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One page abstract: Modelling Recommendations

The presentation discusses suggested recommendations that may make the role of modelling response measures to climate change (and other priorities) more clear, workable and sustainable.

An essential function of modelling is to develop a basis for informed debate surrounding effects of potential and implemented measures. There are effects that are not always taken into account when measures are taken in isolation, and can be counter intuitive.

> E.g. Oil use in South Africa is may be promoted with the effect of halting deforestation, developing carbon sinks and sustaining a renewable energy resource: fuel wood. Transparent integrated modelling is needed to prove the case

The Energy Research Institute at the University of Cape Town in South Africa has been involved in integrated energy planning and modelling since the late seventies. The ERI has recently completed South Africa's first national integrated energy model, requested by national government.

Modelling work should be seen in the context of a process. The following steps are loosely descriptive of energy-environment, but are by no means definitive. They include:

- The identification of a need (e.g. implementing a GHG mitigation measure)
- ' Developing a model to asses the potential of particular measures to respond t the need, or the adaptation of existing models for this purpose.
- Developing appropriate future scenarios in order to evaluate the 'robustness' of the measure, develop contexts and strategy
- Assessing the potential for the measure, including stakeholder feedback to establish 'real-world' potential
- Implementing the measure
- Monitoring key data associated with the measure
- Verification of the measure effect, model and level of accuracy.

The process is pivotal in terms of development towards a sustainable future and needs to be 'marketed' as such to

- host governments,
- project implementers
- the technical community
- international funders
- and intergovernmental executive bodies

For each group there are key objectives that would be well served by adopting a 'loosely standardised' approach.

It is recommended that international norms be promoted in order to help standardise approaches. Sensitively standardised approaches will dramatically improve the effectiveness, speed of the process and reduce the costs. Specific measures include:

- The development of user friendly guidebooks
- Develop clear terms of reference for data collection for specific endevours
- Develop methodologies to establish limitations and error estimates relating to specific approaches and key data
- The development of regional modelling and support centres
- And, The development of an international review team and process with links to appropriate intergovernmental executive bodies.

Modelling Recommendations

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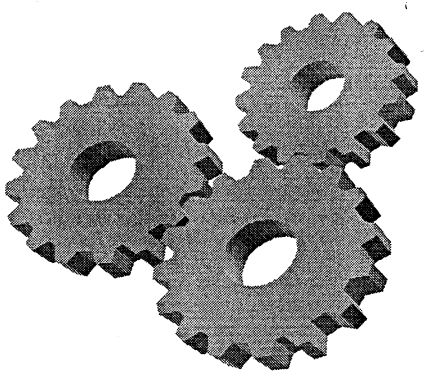
Contents

- Intro to the ERI's modelling work
- Selling the modelling process ?
- The process recommendations from a developing country perspective
  - Initiation
  - Implementation
  - Verification
- Key Recommendations,
  - including limited standardisation

Selected ERI modelling activities



- Started in the late 70's
- Input-output modelling
- Various spreadsheet energy related models
  - Power sector etc.
- Greenhouse gas mitigation modelling (DEAT)
- National integrated energy planning (DME)
- ETSAP (MARKAL, TIMES)
- LEAP

Modelling process in context

- Need & initiation
- Model development (or adaptation)
- Modelling & scenarios
- Feasibility of measures
- Implementation of measure
- Monitoring and verification
- Evaluation
- Re-iteration

OK so what is modelling ?

In some senses:

- A basis for rational debate for the effects of potential and implemented measures

Why ?

- There are effects that are not always taken into account when measures are taken in isolation that need an integrated approach
  - E.g. Oil use in South Africa is may be promoted with the effect of halting deforestation, developing carbon sinks and sustaining a renewable energy resource: fuel wood.

