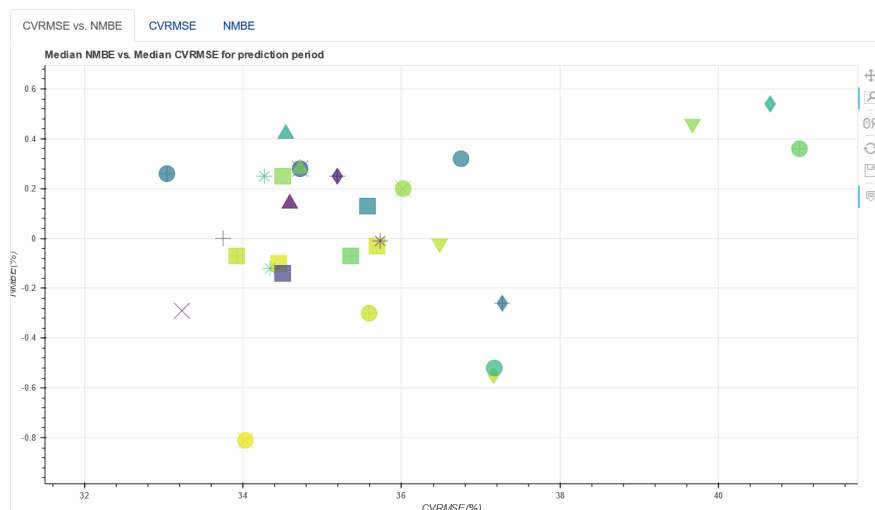
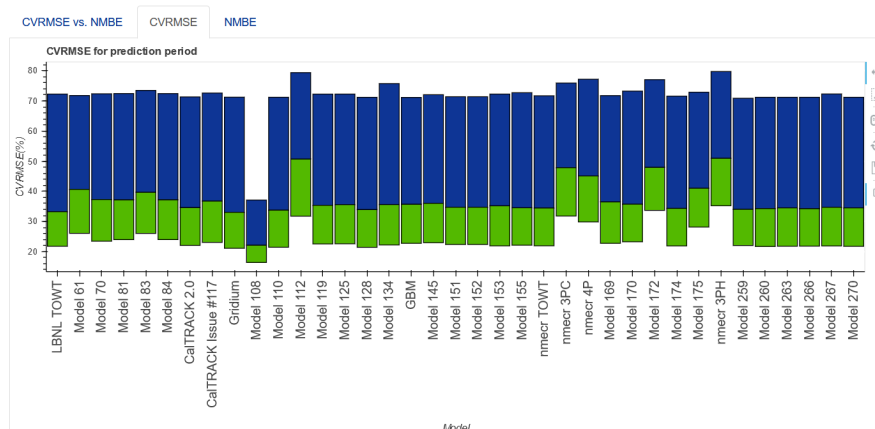
The portal features a three-step process. First, the user downloads the test data set from the online portal, comprising hourly kWh and weather data for 367 buildings, and creates models for each building, covering a 12-month “training period.” Second, using a separate weather data file, the M&V software tool is used to establish modeled kWh values for a distinct 12-month “prediction period” for all buildings in the data set - the user doesn’t get to see actual kWh values for this period. Finally, the user uploads their kWh predictions to the portal and receives their test scores.

Test scores are established with two metrics: normalized mean bias error (NMBE) and CV(RMSE). The users see the median values for those metrics across all of the buildings in the test data set.

The process is more of a benchmarking method than a case of “pass” or “fail.” Test results are posted on the portal so that tools can be objectively compared, and over time we can establish rules of thumb on what constitutes a ‘good’ result.

As a starting point, Berkeley Lab has posted test results using its Time-of-Week and Temperature (TOWT) model. In December 2019, there were more than thirty results displayed on the portal by different users, and they have the option to anonymize the tool name. Since users can add and delete as many of their tests as they want, the number of results displayed at any one time varies continuously. Over one hundred different users had created an account as of December 2019.

