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Joint Technical Evening  
Engineers Ireland Energy-Environment Division & CIBSE




## Building Energy Rating (BER) of Commercial Buildings

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### Overview of presentation



1. Ireland's approach to BER
2. The market arena: non-domestic buildings
3. The scheme/ regime: BER
4. TOOLS: Methodology: End Products
5. PEOPLE: Competent persons
6. SYSTEMS: Administration, databases, quality assurance
7. Expected impacts
8. Progress, research & consultation at EU level
9. Live priorities/ next steps and conclusions
10. Further information

Why, What, When

Who, How

Info



## 1. Ireland's approach to BER

### Responsibility in Ireland





- > Dept. of Environment, Heritage and Local Government
- > Dept. of Communications, Marine & Natural Resources
- > SEI
- > Interdepartmental Working Group  
– now "Implementation Group"

### Research and consultation



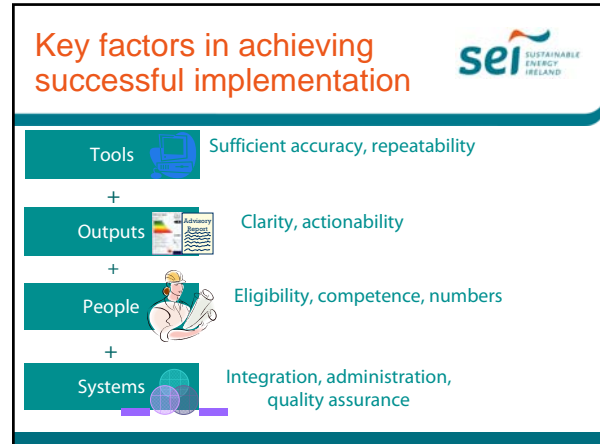
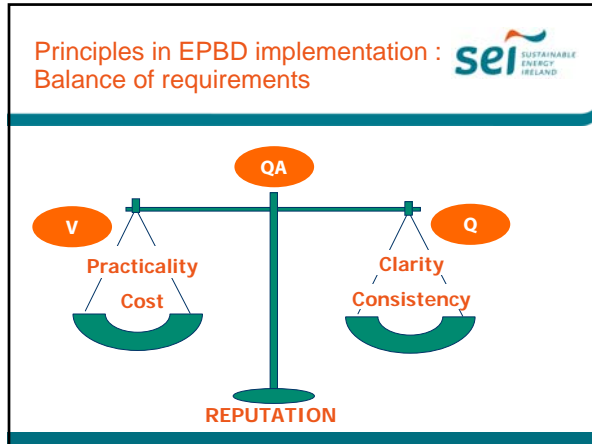
- DEHLG & DCMNR
- Commissioned studies – strategic, technical development, IT
- EU Concerted Action
- EIE projects
- UK Ministries: England & Wales, Scotland, Northern Ireland
- Faber Maunsell
- Dynamic simulation model suppliers
- BRE/ BRE Global
- CIBSE/ CIBSE Certification
- Others

### Implementation in Ireland: Action Plan



Action Plan for Implementation of EPBD in Ireland published July '06

[www.sei.ie/epbd](http://www.sei.ie/epbd)



- ### Implementing Legislation
- Building Control Bill\* & Regulations SI 875 of 2005 (Dec 05)
  - Revised Building Regulations by SI 873 of 2005 (Dec 05)
  - Revised Technical Guidance Document L (May 06)
  - Inspection of A/C Systems Regulations by SI 346 of 2006 (June 06)
  - \* Replaced with Energy Performance of Buildings Regulations by SI 666 of 2006 (Dec 06)
    - Listed buildings etc. are EXEMPT
    - "Major renovations": requirements to be applicable to "material alterations"


- ### EPBD: Implementation Timetable
- Building Regulations**
    - BER New Residential – July '06
    - Building Energy Rating (BER)**
      - BER New Residential – January '07
      - BER New Non-Residential – July '08 ←
      - BER Existing Residential – January '09
      - BER Existing Non-Residential – January '09 ←
      - BER Public Service Buildings – January '09
  - Other Requirements**
    - Alternative Energy Systems – January '07
    - Boilers & Heating Systems – January '08
    - Air Conditioning Systems – January '08

### Establishing a BER system: sequence of main tasks

Legislation, functions, powers
EN standards
Methodologies
Software
Minimum performance standards TGD L
BER label
Advisory report
Training and examination system
Assessor registration system and rules
BER registration/publication system
Administrative system

