

Energy Efficiency – International Approaches



IEC-SMB Strategic Group 1

“Energy efficiency and renewable resources”

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MAKING STANDARDS WORK



Presentation Overview

- Participating Countries & Organizations
- The Challenge we face
- Three aspects of Energy
- Transitioning Standards to include Policy Objectives
- SG1 Approach
- Supply and Consumption Matrix
- Highlights to date
- Summary of Recommendations

The Evolution of SG1

First meeting in Frankfurt Germany, May 2007

8 Dedicated Participants



Seventh meeting in Tel Aviv, Israel, October 2009

**Numbers increased to 20 as Energy Efficiency
takes on new significance**

Participating Countries & Organizations

Australia



Canada



China



France



Germany



Italy



Japan



Spain



Sweden



United Kingdom



United States of America



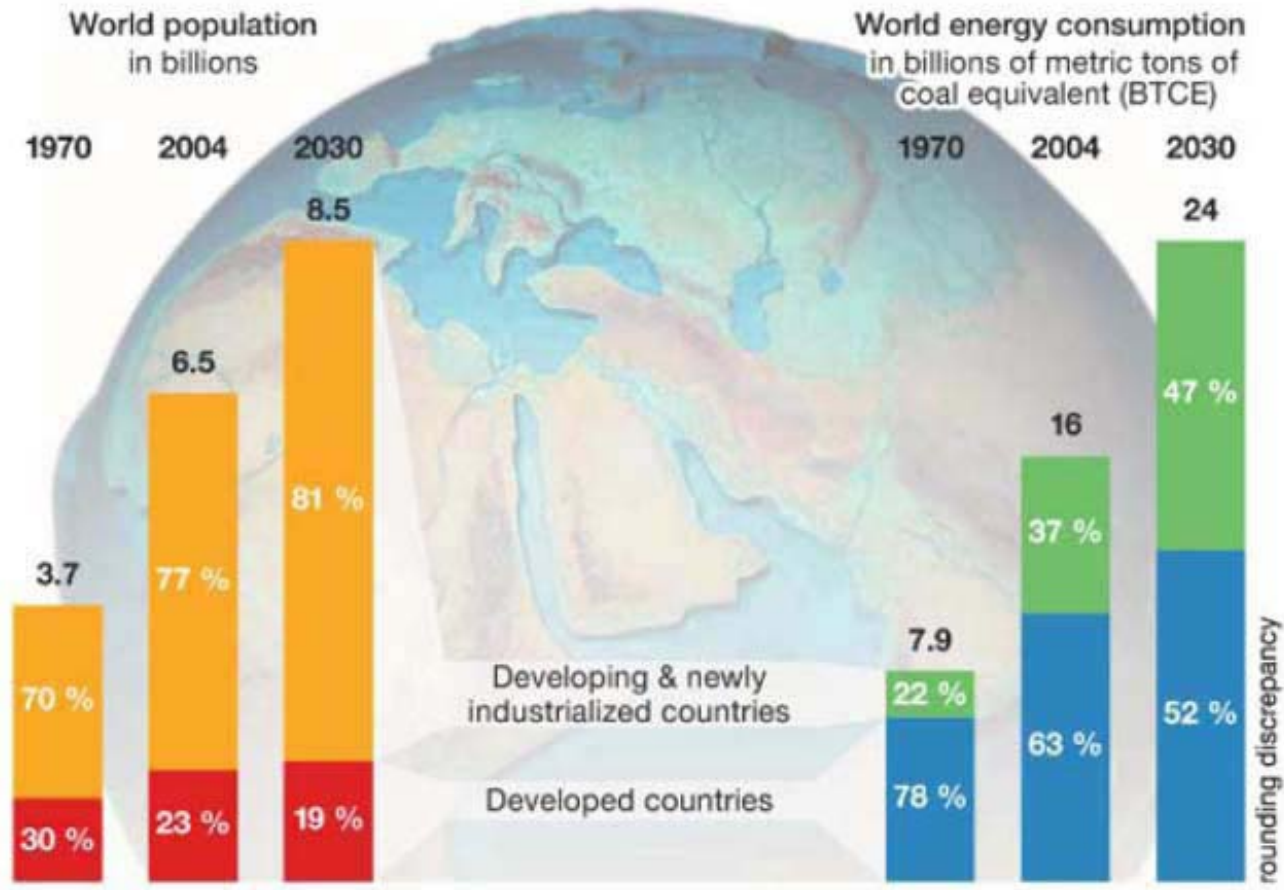
ISO



IEA



The Challenge we face ...



