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2015-10-30

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COUNCIL

SUBJECT

Presentations from the Council Open Session in Minsk, Belarus, 16 October 2015

BACKGROUND

An Open Session of IEC Council, entitled “**Energy Efficiency: From theory to reality with IEC International Standards and Conformity Assessment**”, was held in Minsk, Belarus, on 16 October 2015 during the 79th IEC General Meeting. Presentations given during that session are attached.

ACTION

Document **C/1937/INF** is for information.

Attachments: presentations (10)

79th IEC General Meeting – Open Council Session

Energy efficiency: from theory to reality with IEC International Standards and Conformity Assessment

Speaker name *Richard Schomberg*
Title *Moderator*
Date *16 October 2015*



Coping with the Energy Challenge

Smart electrification

The key to energy efficiency



- Savings to consumers:
 - USD 5.7 trillion in the last 25 years (more than Japan or Germany 2014 GDP)
 - USD 550 billion in 2014 alone
- “Virtual fuel locally generated” improves energy security
- Approximately 40% of the GHG emissions reductions required by 2050 to limit global temperature increase to less than 2 degrees centigrade would potentially come from energy efficiency.



From theory to reality with IEC International Standards and Conformity Assessment

- **Status update on international industrial advancement with IEC**
- **Case studies: Practical experience in the implementation of Energy Efficient technologies in different regions**
- **Reports and recommendations from the workshops (Minsk IEC GM)**



1- Status update on international industrial advancement with IEC

- **Industrial advanced capabilities**
- **IEC Standards**
- **IEC Conformity Assessment**
- **IEC facilitates global trade**



2- Case studies: implementation experience of EE technologies

- **Asia**
- **Europe**
- **Belarus**



3- Reports and recommendations from the Workshops (Minsk IEC GM)

- ***IEC Conformity Assessment : most effective tool to overcome technical barriers to trade – 15 October 2015***
- ***Energy Efficiency in industry. New technologies, requirements and approaches – 14 October 2015***



79th IEC General Meeting - Open council session
Minsk 16 October 2015

Спасибо!

Thank you!



79th IEC General Meeting - Open Session

Minsk 16 October 2015

Modern energy efficient technologies of generation of electric power and management of energy use

Jean-Louis Stasi
President, Russia and CIS
Schneider Electric

Life Is On

Schneider
Electric



Schneider Electric,
the global specialist in energy management and automation

€25 billion

FY 2014 revenues

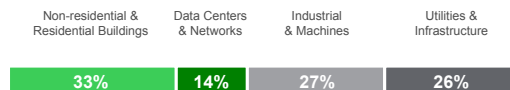
~5%

of revenues devoted to R&D

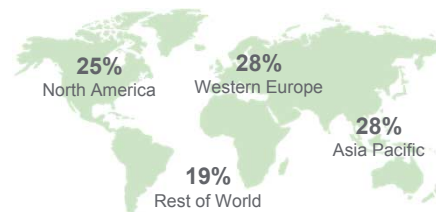
~170,000

people in 100+ countries

Diversified end markets – FY 2014 revenues¹



Balanced geographies – FY 2014 revenues¹

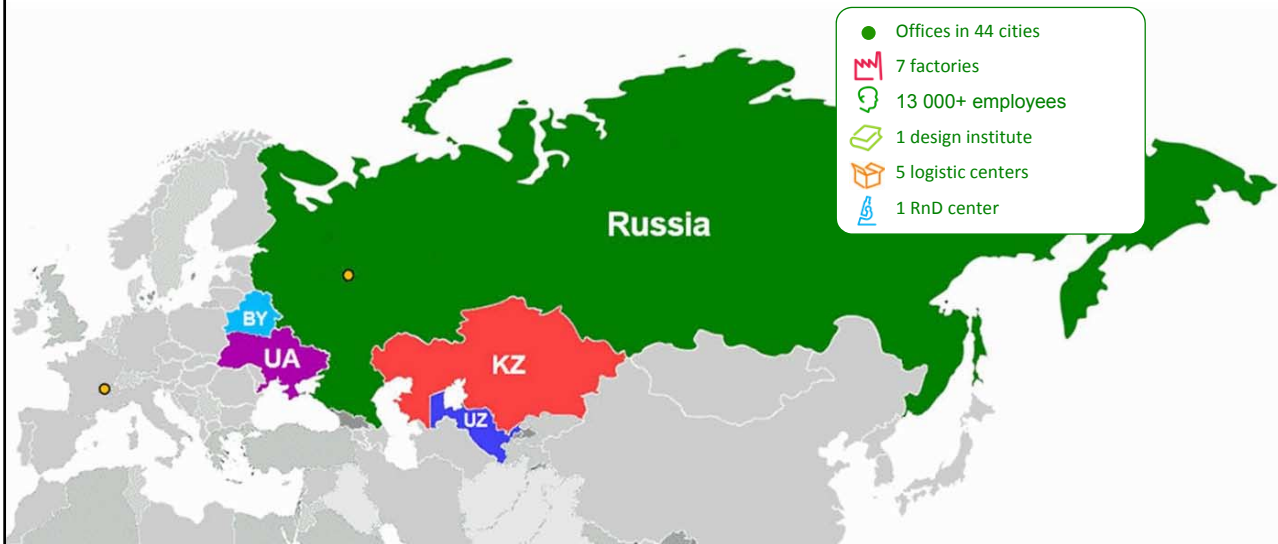


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Schneider Electric in CIS



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We believe access to energy is a
basic human right



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...and the present way of managing energy is
unsustainable



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1.3 billion people currently do not have access to electricity

Another **1** billion people have unreliable and intermittent supply of electricity

Source : IEA, Economist

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Megatrends are provoking a rise in Energy Demand

URBANIZATION

+2.5B people in cities
by 2050

Source: United Nations, DESA



DIGITIZATION

50B connected things
by 2020

Source: Cisco



INDUSTRIALIZATION

+50% Energy consumption
by 2050

Source: IEA



The world in the next 40 years

×2

Energy consumption
will double

÷2

CO₂ emissions
need to be
halved

↑4×

We have to become
4 times more efficient

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Note: Forecast for 2050 compared to 2009 levels

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Our World will be...

MORE ELECTRIC

- Demand for electricity driven by sustainability, intelligent devices, and evolution of key energy consumers (motion and cooling)



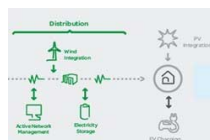
MORE CONNECTED

- Internet of Things will connect at least 50bn devices by 2020



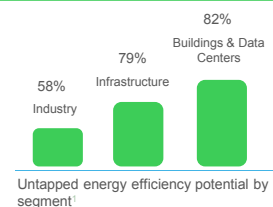
MORE DISTRIBUTED

- Provide local energy to facilities, around positive energy and micro grids, to empower users
- Falling prices of renewable energy



MORE EFFICIENT

- 2/3 of energy efficiency potential remains untapped¹
- Buildings, industry & infrastructure end-users and datacenters all look to improve performance, efficiency and environmental footprint



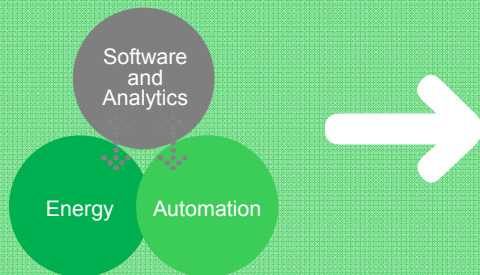
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¹ World Energy Outlook 2012, OECD / IEA, Internal analysis

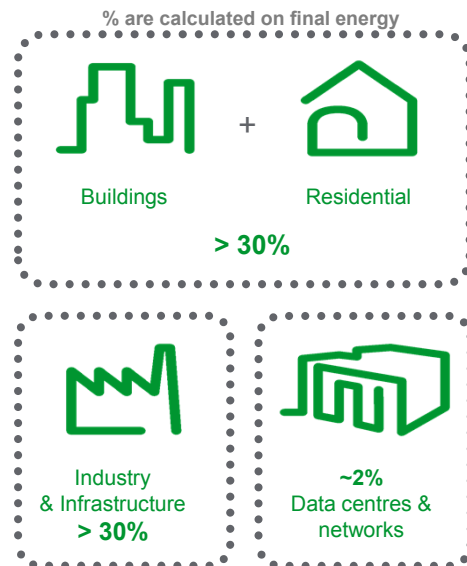
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Schneider
Electric

At Schneider Electric, we combine **Energy Management, Automation** and **Software** serving 4 markets, i.e. 70% of the world energy consumption



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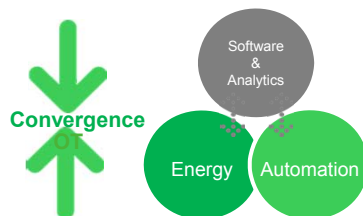
Source: IEA Explore 2015

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Schneider Electric is uniquely positioned to make demand efficient and connected

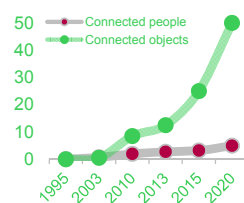
Integration of Energy, Automation and Software

Simpler, more scalable and flexible industrial architectures, leveraging the best of IT technologies



INTERNET OF THINGS

- Number of connected objects expected to double in the next 5 years¹



Energy optimization

+

Process optimization

1. Source Cisco IBSG April 2011 / Internet World Statistics

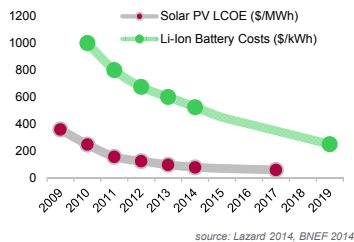
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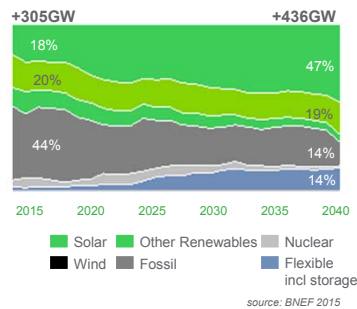
As well as uniquely positioned in Distributed Generation and Smart Grid

A more distributed grid

Solar PV and Storage have seen drastic improvements in their economics over the past 5 years ...



