

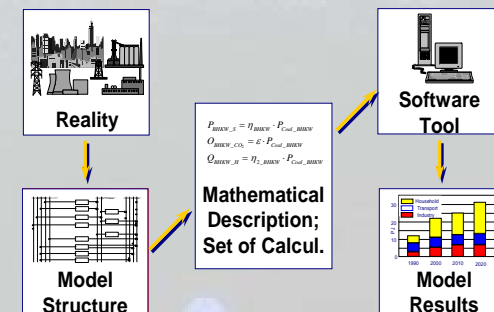


Integrated Energy and Climate Protection Modelling

EnerKey – Module M 1

Johannesburg, 26. June 2008

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Module M 1 – Objectives and expected results

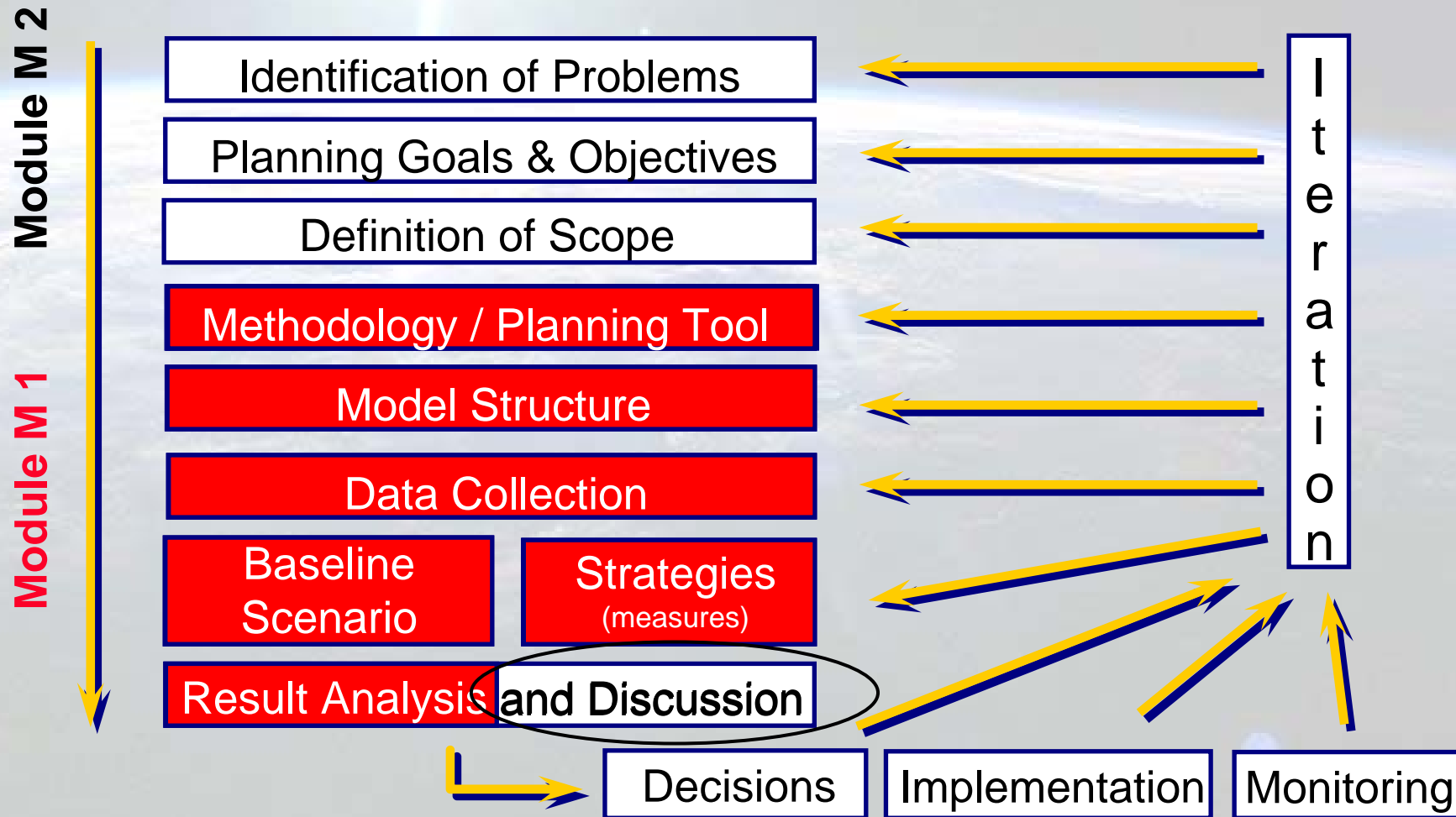
Objectives:

