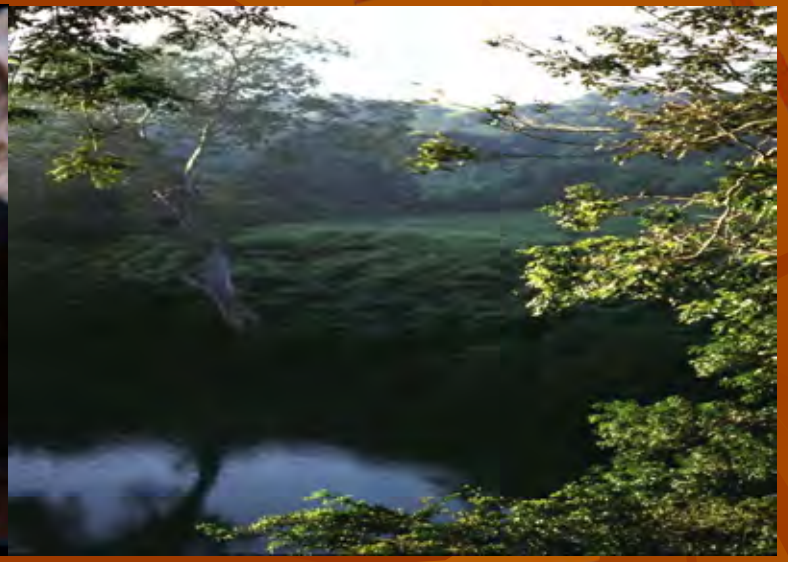
# Social, Livelihood and Biodiversity Indicators and Mitigation Actions for Power Sector Development



**Presented at the first workshop on**
**"Strategic Environmental Assessment in Power Development Plan VII"**
**Quy Nhon, 12 – 13 July 2010**

# Why doing social, livelihoods and biodiversity impacts analysis

- The focus of the Vietnam development is on balancing economic development with social equity and environmental sustainability (Agenda 21) .
- All development has social, livelihoods, environment, biodiversity benefits and costs.
- There is a nescessary to internalize and find solution for social and biodiversity mitigation in development (power plant) projects

# Overall Approach/Rationale

- Different types of power generation have a wide variety of different impacts on people, the environment.
- These need to be measured as accurately and objectively as possible
- If possible, use quantitative measures
- Where not possible, use scales to measure or estimate the severity of the impacts
- Social and livelihoods mitigation has to be seen and implement as a long-term development assistant, including the non-material aspects– not just compensation
- For social, livelihood and biodiversity impacts, most (but not all) are more local in their effects: impacting on people and ecosystems in the environs of the plant

# Impoverishment Risks and Reconstruction: A Model for Displacement and Resettlement (IRR model)

| Risk Factors | Type of Mitigation Action | Specific Measures Recommended for the Mitigation Package for |
|---|---|---|
| Landlessness | Land-based resettlement | ·Compensation for land, crops, fishponds |
| Joblessness | reemployment | ·Investment for production development<br>·Investment for livestock development<br>·Investment for irrigation<br>·Extension training<br>·Community development fund |
| Homelessness | House reconstruction | ·Residential house<br>·Moving allowance within province |
| Marginalization | Social inclusion; | ·Support for resettlement<br>·Allowance for the resettlement supporting group<br>·Assistance partial and indirect Project Affected People |

# Impoverishment Risks and Reconstruction: A Model for Displacement and Resettlement (IRR model)

| Risk Factors | Type of Mitigation Action | Specific Measures Recommended for the Mitigation Package for |
|---|---|---|
| Increased morbidity | Improved health care | •Sanitation construction<br>•Health & hygiene training<br>•Communal health care centre |
| Food insecurity | Adequate nutrition | •Rice support for long enough |
| Loss of access | Restoration of community assets and services | •Public architectural works<br>•Local road infrastructure development<br>•Maintaining infrastructure |
| Social disarticulation | Networks and community rebuilding | •Moving graveyards<br>•Building cultural infrastructure<br>•Supporting for the cultural restoration and rehabilitation activities<br>•Compensation/support host population |

# Social/Cultural Impact Indicators

| Type of Impacts | Indicators | Objective |
|---|---|---|
| Displaced People | 1. Number Displaced<br>2. % Ethnic Minority | Ensure Proper Resettlement Package and Social & Cultural Equity |
| Social/Cultural Impacts | 1. Impacts on Cultural & Religious Sites<br>2. Loss of Areas of Cultural Importance<br>3. Impact on local social institutions and culture<br>4. Changes in access to external markets and institutions<br>5. Lack of Public Awareness & Participation in Planning<br>6. Increased social problems, crime | Avoid or Compensate for Damage and Ensure Effective Participation through amended planning guidelines |

# Livelihood Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Impact on Livelihoods | ➢Changes in parttern of local communities access to natural resource<br>➢Agricultural Land Lost | Provide Proper Compensation: Benefit Transfer Schemes |
| | Fisheries/Forest Products Lost | Provide Proper Compensation: Benefit Transfer Schemes |
| | Job/Income Opportunities | Support Employment and Enterprise Development |
| | Limitation of Reserved Land Area for Resettlement and Cultivation | Ensure Proper Site for Resettlement is Available |

# Biodiversity Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Loss of Biodiversity Value | Hectares of High Biodiversity Value Area Likely to be Impacted | Implement Biodiversity Protection Programme |
| | Hectares of Protected Areas Likely to be Impacted | Ensure Enforcement of Protected Areas Regulations |
| | Length of River Upstream & Downstream Likely to be Impacted | Mitigate through compensation and restocking where feasible |
| | Loss of Wetland and/or Coastal Habitat | Avoid or Compensate for Damage |
| | Ecosystems Impacts from Cooling Waters | Avoid or Compensate for Damage |
| | Impacts on Migratory Birds or Bats | Measures to reduce bird/bat collisions with power lines, wind turbines, etc |

# Natural Resource Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Declining Access to Natural Resources | Hectares of Forest Lost or Impacted | Institute Community Forestry Programme |
| | Reduction in Fish Catches | Provide Proper Compensation |
| | Increased Soil Erosion/Siltation | Avoid or Compensate for Damage: Benefit Sharing Mechanism |
| | Obstruction to Natural Landscape/Loss of Amenity Values | |

# Hydrological, Atmospheric and Climate Change Indicators and Mitigation Actions for Power Sector Development

# Overall Approach/Rationale

- Different types of power generation can have wide-ranging and far-reaching impacts
- These can be hard to measure but are often of great significance in their impact
- Can be trans-boundary, or even global in their effects
- Often represent a ‘risk’ rather than a universal impact
- Often not possible to directly ‘target’ mitigation or compensation measures

# Hydrological Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Alterations to the Hydrological Cycle | Changes to Wet/Dry Season River Flows | Monitor flows & adjust reservoir management where necessary |
| | Reduction of flood risks | Integrate into river basin and flood management systems |
| | Impacts on Water Quality, BOD | Monitor and take remedial actions where necessary |
| | Effects on Minimum Environmental Flows | Monitor and manage flows to ensure minimum flows maintained |
| | Downstream Erosion/Sedimentation | Flow control & remedial structures where needed |
| | Radiological releases into water bodies | |

# Climate Change Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Climate Change Impacts | $CO_2$ Release from Reservoirs | Instigate benefits transfer measures |
| | Methane Release from Reservoirs | Ensure biomass cleared from reservoir area before flooding |
| | $CO_2$ , Other GHG Release from Thermal Power Plants | Instigate benefits transfer measures |
| | $CO_2$ release from geothermal fluids | Reinjection of $CO_2$ in the reservoir |
| | $CO_2$ release from Bagasse combustion | Instigate benefits transfer measures |

# Atmospheric Pollution Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| Human and Environmental Health Impacts of Atmospheric Pollution | Impacts of $PM_{10}$, $SO_2$, NOx on Human Health & Morbidity | Instigate benefits transfer measures |
| | Impacts of PM, $SO_2$, NOx, N, S, Acid Deposition on Water Ecosystems and Crop Production | Instigate benefits transfer measures |
| | $SO_2$, PM, Acid Deposition Impacts on Buildings, other structures & on water bodies, ecosystems | Instigate benefits transfer measures |

# Atmospheric Pollution Impact Indicators

| Type of Impact | Indicators | Objective |
|---|---|---|
| | Impacts of Electric and Magnetic Field of Transmission Lines on Human Health | Provide proper compensation where impacts are proven |
| | Impacts of NOx, CO and PM emissions from Bagasse combustion | Initiate benefits transfer measures |
| | $H_2S$ and other gases release from geothermal fluids | Removal of $H_2S$ and other gases from geothermal steam |

# Scenarios Analysis: Basic Concepts and Approach in PDP VII SEA

**Workshop on Strategic Environmental Assessment in Power Development Plan VII – Quy Nhon 12-13 July**

Bach Tan Sinh and John Soussan

# Contents

- Context: SEI and power sector in VN
- Basic concepts of Scenarios
- Approaches applied for PDP VII

# The Context: SEA & power sector in Viet Nam

- SEA relatively new to Viet Nam but now a mandatory requirement for national planning processes
- Some SEA experience, including for hydropower, but not at a strategic planning level
- SEA Guidelines under evolution: this study should contribute to their development
- Concerns over environmental & social impacts of hydropower

# The Goal

To optimize the potential contribution of power sector to national development through a strategic planning approach that balances economic development, social equity and environmental sustainability

# Contents

- Context: SEI and power sector in VN
- Basic concepts of Scenarios
- Approaches applied for PDP VII

# Scenarios are .....

**stories**... *tools for ordering one's perceptions about alternative future environments in which today's decisions might be played out.* *Ron Johnston*

# Scenarios are not….

**science fiction**…*about predicting the future; rather they are about perceiving the future in the present* *Peter Schwartz*

# What is a scenario?

## A scenario helps to determine opportunities and risks

Forecast

1995 2010

- extrapolation of historical data
- linear pattern of thought
- primarily quantitative results

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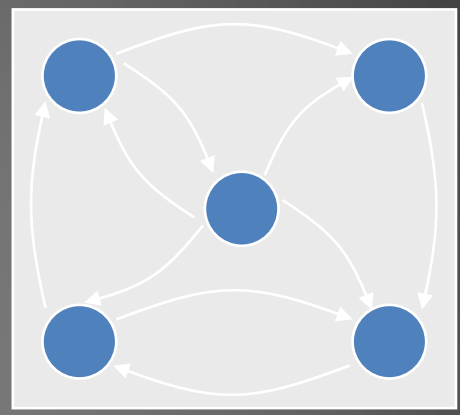
Scenario



- correlations and interrelations in the system
- alternative projections of the future
- qualitative results

=

- basis for decision making
- alternative options to react to changing market conditions
- qualitative approach to future market definition
- minimisation of corporate risk

# The Value of Scenarios

1) learning by putting knowledge to use

2) challenging mind-sets by developing plausible alternatives

3) learning through discussion and dialogue

***Scenarios are descriptive narratives of plausible alternative projections of a part of the future, methodically researched and developed in sets of 3,4 or more to study how an organisation would fare in each future…..*** *Fahey and Randall 1998*

# Scenarios improve the quality of decision-making by:

- questioning assumptions
- developing fresh insights
- getting the ‘measure’ of problems
- developing shared understanding
- rehearsing responses
- developing robust strategies, effective if circumstances change

