

SUSTAINABILITY OF MEGA-CITIES

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Typical problems of mega-cities

AGS contribution

examples: Tokyo and Guangzhou (China)

Typical problems of mega-cities

Pressure to Ecosystem

deforestation, loss of ecosystem

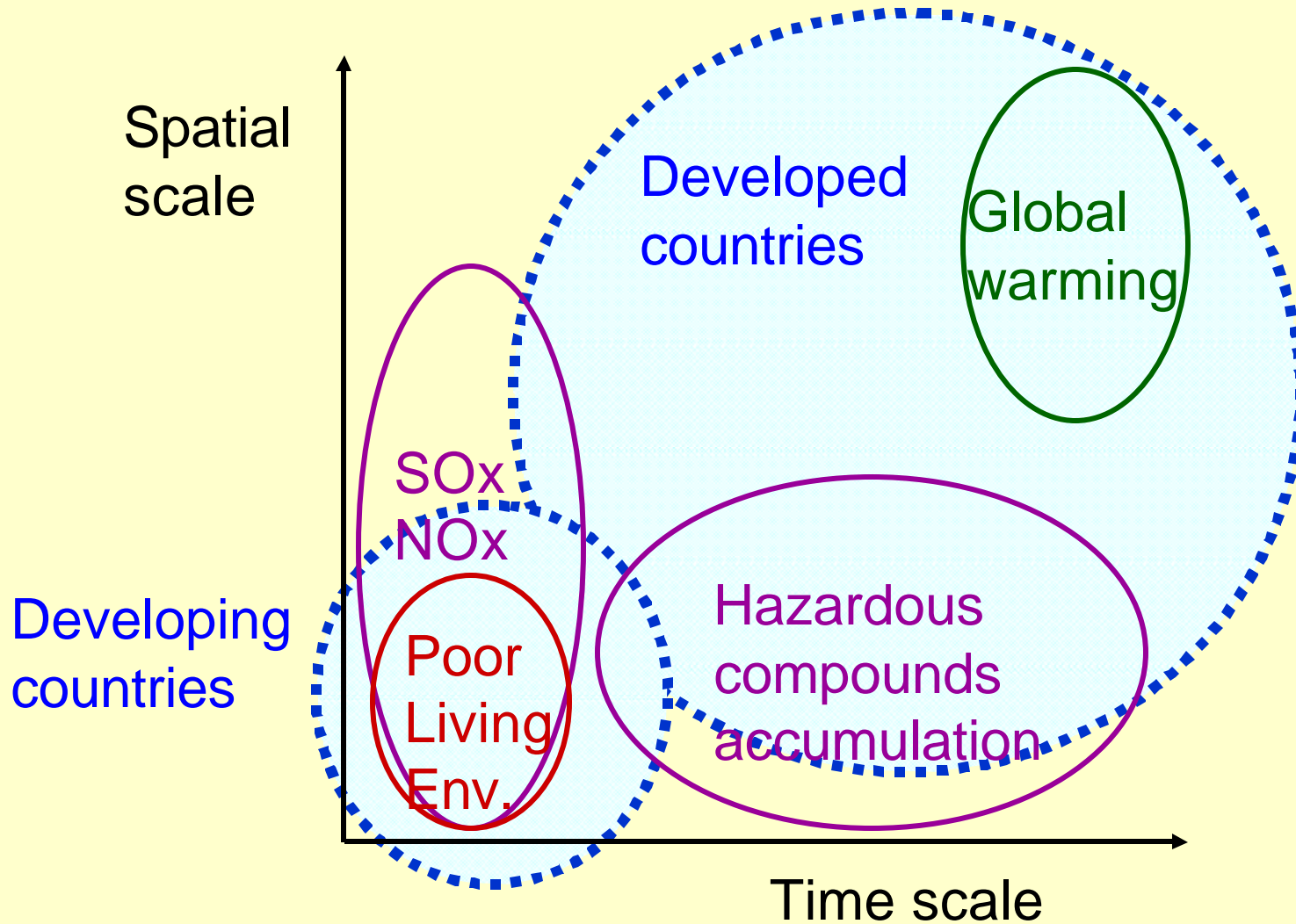
Water, Material and Energy flow

local and/or global environmental impact (pollution)

