



ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

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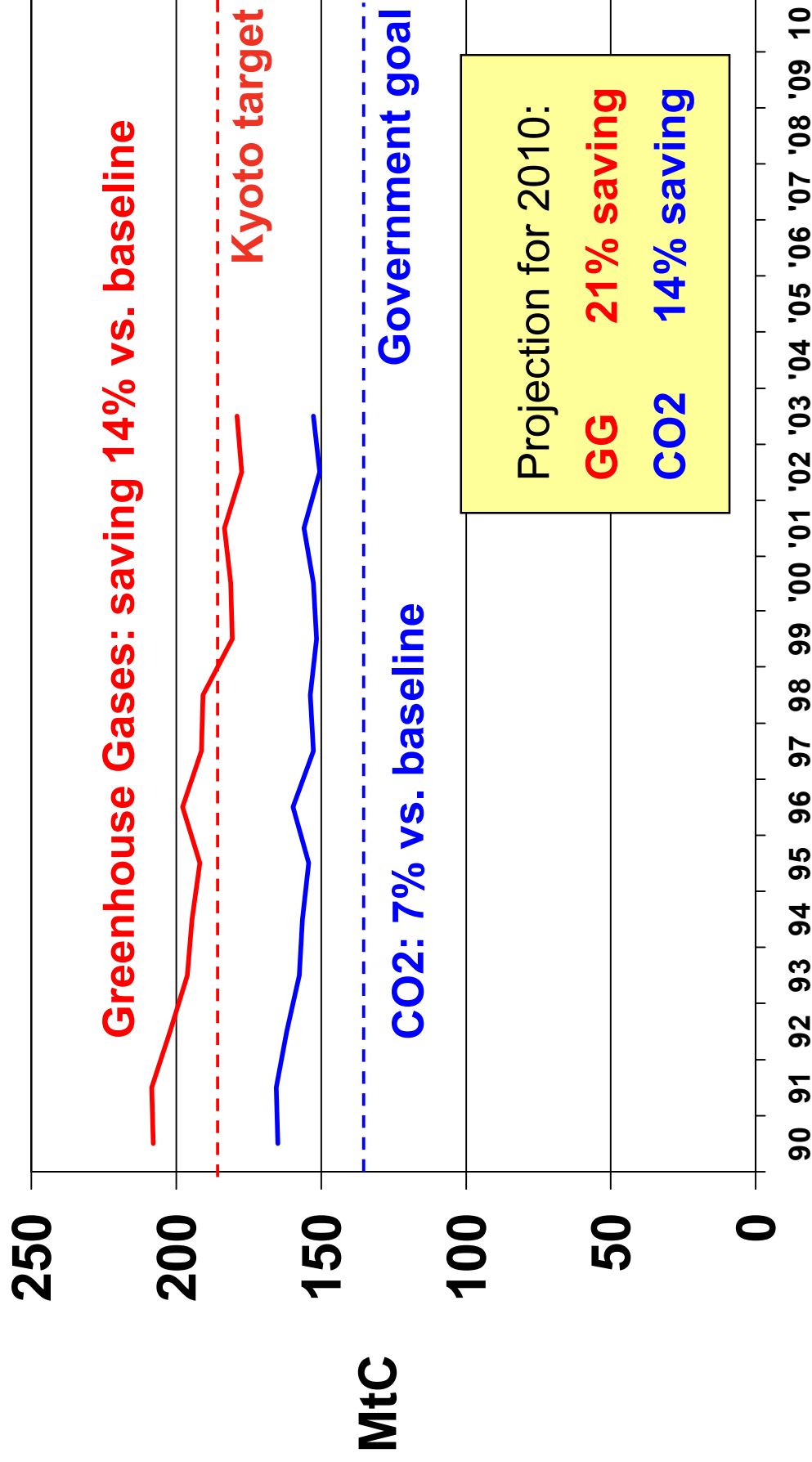
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EPBD - Friend or foe?