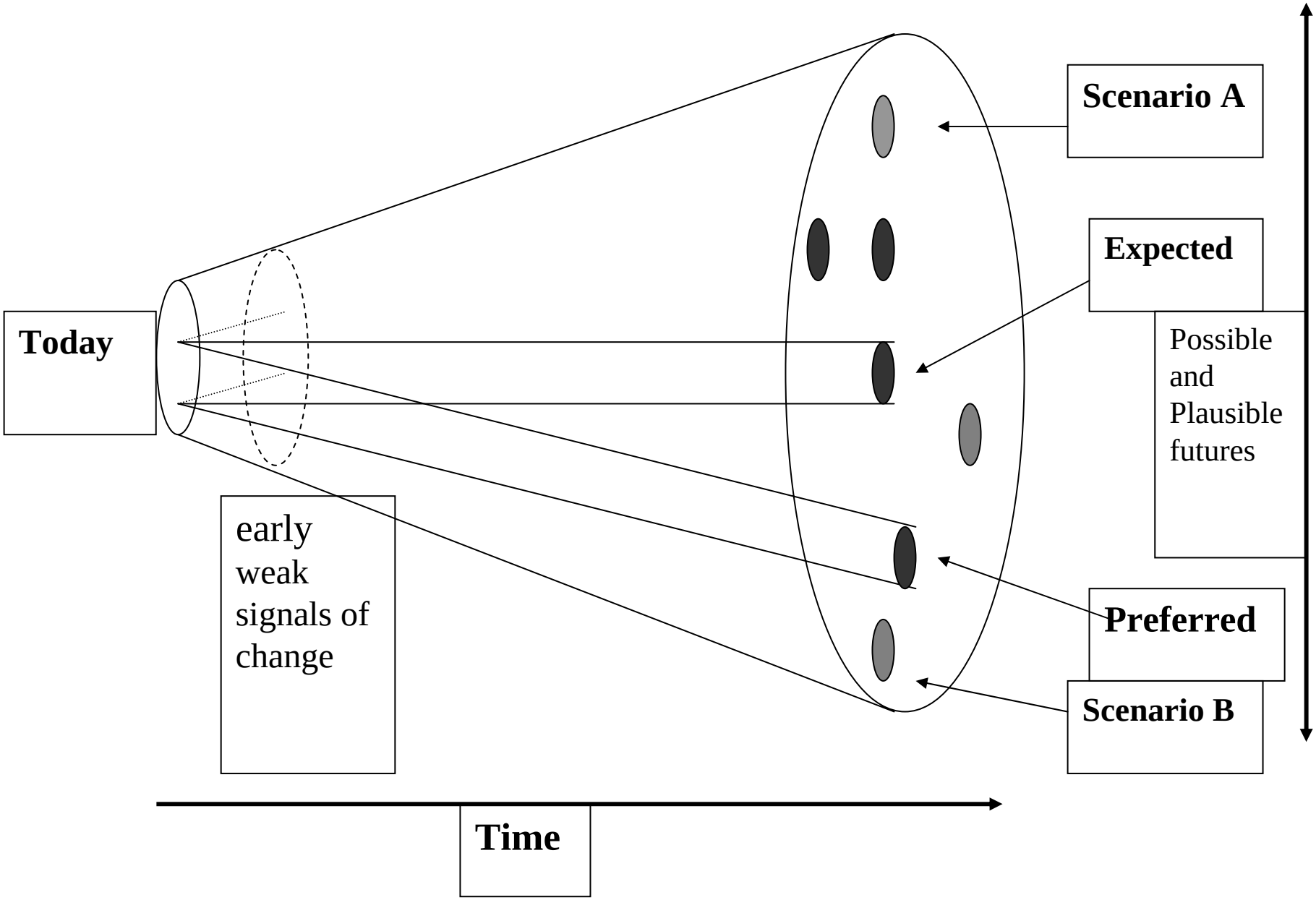
*Ron Johnston 1999*

# What do we want the SEA Scenarios to tell us?

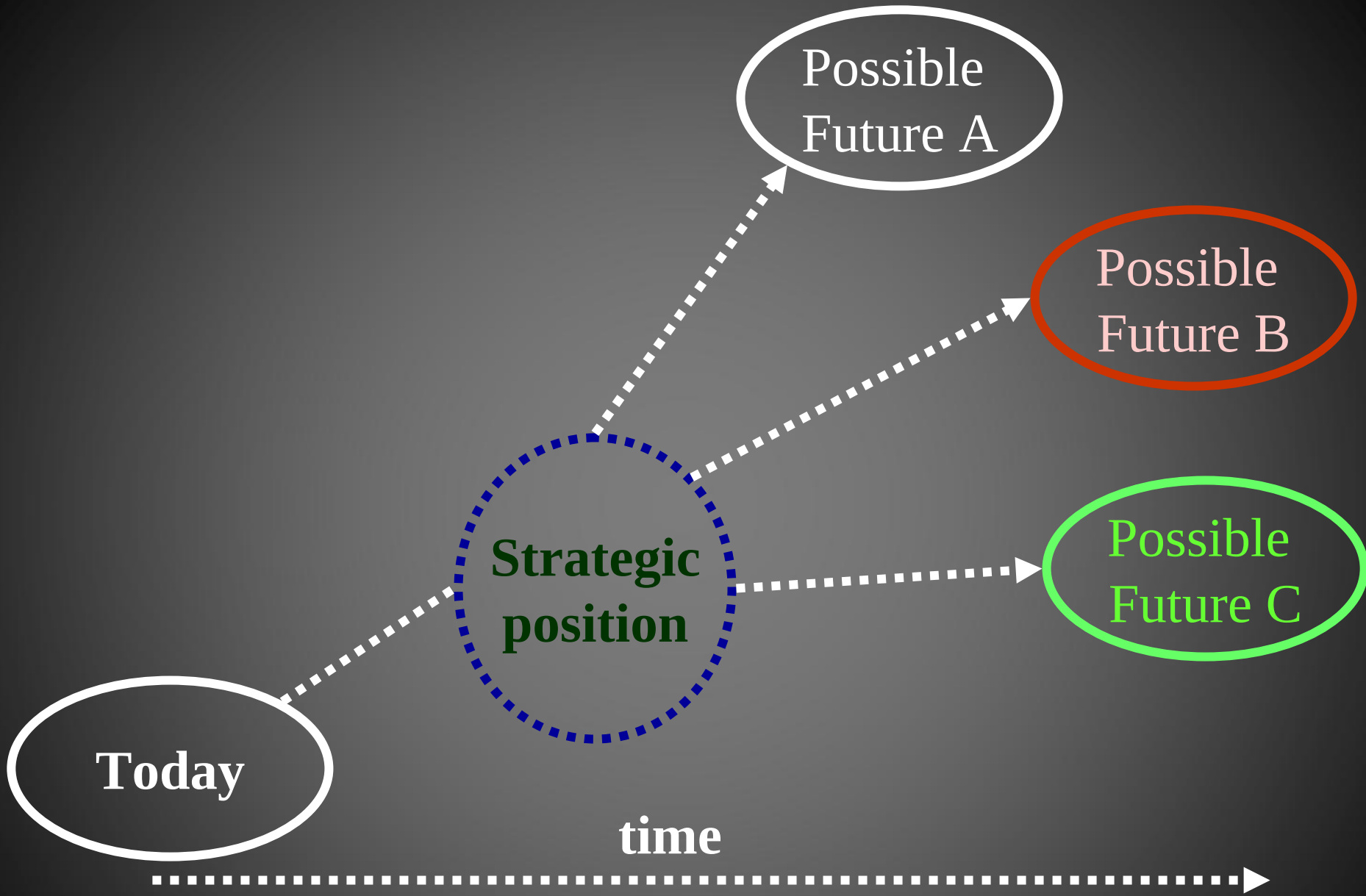
- Define a range of ***sustainable*** power sector development futures
- Sustainable: take account of full range of economic, social and environmental issues
- Goal is to maximise the contribution of sustainable power sector to Viet Nam's development
- Give policy choices to assess the implications of different key strategic issues for power sector development
- Provide clarity, transparency and objectivity in decision making

# Definition of Foresight:

*Foresight involves systematic attempts to look into the future of science, technology, society and economy, and their interactions, in order to promote social, economic and environmental benefits*




Source: modified from Bezold and Hancock 1993




**Foresight and Strategic Planning**

# Why use foresight – a summary

- to anticipate change and shape the future
- to prioritise effort and funds
- to integrate S&T with social, economic and environmental needs
- to change mind-sets

# Essentials of foresight:

- a framework for thinking FROM the future
- a range of plausible futures instead of a single one
- consultative – involve all stakeholders
- systematic and analytic – but also creative
- process is at least as important as product

# Key Issues

- What are the most important problems and opportunities relevant to power sector in Vietnam in the future?
- Defined from the current scoping exercise

# Key Drivers

Key drivers are drivers of change influencing the key issues.

- Society
- Technology
- Economics
- Environment
- Politics

Example of key drivers:

- Rapid urbanisation changes patterns of consumption and demand for electricity

# Concept of Uncertainty

- Uncertainty is discontinuity which dramatically alters the outcome
- Each of them has different degree of **impact** and different degree of **uncertainty**
- Uncertainty is **NOT PROBABILITY**

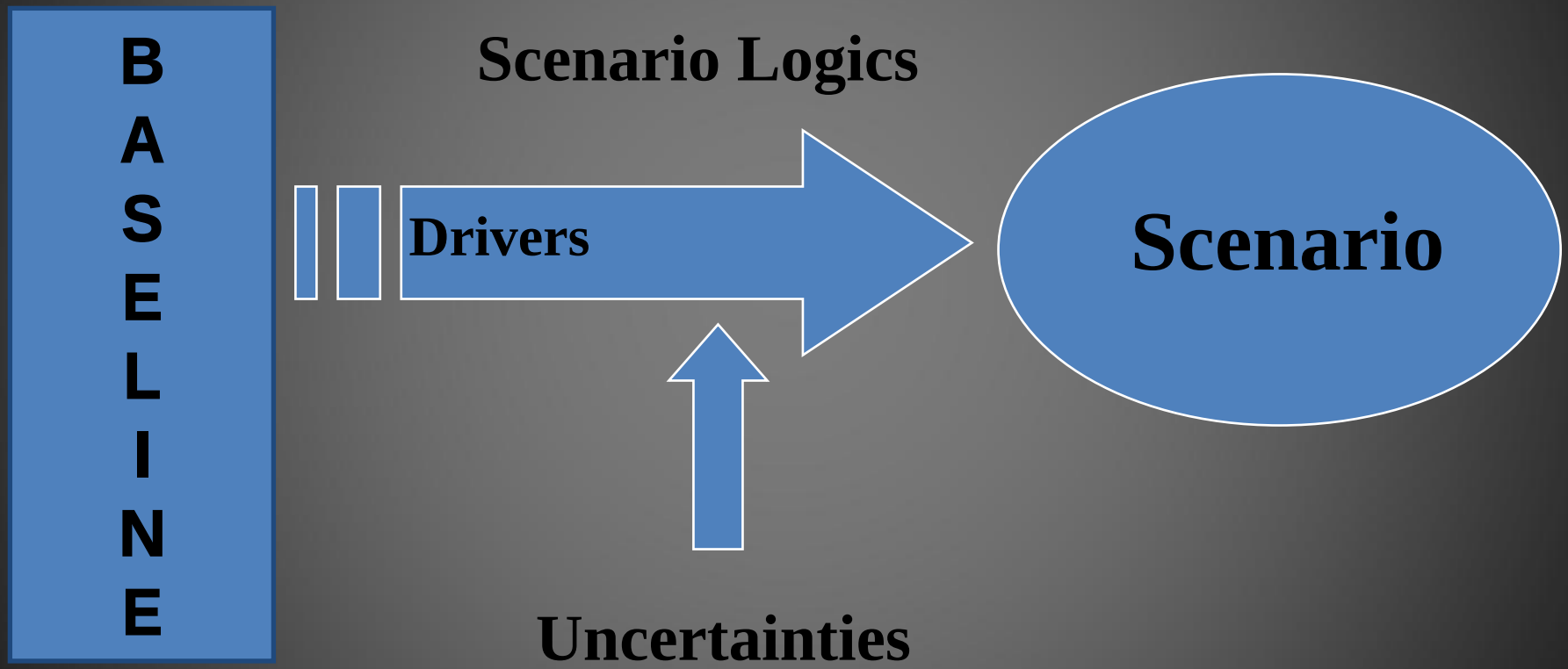
# Degree of Uncertainty

- If you believe that an event is likely to occur OR is unlikely to occur, the uncertainty is **LOW**
- If you have no view of likelihood of occurrence, the uncertainty is **HIGH**