Recommendations: Process

Process needs to be ***sold*** to:

- Host government
  - Clear framework for development
  - Evaluation of potential measures
  - Evaluation of existing measures
  - Linkages with national priorities
  - Advertise potential for implementing win-win measures
  - Confidence for investors
  - Basis for interdepartmental negotiations
  - International peer pressure

Recommendations: Process

- Project implementers
  - What data needs to be supplied and why
  - The method by which they will be evaluated
  - To help develop future project proposals
  - A forum to account for concerns
- Potential modellers
  - Academia, research groups and government
  - Developmental prerogatives
  - A necessary science
  - Funding
  - In affected country

Recommendations: Process

- Project funders, developed countries and international organisations
  - Provides description of the potential and progress of the project
  - Clear description of areas of interest
    - Developing markets: Fossils to renewable, hybrid crops etc
  - Verification of the results
    - Important in a developing country context
    - Transparency
    - Performance & repeatability

Recommendations for: steps in the process

- Need & initiation
  - Make clear expectations for role of modelling
  - Stipulate modelling requirements for the work
  - Explain and sell the concept to relevant parties with feedback component
- Model development (or adaptation)
  - Availability and accessibility of modelling tools and manuals
  - Development of user friendly interfaces and simplification possibilities
  - Framework 'boiler plates' for sector modelling initiatives
    - Play-off, available data, available software, human resources
  - ***Data availability at all appropriate levels***, specific to modelling goals
    - Through host government as part of the modelling prerequisite
- Modelling & scenarios
  - Develop 'boiler plate' baselines strategies for specific technologies or futures
    - E.g. Wind energy requires pumped storage, process required etc...
  - Design must be such that key performance indicators can be absorbed

Recommendations for: steps in the process

- Feasibility of measures
  - Review at several levels:
    - Is it realistically sustainable / possible etc.
    - Stakeholders
    - Is this appropriately modelled
- Implementation of measure
  - Must ensure that M&V is possible
- Monitoring and verification
  - Can be and should be a very low cost component
    - E.g. DSM programs
    - Should fit within a 'boiler plate' type approach where possible

Recommendations for: steps in the process

- Evaluation
  - Key performance indicators should be transparently reported
  - Effects of data inaccuracy needs to be reported
  - Assessment of the measure's impact can be established
  - Effect of error propagation
  - Accuracy of model
  - Define limitations
  - 'Boiler plate'
- Re-iteration
  - Given the new insights the work may need reworking:
    - Due to a methodological shortfall
    - Refine and prime the model
      - new futures
      - new data terms of reference

Recommending limited standardisation and framework

- Guidebooks and databases
  - Baselines, tools, methodologies and adaptable 'boiler plates'
- Role of modelling needs to be highlighted
- Regional and national modelling centres / networks
- Outline appropriate 'modelling for measures'
- International review process with high level links

Recommendations

1. Guidebooks and databases:

- How to model it
  - Tools available
  - Training manuals
  - Methodologies for development
    - Specific and adaptable 'boiler-plate' routes forward
      - Data requirements, and the sensitivity of data
      - Potential Baselines
  - Methodologies for M&V
    - Ensuring the correct data is reported, specific to the task
  - Methodologies for 'iteration and upgrading'
    - Present the rational
      - E.g. moving from simulation to optimisation

Recommendations

2. Role of modelling needs to be highlighted

- Selling the concept to
  - Governments and other stakeholders as a development prerogative
- linking information required for investment / funding / aid
  - Make clear specific data sets need to be gathered
- A forum for focused debate and buy in

Recommendations

3. Modelling a prerequisite for certain projects
   - Host and funder, including appropriate:
     - Data collection
     - Appropriate methodologies

Recommendations

4. Funding to develop modelling expertise
   - Guidebook and database compilation
     - Can be done with existing groups such as ETSAP, SEI etc. and the practitioners
     - Easy access
   - Regional and national centres / networks
     - Supporting appropriate tools
     - Adapting or developing new tools
     - Funded to retain and train local expertise
     - Knowledge management
   - Specific methodologies for modelling response measures
     - 'Walk through' methodologies or boiler plates
       - Model development
       - Data requirements:
         - collect necessary data
         - Methodologies for error estimation and accrual
       - Reporting and developing a seamless process
       - Describe linkages to development gaols
     - Stop re-inventing the wheel

Recommendations

5. International review teams
   - (All of academia is based on this, thus can be done at low cost :)
   - Review modelling efforts
   - Review process methodologies
   - Transparency
   - Development and iteration of guidelines
   - Feedback into the baseline / measure / data etc.
     - No one gets it right first time
     - Development
     - Evaluation
     - Critical due to inadequate current (non-modelling) approaches

Thank you