This active platform is in the public domain and could be leveraged by utilities to competitively screen tools



CAPACITY BUILDING ACTIVITIES

Training Partners



AFNOR COMPÉTENCES
GROUPE AFNOR



Agência para a Energia

AGENCIA PARA
A ENERGIA



ALLIANCE FOR AN
ENERGY EFFICIENT
ECONOMY



AMENEER

AMENEER



THE ASSOCIATION OF
ENERGY ENGINEERS



AUSTRIAN ENERGY AGENCY

AUSTRIAN ENERGY
AGENCY



BUREAU VERITAS



CANADIAN INSTITUTE
FOR ENERGY TRAINING



CONSEJO
COLOMBIANO
DE EFICIENCIA
ENERGÉTICA



ENERGY EFFICIENCY
COUNCIL



ENERGY EFFICIENCY
VERIFICATION
SPECIALISTS



ENERGY LAB



Energy Management
Association of New Zealand

ENERGY MANAGEMENT
ASS. OF NEW ZEALAND



energy services and technology association

ENERGY SERVICES
AND TECHNOLOGY
ASSOCIATION



FEDERAZIONE ITALIANA PER
L'USO RAZIONALE DELL'ENERGIA

FEDERAZIONE ITALIANA
PER L'USO RAZIONALE
DELL' ENERGIA



GREEN PRODUCTIVITY
FOUNDATION



INDEPENDENT
VERIFIERS OF ENERGY
EFFICIENCY SAVINGS



INTERNATIONAL
INSTITUTE
FOR ENERGY TRAINING



KFQ



KOREA ASSOCIATION
OF ESCO



NATIONAL INSTITUTE
OF METROLOGY



SINERGEIA
BGH & ERGON
ENERGY SOLUTIONS



SGS



SUZHOU INSTITUTE
OF ENERGY
MANAGEMENT (SIEM)



ZHONGGUANCUN
NATIONAL

Update of the International Energy Efficiency Financing Protocol (IEEFP)

The scaling up of energy efficiency measures, particularly in commercial buildings, requires a sound understanding of energy efficiency financing mechanisms adapted for the private sector. The successful scaling up of energy efficiency in buildings requires unlocking funds from private banks and investment funds.

The actual planetary movement towards a low carbon economy is raising the profile of energy efficiency as one of the key energy transition tools. This renewed global focus on energy efficiency convinced EVO's leadership to dust-off the International Energy Efficiency Financing Protocol (IEEFP) and modernize it.

In cooperation with the Government of Canada, through an International Contribution Agreement, EVO initiated a full review of the IEEFP in early 2019. The project includes the creation of a Canadian Annex as well as the development of a training program. Working groups and committees were put together to oversee the process.

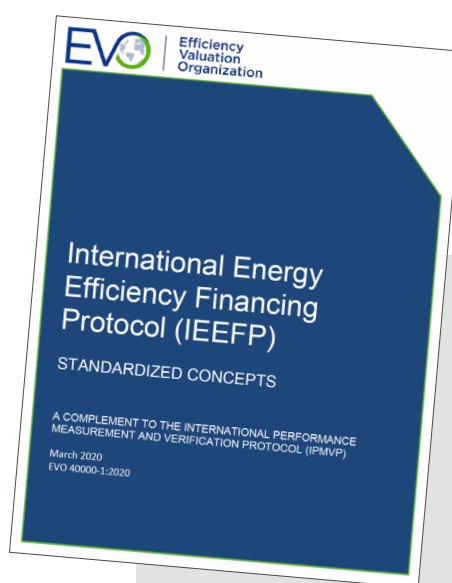
Throughout 2019, EVO staff and consultants conducted interviews with key industry representatives from financial institutions, energy services companies and other private sector stakeholders. A series of workshops were conducted in Toronto and Montréal. The final draft of the revised IEEFP was prepared by the end of 2019.

The IEEFP adds an important tool into the energy efficiency financing discussion. It is a global “blueprint” for educating and training local financial institutions around the world on the specific intricacies, benefits, and risks of financing end-use energy efficiency projects.

An updated and adapted IEEFP will globally contribute to establishing standard and uniform language for energy efficiency financing activities within an independent and neutral protocol framework. Furthermore, it will bridge the language specific to energy efficiency financing with the widely recognized and established measurement and verification concepts of the International Performance Measurement and Verification Protocol (IPMVP).