Human/cultural aspects

poor quality of life, loss of traditional culture

Examples of mapping of environmental issues



ENVIRONMENTAL ISSUES IN TOKYO

Air pollution by automobile (Particulate matters, NOx)

Diesel vehicle control, Traffic Demand Management

Solid waste management (dioxine, landfill site)

Reduce/reuse/recycle

Incineration and heat recovery

Urban heat island

Vegetation increase

CO2 emission

Integration of energy saving technologies

Renewable energy use

No growth in population/ industrial activities

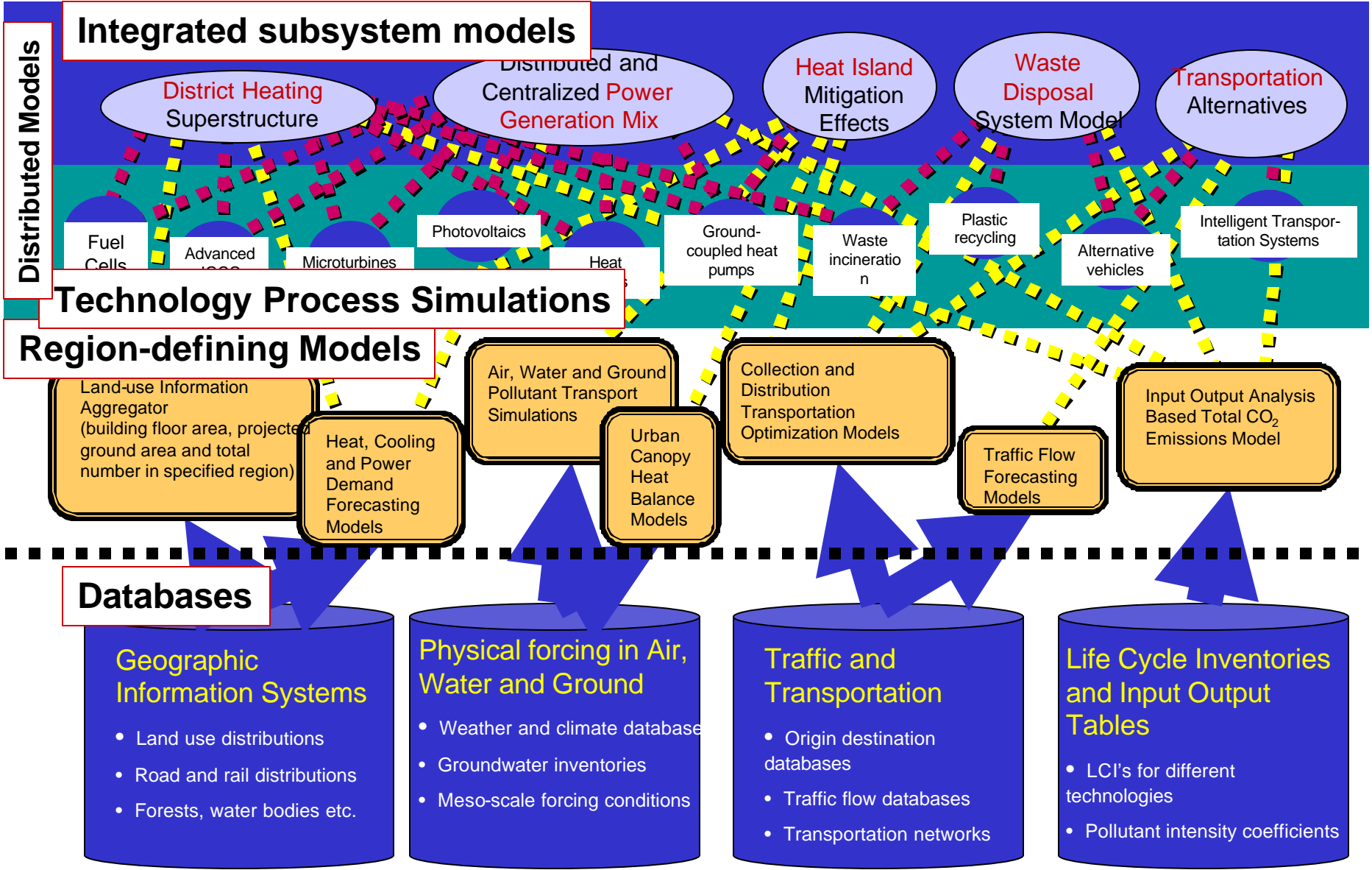
High quality of life vs. Low environmental loading