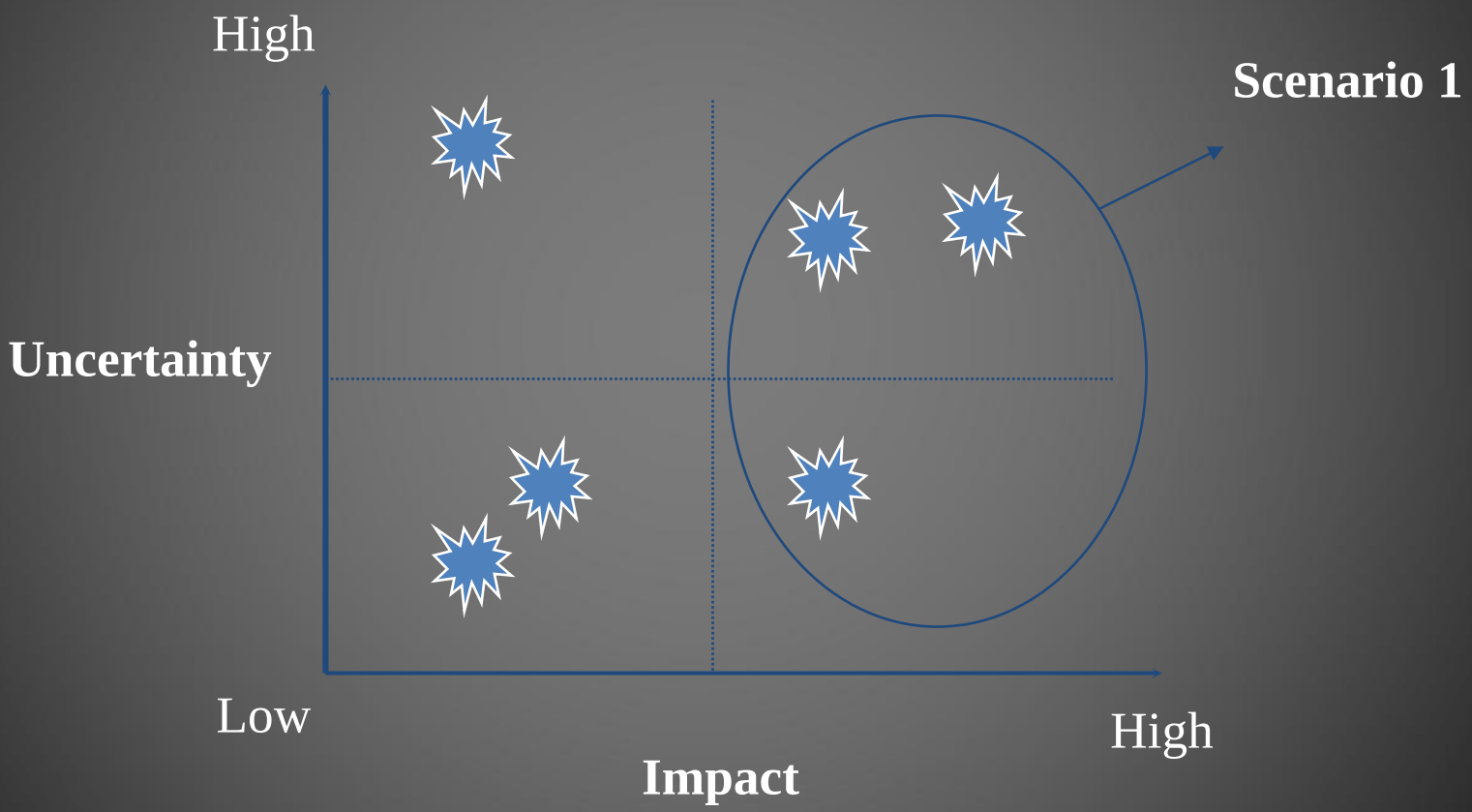
**Example of uncertainty**

- Climate change impacts severely disrupt weather patterns and rainfall variability

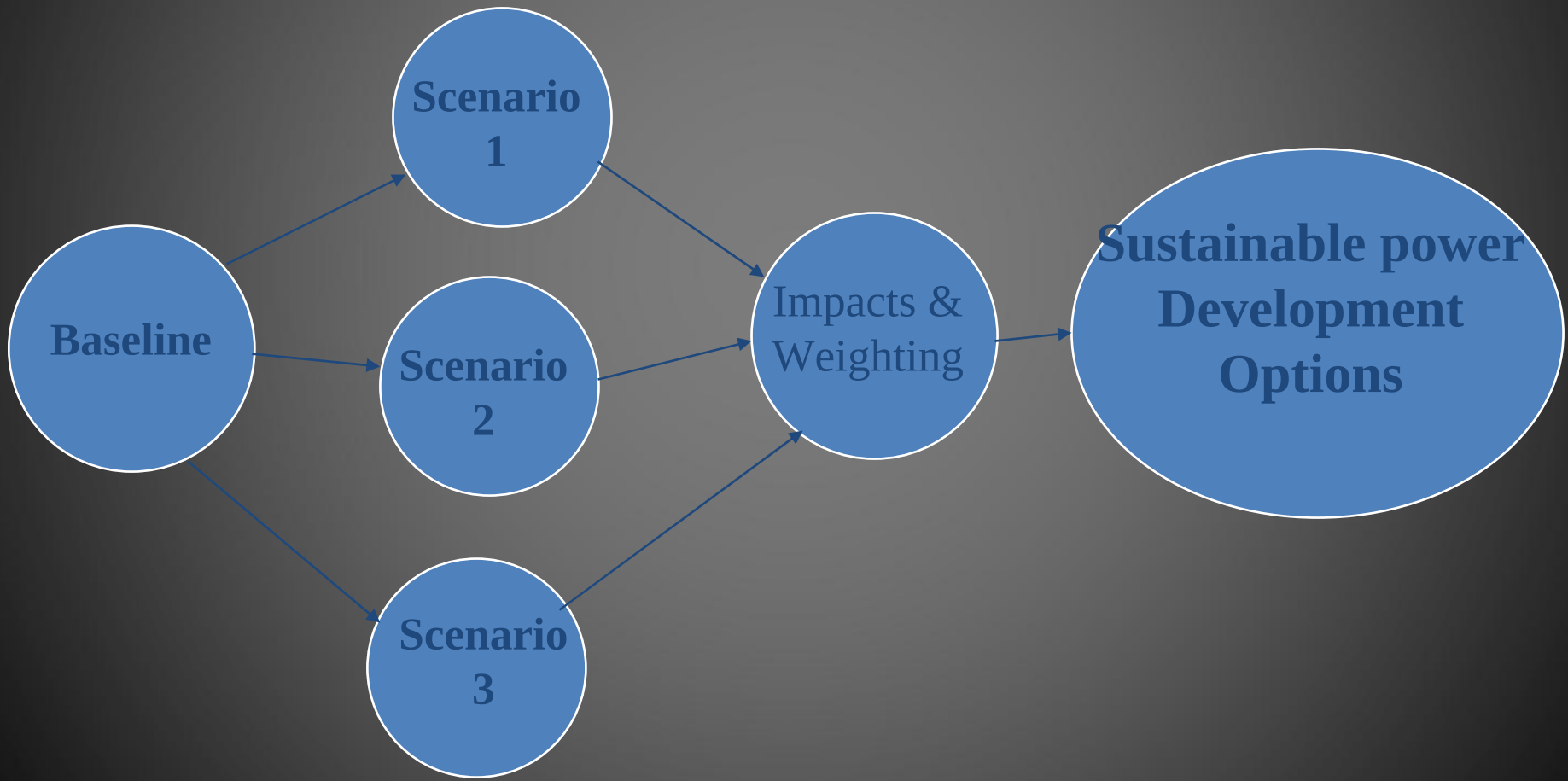
# Construction of Scenarios



# Matrix of Scenario Building



# Outputs of Scenarios



# The Approach to the SEA

- The SEA undertaken in close collaboration with national partners: working group
- Replicable: no expensive collection of new data, rather use of existing data in new forms
- Sustainable: develop capacities to implement SEA for power sector in PDP VII
- Evidence: as far as possible, develop quantitative analysis, with economic valuation where possible
- Strategic: assessment of potential impacts risks and of mitigation actions/costs
- Costs internalized into overall economic assessment of hydropower schemes

# SEA as a tool for Strategic Planning

- SEA is a process of evidence-based analysis of social and environmental issues
- Balanced analysis to build consensus, including recognising trade-offs and linking sector goals to national development
- Decision-oriented: not just about identifying problems, but also about agreeing on solutions

# Phases of the SEA

Scoping

Baseline

Scenarios

Impact Analysis

Weighting and Trade-Offs

Reporting

# Scoping Exercise: The Top 5 Strategic Issues

- Sustainable water resources management
- Mitigating impacts on project affected people
- Maintaining ecosystems integrity in power sector development
- The power sector planning system

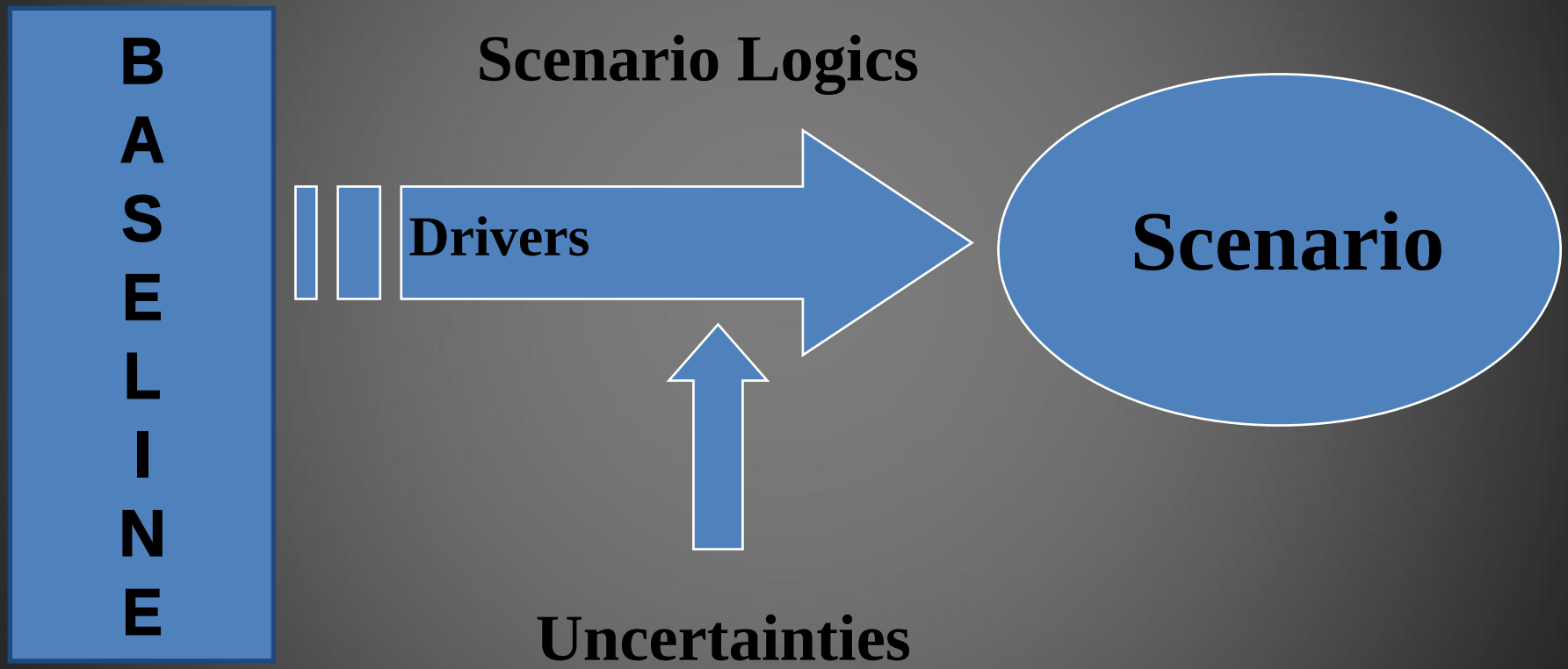
# Scenarios – a Framework for Envisioning Futures

