

# **ENERGY SECURITY FOR DEVELOPING COUNTRIES**

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# OBJECTIVES/ISSUES

To analyse the

- threats to energy security
- different measures/strategies for enhancing energy security, and
- impacts of the measures to improve energy security

in the study countries at national and household level

# **COUNTRIES and GNESD Centres**

- Argentina (Bariloche Foundation)
- Brazil (Centro Clima/COPPE/UFRJ and CENBIO/IEE/USP)
- India (TERI)
- Kenya (AFREPEN/FWD)
- Senegal (ENDA)
- South Africa (ERC)
- Thailand (AIT)
- Tunisia (MEDREC)

# TYPES OF DATA USED

Data Type	Argentina	Brazil	India	Kenya	Senegal	South Africa	Tunisia	Thailand
Secondary	√	√	√	√	√	√	√	√
Primary	√							√

# ENERGY SECURITY DEFINITION

- Ensuring the availability of energy resources
  - That are diverse
  - In sustainable quantities
  - At affordable prices
  - That support economic growth
  - That assists in poverty alleviation measures
  - That does not harm the environment
  - Taking note of shocks and disruptions
- Some countries have specific definitions – South Africa, India and Senegal

# **INDICATORS OF NATIONAL ENERGY SECURITY (Synthesis)**

- **Energy resources vulnerability**

- Resource availability, energy reserves, rate of depletion, diversification of energy resources, dependence on fossil fuels/ renewable Energies

- **Economic vulnerability**

- Import dependency as a percentage of import expenditure, percentage of GDP

- **Energy suppliers**









- Diversification of energy suppliers, political stability of energy supplier

- **Energy intensity/efficiency**

- **Adequacy of supply capacity**









# ENERGY SECURITY: NATIONAL LEVEL

## INDICATORS (1)

Country	Energy Import Dependency	Energy Consumption Per Capita	Diversification of Energy Resources	Energy Intensity (Primary/Final Energy)	Access Levels to Modern Energy	Energy Reserves & Rate of Depletion	Economic Implications of Energy Imports
 Argentina	★	★		★		★	
 Brazil	★					★	
 India	★	★	★			★	
 Kenya	★		★		★	★	
 Senegal	★		★	★		★	★
 S Africa	★					★	
 Thailand	★		★		★	★	★
 Tunisia	★		★	★		★	★

# ENERGY SECURITY: NATIONAL LEVEL

## INDICATORS (2)

Country	Sector Wise Dominant Fuel Share	Electricity Generation, Peak Demand	Electricity Price, Feed in Tariff, Price level	Energy Efficiency Measures Implementation, Clean Technologies	Reliability of Supply, Demand-Supply Gap	Reliability in Hydrocarbon Production (Availability of Reserves)	Strategic Fuel Stocks of Fossil Fuels
 Argentina		★	★	★			
 Brazil							
 India		★	★		★	★	
 Kenya		★	★	★			
 Senegal	★	★	★	★	★		★
 S Africa			★	★	★	★	★
 Thailand	★	★	★			★	
 Tunisia	★					★	

# **TYPE OF THREATS TO NATIONAL ENERGY SECURITY (Synthesis)**

- **Dependency on imported hydrocarbons**
- **Demand - Supply gap in electricity, coal**
- **Environmental Issues (Climate Change, Drought)**
- **Fuel Mix Diversity (Dependency on one major energy resource)**
- **Technical know how & expertise in planning**
- **Low energy efficiency in production, distribution and consumption**









# **MEASURES TO ENHANCE NATIONAL ENERGY SECURITY (1) - Synthesis**

- **Promotion of renewable energy**
  - Pricing (eg. feed in tariff, green pricing), Renewable Portfolio Standards (RPS), Promotion of Biofuels in Transportation Sector, private sector participation in power sector
- **Promotion of energy efficiency**
  - Energy efficiency standards, subsidies/incentives on energy efficiency improvement, energy technology standards
- **Oil and Gas sector**
  - Setting Up Strategic Oil Reserves, Strengthening Exploration & Development of Indigenous Oil & Natural Gas Resources
- **Promote R & D on Energy Generation, Use, Policies & Dissemination**