A robust and well articulated educational program based on this framework – to be piloted in early 2020 – will further address the perspectives of prospective lenders, how to recruit them to this field, and how to develop energy efficiency finance as a profitable new line of business – for all types of projects and financing scales.

The official release of the revised IEEFP and of the training program is planned for the second half of 2020.



In 2004, the UN sponsored a stakeholder workshop in which a broad group of experts in energy efficiency and finance met to discuss barriers to funding energy efficiency projects. The experts agreed that local banks and financial institutions lacked the guidance and expertise to feel comfortable lending money on a cash flow basis to energy efficiency projects.

A consensus was reached that a financing protocol could help to bridge the gap between funding sources and their financing of energy efficiency projects. As the world's only organization solely dedicated to a mission of providing tools to quantify energy efficiency business transactions, EVO agreed to sponsor the creation of the IEEFP. The first version of the protocol was released in 2009.

EVO-Approved Instructors

EVO-approved instructors are M&V experts authorized by EVO's Training Committee to provide trainees with M&V trainings. Instructors are CMVPs and have a teaching background and experience in the field of M&V. They are approved by the Training Committee and must renew their instructor status periodically. Based on the degree of knowledge and expertise in the M&V field, EVO qualifies instructors into three different levels: L2, L3, and L4, each of them with various attributions.

Features and skills of every instructor at the corresponding level

L2 INSTRUCTOR (INTRODUCTORY) – can teach only introductory training (up to 1-day). L2 instructors are CMVPs and have a teaching background and experience in the field of M&V. They have been approved by the Training Committee and must renew their status every three years.

L3 INSTRUCTOR (CMVP) – can teach the *M&V Fundamentals and IPMVP for Energy Managers* course, the prerequisite to writing the CMVP exam. L3 instructors can also teach introductory L2 training. L3 instructors must meet all L2 instructor requirements, and additionally, they must have practical experience in M&V and preparation/implementation of M&V Plans. L3 instructors must go through a mentoring process before being formally approved by the Training Committee. They must renew their status every three years.

L4 INSTRUCTOR (ADVANCED) – can teach advanced M&V training. L4 instructors can also teach introductory classes as well as the *M&V Fundamentals and IPMVP for Energy Managers* course. L4 instructors must meet all L3 instructor requirements. Additionally, they must show an in-depth knowledge in one of the M&V topics. L4 instructors must be CMVPs with a score above 800 points in the CMVP test. Before becoming an L4 instructor, the candidate must have delivered several times the *M&V Fundamentals and IPMVP for Energy Managers* course as an L3 instructor.

L4 instructors must go through a stringent evaluation process consisting of preparing a technical paper on a specific M&V topic and deliver a master class before being formally approved by the Training Committee. All L4 instructors must renew their status every three years.

Some L4 instructors can be qualified as a mentor. Mentors can evaluate candidate-instructors to become EVO-approved L3 instructors.



