

IAEA's Capacity Building Programme

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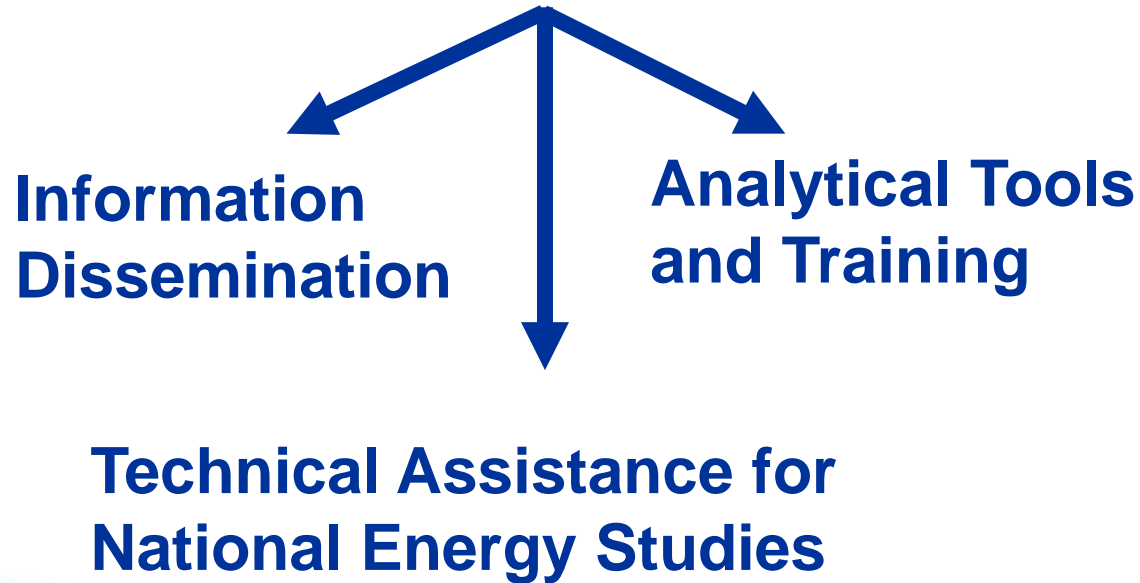
Capacity Building for Energy Planning and Analysis



Help build capabilities in Member States for energy systems analysis to:

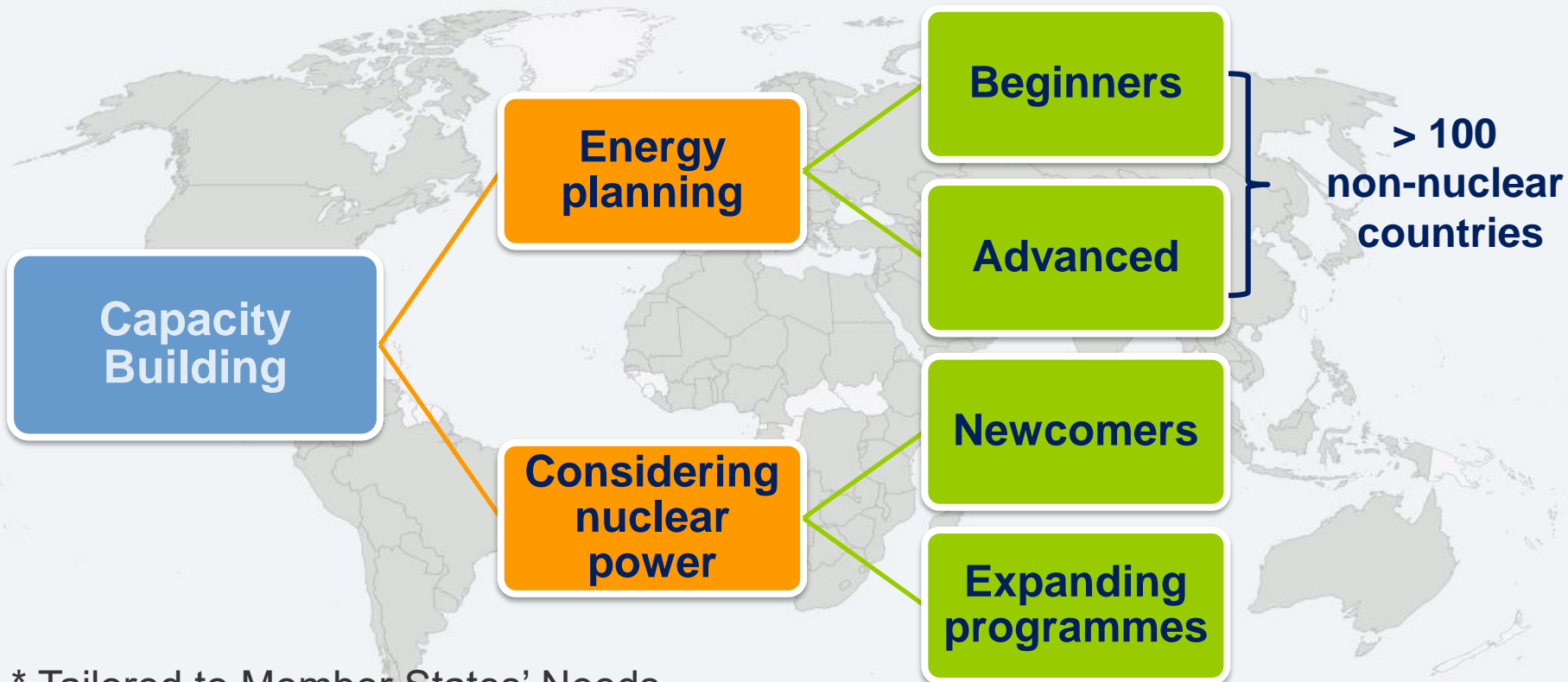
- Develop sustainable energy strategies and
- Identify the potential contribution of different technologies, including nuclear power, in meeting future energy needs

