# Baseline Methodologies for Industrial End-Use Efficiency

World Bank Workshop (Montreal, 3 December 2005)

**"CDM Methodologies & Technical Issues Associated w/Power Generation & Power Saving Project Activities"**

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# Insights – General

- Well-prepared industrial EE methodologies can receive CDM Executive Board approval
- Very few industrial EE methodologies approved, despite huge potential, no registered projects
- Efficiency market focus:
  - discretionary retrofit market;
  - no success with new plants or planned replacement
- Need to assess "what works" and "what doesn't" (consistency, predictability)
- Quality of proposals has varied widely

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# Approved Methodologies Industry

- Steam system efficiency improvements
  - AM0017, at refineries (China)
  - AM0018, at an ammonia plant (India)
- Consolidated Methodologies
  - ACM0004, waste heat for cogeneration
  - ACM0005, blended cement
- Small-scale methodologies
  - AMS-II.C: EE programs for specific technologies
  - AMS-II.D: EE (and fuel switch) measures for industrial facilities

# Rejected Methodologies Industry

- NM0100 (Mexico motors)
  Electric motor replacement
- Rejected for failure to:
  - describe different baseline scenarios / select correct scenario
  - document / justify key assumptions (motor efficiency, remaining motor life, operating hours) and differentiate motor park according to characteristics
  - demonstrate that assumptions are conservative (e.g., operating hours, motor life)
  - provide a methodology to handle variable load applications
  - account for planned replacement (“free riders”)
  - provide for adjustments, if nameplate efficiency of new motors is not maintained (e.g., rewinding)
  - differentiate electricity emission factors based on distribution of motors within project boundary

# Rejected Methodologies Industry

- NM0092-rev (South Africa)
  Manganese alloy smelter upgrade & energy efficiency
- Rejected for failure to:
  - implement changes requested by Meth Panel
  - include procedure to assess different baseline scenarios and choose among them
  - specify how methodology can be applied in different sectors (e.g., provide formulae to calculate emissions for specific processes)
  - specify data/assumptions and explain how to determine if adequate, reliable and conservative
  - describe how methodology ensures transparency and conservativeness
  - adequately evaluate uncertainties

# Rejected Methodologies Cement

- NM0119 (Petromex)
  Energy efficiency, self-generation, and/or cogeneration measures at an industrial facility
- Rejected for failure to:
  - identify alternative baseline scenarios
  - document relationship between fuel use and production
  - justify fixed specific fuel consumption over time / account for autonomous EE improvements over time
  - treat plants individually
  - address planned replacement and planned industrial process changes

# Rejected Methodologies Cement

- NM0101 (Grasim)
  Energy efficiency improvement in heat conversion & heat transfer equipment system
- Rejected for failure to:
  - provide methodology for identification of baseline scenarios and selection of most likely scenario
  - demonstrate that efficiency gains are significant relative to uncertainty (signal-to-noise ratio)
  - specify unambiguously which heat/mass flows to include
  - account for factors other than EE improvements that affect system efficiency (e.g., fuel choice)
  - justify need for complex methodology (suggestion that simpler, more robust and/or readily verifiable methods are available)
  - capture cyclical nature of production in selected benchmarking period (1-3 mos)

# Rejected Methodologies Cement

- NM0099 (Jaypee)
  Energy efficiency improvement in a cement plant
- Rejected for failure to:
  - provide methodology to choose baseline scenario
  - explain how to adjust baseline for “substantial” change in product mix
  - limit use of small-scale operating margin methodology for determining grid electricity factors to projects with electricity savings <15 GWh/y
  - account for planned replacement
  - be specific enough to allow validation by DOE (e.g., treatment of policy implementation in the baseline)
- Editorial quality: proposal did not appear to be final version and did not define all parameters and explain all formulae

# Rejected Methodologies Cement

- NM0074
  Optimization of clinker use and energy conservation through technical improvement
- Rejected for failure to:
  - provide a level of methodological specificity that would allow DOE to verify reductions
  - define a narrow enough scope to address issues specific to each industrial process
  - provide adequate procedures to define baseline scenario (additionality tool is no substitute)
  - specify the applicable efficiency market (e.g., discretionary retrofit)
  - account for emission reductions that may result from a drop in production or change in product quality
  - define project boundary (gases? upstream?)

# Common Problems

- Failure to:
  - Provide method to select baseline scenario
  - Justify appropriateness of benchmarking period
  - Take into account factors unrelated to EE measures that can affect future emissions (e.g., product palette)
  - Consider autonomous EE improvements, equipment lifetime
  - Distinguish between discretionary retrofit and planned replacement (“lost opportunity”) or new equipment markets
  - Justify/document assumptions (e.g., load factor, hours of operation)
  - Give full consideration to leakage
  - Provide adequate guidance on developing a monitoring plan

# Way Forward – Industry/Developer

- Better quality proposals, based on (i) best practice, (ii) existing guidance and (iii) lessons learned from detailed Meth Panel decisions for similar projects:
  - avoid selecting scope that is too broad
  - provide method to identify and select baseline scenario(s)
  - provide data to justify key assumptions
  - better discussion of uncertainties
  - account for autonomous EE improvements
  - consider factors unrelated to EE measures that can affect future emissions
- Develop generic methodological approaches for each efficiency market
  - discretionary retrofit (48a)
  - planned replacement (48a/48b/48c?)
  - new facility (48c?)
- Collaborate on methodologies for key sectors (e.g., cement, iron & steel, pulp & paper…)

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# Way Forward – EB/Meth Panel

- Mandate independent analysis of Meth Panel/EB decisions for EE projects:
  - identify key issues raised
  - derive lessons learned
  - evaluate whether issues have been handled consistently
- Establish (less ambiguous) criteria/requirements for issues common to industrial EE projects, for example:
  - establishing adequate benchmarking period
  - treatment of exogenous factors affecting energy use
  - adjusting for autonomous efficiency improvements, including planned replacement
  - evaluating uncertainties
  - demonstrating transparency and conservativeness

  → draw on existing international protocols/best practice
- For methodologies that pass initial screening process, have DOEs evaluate whether proposed methodologies are sufficient to allow verification of emission reductions

# Way Forward – EB/Meth Panel

- Acknowledge that:
  - barriers to EE projects are often non-financial in nature
  - additional CDM finance can nonetheless provide important additional incentive

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# Proposals

- World Bank, IEA, UNDP and others should create a practitioner/expert forum to derive international best practice with respect to:
  - Monitoring & verification of CDM projects, drawing on existing protocols (e.g., IPMVP, GHG Protocol for Project Accounting, ISO 14064)
  - Common elements in the design of CDM baseline methodologies for end-use energy efficiency projects
- Develop elements of a UNFCCC protocol on “Energy Efficiency for Development” to inform the design of the future climate change regime

# Thanks!


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