For problem solution:

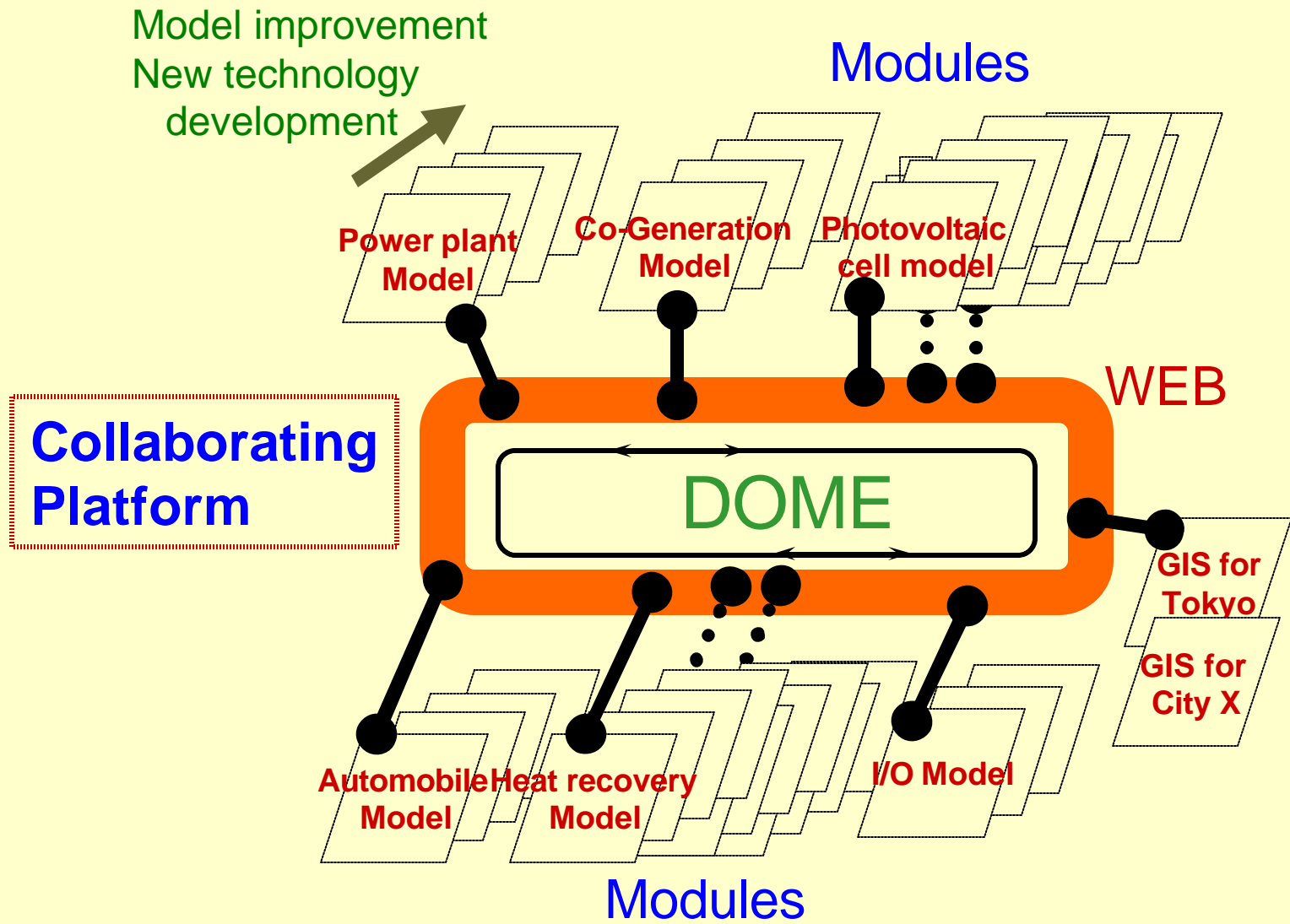
- Policy/technology integration necessary
- Stakeholders participation essential
- Cost-effectiveness to be clarified
- Trade-off between local environment vs. Global environment