## 2. The market arena

### Guesstimates of Ireland's non-residential building stock & transaction activity (excluding industry)



**Estimated building stock 2007:**

- 130,000 buildings
- 73 M m<sup>2</sup>
- Average building size 560 m<sup>2</sup>

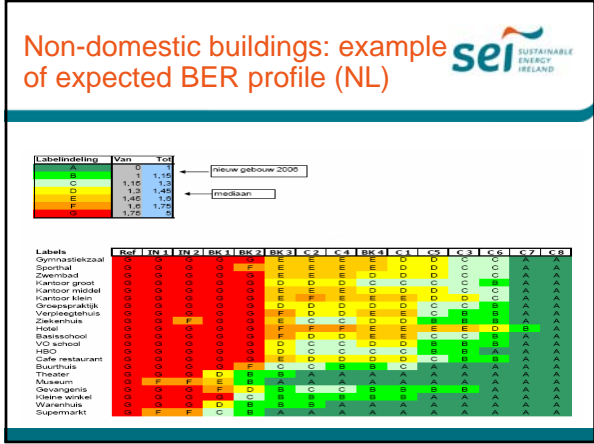
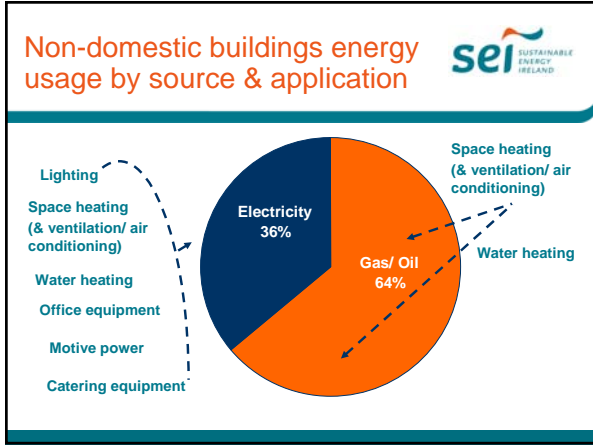
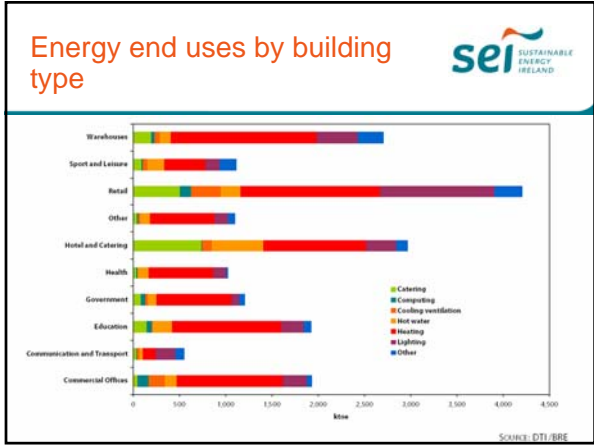
**Potential annual transaction activity:**

- Transfer of ownership 8400 buildings = 4.7 M m<sup>2</sup>
- Transfer of lease 5400 buildings = 5.8 M m<sup>2</sup>
- Total 13800 buildings = 10.5 M m<sup>2</sup>


### Commercial service buildings: diversity




- Offices
- Financial
- Food retail
- Non-food retail
- Hotels
- Restaurants & pubs
- Leisure
- Health
- Education
- Post offices, telecom.....
- ICT
- etc.


### How many assessors are needed for non-domestic buildings ?





- Unlikely to require more than 300 - 500 full time equivalent
- Significantly more may wish to be trained in, for example, SBEM for Building Regulations compliance purposes
- Scope for classes of assessor aligned with competencies:
  - Building complexity (including size)
  - New or existing

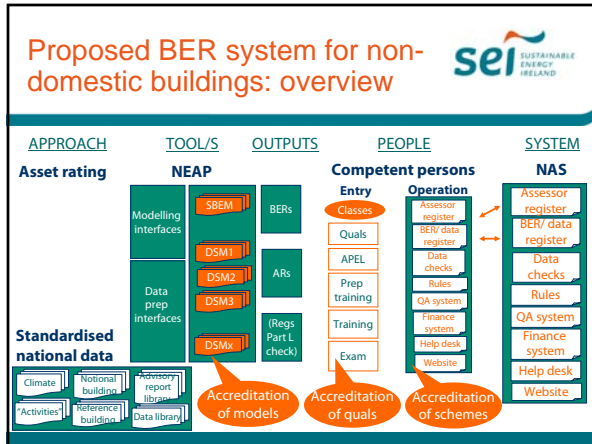



## 3. The BER Scheme


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- ### SI 666 of 2006: Powers and functions of SEI
- Named as "issuing authority" – extensive functions
  - Administration of BER system:
    - Registration of BER assessors
    - Directions to BER assessors
    - Charging of levies
    - Specification and handling of BER data files, certificates etc.
    - Revocation of BER data files or certificates
    - Ownership and maintenance of records, data, documentation
    - Establishment, operation and maintenance of registers
  - Evidential value in court proceedings
  - Appointment and powers of authorised officers