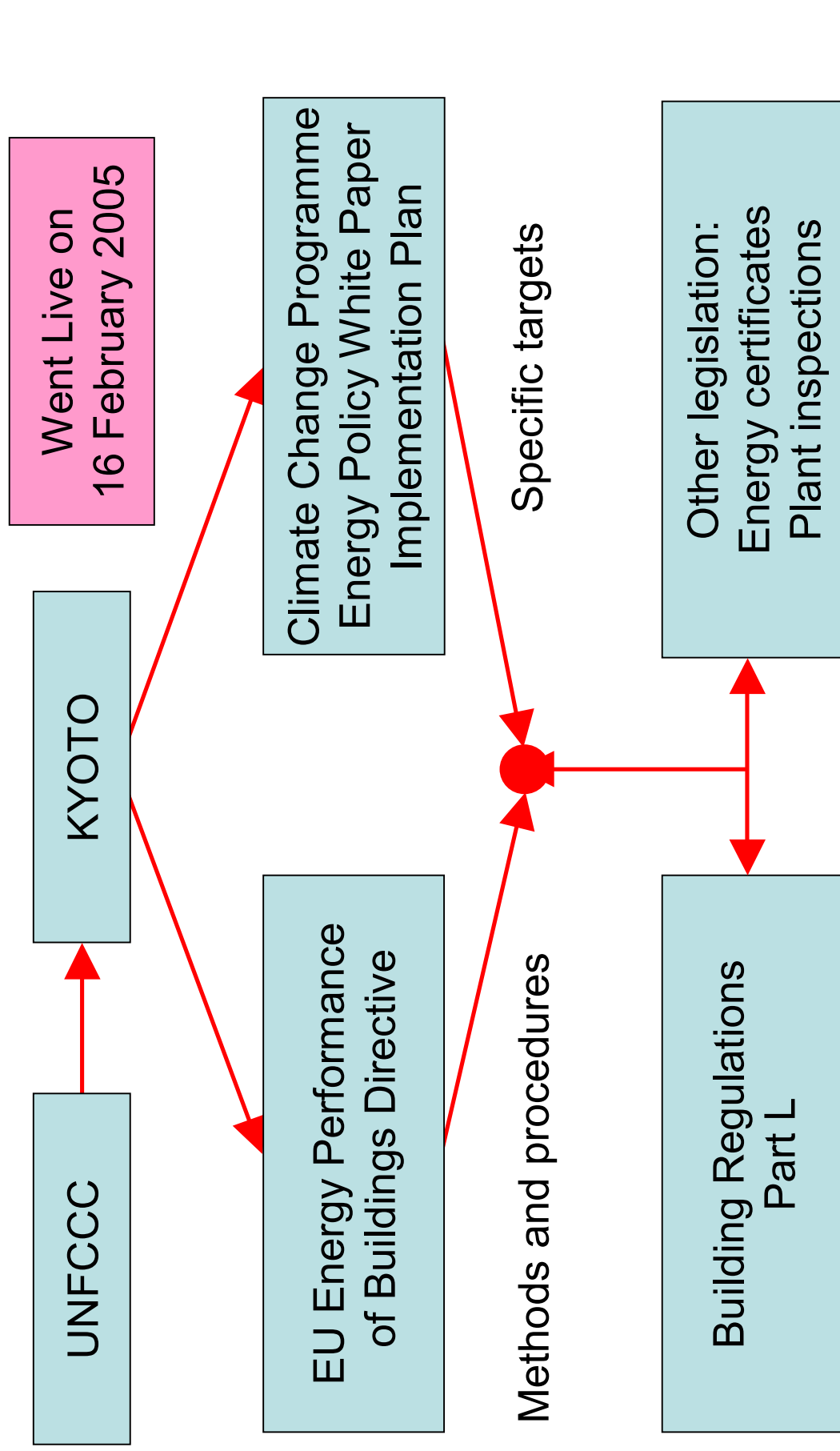
Compliance cost
Rules
Pressures

Improved payback
Operating cost
Levers for change





Source: DEFRA 2003 figures





Energy Performance of Buildings Directive

- ▶ **Directive 2002/91/EC dated 16 December 2002**
- ▶ **EU law 4 January 2003**
- ▶ **UK law by 4 January 2006**
 - ▶ delay some articles up to 3 years if not enough independent experts
- ▶ **UK devolved administrations have common aim**
- ▶ **40% of energy used in buildings – and increasing**
- ▶ **Saving 45 MtC by 2010 across EU**
 - = 21% of required carbon saving under Kyoto
 - = 22% carbon saving in buildings

How much carbon do we use?