Contribution of AGS as THP (Tokyo Half Project)

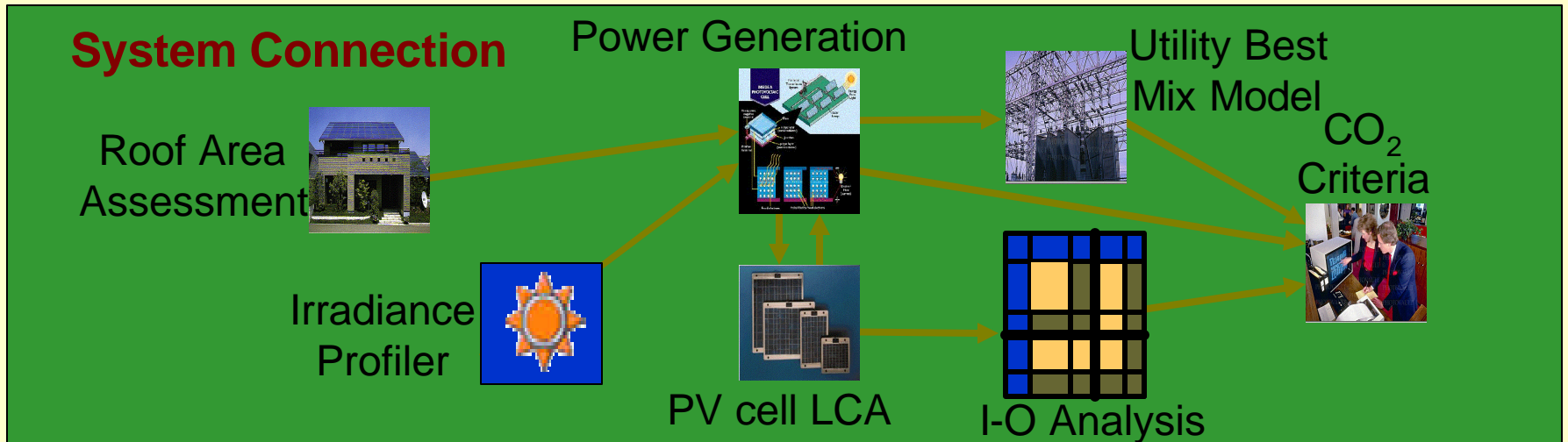
Collaborating platform to evaluate the effectiveness of policy/technology mix for CO2 emission reduction