- 
- ### SI 666 of 2006: Citations of Building Control Authorities
- A building control authority or an authorised officer thereof **may demand**, from the owner of a building, or the agent of such owner ..... the production of a **printed copy** of the BER certificate
  - **Proceedings for an offence under these Regulations may be brought and prosecuted by the building control authority or the issuing authority ....**


- 
- ### Proposed BER system
- Some key elements are closely modelled on the emerging UK system
  - **What follows are PROPOSALS rather than a final position**



- 
- ### Why align with UK system ?
- UK "NCM" methodology:
    - Aligns with EN
    - Relatively stable, tested, mature, user support
    - Composite, flexible, from simple to complex
  - **Several technical/market affinities or similarities:**
    - Professional architectural/ building services engineering practice
    - Climate
    - Data libraries: building typologies and technologies
    - Software tools
    - Legal framework and format of Building Regulations
  - Available timescale for implementation !!



## 4. TOOLS: Methodology




### EPBD Action Plan: Survey/ calculation software options

- Option 1:** Adopt, under licence, national software already developed / tested in another EU Member State
- Option 2:** Commission the development of a national software package that all assessors will be obliged to use
- Option 3:** Commission the development of a national software package that assessors may use but also allow software packages developed by the private sector to be validated and approved for use
- Option 4:** Do not develop a national software package but allow packages developed in the private sector to be validated and approved for use. Standard databases of default data, standard assumptions, standard calculation methodology and standard rating and advisory report format could be specified centrally for use with all software packages developed


>>>> not all mutually exclusive

**PROPOSED APPROACH for non-domestic buildings: Hybrid of Options 1 & 3**




### Methodology framework

- The following software, when adapted for use in Ireland, may be used by BER assessors to demonstrate compliance with part of Building Regulations Part L and to generate the BER and Advisory Report:
  - Standard simplified method SBEM with the user interface iSBEM
  - SBEM with an approved (commercial) user interface
  - Approved Dynamic Simulation Model (DSM) Software
- SBEM: monthly calculation, thermally based on EN ISO 13790
- The most common decision (so far) across Europe
- Simpler calculation than hourly, but
  - User doesn't need to see the calculation engine
  - Less flexible than hourly calculation for unusual designs
- For more details on SBEM and validated software packages currently used in the UK, see <http://www.ncm.bre.co.uk>




### A common scale for all building types? – concept of “notional building”

- The **notional building** is the same size and shape as the actual building
  - But has fixed values of U-values, system efficiencies etc
  - Basically compliant with Building Regulations Part L 2006
- Primary energy and CO<sub>2</sub> emissions of the actual building are compared to those of the same building designed to 2006 standards
- This produces a “self-calibrating” scale
- Reduces sensitivity to dimensional accuracy
- But removes incentive to inherently efficient geometries

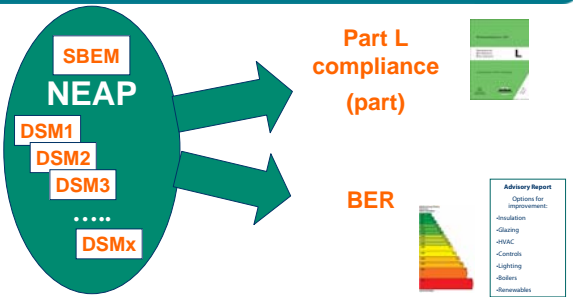


### So what is NEAP ?

- NEAP = “Non-domestic Energy Assessment Procedure”
- The official method for:
  - Showing compliance with EP requirements in Building Regs Part L
  - Generating BERs
- A “black box” procedure with different calculation engine/ software options:
  - Simplified Building Energy Model (SBEM) and interface (iSBEM)
  - Validated dynamic simulation models (DSMs)
- Common standardised data sets:
  - Climate data
  - Building “activity” (function) types
  - “Reference” building for checking compliance with part of Building Regs Part L
  - “Notional” building for generating BER
  - Library of recommendations for auto-generation of Advisory Report