... and are expected to count for ~50% of new capacity additions by 2030 (total additional yearly investment of ~\$400 bn)



Our opportunities

Solar

Energy Storage

Micro-grids

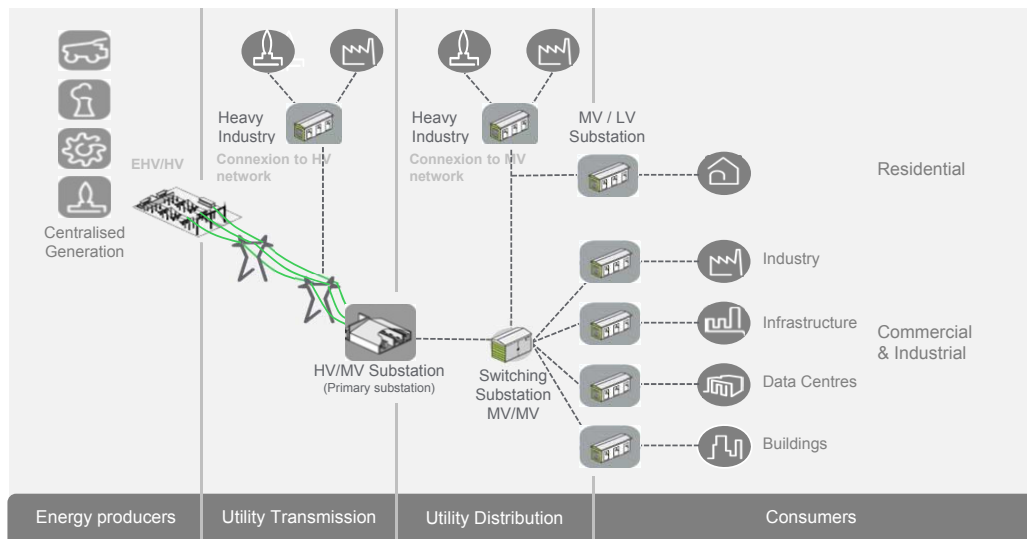
Grid Automation / Smart Grid

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The Old World of Energy: Singular flow of Electricity from source to load

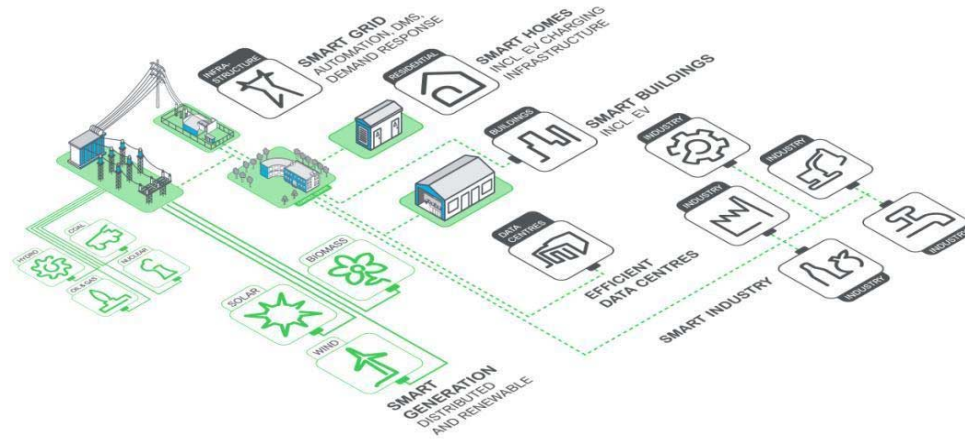


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The New World of Energy: Electricity is Distributed & Connected



Smart Grid

Distributed Generation

Efficient Demand

CONNECTED FROM PLANT TO PLUG

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Life is On with Schneider Electric Smart City Solutions:

From downtown to suburb, we deliver urban efficiency today

Smart Water

- Plant & Network Energy Performance
- Water Distribution Optimization & Loss Mgt
- Stormwater management and Urban Flooding
- Irrigation Management

Smart Energy

- Smart Grid Asset Management, Smart Generation, Demand Side Management, Utility Services
- Renewables Integration & Micro Grid
- District Heating/Cooling Management
- Gas Distribution Management
- Shore Connection

Smart Buildings & Homes

- Multiple Disparate Buildings Management
- High Performance Buildings
- Flexible Buildings
- Efficient Homes

Smart Public Services

- Public Safety: Video Surveillance
- Smart Street Lighting Management

Smart Mobility

- EV Charging Infrastructure & Supervision Services
- Traffic Management
- Tunnel Management
- Tolling Management
- Railway Management
- Airport Solutions



Smart Integration

- City-wide Platforms
- Energy & Sustainability Resource Management
- Urban Efficiency Platform
- District Energy Management Information System

- Cross-domain Application
- Weather
- GIS
- Asset Management

- City Strategy Services
- Sustainability Services
- Smart Cities Advisory Services
- Energy Performance Contracting

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Sustainability is critical on our agenda

Solutions for Efficiency



Active Energy efficiency, Energy management & Sustainability services



Smart grid (renewable, flexible distribution, electric vehicle, demand response)



Smart cities

Ethics & Responsibility



Business practices



Products and sites



Employees



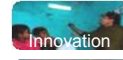
Communities

Solutions for energy gap

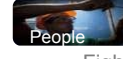
Fostering energy access



Business



Innovation



People

Spreading access to reliable, affordable and clean energy through a combined approach of training, offers, business models and investment

Fighting fuel poverty



A measured commitment: The Planet & Society Barometer

- Measuring sustainability
- Communicating quarterly
- Auditing annually by a third party



#9 in the Global 100
most Sustainable Corporations
in the world in 2015



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Life Is On

Schneider Electric

As the global specialist in
energy management and automation,
we create connected technologies that

RESHAPE INDUSTRIES



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TRANSFORM CITIES



ENRICH LIVES



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....ensuring that **Life Is On**
everywhere, for everyone and at every moment.

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Minsk 16 October 2015



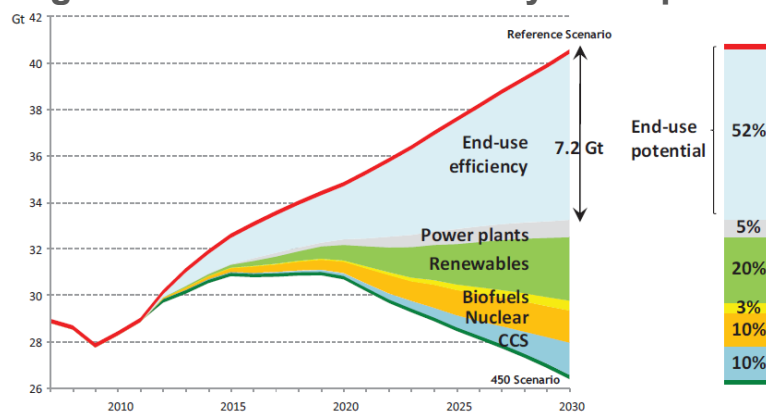
How IEC International Standards enable energy efficiency of equipment

Toru Ishikuma
IEC ACEE
(Advisory Committee Energy Efficiency)
Azbil Corporation, Japan
16 October, 2015



More Energy Efficiency improvement is required in coming years

- Gap between forecasted energy consumption and generation must be filled by EE improvement



Source : Improving Energy Efficiency through Standards by IEA, IEC SMB/SG1



EE Improvement in industrial facilities

- Energy users' project views are being expanded

	EE improvement / Loss reduction through	By whom (typically)
Group level	Changing way of producing (Changing production receipe)	Product designer (in manufacturer)
	Changing the process	Process designers in multiple organizations
	Changing way of control	Process engineer / Instrumentation engineer
	Changing way of operation	Operator
	Changing way of operation / control technically	Equipment manufacturer as proposer
Product level	Replacing with more efficient equipment	Process engineer / Maintenance engineer
	More efficient equipment	Equipment manufacturer as proposer



How standards contribute

- Standards unify visions among different countries, sectors, technologies:

1. Terminology standards
2. Management standards
3. Product standards
4. System standards



- ACEE Study Group 1 observed 44 out of 340 IEC standards are EE related



Some contributing standards

1. Terminology standard

- ISO/IEC 13273-1 (ISO/IEC JPC 2)
 - Energy efficiency and renewable energy sources
 - Common international terminology –
 - Part 1: Energy efficiency

2. Management standards

- ISO 500XX (ISO TC 242)
 - Energy management systems / Energy audits
 - Activities relating to energy services /
 - Commercial building energy data management
 - for energy performance



Some contributing standards

3. Product standards

- IEC 60034-1:2010
 - Rating and performance
- IEC 60034-2-1:2014
 - Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)
- IEC 60034-2-2:2014
 - Specific methods for determining separate losses of large machines from tests
- IEC 60034-2-3:2014
 - Specific test methods for determining losses and efficiency of converter-fed AC induction motors
- IEC 60034-30-1:2014
 - Efficiency classes of line operated AC motors (IE code)
- IEC TS 60034-31:2010
 - Selection of energy-efficient motors including variable speed applications - Application guide

IEC 60034 : Rotating electrical machines (IEC TC 2)



Some contributing standards

4. System standard

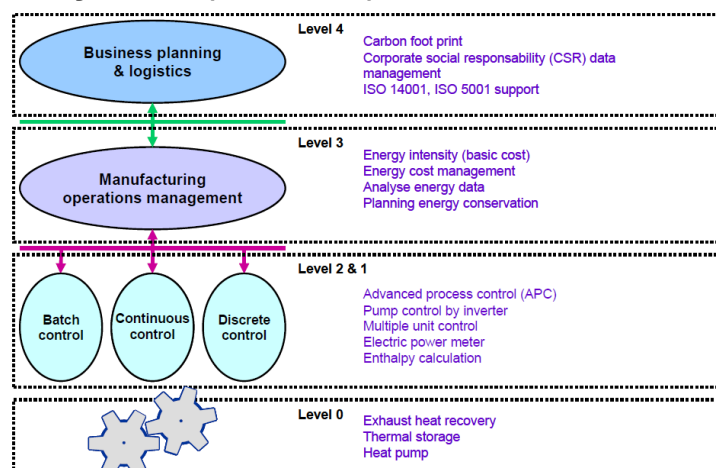
– IEC TR 62837:2013 (IEC TC 65)