- Stories of the future told to inform current decision-making.
- What are Scenarios and what are they useful for?
- Good scenarios are: Plausible, Consistent, Engaging, Compelling, Informative

# Overview of the Process

1. Set boundaries (time, space, themes)
2. Identify what drives the story of the present
3. Identify issues for the future
4. Identify the type of exercise
5. Construct a scenario framework
6. Begin drafting scenario narratives
7. Decide on the form for the quantitative analysis & begin carrying it out
8. Assess, learn, revise

# Construction of Scenarios

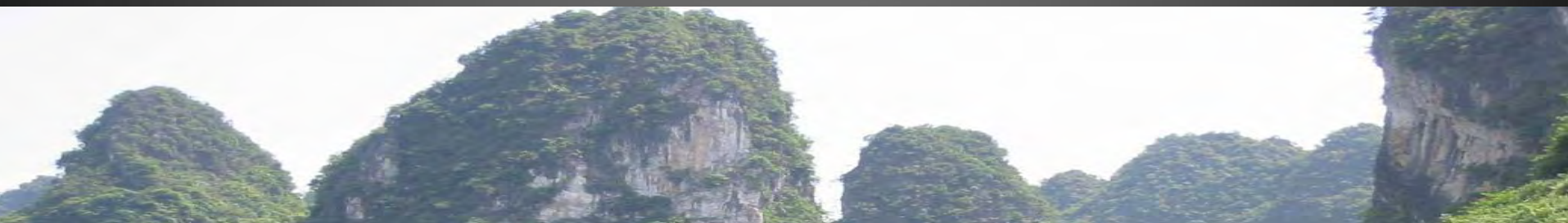


# Constructing the Scenarios

1. Define number of scenarios
2. Define alternative generating sources
3. Identify power schemes in PDP VII
4. Assess total social and environmental risks and impacts for each scenario,

# Constructing the Scenarios (cont)

5. Define (where possible) economic valuation of social and environmental costs & benefits for each scenario
6. Internalize costs into overall economic assessment of each scheme & for each scenario
7. Assess weighting in relation to key strategic issues
8. Define actions to internalize cost & mitigate impacts



# Thanks for Listening

# STRATEGIC ENVIRONMENTAL ASSESSMENT OF THE PDP VII
# APPROACHES TO ECONOMIC VALUATION

John Soussan
Stockholm Environment Institute

# The Objectives

The economic valuation of the different social, environmental and economic impacts of power sector development allows the SEA to achieve 2 key objectives:

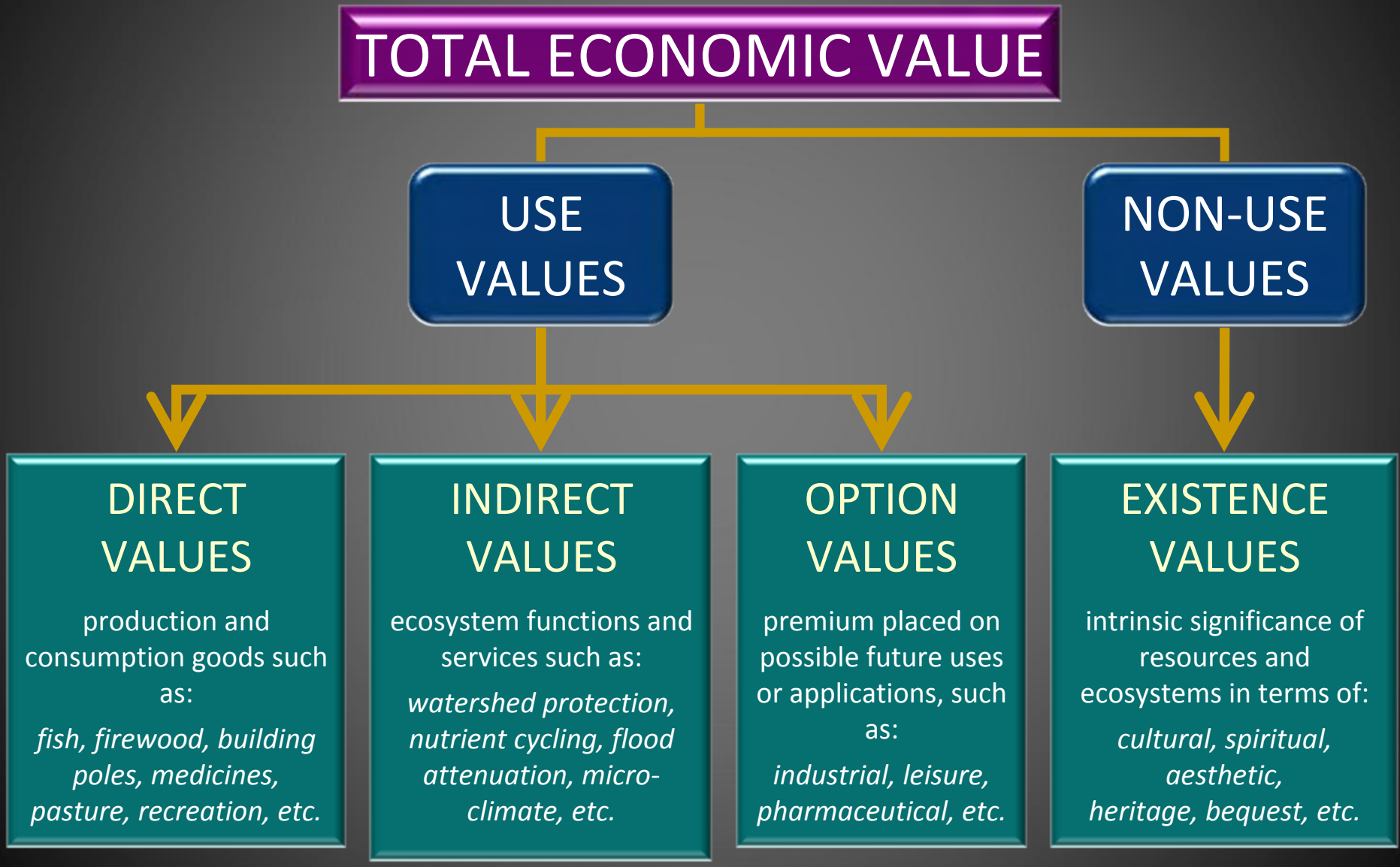
1. It allows the analysis to compare the relative significance of different types of impacts

2. It provides the means to internalize costs and benefits into the main economic analysis of the PDP that have previously been treated as externalities

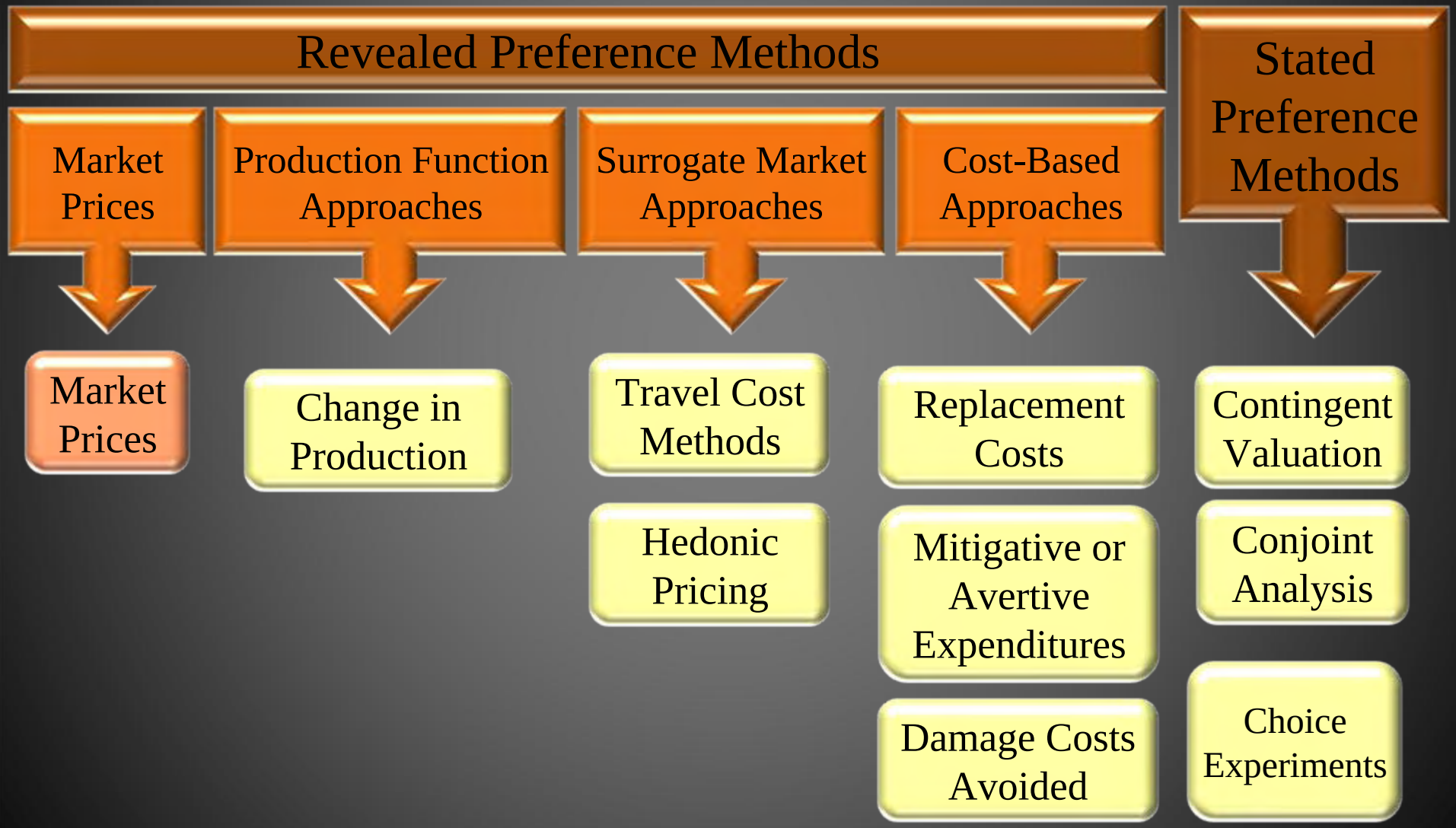
# Understanding Valuation

- Economic valuation is a relatively new field for many types of social and environmental values that are not conventionally priced or traded
- It is not perfect: doing valuation usually involves making assumptions and judgments
- Values are relative: what something is worth is very different for different types of people
- Not everything can be valued: some things that are very valuable to people cannot be given an economic price