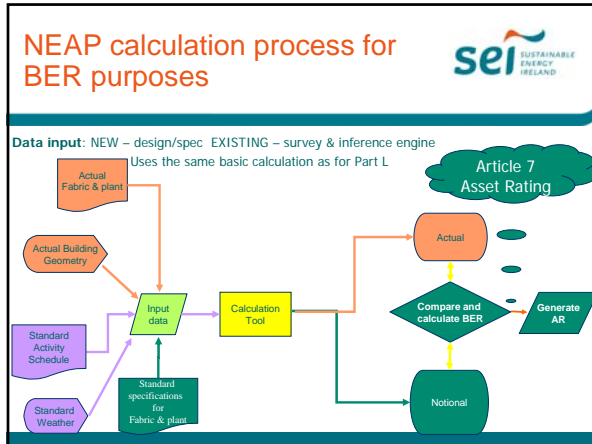
### Dual role of NEAP



**Part L compliance (part)**

**BER**

**Advisory Report**  
Options for improvement:  
-Insulation  
-Glazing  
-MVC  
-Controls  
-Lighting  
-Stairs  
-Renewables



### What information does SBEM need

- 1) General information about the building/certifier/owner etc.. (entered into the **General form**)
- 2) Building fabric – U-values and Cm values for all constructions (entered into the **Project Database form**)
- 3) Geometry of the building along with details of thermal bridges and air-permeability (entered into the **Geometry form**)
- 4) Building Services - details on the HVAC, DHW, lighting and Renewable and Low/Zero Carbon technologies (entered into the **Building Services form**)

- ### UK approved software (through CIBSE TM 33)
- Approved Interfaces
    - iSBEM
    - Carbon Checker
    - Hevacomp
    - IES
    - DesignBuilder
    - DigitalEnergy
    - ECAT
  - Approved Simulation Software
    - IES
    - EDSL TAS
    - Hevacomp

### Draft BER Certificate – UK

- Based on **RATIO** of results for actual/proposed vs reference building
- Based on primary energy kWh/m<sup>2</sup>/year and CO<sub>2</sub>
- Reference building for BER on B/C boundary has mechanical and natural ventilation (mixed mode)

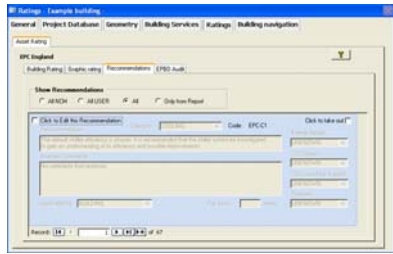
### Proposed BER label - Ireland: Indicative ratios

- Calculated using official method
- Aligned with pr EN 15217
- Principal scale based on **RATIO** primary energy kWh/m<sup>2</sup>/year relative to notional building
- Secondary scale based on **RATIO** CO<sub>2</sub>/m<sup>2</sup>/year relative to notional building
- Must be produced by registered BER assessor
- Valid 10 years unless changes are made to building

### Provisional BER

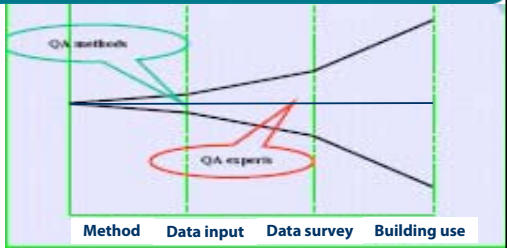
- **ADDITIONAL** requirement if selling off-plans
- When the building is completed, a BER certificate that represents the building as constructed must be supplied to the purchaser
- Same scale as a BER
- Valid for up to 2 years

### Draft Advisory Report - UK



- Standardised recommendations automatically proposed
- BER assessor can customise and add further recommendations

### BER: indicative sources of error: reality versus calculation




### Sources of error or uncertainty

- Typically
  - Data collection + / - 30%
  - Use of default values + / - 5%
  - Calculation method + / - 10%
  - Overall: + / - 15% to 20%
- Optimised (increased use of default values)
  - Data collection + / - 15%
  - Use of default values + / - 15%
  - Calculation method + / - 10%
  - Overall: + / - 10% to 15%