# **MEASURES TO ENHANCE NATIONAL ENERGY SECURITY (2) - Synthesis**

- **Nuclear Energy option**
- **Behavioral Change**
- **Diversifying Supply Sources**
- **Power Pool to Promote Energy (Electricity) Trade Among Neighbouring Countries**

# MEASURES TO ENHANCE ENERGY SECURITY AT NATIONAL LEVEL (1)

Country	Promoting Energy Efficiency in Industries, Buildings, Etc	Increased Use of Alternative Sources (Renewables) for Power Generation Through Private Sector	Promotion of Biofuels in Transportation Sector	Promote R & D on Energy Generation, Use, Policies & Dissemination	Consider Nuclear Energy
 Argentina	★	★			
 Brazil	★	★	★	★	
 India	★	★			
 Kenya	★				
 Senegal	★	★			
 South Africa	★	★			
 Thailand	★	★	★	★	★
 Tunisia	★	★			









# MEASURES TO ENHANCE ENERGY SECURITY AT NATIONAL LEVEL (2)

Country	Behavioral Change	Diversifying Supply Sources	Setting Up Strategic Oil Reserves	Power Pool to Promote Energy (Electricity) Trade Among Neighbouring Countries	Strengthening Exploration & Development of Indigenous Oil & Natural Gas Resources
 Argentina		★		★	★
 Brazil					
 India		★	★		
 Kenya	★				
 Senegal		★	★		★
 South Africa				★	
 Thailand				★	
 Tunisia					★

# **INDICATORS OF HOUSEHOLD ENERGY SECURITY - Synthesis**

- **Energy access and affordability related indicators**
- **Vulnerability: energy expenditure as percentage of household income/expenditure**
- **Energy Consumption Per Capita**
- **Reliability of supply**
- **Inequity of energy supply (urban vs rural)**
- **Local law enforcement/security**









# HOUSEHOLD ENERGY SECURITY INDICATORS

Country	Access Rate Per Energy Type: Power, LPG, Biomass	Useful Residential Energy Consumption Per Capita	Energy Consumption Per Capita Per Source	Share In Final Energy Consumption	Share In Total Electricity Consumption	Expenditure On Energy In Different Regions	Energy Intensity Of GDP	Energy Expenditures In Fuel And Electricity By Income Strata
 Argentina		★	★			★		★
 Brazil				★	★		★	
 India			★					★
 Kenya								
 Senegal	★	★	★					
 S Africa	★							★
 Thailand	★							★
 Tunisia	★		★	★	★		★	★

# **TYPE OF THREATS TO HOUSEHOLD LEVEL ENERGY SECURITY - Synthesis**

- **Provision to affordable energy to all, especially the poor**
- **Energy price rise**
- **Disparity in per capita consumption of energy/ fuels**
- **Access to cleaner energy fuels**
- **Increasing monthly expenditure on energy fuels**

# TYPES OF THREATS TO ENERGY SECURITY AT HOUSEHOLD LEVEL

Country	Provision to Affordable Energy to All, Esp. Poor	Energy Price Rise	Disparity in per Capita Consumption of Energy Fuels	Access to Cleaner Energy Fuels	Increasing Monthly Expenditure on Energy Fuels
 Argentina		★			★
 Brazil					
 India	★		★	★	★
 Kenya					
 Senegal		★			★
 South Africa		★	★		★
 Thailand		★			★
 Tunisia					

# **MEASURES TO ENHANCE HOUSEHOLD LEVEL ENERGY SECURITY - Synthesis**

- **Subsidies on energy (eg. electricity, LPG)**
- **Subsidies for energy efficient/renewable energy devices**
- **Promotion of improved cooking stoves**
- **Improving the distribution system of fuels (eg. LPG)**
- **Promotion of renewable end use devices**
- **Promotion of energy efficient appliances (lamps, refrigerators, etc)**

**Thank You**