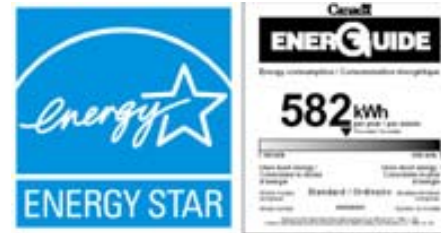
Source: International Energy Agency, World Energy Outlook 2004

Three important aspects of Energy addressed by SG1

Energy conservation
Energy not used.



Energy efficiency
Less energy – Same
Performance



Renewable Energy
New Technology



Transitioning from Standards to Policy Objectives













- **Electrical Safety & harmonization has been the basis for Standards development**
 - Safer Products
 - Economic prosperity (selling more)
- **Energy Efficiency Standards**
 - Economic prosperity (lower operating costs)
 - Environmental Benefits (GHG reductions)
- **Policy Objectives**
 - Require a new way of thinking about Standards

SG 1 Approach

- Analyse priority areas with respect to TC/SC affected
- Review Existing standards for potential Savings
- Identify Opportunities for new work
- Assign “Champions” for each priority area
- Develop Recommendations for approval by Standardization Management Board (SMB)
- Cooperate with ISO/SAG EE on topics of common interest

Supply Chain Matrix

















Energy efficiency significance per application field





Supply chain Application fields	Power Generation	Power Transmission	Power Distribution
Lighting	Box 1 	Box 2 	Box 3 
Rotation	Box 4 	Box 5 	Box 6 
Heating Cooling	Box 7 	Box 8 	Box 9 
Data processing	Box 10 	Box 11 	Box 12 

- high significance
- medium significance
- low significance
- no significance

Consumption Matrix

Energy efficiency significance per application field

Consumption Application fields	Industrial	Commercial buildings (tertiary)	Domestic	Transport
Lighting	Box 13 	Box 14 	Box 15 	Box 16 
Rotation	Box 17 	Box 18 	Box 19 	Box 20 
Heating Cooling	Box 21 	Box 22 	Box 23 	Box 24 
Data processing	Box 25 	Box 26 	Box 27 	Box 28 

-  high significance
-  medium significance
-  low significance
-  no significance

Highlights to date ...

- **Energy Efficiency identified as a priority for IEC**
- **All Technical Committees reviewed standards to identify opportunities to improve efficiency levels.**
- **34 Recommendations have been put forward to the Strategic Management Board. (appendix 1)**

Highlights to date ...

continued

- #1: **Terminology** - To develop a common general terminology, metrics, general calculation methods and criteria in the field of energy efficiency.
- #7: Develop guidelines for the design and operation of energy efficient systems in the field of industrial **automation** and industrial process control from a system point of view.
- #32: To develop a report on the contribution to energy efficiency of **networked systems** used in homes and buildings and to propose how to develop a systematic approach for the design and evaluation of energy efficiency in systems used in homes and buildings

Renewable resources

Electricity generation with renewables comprises

- Wind turbines
 - IEC/TC 88
- Solar photovoltaic energy
 - IEC/TC 82
- Conventional hydraulic turbines
 - IEC/TC 4
- Marine energy – Wave, tidal & other water current conversion
 - IEC/TC 114, established 2007 after consultation with IEA-OES
- (Geothermal energy)

Future & Ongoing Challenges ...

- International Harmonization of Energy Efficiency objectives – the risk of “trying to be the most Energy Efficient”
- Introduction of Electric Vehicles
- Maintaining Performance expectations
- Understanding, incorporating embedded energy
- End of Life / Stewardship (TC111)