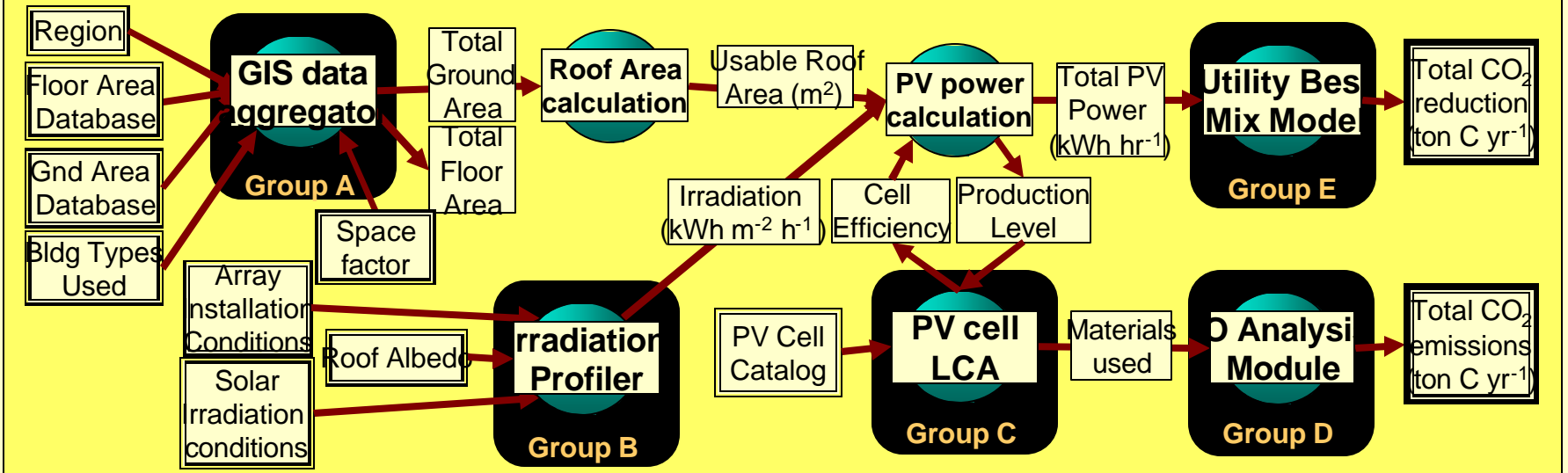
Tokyo Half Project

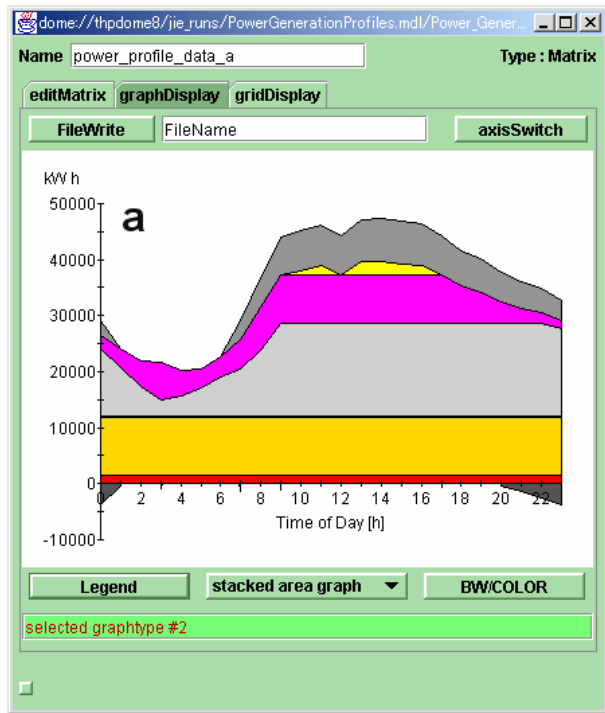


Example of Photovoltaic Cell (PV)