# The Total Economic Value Framework

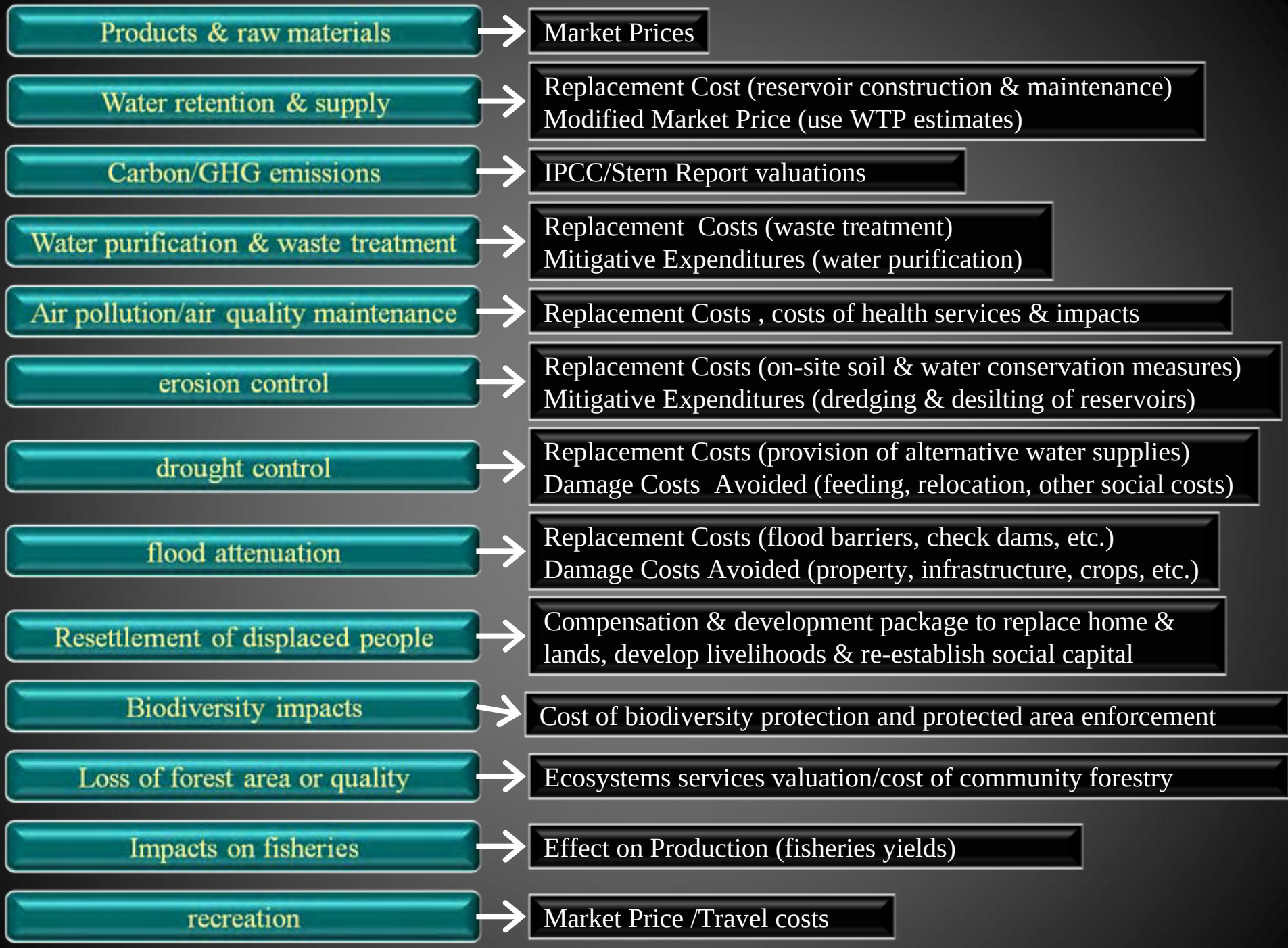


# Social and Ecosystem Valuation Techniques



# Selecting the Right Method

- As shown above, there are many types of techniques that can be used for valuation
- Each has its advantages and disadvantages
- Some require more data, and more accurate data, than others
- Some require extensive surveys: e.g. contingent valuation
- In some cases, value not the loss of inherent values (not possible) but the cost or remedial measures


Products & raw materials
Market Prices
Water retention & supply
Replacement Cost (reservoir construction & maintenance)
Modified Market Price (use WTP estimates)
Carbon/GHG emissions
IPCC/Stern Report valuations
Water purification & waste treatment
Replacement Costs (waste treatment)
Mitigative Expenditures (water purification)
Air pollution/air quality maintenance
Replacement Costs , costs of health services & impacts
erosion control
Replacement Costs (on-site soil & water conservation measures)
Mitigative Expenditures (dredging & desilting of reservoirs)
drought control
Replacement Costs (provision of alternative water supplies)
Damage Costs Avoided (feeding, relocation, other social costs)
flood attenuation
Replacement Costs (flood barriers, check dams, etc.)
Damage Costs Avoided (property, infrastructure, crops, etc.)
Resettlement of displaced people
Compensation & development package to replace home & lands, develop livelihoods & re-establish social capital
Biodiversity impacts
Cost of biodiversity protection and protected area enforcement
Loss of forest area or quality
Ecosystems services valuation/cost of community forestry
Impacts on fisheries
Effect on Production (fisheries yields)
recreation
Market Price /Travel costs

# Internalizing the Externalities

- Once the main impact costs and benefits are calculated for each category of generation source (& each major plant), these costs and benefits are very straightforwardly included in the overall economic calculation of the different generation sources
- This can then be used to re-assess the least cost' calculations for power supply options, to reflect their full economic costs and benefits

# Some Examples from the PDP VI Hydropower SEA

- The SEA re-calculated the costs of a more comprehensive resettlement and development package for displaced communities, based on international best practice
- The SEA estimated the value of the changes to the annual distribution of river flows due to reservoir construction
- The SEA calculated the air pollution and climate change costs of thermal (least cost) alternatives to the planned hydropower schemes

# Re-calculation of Resettlement Costs

| No | Hydropower schemes | Original total social mitigation (Million VND) | Adjusted total social mitigation (Million VND) |
|---|---|---|---|
| 1 | Ban Chat | 1,201,064.00 | 1,415,440.65 |
| 2 | Huoi Quang | 480,025.00 | 566,662.85 |
| 3 | Song Bung 4 | 209,929.00 | 262,088.78 |
| 4 | Dong Nai 2 | 435,409.00 | 527,590.96 |
| 5 | Khe Bo | 311,897.00 | 406,275.81 |
| 6 | Dak Mil 4 | 90,860.00 | 102,496.10 |
| 7 | Srepok 4 | 50,694.00 | 50,693.50 |
| 8 | Dong Nai 5 | - | - |
| 9 | Upper Kontum | 92,351.00 | 118,533.35 |
| 10 | Song Bung 2 | 7,846.00 | 7,845.50 |
| 11 | Aluoi | - | - |
| 12 | Lai Chau | 976,830.00 | 1,124,047.15 |
| 13 | Hua Na | 397,170.00 | 525,779.93 |
| 14 | Song Bung 5 | 17,590.00 | 20,115.03 |
| 14 | Dak Mil 1 | 58,890.00 | 67,874.95 |
| 16 | Trung Son | 257,390.00 | 313,939.28 |
| 17 | Hoi Xuan | 159,340.00 | 276,950.05 |
| 18 | Bac Me | 739,980.00 | 996,870.55 |
| 19 | Nho Que 3 | 68,000.00 | 79,462.76 |
| 20 | Nam Na | 632,570.00 | 719,412.53 |
| 21 | Vinh Son 2 | - | - |
| | **Total** | **6,187,835.00** | **7,582,079.73** |

**In total, it is increasing 1,394,244.73 million VND, equivelent 22.53%**

# Changes to Storage Capacity, Dry Seasons Flows and Maximum Potential Benefits by Scenario

| Scenario | Addition to Storage Capacity ($Mm^3$) | Dry Season Supply Change ($m^3/s$) | Flood Control Capacity ($Mm^3$) | Additional Irrigated Area (Ha) | Additional Crop Yield (rice ton/year) | Economic Value of Crop Yield (000 US$) |
|---|---|---|---|---|---|---|
| Scenario 1 | 7,644.4 | 495 | 734 | 26,990 | 156,542 | 92,047 |
| Scenario 2 | 6139.9 | 365 | 403 | 19,290 | 111,882 | 65,786 |
| Scenario 3 | 4553.2 | 231 | 102 | 11,090 | 64,322 | 37,821 |
| Scenario 4 | 1470.6 | 95 | 0 | 4,490 | 26,042 | 15,312 |
| Scenario 5 | 0 | 0 | 0 | 0 | 0 | 0 |

# Results (Present Value) of "Environmental" Costs - Lower Bounds

| Scenario | $CO_2$ Emission Tonnes Present Value MUSD | $CH_4$ Emission Tonnes Present Value MUSD | $SO_2$ Emission Tonnes Present Value MUSD | $NO_x$ Emission Tonnes Present Value MUSD | $NO_2$ Emission Tonnes Present Value MUSD | $PM_{10}$ Emission Tonnes Present Value MUSD | Total Present Value MUSD | Difference in Total Present Value MUSD |
|---|---|---|---|---|---|---|---|---|
| Base | 4.06 | 1.31 | 0 | 0 | 0 | 0 | 5.37 | **0** |
| Alternative 1 | 154.02 | 42.14 | 4.29 | 33.25 | 216.07 | 27.56 | 477.32 | **471.95** |
| Alternative 2 | 387.98 | 105.86 | 10.97 | 85.02 | 552.51 | 70.47 | 1,212.80 | **1,207.43** |
| Alternative 3 | 646.37 | 176.21 | 18.36 | 142.27 | 924.53 | 117.92 | 2,025.66 | **2,020.29** |
| Alternative 4 | 1,034.95 | 282.09 | 29.43 | 228.08 | 1,482.16 | 189.09 | 3,245.75 | **3,240.38** |
| Alternative 5 | | | | | | | 0 | **-5.37** |

# Thanks for Listening

# Approaches to Integrating Fossil Fuel Price Volatility in Electricity Planning

Workshop on Methodology and Identification of
Key Environmental Issues of Strategic Environmental Assessment in Power Development Plan VII
Hai Au Hotel, Qui Nhon City, Vietnam
12-13 July 2010