Instructors

| LEVEL | INSTRUCTOR | LOCATION | LANGUAGE |
|------------|---------------------------|----------------------------------|---------------------------------|
| LEVEL 4 | Bruce Rowse | Australia | English |
| | Agenor Gomes Pinto Garcia | Brazil, Salvador | Portuguese, Spanish |
| | Stephanie Nour | Canada | English, French, Spanish |
| | Sandeep Dahiya | India | English, Hindi |
| | Antonio Miranda | Spain | Spanish, English |
| | Daniel Magnet | Switzerland | French, English |
| | Steve Kromer | USA | English |
| LEVEL 3 | Georg Trnka | Austria | German |
| | Konstantin Kulterer | Austria | German |
| | Dragos Paraschiv | Canada | English |
| | Eric Mazzi | Canada | English |
| | Genevieve Gauthier | Canada | French |
| | Guy Turgeon | Canada | French |
| | Jon Feldman | Canada | English |
| | Alvaro Soto | Chile | Spanish |
| | Kar Kit Chu | China | English, Mandarin Chinese |
| | Yun Jiang | China | Mandarin Chinese, English |
| | Max Yimeng Zhang | China | Mandarin Chinese, English |
| | William Lau | China | English, Mandarin, Cantonese |
| | Hrvoje Glamuzina | Croatia | English, Croatian |
| | Paul Calberg-Ellen | France | French |
| | Frédéric Saint-André | France, Belgium, and Switzerland | French |
| | Ian Boylan | Ireland | English |
| | Daniele Forni | Italy | Italian, English |
| | Dolf Van Hattem | Italy | Italian, English, German, Dutch |
| | Ignace de Francqueville | Italy | Italian, English, French |
| | Ismael Alhinti | Jordan | Arabic, English |
| | Nermeen Asfour | Jordan | Arabic, English |
| | Fadi Marji | Jordan | Arabic, English |
| | Vanessa Tirado López | Mexico | Spanish |
| | Nadège Richard | Mexico | Spanish |
| | Amádis dos Santos | Portugal | English, Portuguese |
| | Marco A. Correia | Portugal | English, Portuguese |
| | Gorete Soares | Portugal | Portuguese, English |
| | Thamer Alquthami | Saudi Arabia | Arabic, English |
| | Abdullah Alabdulkarem | Saudi Arabia | Arabic, English |
| | Christo van der Merwe | South Africa | English |
| | Denis van Es | South Africa | English |
| | Jinsang Kim | South Korea | Korean |
| | Rafael Poquet Vitoria | Spain | Spanish, English |
| | Hung-Yao Chao | Taiwan | Mandarin, English |
| | Ming-Tsun Ke | Taiwan | Mandarin, English |
| | Jalel Chabchoub | Tunis | English, French, Arabic |
| | Rajvant Nijjhar | UK | English |
| | Hilary Wood | UK | English |
| | Nataka White | USA | English |
| | Chris Balbach | USA | English |
| | Todd Amundson | USA | English |
| LEVEL 2 | Sven Wuyts | Belgium | English |
| | Javier Galván | Colombia | Spanish |
| | Someshwar Derashri | India | English |
| | Eun Jung Kim | South Korea | Korean |
| | Nick Keegan | UK | English |



The Successful Introduction of the Certified Energy Savings Verifier (CESV®) program

Verifying energy savings is a crucial barrier for investors and facility owners to have sufficient confidence in the estimated savings to be willing to fund and implement energy efficiency projects (EEPs) on a scaled-up basis. The new program fills a significant gap in the global energy efficiency market's ability to verify the energy savings generated from EEPs.

The gap is caused in part by the fact that professionals are not consistently applying generally accepted measurement and verification (M&V) principles. The CESV program fills this gap by creating a new high-grade certification category of professionals who are technically competent to provide an independent and professional evaluation and certification of EEP savings.

The CESV program is designed for engineers who have the demonstrated education, professional experience, and knowledge to pass the CESV examination and meet EVO's rigorous qualifications. Through the program, EVO trains and certifies M&V experts in the market who have in-depth knowledge of and experience to:

Efficiency Valuation Organization

Certifies that on 17 December 2019

Name

met the certification requirements to demonstrate competency in estimating, evaluating, measuring savings and preparing measurement and verification plans of energy efficiency projects in buildings that adhere to generally accepted energy engineering principles, and is hereby granted the title of:

Certified Energy Savings Verifier (CESV®)



Mark Lister
Mark Lister, Chairman



Expiration date: 31 December 2022
Certificate #: CESVXXXX

- 1) Prepare/evaluate/implement M&V plans that follow IPMVP and related guidelines.
- 2) Measure/calculate energy savings for various energy efficiency technologies.
- 3) Perform 'pre' and 'post' installation evaluation of EE savings estimates.

CESVs must have the capability to determine that an EEP's pre-installed energy savings estimate is materially correct and that the pre-installed M&V plan complies with the generally accepted principles of IPMVP and other recognized M&V standards and best practices. They must also be able to assess that post-installed energy savings are calculated according to the approved pre-installed M&V plan and that they reflect the actual savings achieved.