Capacity Building for energy assessment



Introduction to PESS

Energy Modelling, Data & Capacity Building

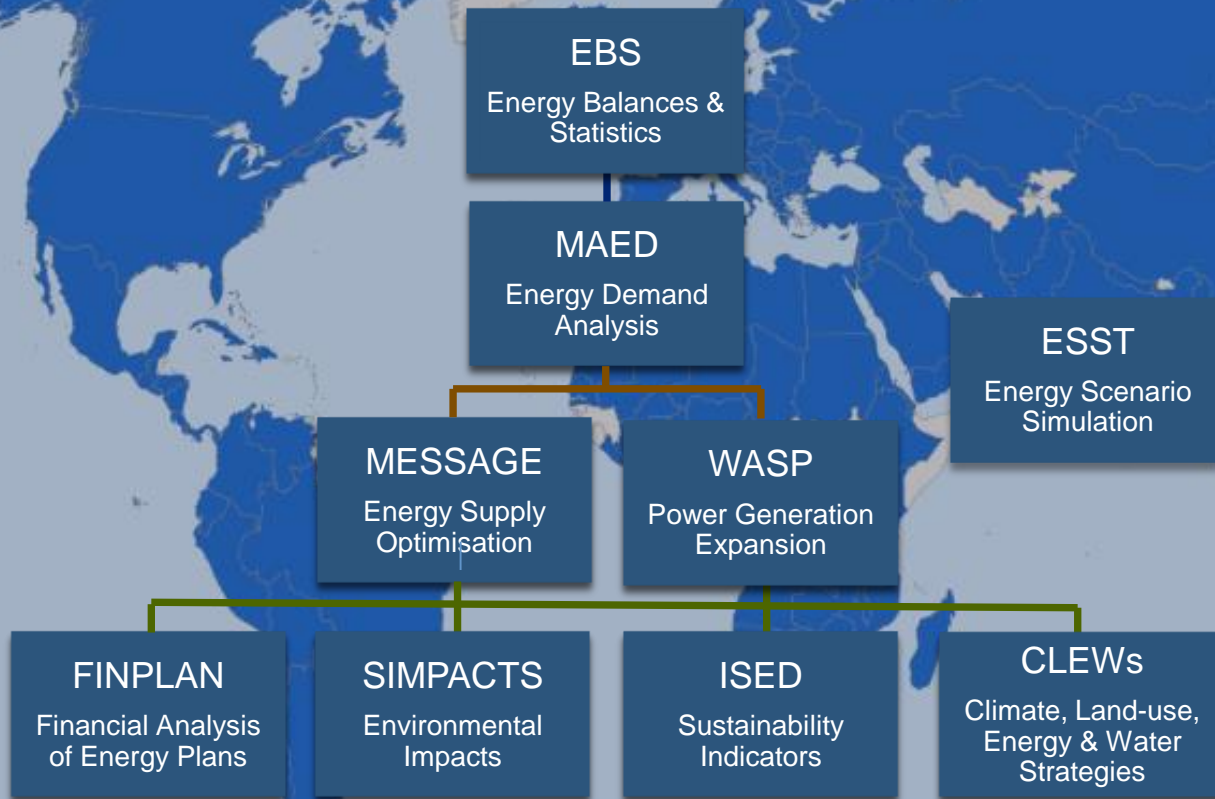


* Tailored to Member States' Needs

147 Member States
21 Regional & International
Organizations

Energy Planning Tools





CLEW

Climate, land-use, energy, and water methodology can analyse complex interactions between these key resources, together with climate change, to support effective policies and strategies.



Thank you!



Energy Balance Studio



- ✓ **Input:** energy products / carriers balances in “native units; specific conversion factors
- ✓ **Output:** energy balance in energy units; electricity tables
- ✓ **Standards:** International Recommendation on Energy Statistics (UNSD)

Model for Analysis of Energy Demand



- ✓ **Input:** energy sector data (energy balance); scenario assumptions -*socio-economic & technological*; substitutable energy uses; process efficiencies; hourly load characteristics
- ✓ **Output:** useful/final energy demand by sector/fuel; electricity demand; degree of electrification; hourly electric load; load duration curves
- ✓ **Standards:** IRES, standards in macro-economic statistics, ...

Model for Energy Supply Strategy Alternatives and their General Environmental Impacts



- ✓ **Input:** energy system structure (including vintage of plant and equipment); base year energy flows and prices; energy demand projections (MAED); technology and resource options and their technoeconomic performance profiles; technical and policy constraints
- ✓ **Output:** primary and final energy mix; emissions and waste streams; resource use; land use; import dependence; investment requirements ...

Wien Automatic System Planning Package



- ✓ **Input:** load forecast; existing generating infrastructure; candidates for new build; constraints: • *reliability* • *fuel* • *generation* • *emissions*