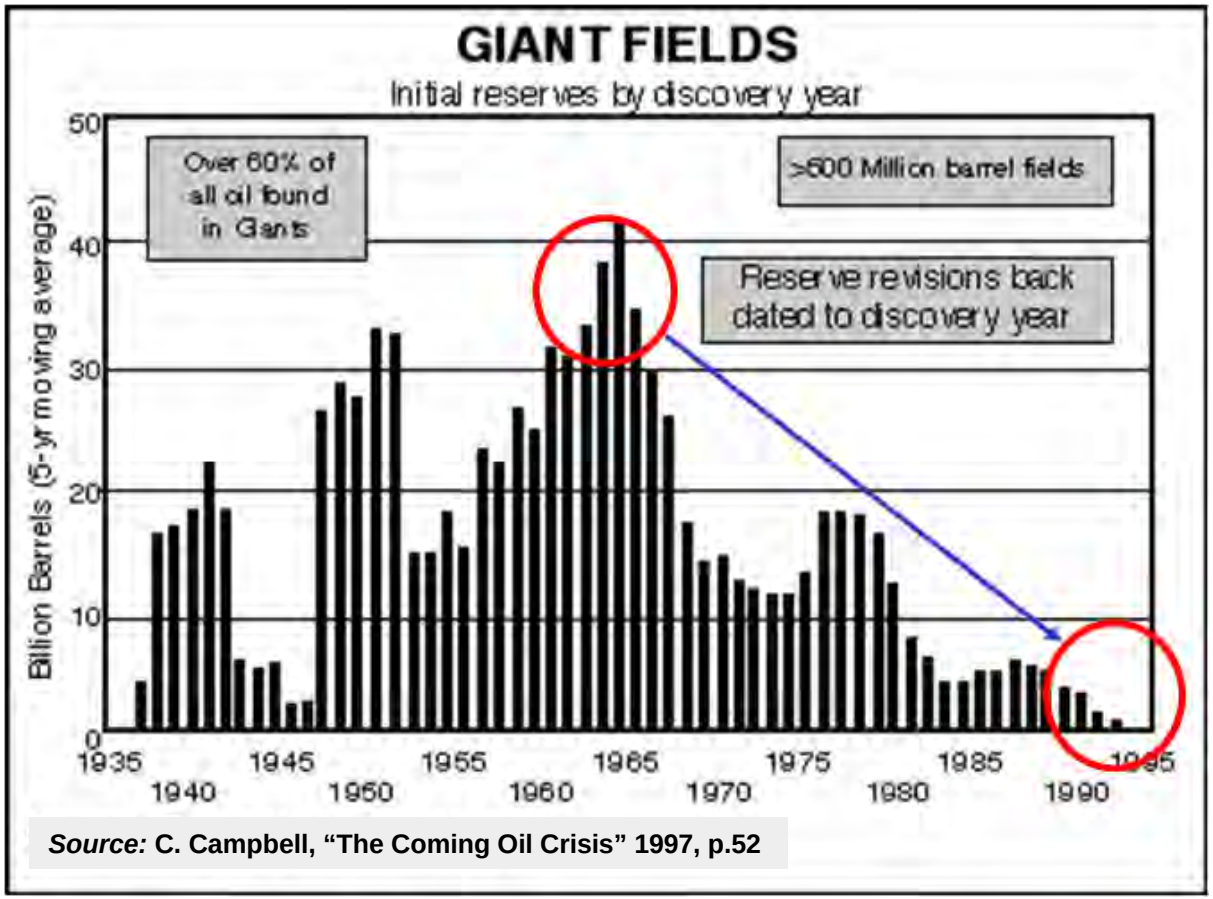
Dr. Romeo Pacudan
Energy Planning Specialist (Consultant)
ADB/GMS RETA 6289

# Structure of Presentation

- Coming Scarcity of Fossil Fuels
- Energy Price Volatility
- Electricity Least-Cost Planning
- Risk Integration
- Porfolio-based Electricity Planning

# 1. Coming Scarcity of Fossil Fuels

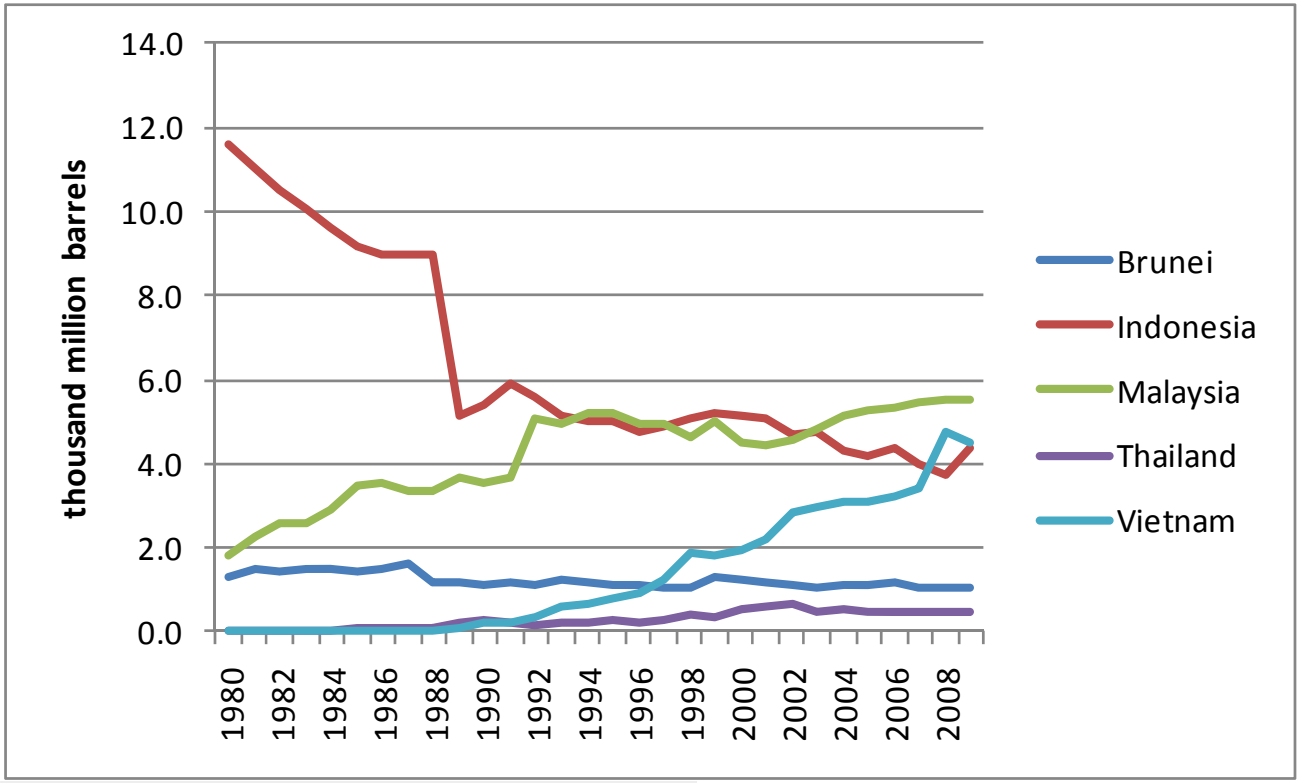
## Discovery of Oil in Giant Fields




***Source:*** **C. Campbell, "The Coming Oil Crisis" 1997, p.52**

# 1. Coming Scarcity of Fossil Fuels

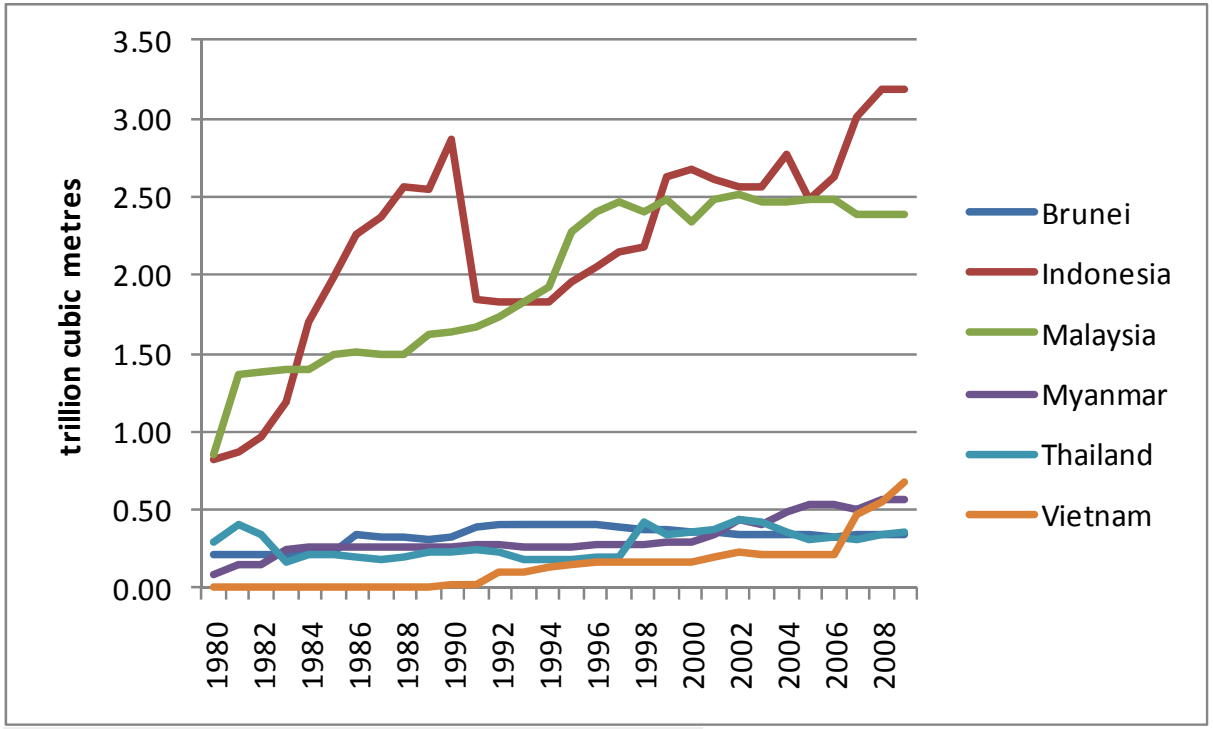
## Declining oil reserves of Southeast Asian Countries




***Source:*** **BP Statistical Review of World Energy 2010**

# 1. Coming Scarcity of Fossil Fuels

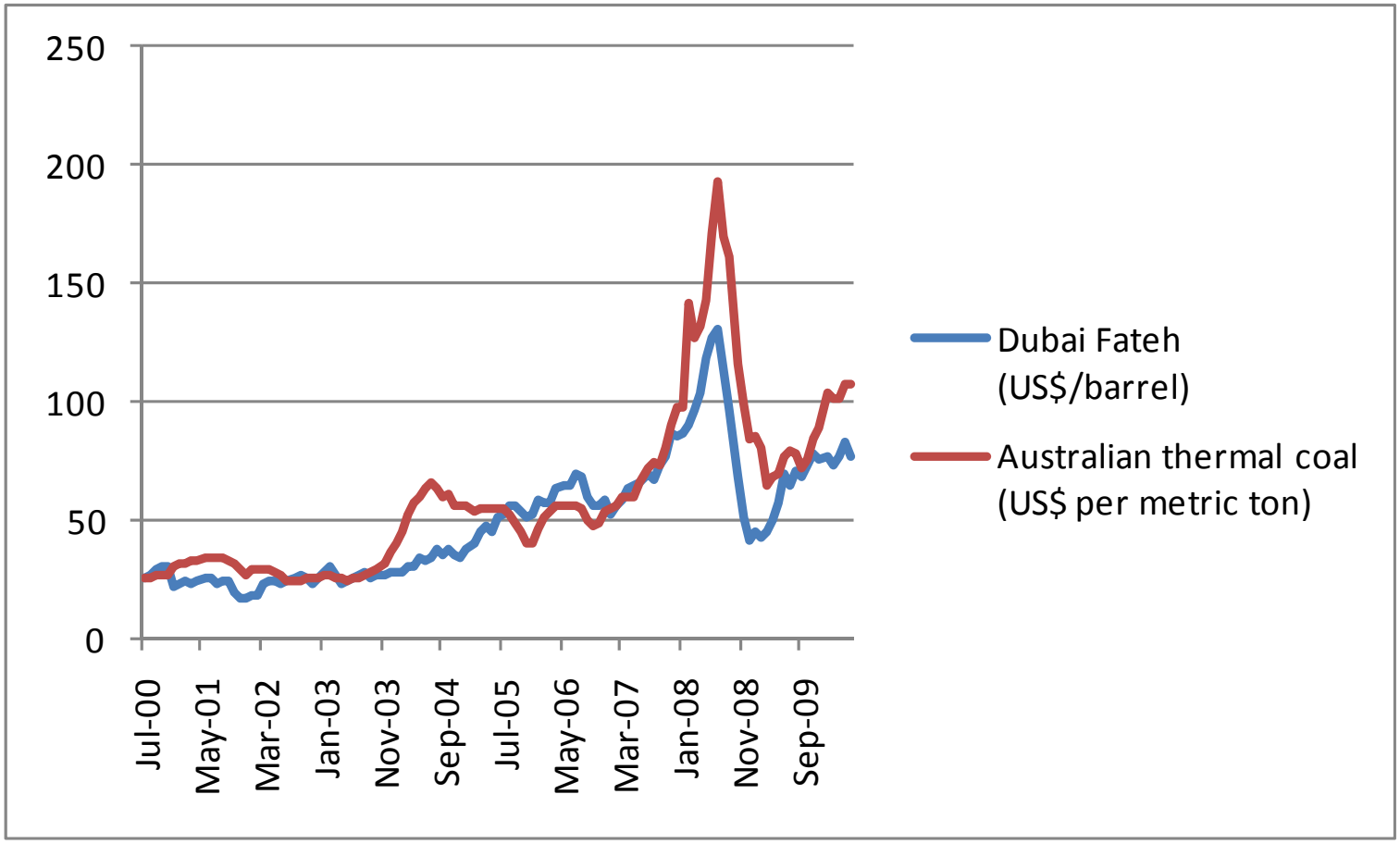
## Declining gas reserves of Southeast Asian Countries