Source: Bart Poel (Netherlands) reports

## 5. PEOPLE: Competent Persons

### BER assessors for non-domestic buildings: proposed approach



- The qualifications/ experience, training, examination and registration requirements for BER non residential assessors have not been finalised
- However prospective assessors will likely be required to join an approved/ accredited "competent persons" scheme
- Such a scheme will have entry and operational conditions, and be monitored by SEI

Entry	Operation
Classes	Assessor register
Quals	BER data register
APEL	Data checks
Prep training	Rules
Training	QA system
Exam	Finance system
	Help desk
	Website

### UK Government specified requirements of Competent Persons Schemes for BER non-domestic

- Ensure BER assessors are fit and proper persons and operate within appropriate code of conduct.
- Ensure BER assessors are qualified.
- Ensure BER assessors have in force suitable indemnity cover.
- Ensure BER assessors use operational procedures that ensure consistency and accuracy.
- Maintain active quality assurance procedures.
- Facilitate resolution of complaints against BER assessors.
- Establish and maintain register of BER assessors.
- Ensure financial probity, stability and operational resilience of the scheme.
- Allow Government to monitor the scheme periodically to ensure compliance with terms of approval and legislation.
- Suitable administrative and operational systems that are applied in a way that is consistent, fair, open and compliant with all relevant legislation.

### Requirements of BER assessors joining Competent Persons schemes: UK



- Demonstrate competence, either by:
  - recognised qualification from an awarding body **or**
  - approved prior experience and learning equivalent to National Occupational Standard requirements
- Maintain appropriate professional indemnity cover
- Update skills and knowledge regularly
- Participate in the scheme's quality assurance system
- Abide by the scheme's advice and guidance

### Qualifications discriminate by building class: UK



- 3 classes:
- Simple, existing non-dwellings: small buildings eg converted dwellings or doctors surgeries (using SBEM)
  - New and existing non-dwellings: eg small purpose built office buildings (using SBEM)
  - New and existing complex non-dwellings: eg large office buildings or factories (using modelling tools eg DSM)

This may or may not apply in Ireland

### UK approved "competent persons" schemes for BER assessors for non-domestic buildings



- BESCA/HVCA
- BRE Global
- CIBSE Certification
- Elmhurst
- EPC Limited
- National Energy Services
- Northgate
- Quidos
- RICS
- Stroma

### Training & Examinations



- Specification of requirements being developed
- Specific training may be aligned with:
  - Different calculation procedures within NEAP, viz. SBEM and DSMs
  - Associated classes of BER assessor
- Specific examinations, assignments or other criteria will be aligned with terms of relevant "competent persons" schemes
- Training offerings may distinguish between Building Regs purposes and BER purposes

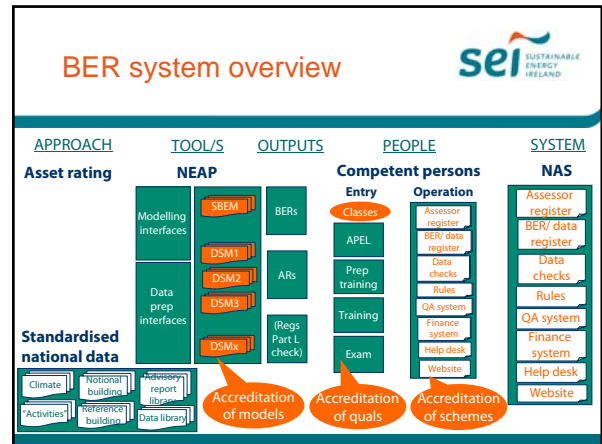
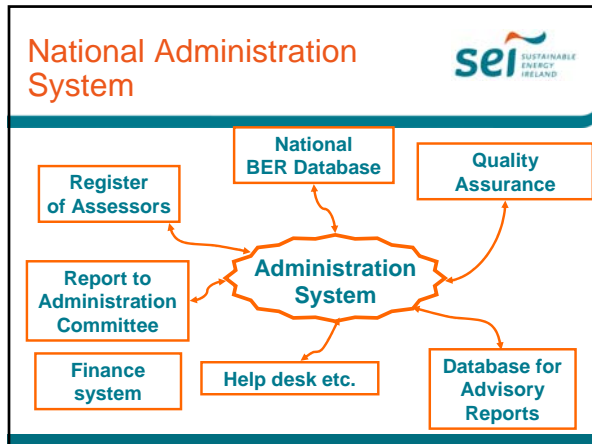
### Registered BER Assessors: Code of Conduct Issues



