



Organization of  
American States



**NIST**  
National Institute of  
Standards and Technology  
U.S. Department of Commerce

**Taller Regional de  
Metrología y Retos Tecnológicos en las Ciencias del Clima  
y Energía Renovable**

**Guatemala, 28-29 de Mayo, 2014  
Hotel Camino Real  
Salón Oro**



**Regional Workshop on  
Metrology and Technology Challenges of  
Climate Science and Renewable Energy**

**Guatemala, May 28-29, 2014  
Hotel Camino Real  
Room Gold**



**Day 1 -Institutional Awareness and Technical Workshop**



**Morning – Do we have the Right Policies in Place?**

<b>8h30</b>	Registration
<b>9h00 – 9h05</b>	Welcome Remarks <b>Lic. Pablo Martinez – Master of Ceremonies</b>
<b>9h10 – 9h15</b>	Presentation of the representatives at the main table – <b>Lic. Pablo Martinez</b>
<b>9h15 – 9h25</b>	Presentation on the importance of the Regional Workshop "Metrology and Technological Challenges in Climate Science and Renewable Energy" <b>Lic. Emmanuel Seidner, Deputy, Legislative Congress</b>
<b>9h25 – 9h30</b>	Remarks by the national representative of the Organization of American States (OAS) in Guatemala <b>Lda. Milagros Martinez de Torres-Chico</b>
<b>9h30 – 9h35</b>	Remarks by the Director of the Office of International Affairs and Academic, National Institute of Standards and Technology (NIST) United States <b>Dr. Claire Saundry</b>
<b>9h35 – 9h45</b>	Opening Address by Vice-Minister of Economy <b>Vice-Minister Claudia de Del Aguila</b>
<b>9h45</b>	Farewell to the representatives of the main table <b>Lic. Pablo Martinez - Master of Ceremonies</b>
<b>9h45 – 10h05</b>	Renewable Energy and Climate Science (RECS)—An OAS-NIST Project <b>Lic. Ruben Contreras Lisperguer, MSc. – OAS Project Coordinator</b>
<b>10h05 – 10h25</b>	Guatemalan Policies and Regulations on RECS <b>Dr. Edwin Josué Castellanos – Director, Center for Environmental Studies and Biodiversity, Universidad del Valle de Guatemala</b>
<b>10h25 – 10h45</b>	Guatemalan Policies to address the Challenges of Renewable Energy <b>Licda. Carmen Urizar – Director of the National Energy Commission /Directora de la Comisión Nacional de Energía Eléctrica (CNEE)</b>
<b>10h45 – 11h15</b>	<b>BREAK</b>
<b>11h15 – 12h00</b>	Climate Change and Renewable Energy – A US Perspective <b>Dr. James Whetstone – Special Assistant for Greenhouse Gas Measurements, NIST</b>
<b>12h00-13h00</b>	Panel Discussion on RECS – Policies and Activities of CAMET Countries <b>Representatives from each CAMET Country</b> <b>Moderator: Dr. Hratch Semerjian – NIST Chief Scientist Emeritus, NIST</b>
<b>13h00-14h00</b>	<b>LUNCH</b>

**Afternoon - Climate Change and GHG Measurements**



14h00-14h45	Air Quality Monitoring and Climate Change Related Measurements (GHG) <b>Lic. Jorge Koelliker Delgado –Scientific Coordinator, Gas Metrology, Centro Nacional de Metrología (CENAM), Mexico</b>
14h45-15h15	Joining Metrology and Meteorology Communities for GHG Measurements <b>Dr. James Whetstone – Special Assistant for Greenhouse Gas Measurements, NIST, USA</b>
15h15-15h45	<b>BREAK</b>
15h45-16h15	Measurements and Standards for Automotive Emissions <b>Lic. Sergio Zirath Hernández- Director of Research in Atmospheric Monitoring and Analytical Characterization of Pollutants, National Institute of Ecology and Climate Change, Mexico</b>
16h15-17h00	Introductory Comments by James Whetstone  Description of the Inventory Methodology of GHG and Preliminary Data for Guatemala <b>Ing. José Luis Rivera Castillo – Coordinator of the Climate Change Unit, Ministerio Ambiental y Recursos Naturales (MARN) and Ing. Enrique Castroconde- Mechanical Engineer, Guatemala</b>
17h00 -17h30	Summary and Closure of Workshop First Day <b>Lic. Javier Arias –Director, CENAMEP AIP, Panama</b> <b>Lic. Efraín Paz – Technical Coordinator, Centro Hondureño de Metrología, Sistema Nacional de la Calidad, Secretaria Nacional de Ciencia y Tecnología (SENACIT), Honduras</b>
18h00-19h30	<b>Reception and Networking</b> <b>Amatitlan Room, Westin Camino Real</b>