***Source:*** **BP Statistical Review of World Energy 2010**

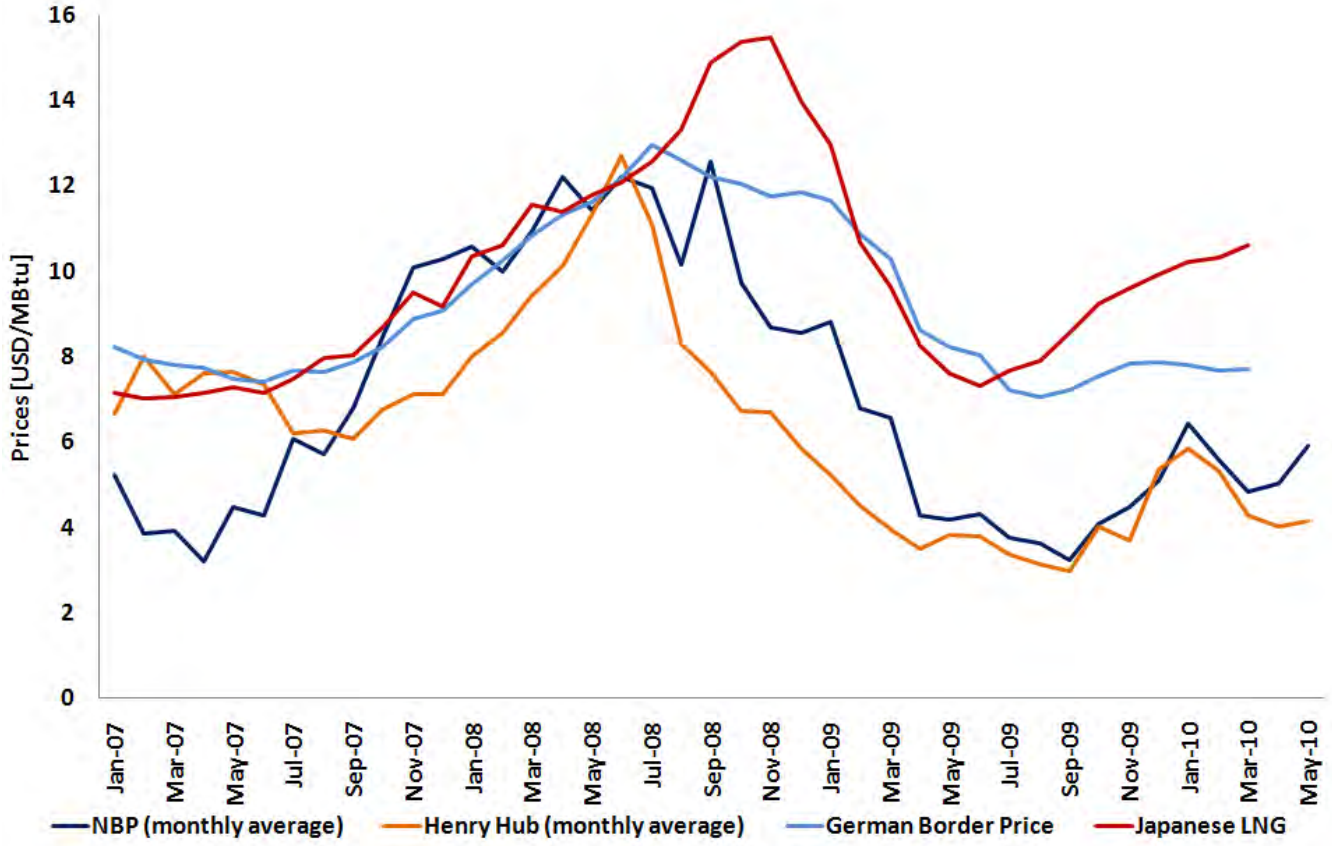
# 2. Fossil Fuel Price Volatility

## Highly unstable oil and coal prices – *translate into risks*



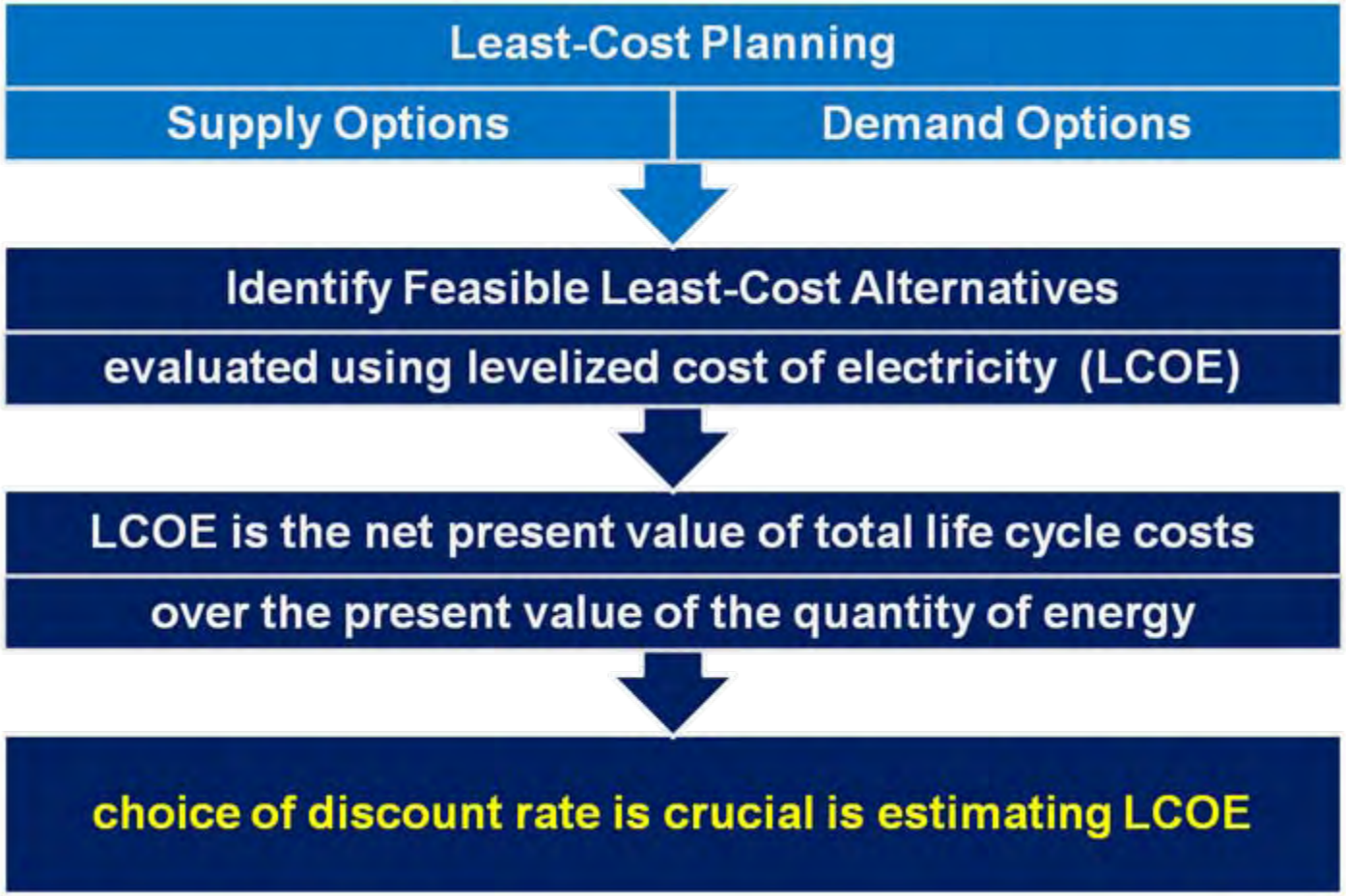
# 2. Fossil Fuel Volatility

## Highly unstable natural gas prices – *translate into risks*



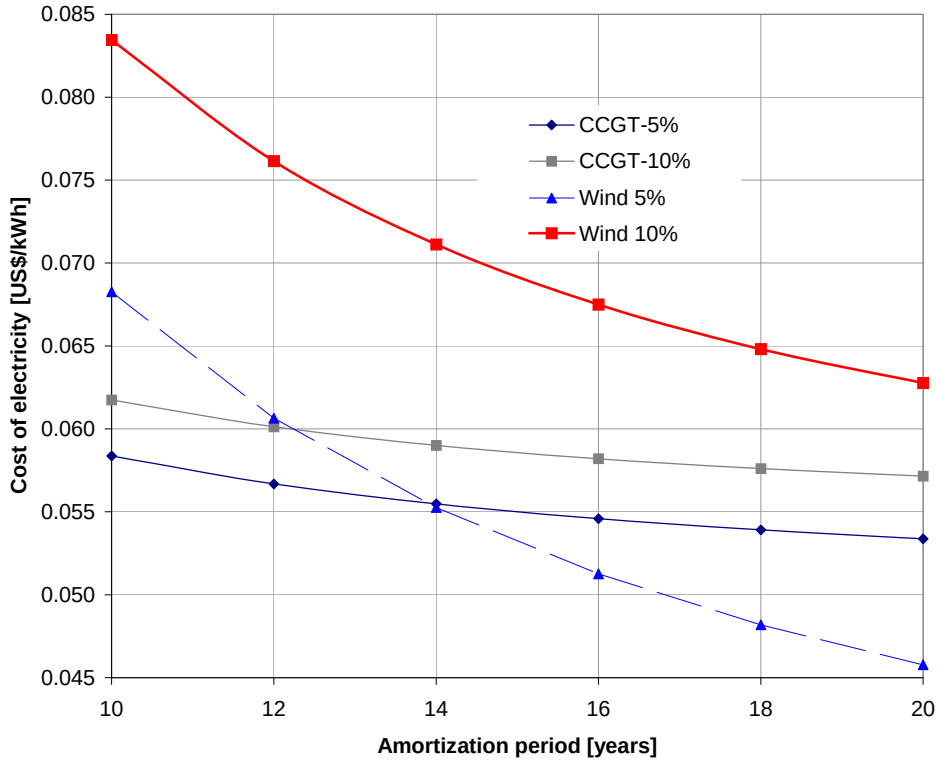
# 3. Electricity Least-Cost Planning

## Levelized cost of electricity and discount rate



# 3. Electricity Least-Cost Planning

## Levelized cost of electricity and effect of discount rate



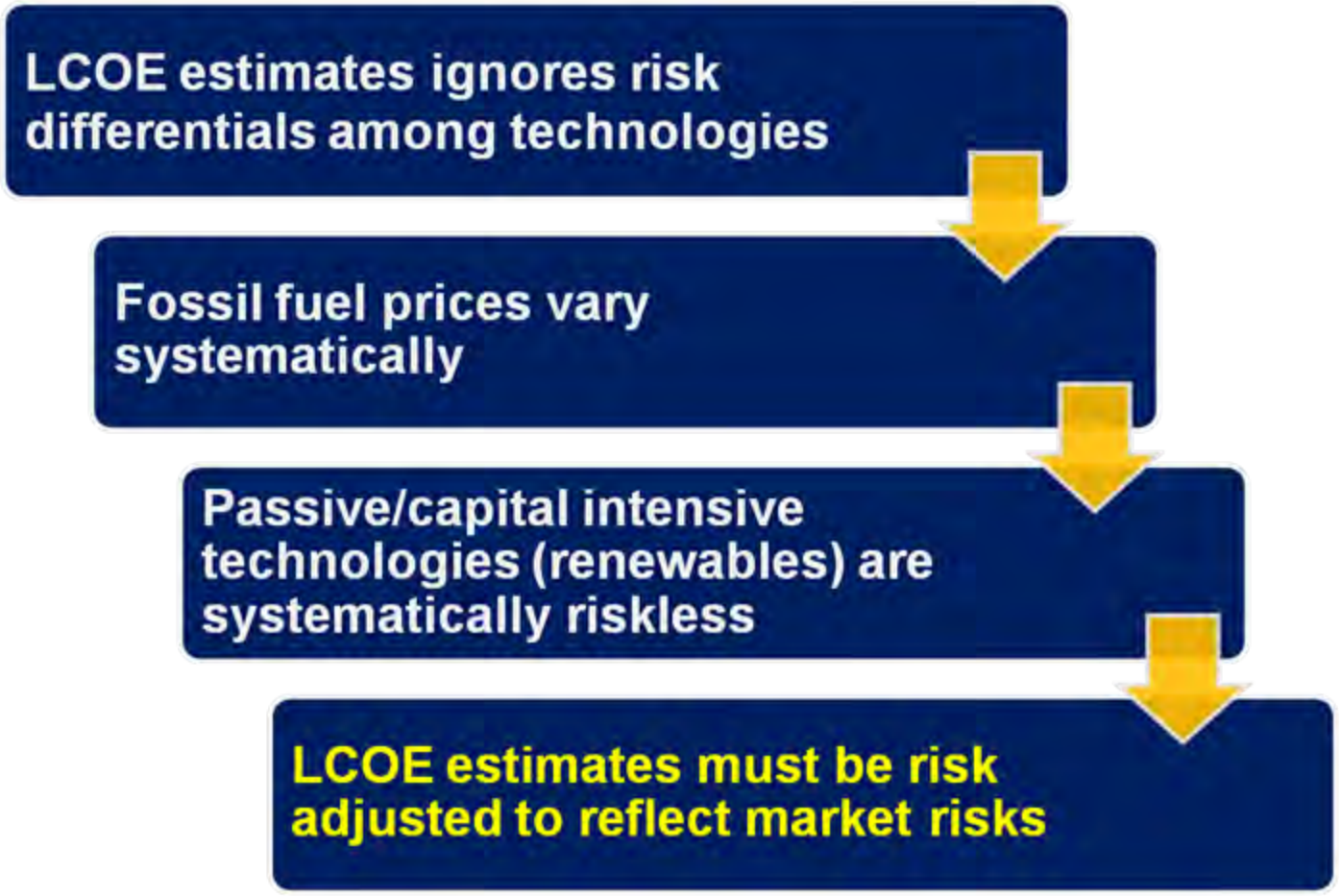

Choosing higher discount rates heavily affects renewable energy technologies like wind, but does little to fuel-based technologies like CCGT.