The CESV program was successfully piloted in Jakarta in December 2019. A cohort of thirteen participants followed the full curriculum and passed the examination. The CESV program will gradually be deployed in other countries starting in 2020.

EVO Thematic Training

Using ISO 50015 with IPMVP

The course covers the ISO 50015 M&V guidance standard and how to use it in conjunction with the world's most widely use protocol, the IPMVP, with minimum duplication effort. This course was designed to help specialists:

- Understand the essentials of good M&V to both 50015 and IPMVP with practical application
- Apply the key principles of both standards to energy savings projects
- Understand how to construct an M&V Plan to both standards
- Understand how to implement an M&V Plan and report savings following both standards with minimum duplication



The course was delivered many times via live webinars, and it is offered through pre-recorded sessions available on the EVO website. There are three modules. At the end of each module, there is a short online test to ensure that the content is understood. Upon completion of all three modules and tests, the registrant receives a CPD certificate of the equivalent of 6 hours of qualifying CPD that can be downloaded and printed automatically.

Introduction to Statistics for M&V

The *Introduction to Statistics for M&V* course was designed for individuals interested in taking the EVO course *M&V Fundamentals and the IPMVP for Energy Managers* and who felt they need a refresher for basic statistics concepts. The course covers basic statistical concepts, such as:

- Definition of statistics and why it is important to Measurement and Verification
- Key statistical terms
- Descriptive stats
- Degrees of freedom
- Errors and statistical terminology associated with errors
- Probability distributions, including normal distributions and the standard normal distribution
- Confidence levels and confidence intervals
- Using the t table



This online course consists of six lessons with a quiz that follows each lesson. Students need to pass the quiz before moving onto the next lesson. However, students can attempt the quiz as many times as needed. Typically, one to three hours is required to complete the online course. Upon completion of the course, a certificate of completion is available for download.

Certified Measurement & Verification Professional (CMVP®) Program



The Association of Energy Engineers (AEE), in cooperation with EVO, established the CMVP program with the dual purpose of recognizing qualified professionals in this area of the energy industry and raising the overall professional standards within the measurement and verification field.

EVO is the exclusive global training body for the CMVP program. EVO developed and owns the IPMVP and training material used with the CMVP examination.

The training is geared toward the needs of a variety of professionals including performance contractors; energy auditors wanting to expand their expertise into verification roles; large energy users using performance contracting; large energy users interested in getting a better understanding of their energy budgets and being able to explain significant variations and fluctuations in energy use; and energy efficiency program designers, policy makers and managers working for government or utilities.

