Energy Efficiency Standard Harmonization: The Role of the APEC Steering Group on Energy Standards

by Energy Efficient Strategies

Presentation to CLASP Regional Symposium on Energy Efficiency Standards and Labelling

29 May 2001, Bangkok

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What is a test procedure?

"Test procedures are the method of test used to determine appliance performance, energy consumption and hence energy efficiency. They are critical in that they allow the comparison of products on a fair basis."

What should a test procedure cover?

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- **ambient temperature**
- **water quality and temperature**
- **test loads**
- **instrumentation and equipment**
- **special materials and methods**
- **duty cycles and/or loading patterns (but not frequency of use)**

What should a test procedure deliver?

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- **Repeatability - same result each time**
- **Reproducibility - same result in different labs**
- **Reflective of consumer use**
- **Simple but effective**
- **Covers existing products and new and forthcoming technologies**
- **Represents cultural, climatic influences and user patterns**

Benefits of Alignment/Algorithms

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- **facilitates international trade**
- **decrease testing and approval costs**
- **allow the free movement of the most efficient products (products with a low energy efficiency may be barred if they do not meet local MEPS)**
- **facilitate international comparisons**
- **assist in the diffusion of advanced energy saving technologies.**

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Alignment or Algorithm?

- **Outcome is the same for both - avoids having to retest products for different economies.**
- **Alignment - preferred where there is a single approach for determination of efficiency that is "adequate" (generic)**
- **Algorithm - preferred where impact of usage, climate or local conditions is large and complex**

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Appliance performance

- **Energy and performance are strongly related**
- **Consumers are interested in energy services that appliances provide, not energy consumption**
- **Need to measure energy service (performance) *and* energy to get a measure of efficiency**
- **“Smart” machines can trick test procedures where there is no realistic task (eg US)**

What program elements can be harmonised??

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- **Test procedures? - YES!! (alignment OR algorithm is OK - same effect)**
- **Energy labels? - probably not: too many cultural and language issues; large variation in local products; labels need to be locally relevant, local ownership/control**
- **MEPS (efficiency standards) - may be some benefits in regional or bilateral approaches (eg adoption of world's best practice), local factors**
- **Administrative aspects - probably not necessary, but there are many lessons that can be learned through cooperation**

APEC Steering Group on Energy Standards

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- **Aim - achieve the benefits of increased co-operation on energy standards (test procedures)**
- **Formed 1997, work completed 2000**
- **Major projects outlined in paper**
- **Review of test procedures in APEC economies a major part of work – findings reported in paper**

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Summary & Conclusions

- **Lots of test procedures, generally poor alignment within APEC**
- **Few international standards are fully suitable for adoption now**
- **Alignment appears best option for many products - however this requires work from APEC**

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Summary & Conclusions

- **Few international test standards are “generic” and few have energy efficiency as a prime consideration**
- **There is a need to develop standards which are worth aligning with or alternatively robust algorithms**

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Summary & Conclusions

- **Needs to be general agreement within APEC to develop a strategy to move forward - without the commitment of government, there will be little progress**
- **A need for some commitment and dialogue into selected international standards processes**

Summary & Conclusions

- **Climate impacts are critical for a few key products - mainly refrigerators and air conditioners, but also water heaters - need to account for climate influences in the test procedure (or algorithm)**
- **Realistic tests make it harder for "smart products" to outsmart test methods - performance range**

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Product Profiles

Product Summary - *Refrigerators*

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- large world trade
- large number of different test procedures
- widely regulated across APEC
- no test procedure is clearly superior to others (former Japanese best)
- some prospects for a conversion algorithm, but this is likely to be complex and is yet to be proved

Product Strategy - *Refrigerators*

Energy Efficient Strategies

- Test procedures are poorly aligned
- All current test procedures are inadequate to characterise climate / use
- Large and valuable trade and common regulation makes this a critical product
- Algorithm (computer model) may be feasible, although probably difficult

Product Strategy - *Refrigerators*

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- Critical review of current test procedures is required: reproducibility
- Select best current procedure for further investigation (possibly old JIS)
- Undertake initial investigations on feasibility of modelling based on test data

Product Summary - *Air conditioners*

Energy Efficient Strategies

- large world trade
- mostly similar test procedures, but with many small variations
- widely regulated across APEC
- ISO widely used but is currently inadequate for modelling actual use, a range of climatic conditions or part load operation (esp. inverter types).

Product Summary - *Air conditioners*

Energy Efficient Strategies

- good prospects for a conversion algorithm, but there is still significant development work to be done
- reasonable prospects of alignment in the short to medium term, probably using ISO standard conditions
- APEC leaders directive regarding ISO5151 Need to address outstanding issues

Product Strategy - *Air conditioners*

Energy Efficient Strategies

- align current test conditions and methods to ISO5151 and ISO13253
- Note APEC leaders directive re: ISO5151 alignment +Korea workshop
- endorse current part load testing regimes for multi/variable speed compressors (Japan/ISO)
- Investigate feasibility of algorithms and modelling - especially inverters

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Product Summary - *Motors*

- large world trade
- mostly similar test procedures, but with some significant differences
- some regulation in APEC economies, many under consideration
- IEC test procedure is used widely but currently inadequate.
- IEEE approach used in NAFTA and is the superior methodology

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Product Summary - *Motors*

- conversion algorithm not necessary as proposed IEC standard is adequate
- good prospects of alignment in the short to medium term if current IEC draft (incorporating IEEE methods) proceeds to publication.