- Energy efficiency through automation systems
- Framework for the other automation related standard setting organizations to harmonize the EE projects
- Generic models
 - Energy functions on the functional hierarchy model
- Tools and methods
 - Energy managed unit model as system boundary
 - KPI for EE



Some contributing standards

IEC TR 62837 : Energy functions mapped on the functional hierarchy model (IEC 62264)



ACEE is developing two guides

- To encourages a systems perspective for the development of standards for energy efficiency and provides support for system considerations in IEC

1. EE Aspects

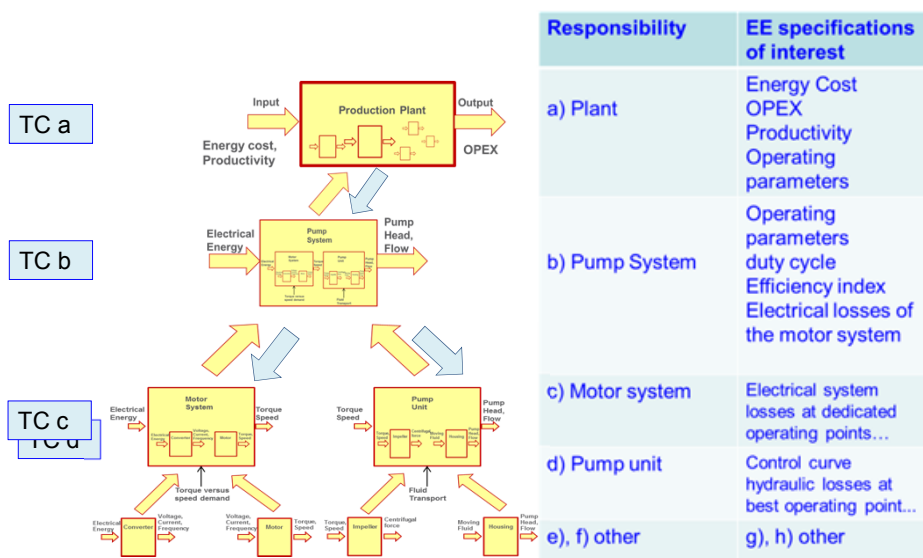
- List of EE Aspects that may need to be considered by TCs/SCs, and could be included in their publication

2. Preparation of the EE Publications

- Descriptions of the information to be exchanged between parts of a system
- Harmonizing approaches of TCs/SCs in IEC through development and reference to basic and group EE publications



Collaboration between TCs/SCs



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Thank you!

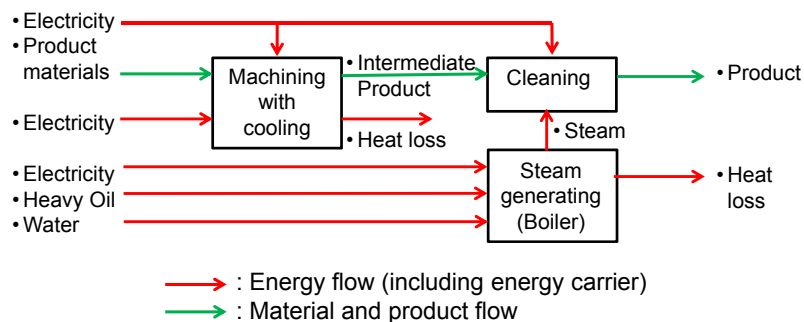
Toru Ishikuma
IEC ACEE JP expert
Azbil Corporation, Japan
16 October, 2015

azbil



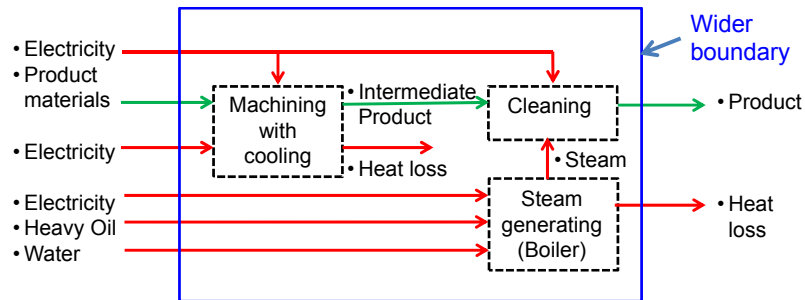
An example of process changes (1/3)

- Automobile parts manufacturer in Japan
- Three energy using units were used in production
- EE of each unit was improved in the past, but still lots of energy was used and even lost



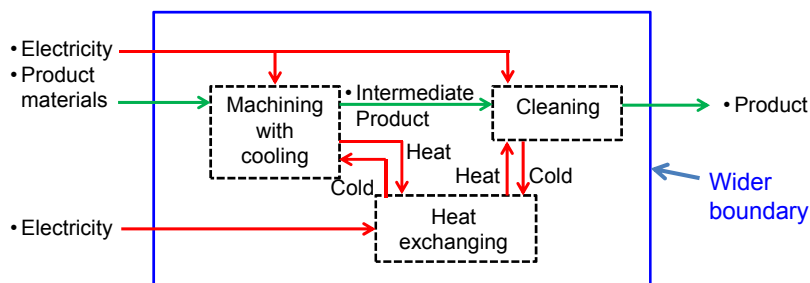
An example of process changes (2/3)

- The project changed the view with wider boundary, combining those units as a system, to evaluate and improve energy flow



An example of process changes (3/3)

- Implemented solution was to replace the boiler with an heat exchanger, to manage "heat" and "cold" between two units
- 80% energy was reduced for the same production volume





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Minsk 16 October 2015

Introduction to the IEC Conformity Assessment systems with focus on the IECEE/CB scheme to facilitate international trade.

Trond Sollie
Nemko Group
Senior Corporate Advisor



Conformity Assessment

What is Conformity Assessment ?

- **Demonstration that specified requirements (IEC Standards) relating to a product, process, system, person or body are fulfilled**

Testing, inspection and certification are part of the concept of Conformity Assessment either as a stand alone activity or all together.

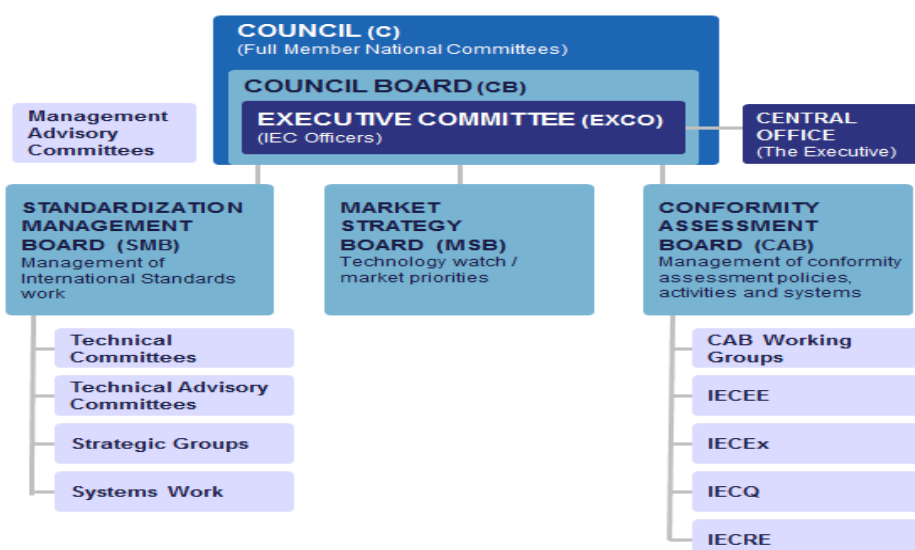




IEC conformity assessment is not left to amateurs

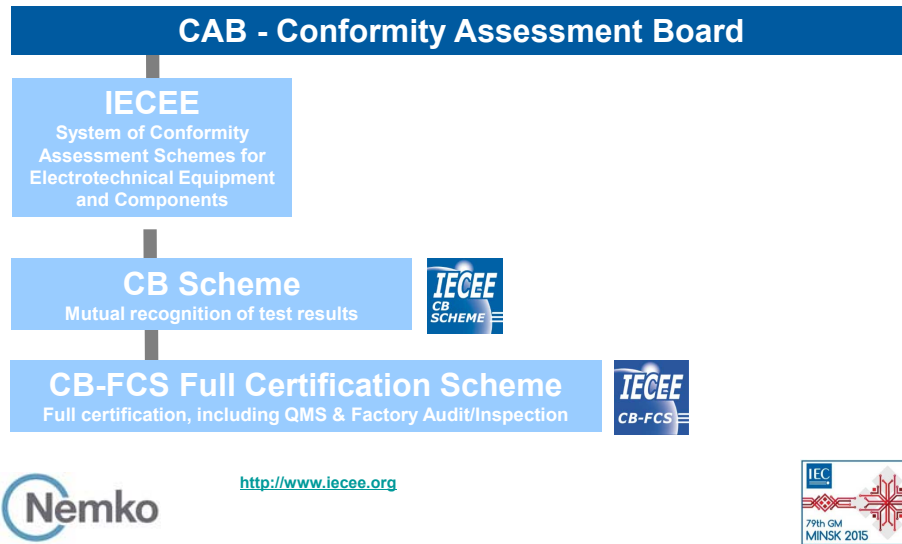


The IEC Conformity Assessment systems





IECEE System and the CAB



History of the IECEE

The IECEE System, originally operated by the **CEE** (International (European) Commission for Conformity Certification of Electrical Equipment), was integrated into the **IEC** in 1985 as the CB Scheme of the IECEE.