## Day 2 Technical Workshop

### Morning – Building Energy Efficiency Systems and Renewable Energy

8h30	Registration
9h00 – 9h05	Welcome Remarks <b>Lic. Jose Trejo - Director, Belize Bureau of Standards</b>
9h05 – 9h30	Building Energy Efficiency Systems <b>Dr. David Yashar – Deputy Division Chief, NIST, USA (Presented by James Whetstone)</b>
9h30 – 9h50	Energy Star Program <b>Lic. Kristen Taddonio – Deployment Team Lead, Commercial Building Integration Program, Dept. Energy, USA</b>
9h50 – 10h15	Experiences in Renewable Energy and Energy Efficiency in Honduras <b>Ing. Jorge Núñez, M.Eng., Empresa Nacional de Energía Eléctrica (ENEE), Honduras</b>
10h15-10h45	<b>BREAK</b>



	<b>RENEWABLE ENERGY</b>
<b>10h45-11h15</b>	Standards for the connection of photovoltaic installations to the national grid in Panama <b>Lic. Daniel Mina – Dep. Director of Electricity at Autoridad Nacional de Servicios Públicos (ASEP), Panama</b>
<b>11h15-12h00</b>	Outlook for 2 <sup>nd</sup> and 3 <sup>rd</sup> Generation Biofuels: Where we are and where are we going? <b>Lic. Larry Taylor –Scientist, National Renewable Energy Lab (NREL), USA</b>
<b>12h00-13h00</b>	Renewable Energy Hubs: Ecological, Economical, Sustainable <b>Moderator – Lic. Jorge Urrutia, President and CEO MSI Universal</b>  A Renewable Energy Environment for Climate Change <b>Lic. Reuben Chow, Principal, Chow Engineering, Inc. , USA</b> A Supportive Regulatory Environment, Integrated Technologies and Finance <b>Lic. David Galicia, CEO Arnasa Consulting, Mexico D.F.</b>
<b>13h00-14h00</b>	<b>LUNCH</b>
<b>Afternoon – What can be done? Training needs?</b>	
<b>14h00-14h45</b>	Introductory Comments; MEP in the U.S. <b>Dr. Hratch Semerjian – NIST, USA</b>  How do we get small businesses involved in RECS? <b>Dra. Ernestina Torres Reyes, Director of Technology Innovation, Energy Efficiency and Renewable Energy Sources from “Renovables de México, SA de C.V.”, Mexico</b>
<b>14h45-15h15</b>	Measuring Energy Efficiency of Clean Stoves <b>Dr. John McCracken, Director, UEIE, Universidad del Valle de Guatemala (UVG)</b>
<b>15h15-15h45</b>	Metrology for Energy Efficiency <b>Ing. Virgilio Jiménez Valverde, Director, Laboratory of Energy Efficiency, Costa Rica</b>
<b>15h45-15h45</b>	<b>BREAK</b>
<b>15h45-16h15</b>	Metrology to meet the Challenges of Climate Change and Renewable Energy <b>Dr. Gerardo Padilla, Physical Metrologist, Laboratorio Costarricense de Metrología, LACOMET, Costa Rica</b>
<b>16h15-17h30</b>	Panel Discussion: Development of an Action Plan for the CAMET region <b>CAMET Representatives</b> <b>Moderator: Ing. Julio Alberto González, CENAMEP AIP, Panamá</b>
<b>17h30-18h00</b>	Summary and Action Items for the Future <b>Moderators: Dr. Hratch Semerjian – Chief Scientist Emeritus, NIST, USA and Lic. Efraín Paz – Technical Coordinator, SENACIT, Honduras</b>
<b>18h00-18h15</b>	Closing Remarks <b>Lic. Franky Eduardo Reyes – Director of the National Quality System, Guatemala</b>