Product Strategy - *Electric motors*

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- all key parties actively participate in development of new IEC method (incorporating IEEE approach)
- final IEC document should be available early to mid 2000
- adopt new test method when available

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Product Summary - *Lighting*

- large world trade
- mostly similar test procedures, based on IEC performance standards, but with significant differences with respect to efficacy
- some regulation in APEC economies, some under consideration
- IEC ballast procedure widely used but inadequate, lamps are OK.

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Product Summary - *Lighting*

- there is a need to develop a new IEC ballast efficacy standard based on the superior methods now used in North America and Europe
- conversion algorithm not necessary as proposed standard (if developed) will be adequate
- good prospects of alignment in medium term if IEC std developed.

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Product Strategy - *Lamps*

- IEC standards for lamp performance and efficacy are adequate
- may need to assess position of IES of NA before adoption of IEC standards fully recommended within NAFTA

Product Strategy - *Ballasts*

- Continue work commenced by the APEC workshop in Korea
- Develop a draft test method for consideration within APEC
- Australia/NZ to issue as national standard (completed early 2001)
- Put into IEC as new work proposal

Product Summary - *Water heaters*

Energy Efficient Strategies

- small but growing world trade
- many different test procedures, wide range of temperature requirements, both static and drawoff tests used
- regulation in many APEC economies, under consideration in some
- current IEC test procedure is currently inadequate (only provides static heat loss measurement).

Product Summary - *Water heaters*

Energy Efficient Strategies

- conversion algorithm appears to be the most feasible option.
- suitable computer model already developed and is suitable for adoption as a conversion algorithm.
- suitable accuracy for regulation
- flexibility to model existing test procedures and actual use.
- poor prospects for harmonisation.

Product Strategy - *Water heaters*

Energy Efficient Strategies

- Examine feasibility of introducing AS4234 as an IEC standard for modelling of water heaters
- If feasible, develop set of standard test methods for determination of key variables (reference existing methods where possible)
- Refine method, document and implement as IEC standard

Product Summary - *Clothes washers*

Energy Efficient Strategies

- large world trade
- wide range of test procedures, some home grown, others derived from IEC
- some regulation in APEC economies, some under consideration
- IEC test procedure is currently inadequate wrt performance of top loading. Wide range of work in progress, some time before resolved

Product Summary - *Clothes washers*

Energy Efficient Strategies

- AS/NZS probably best of the existing test methods (based on IEC).
- conversion algorithm not likely to be feasible
- moderate prospects of alignment in the medium term if IEC developed with input of APEC economies. May be some local variations as a result of wash temperature, water.

Product Strategy - *Clothes Washers*

Energy Efficient Strategies

- Get greater participation by APEC economies in IEC for performance of clothes washers (SC59D)
- Gradual refinement of test methods and material to be applicable to non-drum machines
- More interest from APEC economies regulating product is required

Product Summary - *Dishwashers*

Energy Efficient Strategies

- small world trade
- four main test procedures – IEC (wash), AHAM (wash), US DOE (clean load), CENELEC (wash)
- some regulation in APEC economies, no more proposed
- current IEC test procedure is currently inadequate with respect to performance.

Product Summary - *Dishwashers*

Energy Efficient Strategies

- Extensive work is under way in IEC with input from Europe, North America and Australasia – good progress to date.
- conversion algorithm unlikely
- good prospects of alignment in medium term if the IEC standard completed and accepted within relevant APEC economies.

Product Strategy - *Dishwashers*

Energy Efficient Strategies

- Current participation in current IEC is barely adequate (SC59A)
- Continue current work in the development of an international test method for dishwasher performance
- More interest from APEC economies regulating product is required

Product Summary - *Clothes Dryers*

Energy Efficient Strategies

- small world trade
- two main test procedures – IEC and AHAM (US DOE)
- some regulation in APEC economies, no more proposed
- current IEC & AHAM test procedure is currently inadequate with respect to performance (poor correction). AS/NZS technically better.

Product Summary - *Clothes Dryers*

Energy Efficient Strategies

- IEC needs improvement in the area of energy correction. Method needs to be made more generic (initial moisture content). Work going on.
- conversion algorithm not necessary if flexible IEC standard developed
- good prospects of alignment in medium term if IEC improved and accepted within APEC economies.

Product Strategy - *Clothes Dryers*

Energy Efficient Strategies

- Get greater participation by APEC economies in IEC for performance of clothes dryers (SC59D)
- Short term introduction of improved correction method, improved load
- Development of generic test method within IEC by APEC members (longer)
- More interest from APEC economies regulating product is required

Product Summary - *Office Equipment*

Energy Efficient Strategies

- huge world trade, short life, fast turnover, rapid change in technology
- few formal test procedures
- few regulations in APEC, but widely covered by voluntary programs
- case for the standardisation of some aspects of the testing (eg instrumentation and accuracy). Most common measurement is for standby

Product Summary - *Office Equipment*

Energy Efficient Strategies

- conversion algorithm probably unnecessary
- global product specifications and program coverage suggests a strong case for methodology alignment, whether these are formal or informal test procedures (Energy Star).
- standby consumption of standard appliances a related issue (not RF)

Product Strategy - *Office Equipment*

Energy Efficient Strategies

- Develop definitions of various modes of operation (off, sleep, standby etc.)
- Develop general approaches for measurement of standby power (instrumentation, methods)
- Liaise with key agencies (US EPA)
- Look at applicability across broader product groups (eg appliances - note IEC TC59 WG)

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Information Sources

- **All APEC documents are on www.energyefficient.com.au see link to APEC under documents**

- **International Review of Energy Labelling and Standards Programs Throughout the World (released this week) - also available under documents**

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The End

thank you