Today the IECEE System operates two Schemes, the historical CB Scheme and the CB-FCS that helps Industry to access the Global Market for Electrotechnical Equipment and Components.





Conformity Assessment

- **IECEE is operating 3rd Party conformity assessment schemes**
- **3rd party conformity assessment activity is performed by a person or body that is independent from the person or organization that provides the product, and of users of that product.**

Quality criteria for the qualifications and independence of the conformity assessment bodies are provided in the ISO/IEC 17000-series of International standards.



Conformity Assessment under IECEE Scheme

- **Products are tested to IEC standards with provision for supplementary testing for national differences, when relevant.**
- **Reciprocal recognition of test results among all participating Certification Bodies simplifies the granting of certification or approval at national levels.**
- **CB Test Certificates and associated Test Reports facilitate obtaining secondary certifications.**





Tailor Made for the Customer

Because Globalization and competition are leading

- Globalization and competition lead to rapid changes, and technical barriers to trade remain a serious problem for industry's time to market, the shortening life cycle of products and the need to reduce costs...
- The CB Scheme offers de facto a true “passport” for the needs of different countries.
- The CB Scheme answers de facto the market needs to have a Test Certificate tailored to be recognized worldwide.
- The CB Scheme, in its fullest extent, proves de facto that the costs of certification, testing and inspection can be drastically reduced.

9



A passport to access worldwide markets





Aim

The basic aim of the CB Scheme is to provide manufacturers/ suppliers seeking worldwide third party certification/marks,

- **the most economic and cost effective procedures**
- **within the best certification time frame.**



Objectives

- **A global solution for a global market**
- **Partners with standards in facilitating international trade**
- **Elimination of multiple testing, (also for national differences)**
- **Reduce multiple factory visits for production surveillance**
- **Increased access to markets and reduced time to market**
- **Reduced costs – increased trade**
- **Increased confidence**
- **Acceptance by Regulators**





Global conformity assessment

- CB Test Certificates and associated Test Reports issued by an NCB accepted by NCBs in other member countries for purposes of national certification
- CB Test Certificates and associated Test Reports recognized/accepted by many Regulatory Authorities
- CB Test Certificates and associated Test Reports directly accepted directly by retailers, buyers, vendors worldwide
- Reduced testing and certification costs



The scope of the CB Scheme

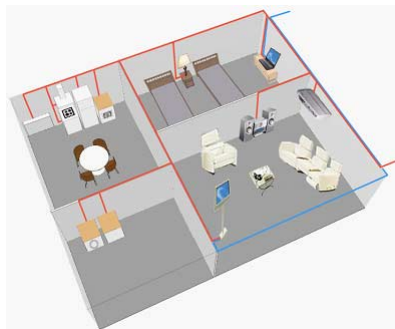
Industrial Control
Products (TC 65)

Electrical accessories
(TC 23)

Luminaires
(TC 34)

Electric cables
(TC 20)

Lamps and related
equipment (TC 34)



Information Technology
(TC 108)

Multimedia
(TC 100)

Fibre optics
(TC 86)

Cables, wires,
waveguides (TC 46)

Household appliances
(TCs 59 & 61)

CB Scheme Operations

- **23** product categories ranging from Information Technology and electronic equipment, household, medical equipment, lighting to EMC, and Photovoltaics but 60% of activity is concentrated in these three areas:

- Household appliances
- Office & IT equipment
- Electronics / entertainment



IECEE member countries

 Argentina	 Finland	 Malaysia	 Slovakia
 Australia	 France	 Mexico	 Slovenia
 Austria	 Germany	 Netherlands	 South Africa
 Bahrain	 Greece	 New Zealand	 Spain
 Belarus	 Hungary	 Nigeria	 Sweden
 Belgium	 India	 Norway	 Switzerland
 Brazil	 Indonesia	 Pakistan	 Thailand
 Bulgaria	 Ireland	 Poland	 Turkey
 Canada	 Israel	 Portugal	 Ukraine
 China	 Italy	 Russian Federation	 United Arab Emirates
 Colombia	 Japan	 Saudi Arabia	 United Kingdom
 Croatia	 Kenya	 Serbia	 United States
 Czech Rep.	 Korea Rep. of	 Singapore	 Viet Nam
 Denmark	 Libya		

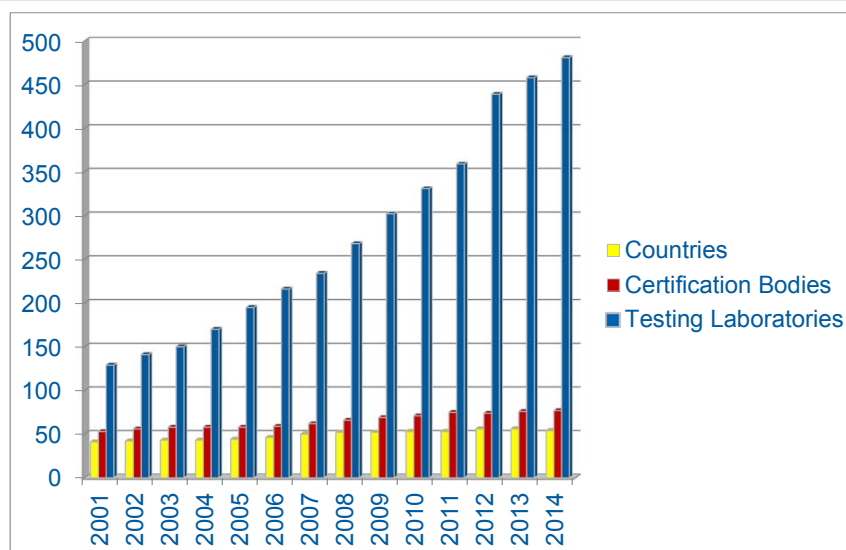




IECEE Facts

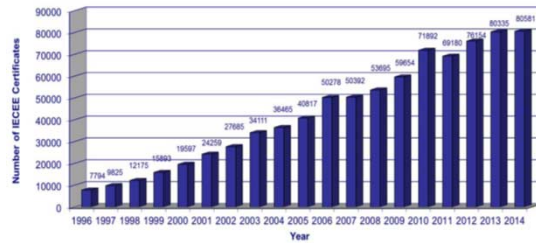
- **54** participating countries
- **77** National Certification Bodies (NCBs)
- **About 500** Testing Laboratories (CBTLs)
- Over **80.000** certificates issued in 2014
- Over **500.000** current certificates
- More than **15.000** manufacturers using,
- About **1700** manufacturers registered in the programs for testing at own premises

IECEE Conformity Assessment Providers

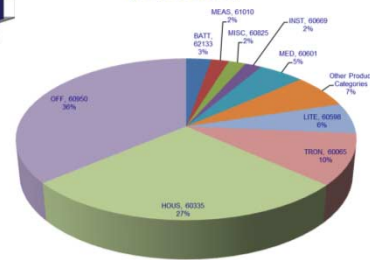




IECEE CB Test Certificates issued

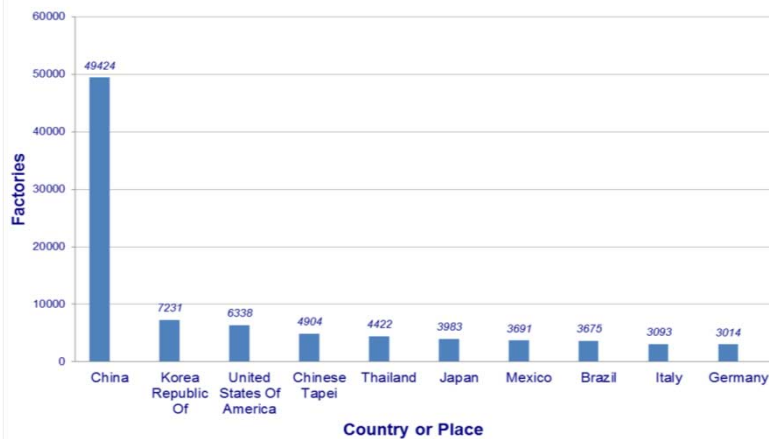


Top 10 Product Categories in the last 3 years (2012, 2013 and 2014)



IECEE CB Test Certificates issued

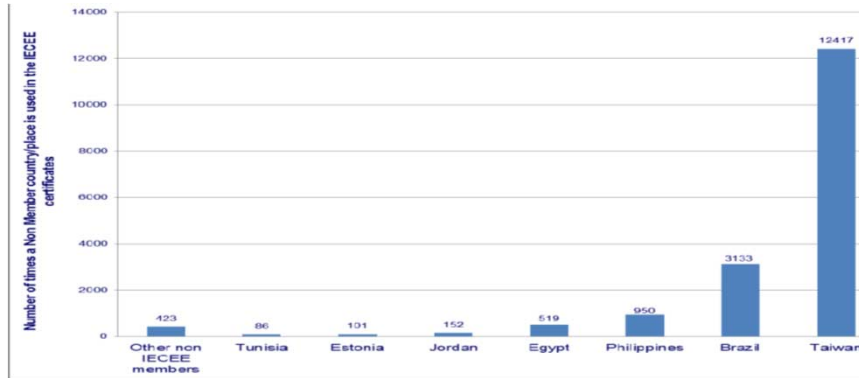
TOP 10 FACTORY LOCATIONS IN 2014





IECEE CB Test Certificates issued

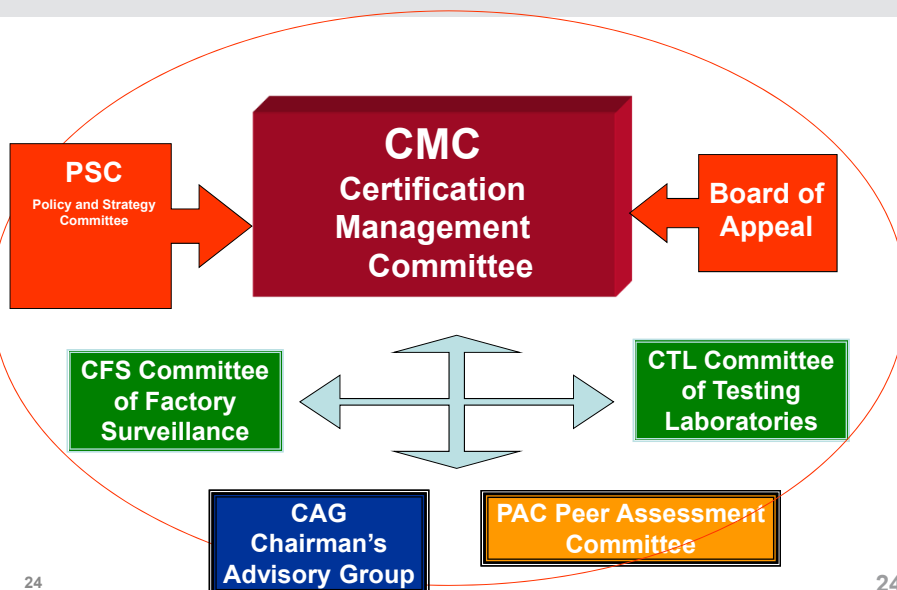
Number of certificates from non-IECEE member countries 2014