10 to 12 kg



Typical 10,000 m² A/C office



Every 3 minutes

- ▶ **Revisions to Building Regulations Part L**
- ▶ **Creates 4 sections:**
 - ▶ ADL1A New dwellings; ADL1B Existing dwellings
 - ▶ ADL2A New buildings other than dwellings
 - ▶ ADL2B Existing buildings other than dwellings
- ▶ **New build: Whole building method for CO2 emissions**
- ▶ **Existing buildings: Economically viable:**
 - ▶ 7 year payback; less than 10% capital cost increase
- ▶ **Improved insulation and lighting standards**
- ▶ **Low / zero carbon options**
- ▶ **System efficiencies – focus on seasonal / part load:**
 - ▶ Boilers; cooling; air-conditioning; fans

- ▶ **CO2 emissions from ‘Notional building’:** **100**
 - ▶ Same size, temp, light levels, occupation; 2002 standards
- ▶ **Calculate target CO2 emissions:**
 - ▶ Improvement factor for A/C @ 20% less 20
 - ▶ Benchmark allowance for on-site renewables @ 10% less 8
- ▶ **Target CO2 emissions = 28% improvement** **72**
- ▶ **Enhanced management features:**
 - ▶ **aM&T system with alarms** = +5% allowance plus 3.6
 - ▶ Power Factor correction to over 0.95 = +2.5% allowance plus 1.8
- ▶ **‘Effective’ CO2 target** **77.4**
- ▶ **Must meet ‘minimum (worst acceptable) standards’**
 - ▶ U values; air leakage; system efficiencies
 - ▶ Measures for ‘overheating risk’ and ‘control of solar gain’

- ▶ **Heating system seasonal efficiency** **80.8%**
- ▶ **Cooling system [seasonal CoP]** **2.25**
- ▶ **Whole building ventilation system** **2.0 W/I/s**
- ▶ **Local ventilation [fan coil]** **0.2 W/I/s**
- ▶ **General Lighting** **3.75 W/m².100 lux**
- ▶ **100% testing of air leakage**

Emphasis on part load / seasonal effects

- ▶ **Automatic Meter Reading for buildings over 1,000 sq.m.**
- ▶ **Variable volume AC / ventilation:**
 - ▶ same efficiency at 25% flow volume as 100%
Effectively exclude flow control dampers for volume control
- ▶ **Constant volume AC / ventilation:**
 - ▶ Facility to readily adjust airflow volume to aid commissioning and correct adjustment of flowrate in use.
 - ▶ Variable speed drives or variable pitch fans comply.
- ▶ **Further guidance on building controls for larger buildings**
 - ▶ Zones, timing and demand
 - ▶ already exists for small buildings GPG132
 - ▶ Aim to simplify!

- ▶ **Methodology for calculating energy performance**
 - ▶ Under consideration; options in consultation

- ▶ **Energy Performance Certificate:**
 - ▶ Required at construction, sold or let-out
 - ▶ Certificate no older than 10 years
 - ▶ Prominent display in buildings
 - ▶ *‘over 1000m² occupied by public authorities or by institutions providing public services to a large number of people’*
 - ▶ Currently viewed for public sector only BUT wider consensus that this should include private sector buildings

- ▶ **Regular inspection for energy performance:**
 - ▶ Boilers and heating systems; Air conditioning systems