- **SG1 Recommendation 1:**
- To develop a common general terminology, metrics, general calculation methods and criteria in the field of energy efficiency in order to provide a generic framework as the basis for further detailed domain specific requirements. This should be a joint activity of IEC, ISO and possibly ITU incl. the cooperation with the International Energy Agency (IEA).
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- **SG1 Recommendation 2:**
- To develop a guideline on best practices for the operation of an electrical power plant, which allows for the determination of the performance/efficiency of a plant and a comparison with other plants.
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- **SG1 Recommendation 3a:**
- IEC/TC 14 "Power transformers" to develop a common classification and associated calculation methods for power transformers with a view to facilitate harmonization of energy labelling schemes existing at various national and regional levels. It is anticipated that the resulting IEC publication will be of particular interest for use in industrial distribution systems.
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- **SG1 Recommendation 3b:**
- Furthermore, a guideline document (Technical Report) is required on the choice of the optimal transformer in a given application.
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- **SG1 Recommendation 4:**
- A guidance of best practise is to be developed regarding the reduction of network losses in the distribution system.
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- **SG1 Recommendation 5:**
- As a long term activity the minimization of network losses in general needs to be addressed from a system point of view.
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- **SG1 Recommendation 6:**
- IEC/TC 34 and its subcommittees
- - to develop energy saving calculation standards or guidelines for lighting
- - to improve standards adding energy efficiency tests to check the minimum efficiency levels established by law in national regulations
- - to modify incandescent lamp standards to provide guidance for avoidance of use of some types of these lamps.
- - to develop (a) Technical Report(s) on how to design lighting installations under energy efficiency criteria as a complementary document to IEC 62368 "Digital control interface for electronic lamp control gear (DALI)".
- - to require that manufacturers include in the technical documentation the performance ratio of the luminaire according to the measurement procedures established in the standards. This information is fundamental for the contractor or designer of the full installation.

- **SG1 Recommendation 7:**
- IEC/TC 2, SC 22G and TC 65 together with ISO/TC 184 should develop guidelines for the design and operation of energy efficient systems in the field of industrial automation and industrial process control from a system point of view.
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- **SG1 Recommendation 8:**
- TC 9 should explore further possibilities for standardization projects to assist the reduction of energy consumption in trains and associated infrastructures.
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- **SG1 Recommendation 9:**
- TC 69 should consider the feasibility of including requirements regarding energy efficiency/reduction of energy use in their standards, where appropriate.
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- **SG1 Recommendation 10:**
- The need for and the feasibility of standardization activities for the energy efficiency of other transportation systems, such as lifts/elevators, escalators, moving walkways, which are widely used both in industry and publicly accessible areas and buildings areas should be considered. Examples are luggage transportation in airports, moving walkways in airports and other large buildings, escalators used to access underground transportation or within big stores.
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- **SG1 Recommendation 11:**
- TC 27 should consider the development of guidelines for the classification of industrial electro-heating systems, which allows for the determination of the performance/efficiency of a given system and a comparison with other systems of that class.
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- **SG1 Recommendation 12:**
- TC 21/SC 21A to develop (an) international standard(s) for batteries suitable for large scale storage of electricity (high generation – low consumption vs. low generation – high consumption), which are required in (highly) decentralized electrical grids fed by wind mills, photovoltaic systems and/or similar renewables.
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- **SG 1 Recommendation 13:**
- IEC to organize a Workshop on the topic of “Advanced supply and demand side balance in electrical grids” in order to inform on the state-of-the-art in standardization and to further propose concrete new standardization activities. This encompasses a) the integration of renewable energy sources into existing grids as well as b) techniques aiming at the optimization of electricity supply versus electricity demand.

- **SG 1 Recommendation 14:**
- TC 59 and its SCs to develop/update International Standards on measurement procedures. The relevant evaluation methods shall take into account a realistic simulation of the actual use of each type of appliance.
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- **SG 1 Recommendation 15:**
- TC 59 and its SCs to support a harmonized international system of energy consumption classes including a labelling scheme to determine the energy consumption/energy efficiency of household appliances, taking into account the existing regional and national standards in this field.
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- **SG 1 Recommendation 16:**
- TC 59 and its SCs to take into account both standby losses and off-mode losses in their product standards.
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- **SG 1 Recommendation 17:**
- TC 96 "Small power transformers, reactors, power supply units and similar products" to take into account standby operation and energy efficiency of power supplies in their standardization activities.
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- **SG 1 Recommendation 18:**
- TC 100 and TC 108 shall take into account both standby losses and off-mode losses in their standards by taking duly into account pertinent regional legislation. This implies external power supplies (AC/DC converters) to be considered as integral parts of the pertinent equipment (i.e. same treatment as for internal power supplies).
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- **SG 1 Recommendation 19:**
- TC 100 and TC 108 to develop/update International Standards on measurement procedures for IT equipment and consumer electronics.
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- **SG 1 Recommendation 20:**
- TC 100 and TC 108 to support a harmonized international system of energy consumption classes or other performance indicators including to determine the energy consumption / energy efficiency of consumer electronic products, such as TV sets, set-top boxes, cable modems, DSL routers etc., taking into account the existing regional and national standards in this field.
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- **SG 1 Recommendation 21:**
- ISO/TC 184 and IEC/TC 65 (in combination with further committees to be defined) should have a workshop to find out resources for energy efficiency combining the process itself with suitable IT-tools.