Other Non IECEE Members countries/places include: Afghanistan, Albania, Algeria, Bangladesh, Barbados, Bosnia Herzegovina, Botswana, Chile, Costa Rica, Cyprus, Dominican Republic, Ecuador, Iceland, Jamaica, Latvia, Lesotho, Liechtenstein, Lithuania, Luxemburg, Macao, Macedonia, Malta, Mauritius, Montenegro, Morocco, Myanmar, Peru, Puerto Rico, Qatar, Samoa, Sri Lanka, Swaziland, Syrian Arab Republic, Trinidad and Tobago, Tuvalu and Virgin Islands (British)



IECEE Organizational Structure



24

24



The main technical branch of the IECEE

- Agree on uniform understanding of IEC Standards
- Achieve the necessary reproducibility of test results
- Agrees on common test methodologies
- Harmonize the design and use of the test equipment



Committee of Testing Laboratories

- **The Committee of Testing Laboratories (CTL) consists of:**
 - **Chairman**
 - **Secretary, nominated by the IECEE Member Bodies and formally appointed by the CMC**
 - **Technical experts, employed by the Testing Laboratories' members of the IECEE System.**
- **The IECEE CTL is the biggest Technical Committee with more than 500 experts in the various Product Categories operated by the IECEE**



The Peer Assessment Committee (PAC)

- **To monitor the Peer Assessment and Re-assessment programmes**
- **To determine a common understanding and approach on ISO/IEC 17065 and ISO/IEC 17025, etc**
- **To legislate over Conformity Assessment issues**
- **To evaluate the Assessment Reports of candidate NCBs and CBTLs and make recommendations to the IECEE Management Committee (CMC)**





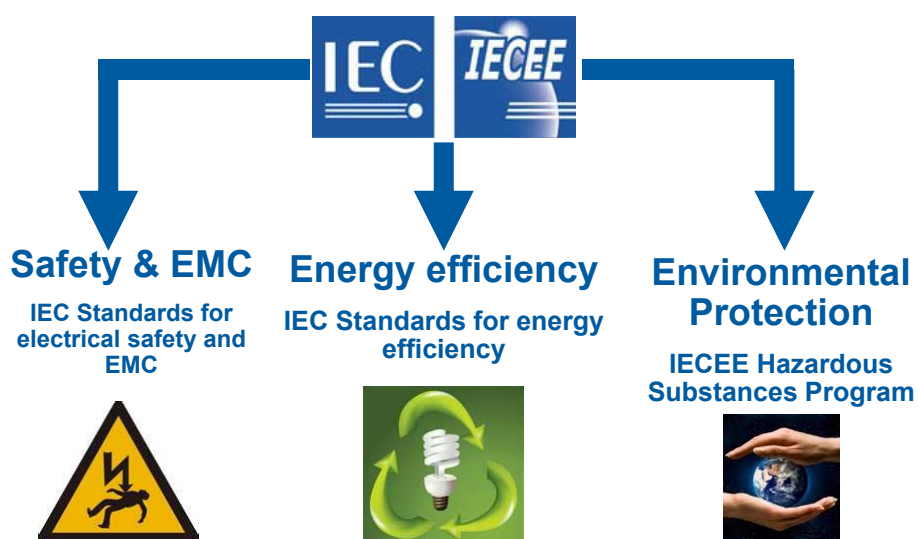
Peer Assessment Committee

The Peer Assessment Committee (PAC) consists of:

- Chairman
- IECEE Executive Secretary
- 12 members, each of whom shall be associated with an Issuing and Recognizing NCB. They shall be appointed by the CMC, upon nomination by the Member Bodies of the IECEE.



Safety – Performance - Environmental





The dreaming target

One test

One factory surveillance

One certification

One certification mark



Today's achieved target

One test

**Reduced multiple
factory surveillance**

**One international
certificate**

**One or more certification marks as needed
or direct acceptance in the market place by
regulators, customs, retailers, buyers, etc..**



How to Search for valid certificates



International Standards, Conformity Assessment and the TBT Agreement

Council Open Session
79th IEC General Meeting
16 October 2015, Minsk

Devin McDaniels
Economic Affairs Officer
Trade and Environment Division
World Trade Organization (WTO, OMC)
devin.mcdaniels@wto.org



TBT is 20 years old

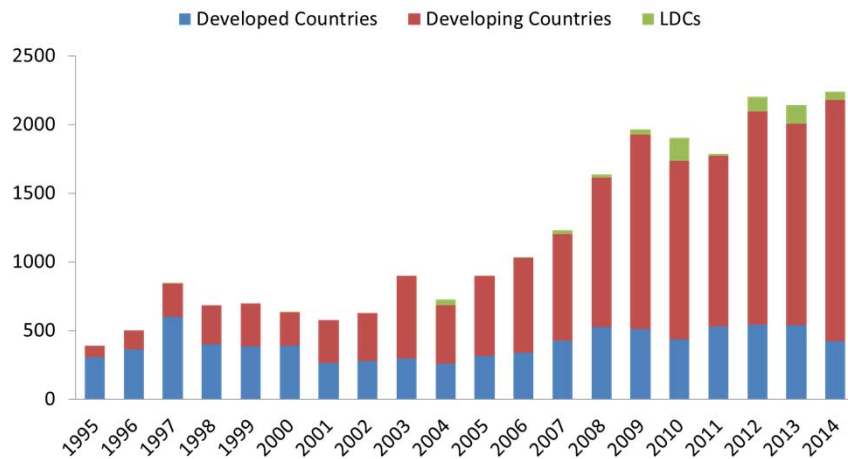
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Notifications

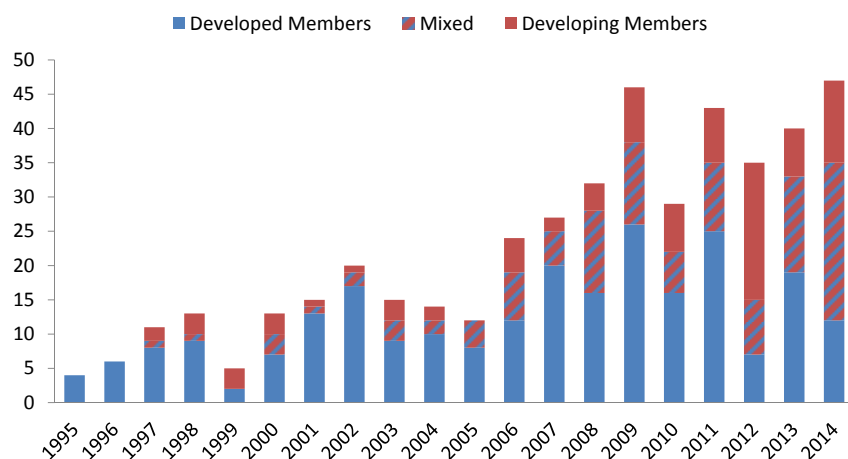
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Specific Trade Concerns

TBT Notifications 1995-2014



TBT Specific Trade Concerns 1995-2014



Context has changed...

9% average tariff applied by WTO Members(2013)

RTAs: rise in TBT provisions

Trade Facilitation Agreement: focus on reducing trade costs

Fragmented production in global value chains

**using
international standards**
↓
regulation

6 principles

better international standards =
better trade

standards ≠ regulation

Voluntary

Market-driven,
market needs

Mandatory

Government:

- Health
- Safety
- Environment

Problem: rise in trade concerns related to testing and certification



Solution: international systems for conformity assessment
(e.g. IECEE, ILAC/IAF)



Thank you, any questions?

devin.mcdaniels@wto.org



79th IEC General Meeting - Open Session
Minsk 16 October 2015

**Case Study: Practical Experience in the Implementation of
Energy Efficient Technologies in Different Regions of the
World
- Asia's Perspective**

Mr Tak Leong, CHEONG
PASC Secretary
16 Oct 2015







PASC Members



- 25 National Standards Bodies from the Pacific Rim Countries
- 50% of world population, high growth opportunity (> 5% GDP annual growth)



Outline



- Introduction of PASC
- Key Approaches to Improve the Implementation of Energy Efficient Technologies
- Examples of Initiatives to Improve the Energy Performance
- Key Roles of National Standards Bodies



PASC Objectives



- Key Objectives
 - Strengthen international standardization programmes & enable PASC members' to effectively participate in them
 - Improve regional quality & capacity of standardisation
 - Support free trade and market access
 - Collaborate with other bodies who are part of the standardization technical infrastructure, industry, consumers and government



Key Approaches to Improve the Implementation of Energy Efficient Technologies



1. *Improve efficacy of price signals*
 - Price energy 'right'
2. *Targeted industry and/or government intervention to address sector-specific market barriers:*
 - Lack of awareness & capability – training & seminars
 - Financing constraints
 - Coordinating unit to provide integrated approach

Industry	Buildings	Transport	Households
• Co-generation plants • Financing schemes through grant to address limited capital barrier	• Energy efficiency standards for building owners • Financing support	• Invest in public transport • Pricing mechanisms to encourage up-take of fuel efficient cars	• Help consumers via appliance labeling and minimum energy performance standards