## Summary Report from CAMET Regional Workshop on

### **Renewable Energy and Climate Science (RECS)**

#### **Observations:**

1. The Workshop organization was excellent, in terms of the program and speakers, as well as the workshop logistics. All attendees were very appreciative of the hospitality provided by the Guatemalan Government and CENAME Staff, in particular.
2. The Workshop Steering Committee deserves our thanks for putting together an excellent program that was both informative and stimulated much discussion. In fact, the program was packed, and left little time for discussion. (Future workshops should allow more time for discussion and reduce the number of presentations and the topics to be covered.)
3. The Guatemalan Government deserves our thanks for their support of the Workshop and personal participation of the Vice-Minister of Economy Claudia de Del Aguila and Congressman Emmanuel Seidner.
4. Participation by all countries of the CAMET Region (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama) was critical for the success of the workshop. Participation by more than 200 attendees from the government, private sector and universities at the workshop certainly is a testimony to the importance of RECS.
5. Several Ministries were represented at the workshop including the Guatemalan Ministry of Energy and Mines, National Secretary of Science and Technology (SENACYT), Ministry of the Environment and Natural Resources, Ministry of Communication, Infrastructure, and Housing, and Ministry of Economy (El Salvador).
6. It was gratifying to see that most Central American countries have already established policies and regulations to promote utilization of renewable energy and reduce the impact of climate change.
7. It was also reassuring to see that the importance of RECS policies for economic development of each country was appreciated by the public and policy makers.
8. However, in many cases, the countries are not in a position to implement the policies and regulations because of lack of metrological and technological infrastructure.
9. It was pointed out several times that the Central American Economy of 35-40 million people is relatively small, and each country does not have the economic power to establish independent capabilities in metrology and technology.



10. The last two observations make it imperative for the Central American Countries to cooperate to put in place the necessary infrastructural capabilities to implement RECS related policies.

11. Central American Countries are already making strides in establishing cooperative programs, such as the Central American Commission for Integration; these efforts need to be extended to the arenas of technology and metrology.

### **Actions Under Consideration:**

1. Measurement capabilities for air quality and GHG emissions are almost non-existent in Central American countries (This may be true throughout much of the Americas). A hands-on training workshop for GHG measurements from fixed and mobile emission sources was identified as a priority item. CENAM (Mexico) has the capabilities and expressed the willingness to organize such a workshop (pending approval from Dr. Hector Nava Jaimes, CENAM Director), in cooperation with NIST. This will enable participants to: a) develop an appreciation of the measurement techniques needed, complexity of the measurement apparatus, and the methodologies to establish GHG and other emissions inventories; b) plan development of human resources with appropriate expertise; c) plan acquisition of measurement apparatus; and d) plan cooperative activities among the NMIs of the hemisphere.

2. Improving energy efficiency of buildings as well as industrial systems will have immediate impact on a country's energy demand and GHG emissions. Building Energy Efficiency Systems was identified as a high priority area of interest for all CAMEC Countries, and may be true for many other SIM countries. Training on efficient lighting systems for EE buildings, houses and industry was identified as a useful undertaking for the region. NIST will explore organizing visits to the NIST Net Zero Energy Residential Test Facility (NZERTF) and training workshops to familiarize the SIM metrology community with the metrology and technology tools currently available.

3. Photovoltaic energy systems are finding increasing use in Central American countries to supplement fossil-fuel based energy generation systems. Evaluating the performance of PV systems requires complex calibration and certification capabilities. A SIM training workshop on existing PV evaluation systems and design of new apparatus will be explored.

4. Effective use of highly distributed PV systems (e.g., from residential units) will require efficient connectivity to the electrical power grid. A wide-area network currently planned to extend from Guatemala to Panama will also require implementation of an efficient and secure power grid. Both of these activities will require an advanced power grid to ensure interconnections to networks with minimum losses and maximum security. A specific training on how to minimize energy losses when interconnecting different networks was suggested. NIST will look into organizing a training workshop on Smart-Grid technologies, the standards required and the cybersecurity requirements of such a system.



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5. Linkages among CAMET NMIs need to be strengthened. Regional NMIs need to empower CAMET as a Technical Support Council for the Decision Makers in the Region to utilize such an organization to suggest a CAMET Unified Labelling & Efficiency Index Code for the Region (similar to Energy Star discussed at the workshop).
6. All NMIs in CAMET, and indeed in SIM, can benefit from collaboration and sharing of resources, given limited resources of these relatively small economies. National Governments may not lead such an effort, because of political reasons and national pride. NMIs and their leadership will have to take the lead in identifying their strengths and areas where they can benefit from expertise in other NMIs.
7. The Directors of the NMIs identified the following items to work on together: suggest a CAMET Unified Labelling and Efficiency Index Code for the Region; promote regional organizations (CAMET, FOCA & CONCANOR) to improve quality infrastructure in the Region; and work together with international organizations such as OAS, SICA, and SIECA to promote these and other regional standards and regulations at governmental levels.