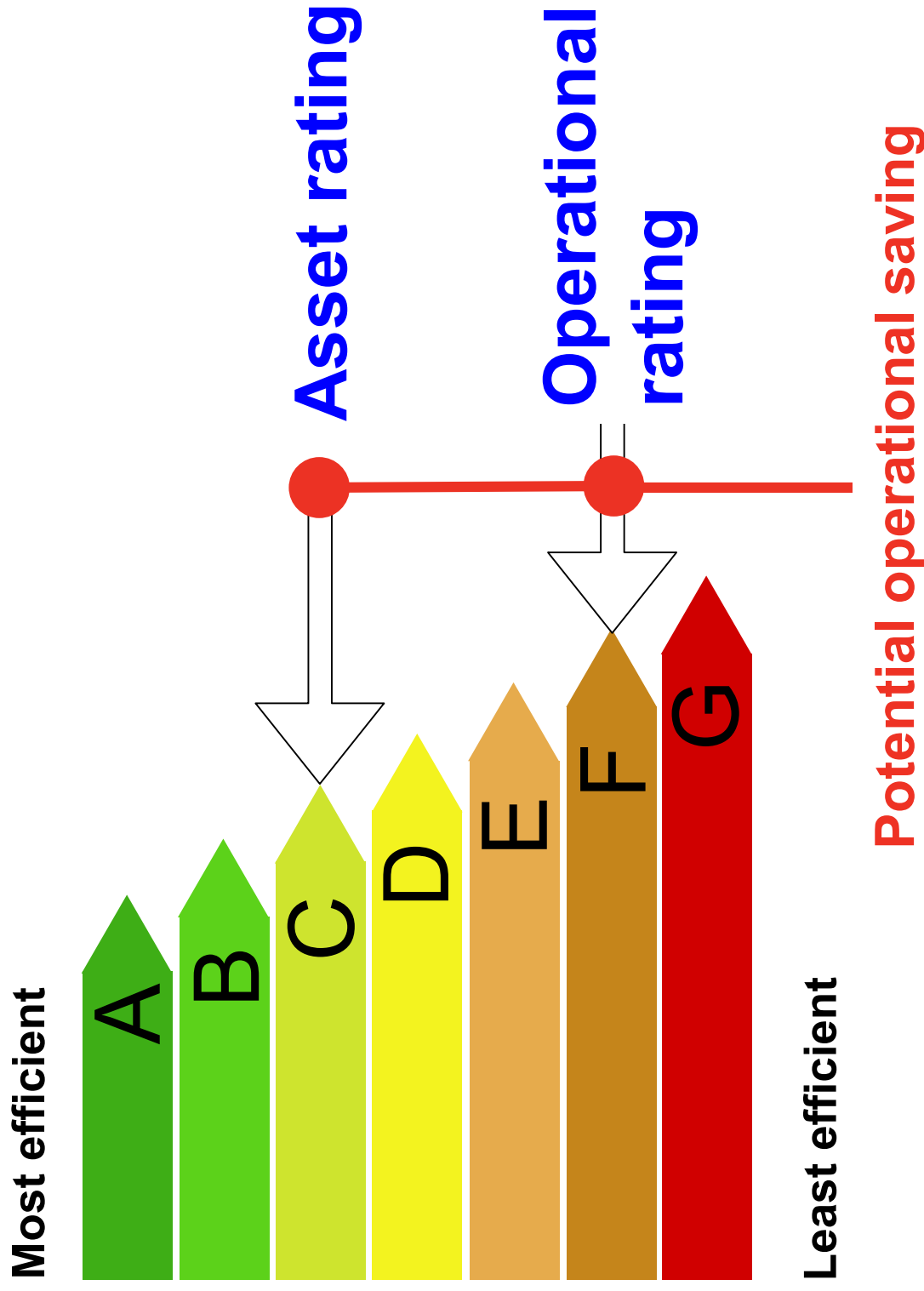
- ▶ **Asset rating – valid for 10 years:**
What is the building inherently capable of achieving
 - ▶ Inherent efficiency of the building
 - ▶ New buildings: ‘compliance’ calculation
 - ▶ Existing buildings: use inference engine
 - ▶ Standardised weather and pattern of use

- ▶ **Operational rating – expect validity between 1 and 3 years:**
Actual performance achieved from metered energy consumption
 - ▶ Derived from measured energy consumption
 - ▶ Measurements ‘normalised’ into standard patterns
 - ▶ Compared to tailored benchmarks



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Energy Rating



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Friend or Foe?



Hands up - who wants a G rated building?