Example 1: Setting the Minimum Energy Performance Standards (MEPS) for Home Appliances in Singapore



Mandatory Energy Labelling Scheme (MELS)

- To provide consumers with the relevant information on energy consumption and efficiency of the labelled products
- To differentiate the more energy efficient models from the less efficient ones

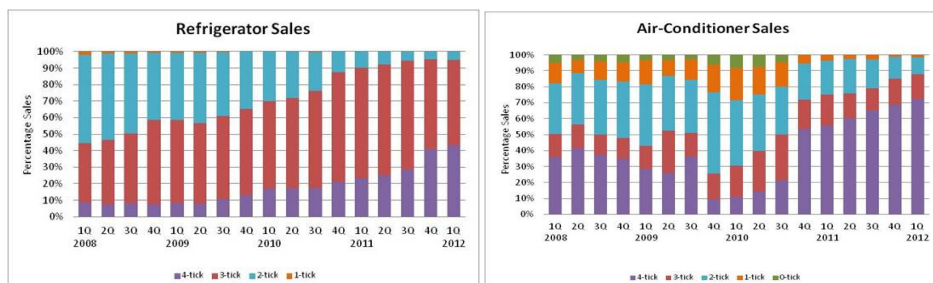


Minimum Energy Performance Standards (MEPS)

- For registrable air-conditioners, refrigerators and lighting**
- To improve average energy efficiency of appliances by prohibiting sale of inefficient models that do not meet the standards



Example 1: Results of Mandatory Energy Labelling



- MELS has been successful at modifying consumer behaviour
 - A gradual shift towards more energy efficient models (3 to 4 ticks)
- Continuous improvements in the energy efficiency of appliances over the years have led to the introduction of new, higher efficiency models by suppliers
 - Led to higher competition among suppliers to differentiate themselves in the higher bands, i.e. 3-tick & 4-tick bands



Example 2: Setting Minimum Energy Efficiency Requirements for Equipment in Building



Incentive scheme for existing buildings & premises

- Platinum, Gold Plus, Gold & Certified



MANDATORY MINIMUM ENVIRONMENTAL SUSTAINABILITY STANDARD FOR NEW & EXISTING BUILDINGS

Meet minimum Green Mark standards- NEW residential and non-residential buildings Gross Floor Areas (GFA) >2,000m²

Meet minimum Green Mark standards- EXISTING single and mixed-use developments of hotel, retail and office building with > 15,000m² GFA when replacing their chilled water system



Example 2: Economic Benefits



City Square Mall – The First Eco-Shopping Mall in Singapore

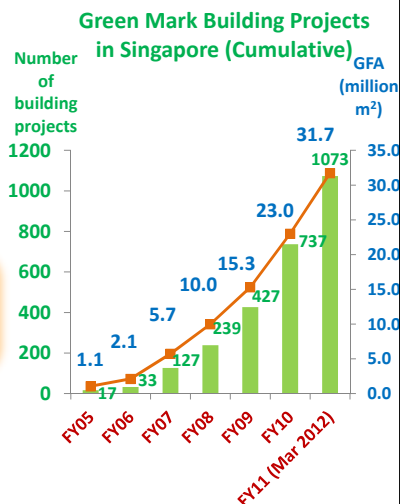


The most relevant business function impacted is the usage and maintenance of Chillers

Due to higher minimum energy efficiency performance requirements in standard

✓ > \$300,000 of annual savings in electricity bills*

* Based on ISO Methodology on Quantifying the Economic Benefits of Standards



Example 3: Training, Workshops and Partnerships

Training/workshops/seminars/conference

- Examples:
 - Energy efficient and renewable technologies,
 - Standards, policy and financing related to energy efficient and renewables technologies
 - Case studies on system design, modelling and technical assessments



Partnerships

- Examples: APEC SCSC and Industry Associations in partnership with Development Banks and Government Agencies



Develop a knowledge repository in sustainable energy that developing countries can tap on



Highlights on the Key Roles of National Standards Bodies



- Work with industry key stakeholders, government agencies and regional standards partners to identify, develop and promote the adoption of international and national standards to support sustainable energy initiatives
 - E.g. Energy management systems (e.g. ISO 50001), energy efficiency standard for building services and equipment, IEC standards on equipment energy performance and measurement & validation of energy performance
- Benchmark national minimum energy performance requirements against international baselines and review these requirements regularly
- Partner with local, regional and international key stakeholders to support their initiatives to improve organisations' energy performance



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Thank you!

Mr Tak Leong, CHEONG
PASC Secretary
16 Oct 2015
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**Europe: Practical experience in the
implementation of energy efficient
technologies**

Dr. Bernhard Thies
DKE German Commission for Electrical,
Electronic & Information Technologies of DIN and VDE
16 October 2015



**“Energy efficiency is the most
exciting technology you’ve
never seen”**

[Elaine Adams, Senior Consultant ,AT&T]



Energy efficient Technologies

- Heat supply
- Refrigeration engineering
- Waste heat utilisation
- Insulation of industrial facilities
- Compressed air
- Pumping systems
- Ventilation technology
- Conveyance
- Propulsion technology

➔ Cross-sectional technologies



Fields of Standardization activities

- Energy labelling
- Ecodesign
- Energy management
- Smart grids
- Smart meters



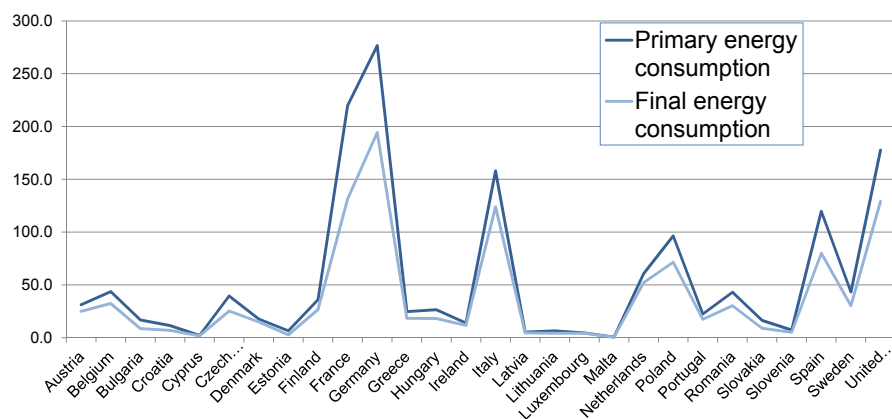
Energy Efficiency Directive

- establishes a set of binding measures to help the EU reach its 20% energy efficiency target by 2020
- all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption
- Transposed the Directive's provisions into their national laws

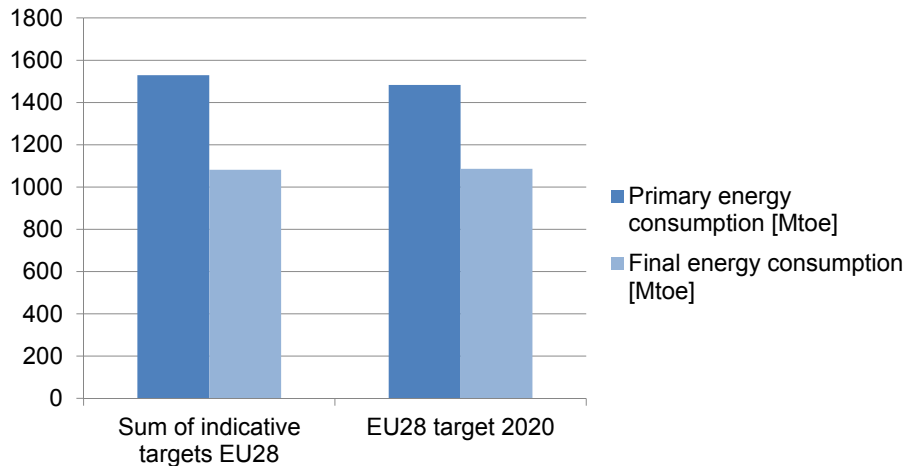


National energy efficiency targets

Absolute level of energy consumption in 2020 [Mtoe]



European energy efficiency target



Policies to improve energy efficiency include

- A reduction of 1.5% in national energy sales per year
- EU countries making energy efficient renovations to at least 3% of buildings owned and occupied by central governments per year
- mandatory energy efficiency certificates accompanying the sale and rental of buildings
- minimum energy efficiency standards and labelling for a variety of products such as boilers, household appliances, lighting and televisions (EcoDesign)
- the preparation of National Energy Efficiency Action Plans every three years by EU countries
- the planned rollout of close to 200 million smart meters for electricity and 45 million for gas by 2020
- large companies conducting energy audits at least every four years
- protecting the rights of consumers to receive easy and free access to data on real-time and historical energy consumption

[SOURCE: www.ec.europa.eu]



First Results

- new buildings consume half the energy they did in the 1980s
- energy intensity in EU industry decreased by almost 19% between 2001 and 2011
- more efficient appliances are expected to save consumers €100 billion annually – about €465 per household – on their energy bills by 2020
- EU countries have committed themselves to rolling out close to 200 million smart meters for electricity and 45 million for gas by 2020, leading to greater savings for consumers
- the share of refrigerators meeting the highest energy efficiency labelling classes (A and above) increased from less than 5% in 1995 to more than 90% in 2010

[SOURCE: www.ec.europa.eu]



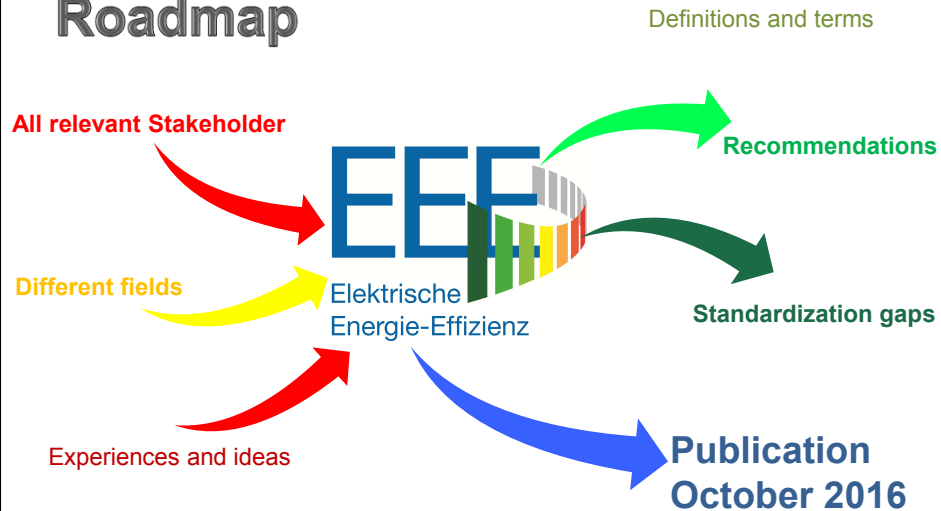
Positive ancillary effects

- for every 1% improvement in energy efficiency, EU gas imports fall by 2.6%
- lower energy costs for people who live and work in energy efficient buildings, as well as additional benefits such as improved air quality and protection from external noise provided by energy efficient windows
- business opportunities for European companies such as construction firms and manufacturers of energy-using equipment
- new jobs in construction, manufacturing, research, and other industries investing in energy efficiency

[SOURCE: www.ec.europa.eu]



German Standardization Roadmap



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Minsk 16 October 2015

Thank you!