1. To develop an integrated energy and climate protection concept with the help of an integrated energy system model (TIMES) for Gauteng City Region
2. To develop and implement a megacity energy optimising model (TIMES modified) to show the feasibility and practical use of model tools and planning instruments
3. To collect and evaluate data within adapted energy optimising models
4. To develop a common platform of strategies and measures for the integrated energy and GHG mitigation concept for the JET cities

Expected results:

1. Establishment of a solid data base
2. Development of a priority list of strategies and actively implementable measures
3. Modified TIMES version by integrating existing and newly generated (by this project) knowledge
4. Implementation of the TIMES-JET model at UCT, IER and at the 3 JET cities

Phases of Structured Energy Planning



Work and tasks of Module M 1

Work packages:

WP1: Data Requirements and Data Provision

- Task 1: Energy and Emissions inventories / balances for the JET cities and in comparison for Stuttgart
- Task 2: Structures of demand categories: Building registry, urban district patterns, transport patterns, ...
- Task 3: Scenario drivers
- Task 4: Energy Technology Data Handbook
- Task 5: Data base on policies and measures
- Task 6: Development of a Data Management Concept

WP2: Ways of Representing the Local Energy System

WP3: Model set-up, scenarios and model runs

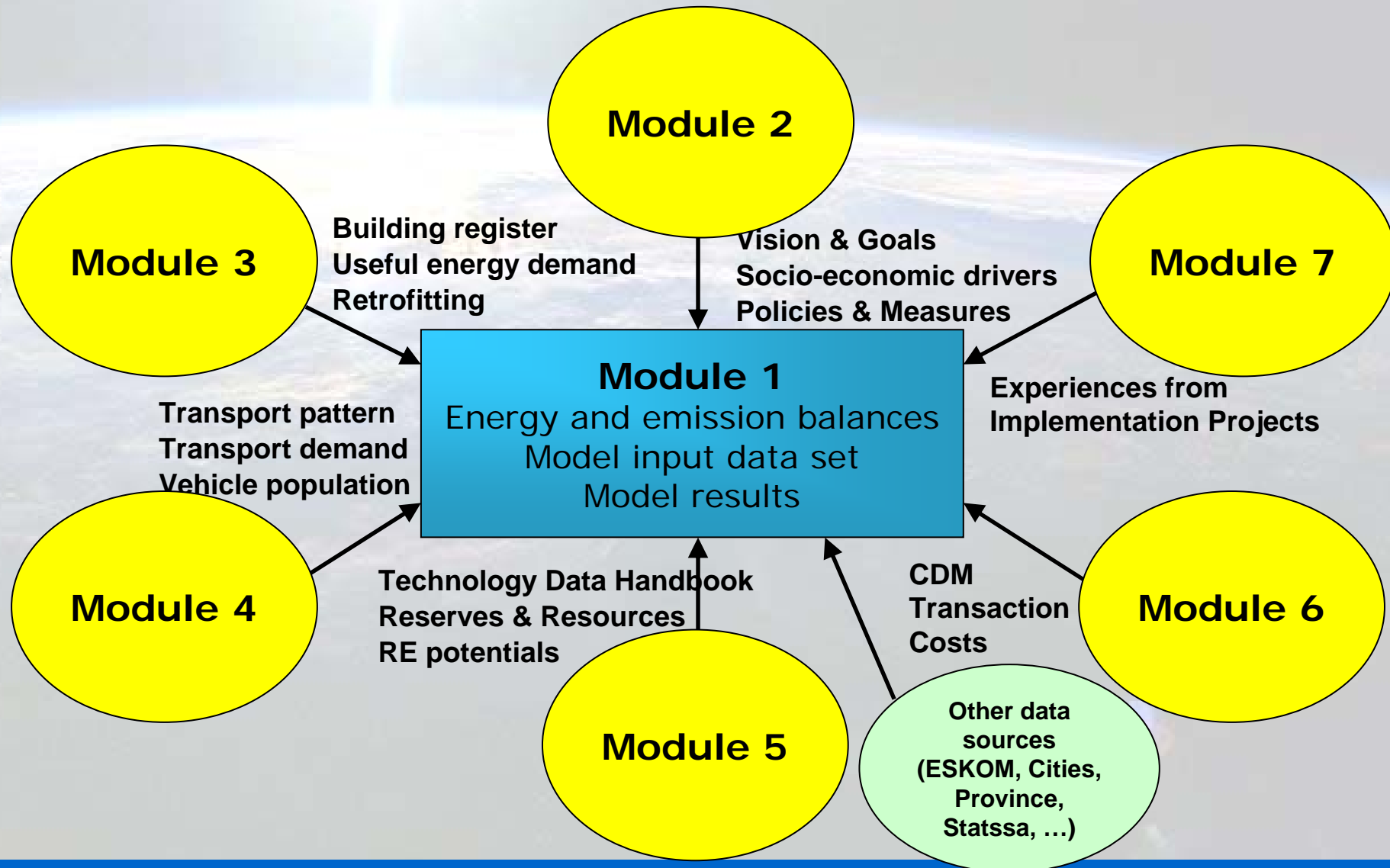
- Task 1: Model Calibration
- Task 2: Model Runs
- Task 3: Results Interpretation