- ✓ **Output:** build schedule of new generating capacity; generation mix; fuel mix; costs; emissions

Energy Scenario Simulation Tool



- ✓ **Input:** historical energy balance; existing generating capacities by fuel; changes in the structure of final energy consumption; structure of future generation; *for hourly analysis:* load curves; generation capacity availability
- ✓ **Output:** future energy balance; new generating capacity; generation mix; primary mix; emissions; dispatch simulation; energy not served; ...

Model for **Financial** Analysis of Electric Sector Expansion **Plans**



- ✓ **Input:** investment programme for capacity additions and operating expenses; economic and fiscal parameters (inflation, escalation, exchange rates, taxes); financial parameters (credits, bonds...)
- ✓ **Output:** cash flows; balance sheet, statement of sources, applications of funds; financial ratios:
 - working capital ratio
 - leverage ratio
 - debt repayment ratio
 - global ratio

Simplified Approach for Estimating Impacts of Electricity Generation



- ✓ **Input:** pollutant emission rates; regional population density; source location; stack characteristics; local population; response functions adjustments
- ✓ **Output:** total exposure; quantification of health impacts; monetisation of impacts



MAED

Model for Analysis of Energy Demand



MAED eI

Model for Analysis of Energy Demand Electricity



WASP

Wien Automatic System Planning Package



MESSAGE

Model for Energy Supply Strategy Alternatives
and their General Environmental Impacts



SIMPACTS

Simplified Approach for Estimating Impacts of
Electricity Generation



FINPLAN

Model for Financial Analysis of Electric Sector
Expansion Plans



ESST

Energy Scenarios Simulation Tool



EBS

Energy Balance Studio



NEST

NESA Economics Support Tool