Dr. Bernhard Thies
DKE German Commission for Electrical,
Electronic & Information Technologies of DIN and VDE
16 October 2015



79th IEC General Meeting - Open Session
Minsk, 16 October 2015

Energy efficiency and energy security: *current situation and prospects of development*

Nazarenko V.V.
Chairman of the State
Committee for Standardization
of the Republic of Belarus



Balance of energy resources consumption in the Republic of Belarus

- ✓ Deficit of its own energy resources
- ✓ Imports of energy resources (gas, electricity) – **more than 70 %**

Energy security of the Republic of Belarus



- Energy conservation in social and industrial spheres (including in manufacture, storage, transportation and transmission of electric energy)
- Increasing efficiency of fuel and energy resources use
- Use of local fuels (LF), including renewable energy sources (RES)



State policy in the field of energy conservation

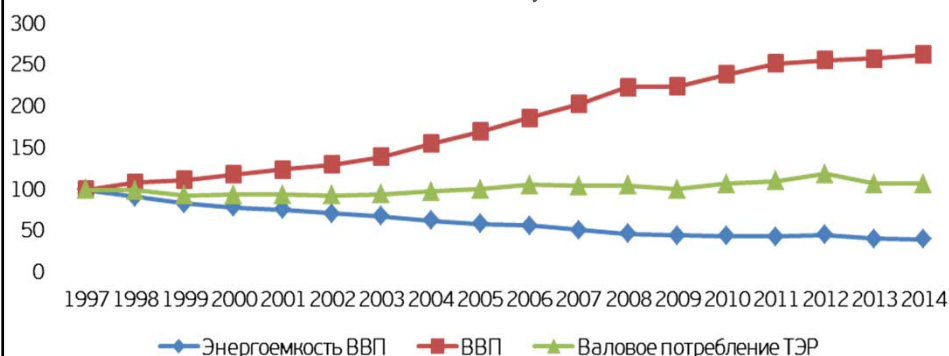
- Directive No. 3 of the President "Economy and thrift are the main factors of the economic security of the state" (2007)
- The law "On energy conservation" (1996, 2015)
- The development strategy of the energy potential of the Republic of Belarus (2010)
- Republican program for energy conservation for 2011-2015 (4th)

3



The country's achievements in energy conservation

Changes in GDP, gross consumption of fuel and energy resources and energy intensity of GDP to the level of 1997, %

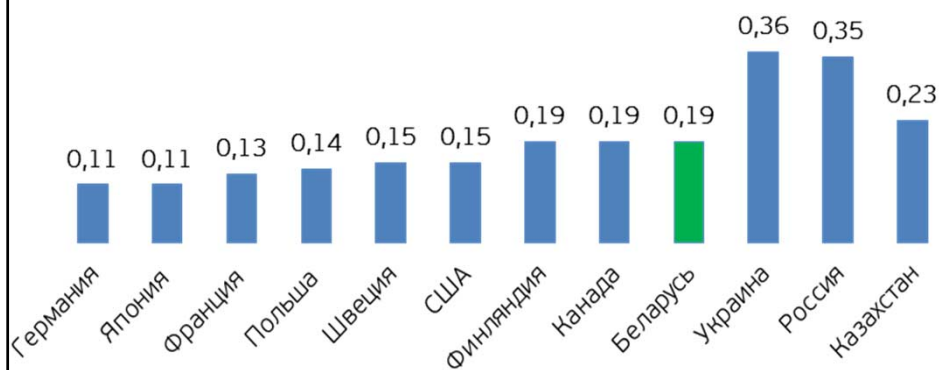


4



The country's achievements in energy conservation

Indicators of energy intensity of GDP in 2013 in the world (in 2005 prices PPP), according to the IEA

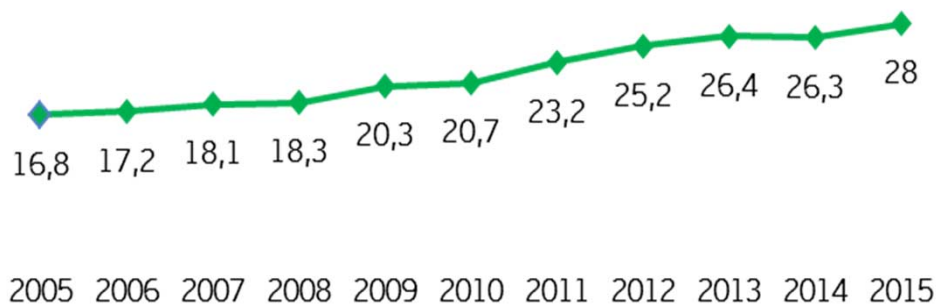


5



The country's achievements in energy conservation

The share of local energy resources in the balance of boiler and furnace fuel

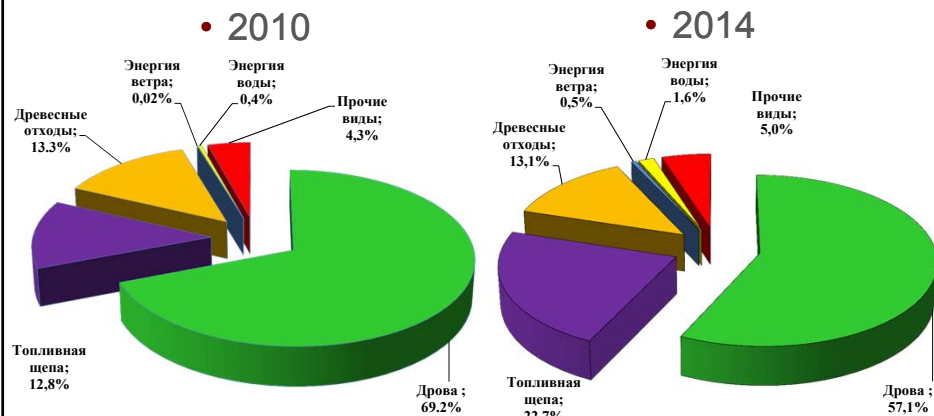


6



The country's achievements in energy conservation

Structure of the renewable energy resources (without secondary energy resources), %



7



The country's achievements in energy conservation

Today in the Republic there are:

- more **3000** power sources on local fuel with a total installed capacity about 5.4 thousand MW
- **16** biogas plants on agricultural waste, landfill gas, sewage sludge of total electrical capacity of 20.63 MW
- **37** wind turbines of total electrical capacity about 17 MW

8



The country's achievements in energy conservation

- **51** hydro power plants of total electrical capacity about 34.5 MW
- **170** solar water heaters of total thermal capacity more than 1.5 MW
- **15** photovoltaic power plants of total electrical capacity more than 6.25 MW

9



Key tools to improve energy efficiency

- 1) Planning of indicators in energy efficiency and energy conservation
- 2) Technical regulation
- 3) Development and application of governmental standards in terms of energy efficiency performance
 - ✓ energy-related equipment
 - ✓ fuel and materials
 - ✓ technological energy-related equipment
 - ✓ electrical household appliances
- 4) Metrological support of energy conservation

10



Planning of indicators in energy efficiency and energy conservation

- Reducing energy intensity of GDP in the Republic of Belarus
- Target indicators for energy conservation for industries and regions
- Target indicators for energy conservation for organizations
- Slowdown in spending fuel and energy resources per unit of output



Development and implementation of national, regional, sectoral programs for energy conservation and achievement of planned indicators

11



Technical regulation of energy conservation

- Establishment of the mandatory requirements for energy efficiency in the Republic of Belarus
- Adoption and implementation of the mandatory requirements for energy efficiency in EAEU



Development and adoption of technical regulations of the Republic of Belarus and the Eurasian Economic Union specifying the requirements for energy efficiency

12



Technical regulations of the Republic of Belarus

TR 2009/013 /BY “Buildings and structures, building materials and products. Safety”

- *requirements to housing conditions or the activities of people providing efficient and economical use of energy resources*

Draft

TR BY “Energy efficiency of buildings”

- requirements of energy efficiency and cost-effective use of resources for buildings and structures
- procedures of conformity attestation
- harmonization with International and European requirements (*Directive 2013/31/EU, etc.*)

13



Technical regulations within the Eurasian Economic Union

Draft

EAEU TR «On the requirements to energy efficiency of electrical energy-related devices»

Draft

EAEU TR «On informing consumers about the energy efficiency of electrical energy-related devices»



EAEU TRs have passed the stage of public discussion

14



Development and application of governmental standards

- Selection of priority directions of standardization in energy efficiency
- Development of governmental and intergovernmental standards on energy performance and test methods
- Use as a basis of International Standards IEC and ISO, EU Directives