WP4: Development of strategies for an integrated energy and GHG mitigation concept

WP5: Contribution to Module 7 "Implementation": Capacity building by TIMES training courses, students exchange and model implementation

- Task 1: Students Exchange
- Task 2: TIMES training courses
- Task 3: Implementation of the TIMES-JET model in South Africa
- Task 4: Energy Management Conferences in Germany

Information flow



Objective functions in energy system models

- **Objective in energy system models is typically minimization of total discounted costs of the energy system over the entire model horizon (clairvoyant) or only for a few periods (myopic).**
- **Policy goals (e.g. emission reductions, renewable share, supply security) are formulated as additional constraints that have to be fulfilled. Sensitivity analysis on the levels of the goal (e.g. emission target) gives insight in the trade-off between different objectives. Instead of varying the goal, one can use a penalty cost associated with the non-achievement of the goal (e.g. CO₂ tax).**
- **Alternative objective functions in TIMES: Recently introduced new feature allows the minimization of other functions than costs. Possible to optimize the weighted sum of different goals (similar to goal programming). Related to this is the possibility to put bounds on the cost variables of the cost objective function, e.g. to limit the capital available for new investments in a sector.**

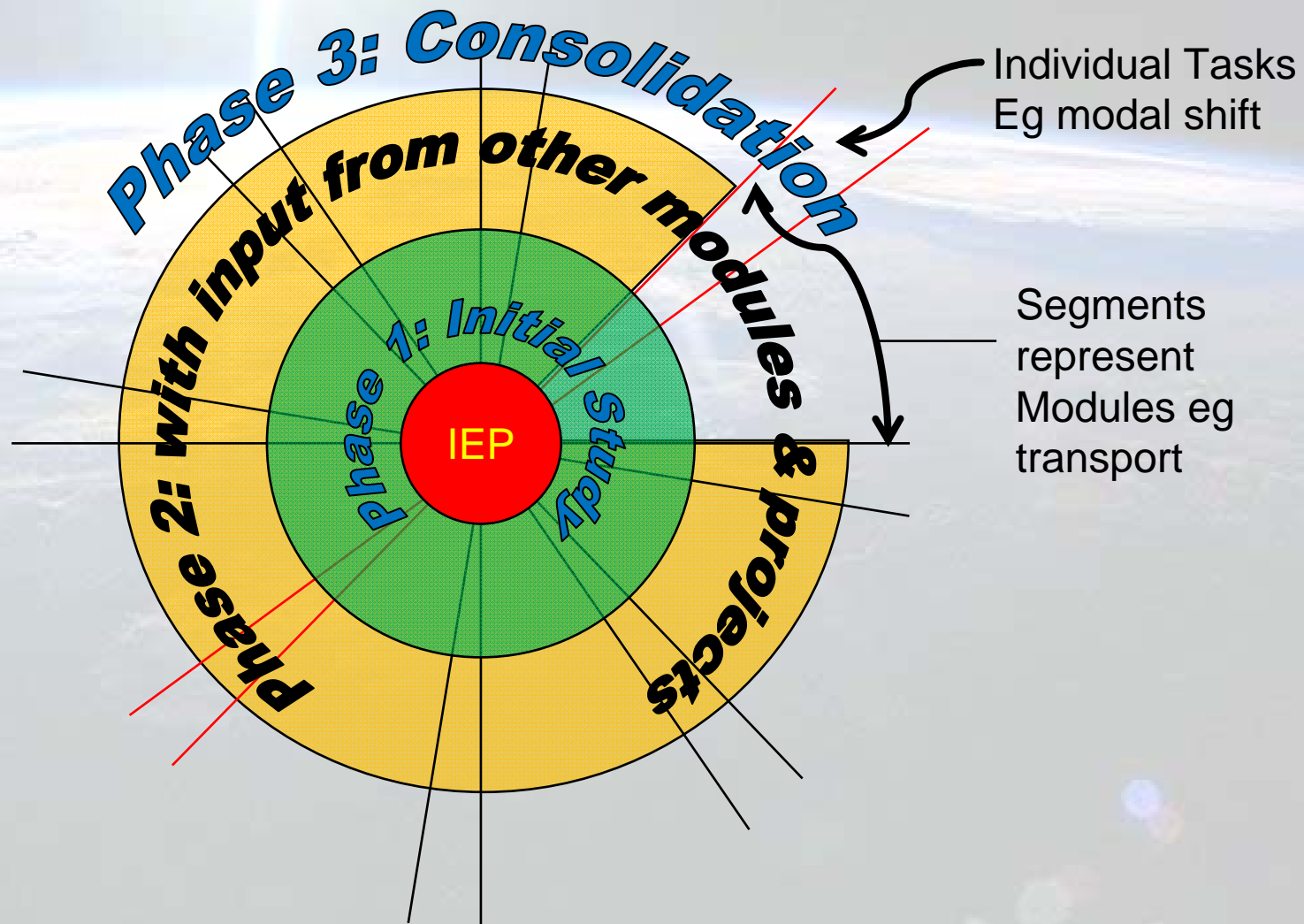
Examples of essential CO₂ Mitigation Potential (Basitgart)

Criteria Perspective	Expenditure City Administration			Competitiveness Investor			CO ₂ reduction (longterm)			Priority					