- Competence
- Data integrity
- Obligation to act in an independent manner
- Indemnification of SEI and Insurance
- Records, data and documentation
- Confidentiality and data protection
- Client service
- Charges and levies
- Advertising and sales promotion
- Monitoring by scheme and compliance
- Appeals, complaints and disputes
- Public registers managed by SEI
  - Register of BER assessors
  - Register of BER certificates

## 6. SYSTEMS: Administration, Databases, Quality Assurance





## 7. Expected Impacts

- ### BER cost ?
- The cost of BERs will be determined by the market
  - Fee payable by the builder/developer or property owner
  - Minister for the Environment, Heritage and Local Government can set maximum fees if necessary
  - UK trials for existing buildings have suggested:
    - £260 (€400) for a small retail unit
    - £480 (€750) for a small commercial building
    - £1,800 (€3000) for a large commercial building
  - But all such figures must be viewed with caution

### Time spent on different tasks – German field trials (source DENA)

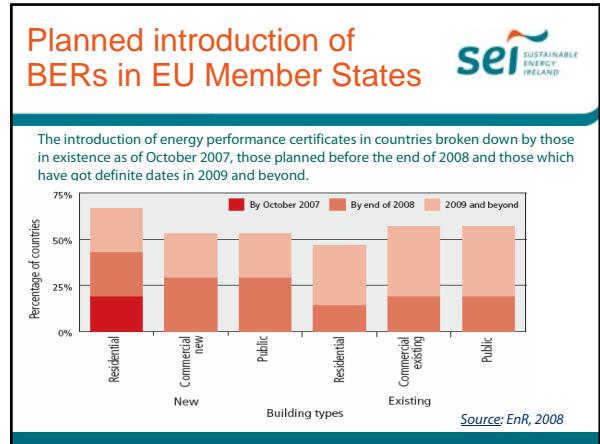
Task	Observed time (hours)	Expected time after training (hours)
Initial meeting	4.9	4.0
Collection of data	44.5	31.5
Calculation	63.8	38.9
Explanation to customer	4.7	4.0

UK experience so far is that data collection and calculation require less time than this – typically 20 to 25 hours each (but less for simple buildings)


- ### EPBD: Expected market impacts
- Making energy performance of buildings visible
  - Stimulating:
    - Improved design/ specifications in new buildings
    - Investment in upgrading of existing buildings
  - Energy rating as marketing tool: market edge
  - Potential impact on property values?
  - New market for EE/RE services and products
  - Demand for BER assessors
  - Cost of BERs & other services
  - Potential impact on property transaction times
- Opportunity  
Threat
- Significant lever to improve the energy, environmental & economic performance of Irish buildings




## 8. EU level activities




### EPBD Concerted Action project: 29 countries




**National Reports published through the EU Buildings Platform for most countries (more than 36 country reports by Feb 2008)**



## 9. Conclusions and Key Goals for 2008


- 
- ### Key goals for BER (asset rating) of non-domestic buildings in 2008
- Publish detailed proposals
  - (Publish revised TGD L for buildings other than dwellings)
  - Publish Irish localisation of SBEM
  - Publish BER and advisory report formats
  - Publish accreditation criteria for competent persons schemes
  - Publish specification/ guidelines for training, examinations etc.
  - Achieve training and registration of sufficient number of BER assessors for non-residential buildings
  - Integrate into national BER administration system
  - Consultation and awareness raising

## Conclusions




- The agenda: market transformation
- Energy performance in buildings: ripe for change – driven by policy and market forces
- A key intervention: BER and advisory report
- SEI is "issuing authority"
- Building Control Officers are enforcing authorities
- BER of domestic vs non-domestic buildings:
  - Common organisational geometry
  - Differing levels of administrative intervention/ devolution
- Proposed approach modelled strongly on UK system
- Details scheduled to emerge over the next 3 - 4 months

## 10. Further information



## Awareness raising



- Queries Database: 3,500 names
- e-EPBD e-updates
- Marketing Plan
- Participation/Organisation of Information Events:

Year	Number of Events	Attendance
2004	12	836
2005	46	2242
2006	45	5605
2007	39	5049
2008	10	(3000)
<b>Total</b>	<b>152</b>	<b>(16732)</b>




www.sei.ie

## BER web pages



Non-domestic buildings

## BER Help Desk



Registered BER assessors (i.e. currently new dwellings only):

E [registered@ber.sei.ie](mailto:registered@ber.sei.ie)  
P 1890 252 738

General public:

E [infor@ber.sei.ie](mailto:infor@ber.sei.ie)  
P 1890 734 237