Development and implementation of standardization programs in energy conservation and energy efficiency at the level of the Republic of Belarus and the Commonwealth of Independent States

15



National standardization in the field of energy conservation

Program for 2007-2010

- ❑ **132** TNLA have been developed
(**1** – TR BY, **15** – TCPs, **116** – STBs)

Program for 2011-2015

- ❑ **87** STBs and GOSTs have been developed, development of **136** standards is envisaged

- ✓ *local fuels*
- ✓ *highly efficient heat generating equipment*
- ✓ *new types of industrial equipment*
- ✓ *household electrical equipment*
- ✓ *energy-efficient construction, energy management*

**Harmonization level of standards is 85%
(compliance with ISO, IEC, EN)**

16



International technical project of the European Union in the field of energy efficiency

Development of **48 governmental standards** to
the requirements and test methods of energy
performance of consumer goods and industrial
products

- **22** standards, harmonized with International and European ones
- **26** standards, harmonized with the EU Directives



Adoption of standards is planned in 2015 – 2016

17



International technical project of the European Union in the field of energy efficiency

Creation of a testing base for assessment of
energy efficiency of energy-related products

- *lighting equipment*
- *air conditioners*
- *refrigerating equipment*
- *electrical ovens*
- *washing machines, dryers and dishwashers*
- *circulating pumps*
- *electrical household and office equipment, and others*

Entering the lab into operation – December 2015

18



Metrological support of energy conservation

- Development of a reference base for ensuring traceability of measurements
- Formation of a system for accounting and control of fuel and energy resources consumption



- **State reference standards of the Republic of Belarus – 51, including in energy conservation – 12**
- **Standards and documents in metrology on test methods in energy efficiency – 275**
Harmonization level of standards – 35% (ISO, IEC, EN)
- **Types of measuring instruments in the field of energy conservation included into the State register of the Republic of Belarus, in total - 364**

19



Improvement of energy security of the Republic of Belarus

- ✓ **Creation of modern normative and technical base**
- ✓ **Systematic purposeful work at all levels of management**
- ✓ **Complex approach to the matters of energy efficiency and energy conservation**

20



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Minsk, 16 October 2015

Thank you for attention!

Nazarenko V.V.
Chairman of the State
Committee for Standardization
of the Republic of Belarus
16 October 2015



79th IEC General Meeting – Open Council Session

**Workshop Report :
IEC Conformity Assessment
Systems as the most effective tool
to overcome the technical barriers
in international trade
Minsk 15 October 2015**

Steve ALLAN
IECQ Business Manager
2015-10-16



**Development directions of the IEC
Conformity Assessment Systems
(IECEE, IECEX, IECQ, IECRE)**

Speaker: David HANLON

Summary

- Risk management to reduce risk
- Mutual recognition of test results / certificates
- Allows easier market access – simplifies market surveillance



IECEX Conformity Assessment System, An example of an IEC solution for a Specialised Sector covering Equipment, Services and Personal, through the eyes of industry

Speaker: Marty COLE

Summary

- Specialised sector heavily regulated in many countries
- Addresses industry needs, from design to end use and maintenance
- Provides high level of integrity through manufacturing surveillance and personal competency



IECEE Conformity Assessment Scheme. Advantages and new opportunities. Interaction of accreditation systems at the national and regional levels and within the IECEE

Speaker: Wolfgang NIEDZIELLA

Summary

- Reduces obstacles to international trade
- All testing conducted to IEC standards
- Based on mutual agreement → only works with trust
- Improved safety and reliability of products in the marketplace



Conformity assessment for admission of products to the market in Japan

Speaker: Toshiyuki KAJIYA

Summary

- Japan adopts more than 80% of IEC standards
- Two main compulsory schemes (Category A & B) with IECEE reports able to be utilised within these schemes



Conformity assessment for admission of products to the market in Korea and perspective of harmonizing conformity assessment rules and procedures in North East Asia countries

Speaker: Kaphong CHOI

Summary

- Korea have adopted 62% of IEC and ISO standards
- Standards and Conformity Assessment has been a powerful vehicle to drive national economic growth
- Conformity assessment scheme is a good means to disseminate standards effectively and improve the quality of products



Conformity assessment for admission of products to the market in China

Speaker: Weijun LIU

Summary

- China government is open for CA systems and well established within IEC's CA systems
- Key objectives for China CA systems
 - To facilitate cross-border trade in the electrotechnical field
 - To enhance electrotechnical manufacturing in China and its competitiveness in the world
- China acceptance of all IEC CA system reports, tests and certificates



Conformity assessment for admission of products to the market in Gulf countries

Speaker: Basem SALAMEH

Summary

- GSO have adopted 80% IEC Standards in the electrotechnical field
- Single market strategy
 - Free product circulation → remove barriers
 - Consumer protection → apply appropriate technical requirements & CA



Conformity assessment for admission of products to the market in EAEU

Speaker: Vigen ENOKIAN

Summary

- Mandatory requirements – 66 products
- Covered by 800 IEC standards
- 11 technical regulations have been harmonized
- Single product Mark



Conformity assessment for admission of products to the market in European countries

Speaker: Trond SOLLIE

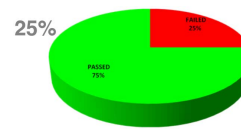
Summary

Results of a European-wide survey made 2012-2014:

Self-declared only



Conformity assessed by 3rd party



Proposals and recommendations from the discussions

- To develop conformity assessment Schemes **FROM** industry and **FOR** industry
- To strengthen recognition of IEC CA by regulators
- To promote cooperation among the IEC CA systems
- To enhance mutual recognition
- To prevent counterfeit
- To address cybersecurity of data for communication systems within industry and power grids etc.
- To open clear communication and coordination of technical resource pools between Standards Development and Conformity Assessment



79th IEC General Meeting – Open Session

Thank you!

Steve ALLAN
IECQ Business Manager
2015-10-16



79th IEC General Meeting – Open Council Session

Workshop Report: Energy efficiency in industry. New technologies, requirements and approaches (Minsk 14 October 2015)

Speaker name *Richard Schomberg*
Title *IEC Smart Energy chair*
Date *16 October 2015*

*



Coping with the Energy Challenge

Smart electrification The key to energy efficiency



- Savings to consumers:
 - USD 5.7 trillion in the last 25 years (more than Japan or Germany 2014 GDP)
 - USD 550 billion in 2014 alone
- “Virtual fuel locally generated” improves energy security
- Approximately 40% of the GHG emissions reductions required by 2050 to limit global temperature increase to less than 2 degrees centigrade would potentially come from energy efficiency.



System of IEC Standards in the field of Energy Efficiency.

Speaker: Ralph SPORER

Chair Advisory Committee on Energy Efficiency

ACEE guides for accelerating harmonization:

- *Guide 1: Energy Efficiency Aspects inclusion in electrotechnical standards*
- *Guide 2: Preparation of Energy Efficiency (EE) Publications*



Experience in application of EE standards on household and industrial electrical products

Speaker: Toshiyuki KAJIYA, Panasonic

Fragmented markets are challenging for manufacturers, conformity assessment, and ...consumers



New energy-efficient technologies in energy production, transmission and storage

Speaker: Bernhard THIES, DKE

“The most efficient power is the one you don’t have to produce”

- Smart technologies are fully mature and available to unlock new Energy Efficiency breakthroughs.
 - And EE effectively from cradle to grave !
- Higher Flexibility = Higher Efficiency thanks to :
 - Intelligent, distributed Energy Management
 - Load / Storage / Generation Management



An integrated approach to energy efficiency in the construction and operation of buildings and structures

Speaker: Fumio UENO

Convenor of IEC SEG1 Smart Cities, TOSHIBA

- Buildings account for 30% of the load
- “systems of (vertical) systems”
- Smart Cities systemic design will dramatically enhance Energy Efficiency in:
 - each of the “verticals”
 - by synergies in between the “verticals”



Practice and key aspects of creating testing laboratories for energy efficiency

Speakers:

Ivan TSERAKH, Profcon -Theseus Lab

Roman MORDASHOV, BelGISS Testing Center

- **Design and set up of a testing facility:**
 - *Defining what to test and how*
 - *Procure standard and specific equipment*
 - *Organize laboratories to 7 dedicated processes*
- **Plan ahead in great detail to make available a fully operational facility all at once from day one !**



Development of an EAEU technical regulation system in ecodesign and energy labeling

Speaker: *Yury PASHYK, Secretary Belarus NC*

- **Harmonization of ecodesign and energy labelling requirements**
 - *for market access: based on international knowledge and not the other way around*
- **Pragmatic and ambitious 12 steps Road Map to jumpstart a self sustaining process, covering all the dimensions:**
 - *legislation, standardization, labs, technical staff, population, market surveillance*



79th IEC General Meeting – Workshop: Energy efficiency in industry. New technologies, requirements and approaches - Minsk 14 October 2015

Recommendations from Speakers and Audience



Expectations on E3 standardization

- **Advance test methodology standardization**
 - *To offer a common assessment basis first, that will support so that methodology can be harmonized as a minimum measure*
- **Across markets, develop a master dashboard to define realistic targets and monitor actual progress**
 - *by type of appliances, markets, timeline 2015-2025-2035*
- **Offer a choice of EE “levels” in the standards**
 - *regulators & customers can have multiple choices for a given purpose*
- **Consider including Customers’ behavior**
 - *There might be many ways to use and operate products*
- **Rely on IEC ACEE Guides to drive harmonization of EE aspects in the standards across IEC and SDOs**



Critical success factors for implementing E3 solutions



- Design self sustaining local processes and detailed implementation roadmaps covering all dimensions, but based on the international harmonized practices
- Standardized solutions must go beyond product to provide an application perspective
- Reference architectures for electrical energy performance are needed
- Electrical Energy Efficiency needs to become visible on the political agenda and in public incentive plans.



The way forward !

The IEC's Electrical Energy Efficiency approaches should be made politically visible and offered at the COP21 meetings (Dec. 2015)



79th IEC General Workshop: Energy efficiency in industry. New technologies, requirements and approaches Minsk 14 October 2015

Спасибо!

Thank you!