	Investments by the city necessarily?	City administration staff necessarily?	External support necessarily?	Agreements with partners necessarily?	Implementation by City administration?	Decision by the City Council necessarily?	competitive	non-competitive	no data	high	medium	low	high	medium	low
3	Demand Side Management														
3.1	Accelerated Aerated Showerheads Replacement														
3.2	Household Cooking - conversion to LPG														
3.3	Solar Water Heaters														
3.4	Intensive Awareness Programme														
3.5	Residential Time-of-Use Tariffs														
3.6	De-marketing of Residential Cooking Load to Gas														
3.7	Traffic Lights														
3.8	Public Lighting														
3.9	Hospitality Industry														
3.10	Revision of EEDSM Policy														
3.11	Pro-poor Cost Reflective Tariffs														
3.12	EIA Fast-tracking														



CO₂-Mitigation to 2020 [1000 t]

Module M 1 – Project Phases



Module M 1 – Current resolutions

1. Model refinement

- Inclusion of Middle Class Households, Schools and Administrative Public Buildings
- Time horizon and timely resolution – annual up to 2015, every three years up to 2030

2. High Level Energy Information Sharing Agreement is necessary

3. Defined Module Management Communications between ERC and IER every two month

4. Proposed Members of the EnerKey Module Team (EMT) 1

- Representatives of the JET Cities
- Gauteng Department of Local Governments
- DME (Energy Planning & Electricity & Hydrocarbons)
- CSIR Built Environment – Regional and Urban Planning
- ESKOM & SANERI & DBSA & UJ

5. Next Meetings of the EMT 1

- September 2008 (Data Handling + Model Structure)
- November 2008 (Energy Balances)
- January 2009 (TIMES Training Course in SA + Stakeholder Process)

EnerKey



*Thank you for your
attention*

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