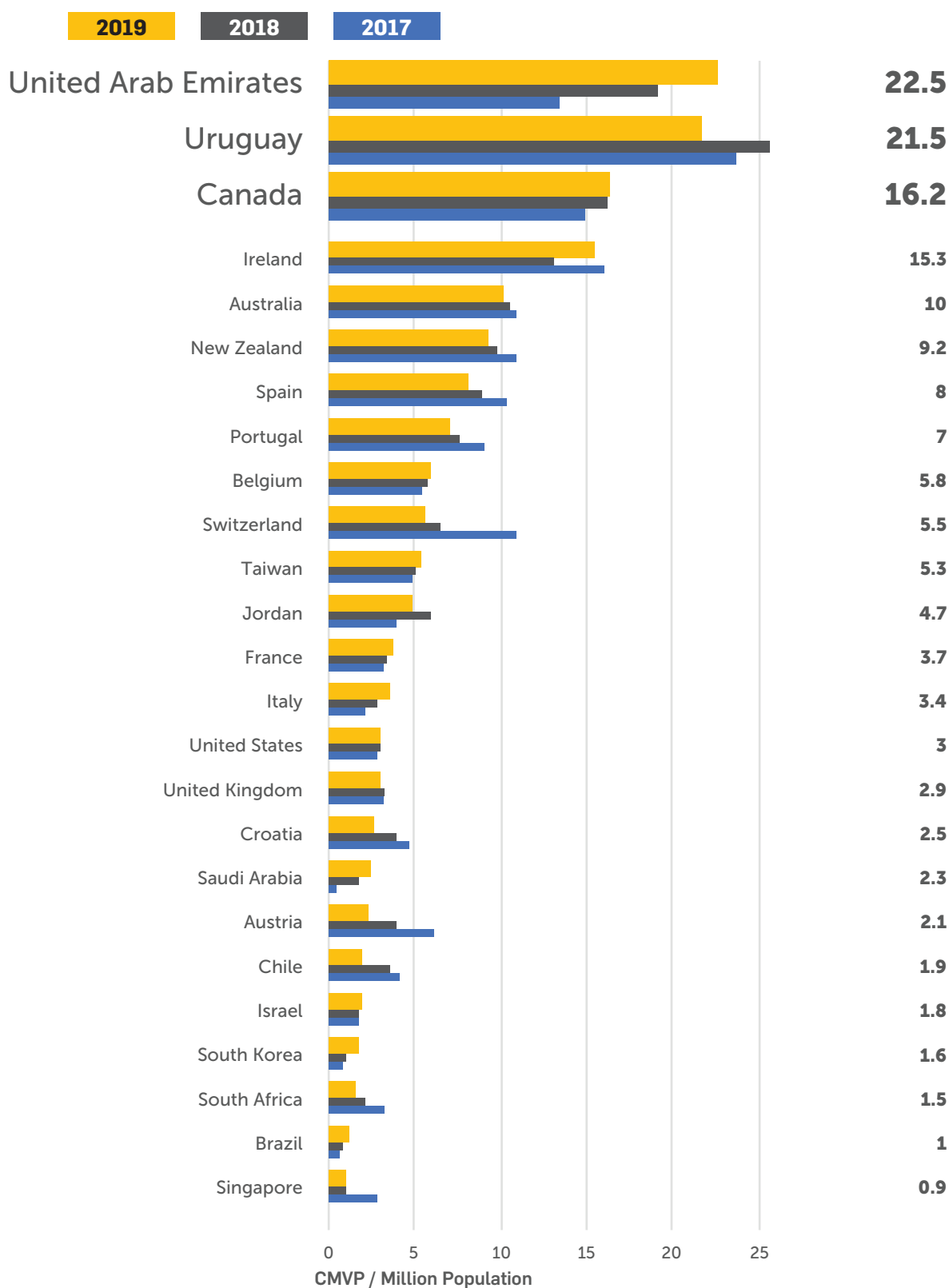
The right to use the CMVP title is granted by the AEE to those who pass a four-hour written exam and meet the required academic and professional qualifications.

Countries with at least 1 CMVP

| | |
|----------------|-------------------------|
| Argentina | Macao |
| Australia | Malaysia |
| Austria | Mexico |
| Barbados | Morocco |
| Belgium | Netherlands |
| Brazil | New Caledonia |
| Cameroon | New Zealand |
| Canada | Pakistan |
| Chile | Palestinian Territories |
| China | Philippines |
| Colombia | Poland |
| Costa Rica | Portugal |
| Cote D'ivoire | Qatar |
| Croatia | Russian Federation |
| Cyprus | Saudi Arabia |
| Czech Republic | Singapore |
| Denmark | South Africa |
| France | South Korea |
| Germany | Spain |
| Greece | Switzerland |
| Guam | Taiwan |
| Guatemala | Thailand |
| Hong Kong | Tunisia |
| India | Turkey |
| Indonesia | Ukraine |
| Iran | United Arab Emirates |
| Ireland | United Kingdom |
| Ireland | United States |
| Israel | Uruguay |
| Italy | Viet Nam |
| Jordan | Viet Nam |
| Kenya | Zambia |
| Lebanon | Zimbabwe |
| Luxembourg | |

Number of CMVPs per Capita in 2017-2018-2019

(TOP 25 COUNTRIES)