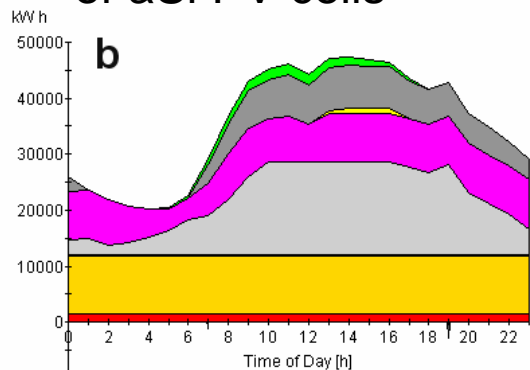
Information Flows



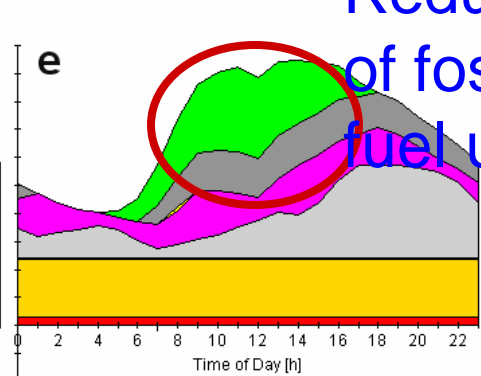
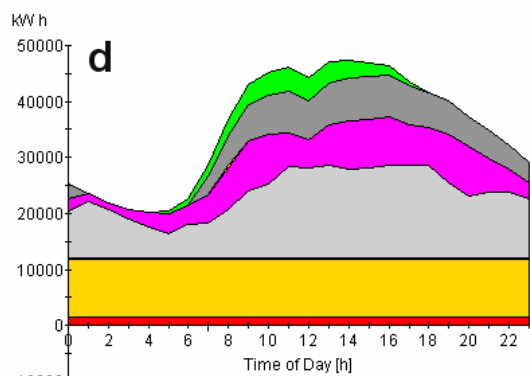
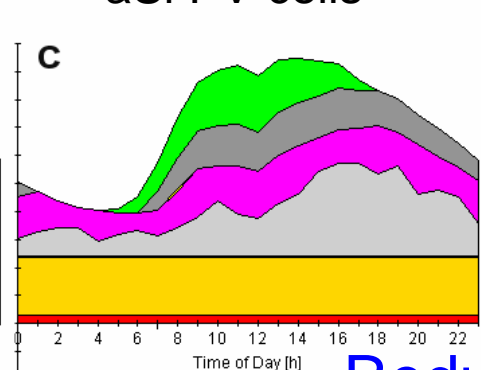


Base case

b) limited installation of aSi PV cells



c) full installation of aSi PV cells



Reduction of fossil fuel use



d) limited installation of pSi PV cells

e) full installation of pSi PV cells

power generation best mix results

Guangzhou, China

City area: 7,400 square km, Population: 10 million



Rapid growth in population/ Increased industrial activities
Rise of quality of life vs. Reasonable environmental loading

Annual growth rate in 1999, Guangzhou

GDP 13.3%

per capita GDP 11.7%

urban construction investment 24.9%

power supply 8.5%

urban road area 8.0%

AGS Guangzhou Project

Collaboration with city government

Outreach of fundamental AGS research

Solution of actual problems

Feedback to fundamental research

Identification of key-issues

Transportation planning -- MIT

Housing in village in city -- ETH

Water management -- UT

EXTERNAL DRIVERS

NEED FOR QUALITY
INFRASTRUCTURE &
MASS TRANSIT

NEED TO CONTROL
FLEET GROWTH
AND CHARACTERISTICS

NEED TO REDUCE
ENVIRONMENTAL
IMPACT

NEED TO IMPROVE
MOBILITY OPTIONS

NEED TO MANAGE
DEMAND FOR LIMITED
RESOURCES

NEED TO INTEGRATE
LAND-USE PLANNING &
TRANSPORTATION
SYSTEMS

GLOBAL DRIVERS

GLOBALIZATION
REGIONAL COMPETITION
WTO

INTERNAL DRIVERS

NEED FOR A CLEAR
REGULATORY
ENVIRONMENT

NEED FOR EXPANDED
SOURCES OF FUNDING

NEED FOR STREAMLINED
MODERN PROCESSES

NEED FOR INTEGRATED
RESEARCH AND
INFORMATION SYSTEMS

NEED FOR DEFINED
RESPONSIBILITIES &
JURISDICTIONS

NEED TO LOWER
ADMINISTRATIVE &
ENFORCEMENT COSTS

NEED FOR BETTER
INTERNAL TRANSFER OF
KNOWLEDGE

**GUNAGZHOU
TRANSPORT
TRANSIT &
LAND-USE
AGENCIES**

INSTITUTIONAL DEVELOPMENT STRATEGY

CONSOLIDATION	REORGANIZATION	DEFINED RESPONSIBILITIES
COORDINATION	STREAMLINING	COLLABORATION

Zhu village -village in a mega-city-
Preservation of historical culture and community
Improvement of living environment



Water resources management in Panyu district

Panyu: future development area of Guangzhou

Population projection of Panyu area

current: 1.63 million

2030: 3.4 million

2050: 4.15 million

Water quantity and quality



Strategy of mega-city management

Common issues --> common solution

Ex. Energy saving technology

Application of new technology/policy

Local issues --> country/region-dependent solution

Ex. Social/economic issue

Common approach/ Modified approach effective