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- **SG 1 Recommendation 22:**
- Regarding efficiency in energy intensive industries a workshop involving IEC/TC 4, TC 5 and TC 65 should be arranged in order to develop a common understanding.
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- **SG 1 Recommendation 23:**
- IEC/TC 111 in conjunction with ITU is requested to give the guidance on the methodology to measure carbon emissions.
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- **SG 1 Recommendation 24:**
- The incorporation of energy efficiency and renewable energy sources require a smart power distribution grid. IEC work on this subject should start immediately.
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- **SG1 Recommendation 25:**
- There is a need for a Committee preparing standards for Concentrating Solar Power Plants (CSP). SG 1 recommends to establish a Project Committee on this subject.
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- **SG 1 Recommendation 26:**
- There is a need for a Committee preparing standards for Salinity Gradient Power Generation. SG1 recommends to establish a Project Committee on this subject.
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- **SG1 Recommendation 27:**
- In order to support the optimization of automation and production processes already during the planning phase of production systems, SG1 recommends that all relevant product TC/SC include key data in their components/devices standards that are vital for a priori-simulation of the component/device behaviour in an intended production system, as such simulation leads to optimized processes from an energy efficiency perspective. Note: The committees should take into account that facility management recommends a similar approach but including organisational issues, too.
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- **SG1 Recommendation 28:**
- In order to support the optimization of automation and production processes already during the planning phase of production systems, SG1 recommends that TC 65 and its SCs consider the development of simulation tools from a system point of view, to allow a priori optimization of automation and production processes on the factory floor in terms of energy efficiency.
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- **SG1 Recommendation 29:**
- SG1 recommends that SMB invite SG3 to duly consider standardization requirements for smart metering being an integral element in the smart grid framework.
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- **SG1 Recommendation 30:**
- In order to ensure a consistent set of definitions, SG1 encourages TC 34 and its SCs to actively participate in the revision of the CIE/IEC lighting vocabulary.
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- **SG1 Recommendation 31:**
- With a view to intensify the cooperation between IEC and CIE, SG1 recommends that TC 34 and TC 76 identify those CIE publications, which are suitable for adoption as IEC publication.
- NOTE 1: To be executed under the leadership of IEC/CO in cooperation with CIE and relevant experts.
- NOTE 2: IEC/TC 34 + SCs, TC 76 and TC 100 should be consulted from IEC side for this exercise.
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- **SG1 Recommendation 32:**
- ISO/IEC JTC 1/SC 25 to consider the revision of ISO/IEC TR 15067-3, which provides a model of an energy management system for home electronic systems, in cooperation with relevant Committees such as TC 23, TC 34, TC 59, TC 100, ISO/TC 205, IEC/TC 22, TC 64.
- Furthermore, to develop a report on the contribution to energy efficiency of networked systems used in homes and buildings and to propose how to develop a systematic approach for the design and evaluation of energy efficiency in systems used in homes and buildings in cooperation with relevant bodies such as ISO/TC 205.
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- **SG1 Recommendation 33:**
- IEC/TC 64 to establish a dialogue with ISO/IEC JTC 1/SC 25, TC 23, TC 34, TC 59, TC 100, ISO/TC 205, IEC/TC 22, to address
- - the development of guidelines to improve energy efficiency with help of co-operation between different product groups,
- - the development of an international standard that lists information that supports energy efficiency when conveyed from one product (group) to another product (group). Who: ISO/IEC JTC 1/SC 25, TC 23, TC 34, TC 59, TC 100, ISO/TC 205, IEC/TC 22, TC 64
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- **SG1 Recommendation 34**
- SG1, noting the May 2009 recommendations of ISO/COPOLCO, recommends that SMB draws COPOLCO's attention to the following:
- a) COPOLCO Rec. 2: The topic of smart metering is coordinated by SMB/SG3. IEC/TC 13 is responsible for smart electricity meters and has a considerable portfolio of both published standards and ongoing projects.
- b) COPOLCO Rec. 5: There are various IEC TC active in the field of renewable energies: TC 82, TC 88, TC 105. Furthermore, IEC runs various certification and conformity assessment schemes, e.g. on photovoltaics (PV GAP).

Thank you ...

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CANADIAN

Energy Efficiency Alliance



L'Alliance de l'Éfficacité Énergétique

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