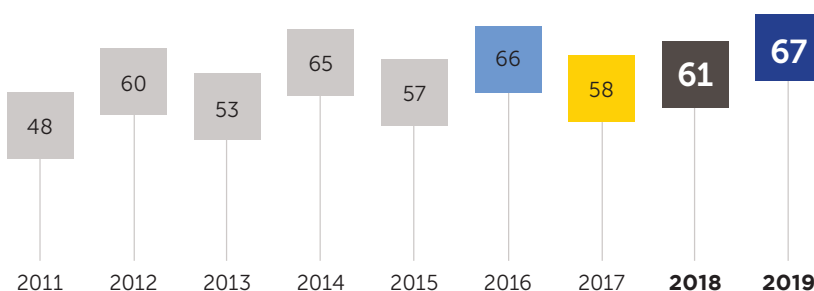


M&V Fundamentals and the IPMVP for Energy Managers — Training Statistics

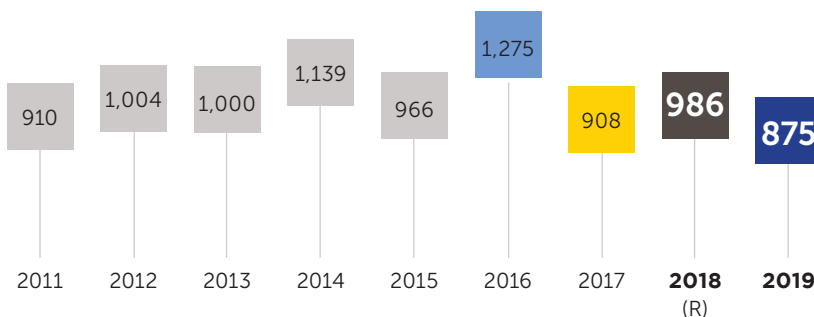
M&V FUNDAMENTALS AND THE INTERNATIONAL PERFORMANCE MEASUREMENT AND VERIFICATION PROTOCOL (IPMVP)®

For Energy Managers

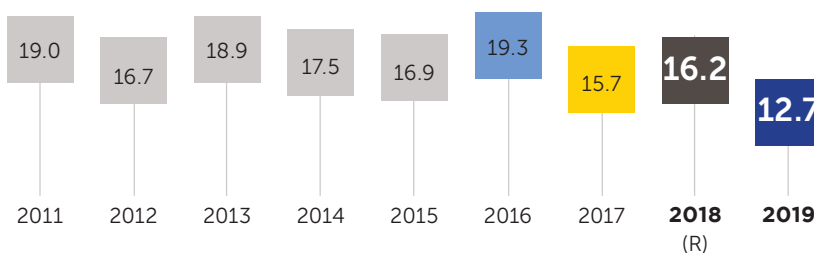
Number of Sessions



Number of Participants



Participants per Session



OUR ORGANIZATIONAL SUPPORTERS

The knowledge that energy savings can be transparently reported is vital to the acceptance of energy efficiency proposals. EVO is the only organization dedicated to the provision of tools for this purpose. The IPMVP defines transparency in savings reports while assembling best practice from around the world.

By their contribution to our protocol development activities, our organizational supporters are shaping the future of M&V and helping governments, utilities, regulators and other stakeholders adopt sound policies and regulations. They also help the financial community and contracting parties to manage the risks associated with the financing of energy efficiency and water saving projects.

Becoming an EVO organizational supporter allows EVO to do its important work in the field of M&V. Through their support, EVO can continue to provide its publications free of charge to industry M&V professionals worldwide, ensuring that the information is available to all. Thanks to this support we are in a position to continue developing and improving M&V protocols and other related products and technical guides.

EVO's protocols have historically been provided for free to the M&V community because of the financial support received from various organizations. However, as a non-member-based, not-for-profit organization, EVO has limited financial resources to fulfill its widely recognized mission.

EVO receives royalties from its training programs as well as a portion of the CMVP® certification renewals. These are the two main sources of revenues. EVO web subscribers also help to maintain EVO's online resources and library through their annual contributions. A major source of funding comes from our institutional and organizational supporters.

Organizational supporters' contributions go towards maintaining the actual portfolio of protocols and educational material. Most importantly, these contributions help design and deploy the next generation of M&V protocols that will continue to be offered for free to the international M&V community.



Bonneville Power Administration



Agência para a Energia
ADENE – Agência para a Energia
(Portuguese Energy Agency)



IESO – Independent Electricity Operator



Taiwan Green Productivity Foundation



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