Key Issue:
discount rates must be tied to risk

- Renewables:
  no fuel price risk
- Gas:
  high price risk

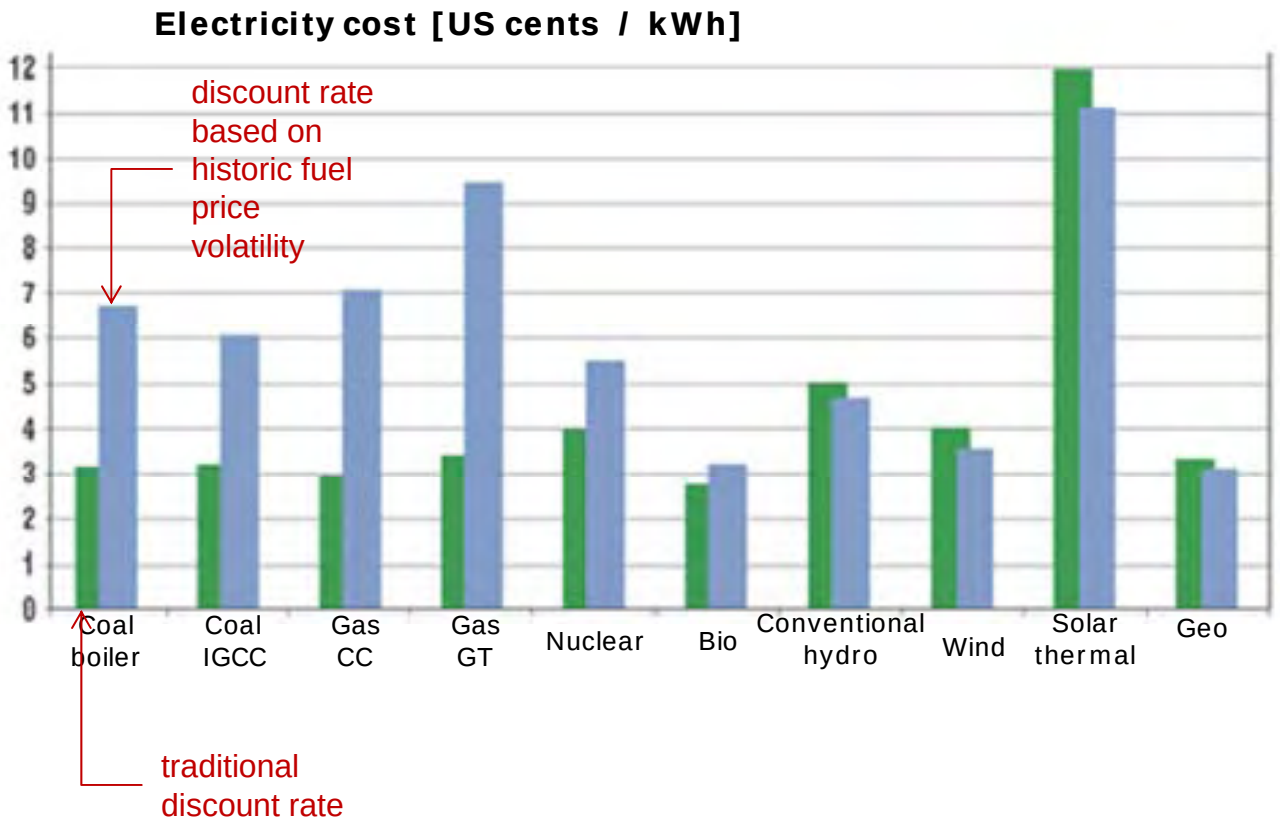
# 4. Risk Integration

## Risk adjusted cost of electricity based on historic fuel price risk



# 4. Risk Integration

## Risk adjusted cost of electricity based on historic fuel price risk



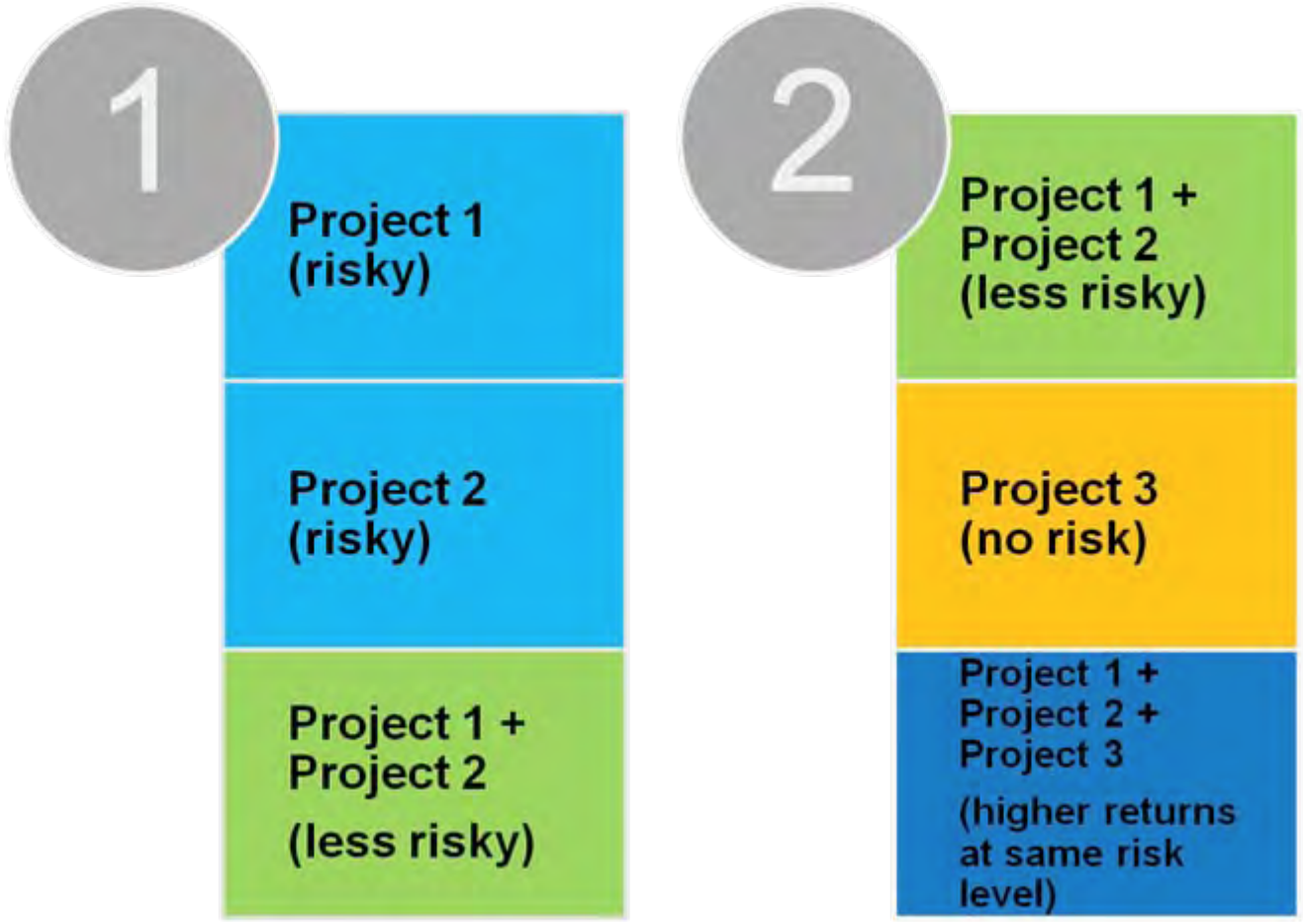

Risky cost-streams have to be discounted at a lower rate

*Example*: CCGT fuel cost

| Approach | Discount rate |
|---|---|
| Traditional (arbitrary) | 7% |
| Based on historic fuel price volatility | 2.3% |
| Contractually guaranteed prices | 3.9% |

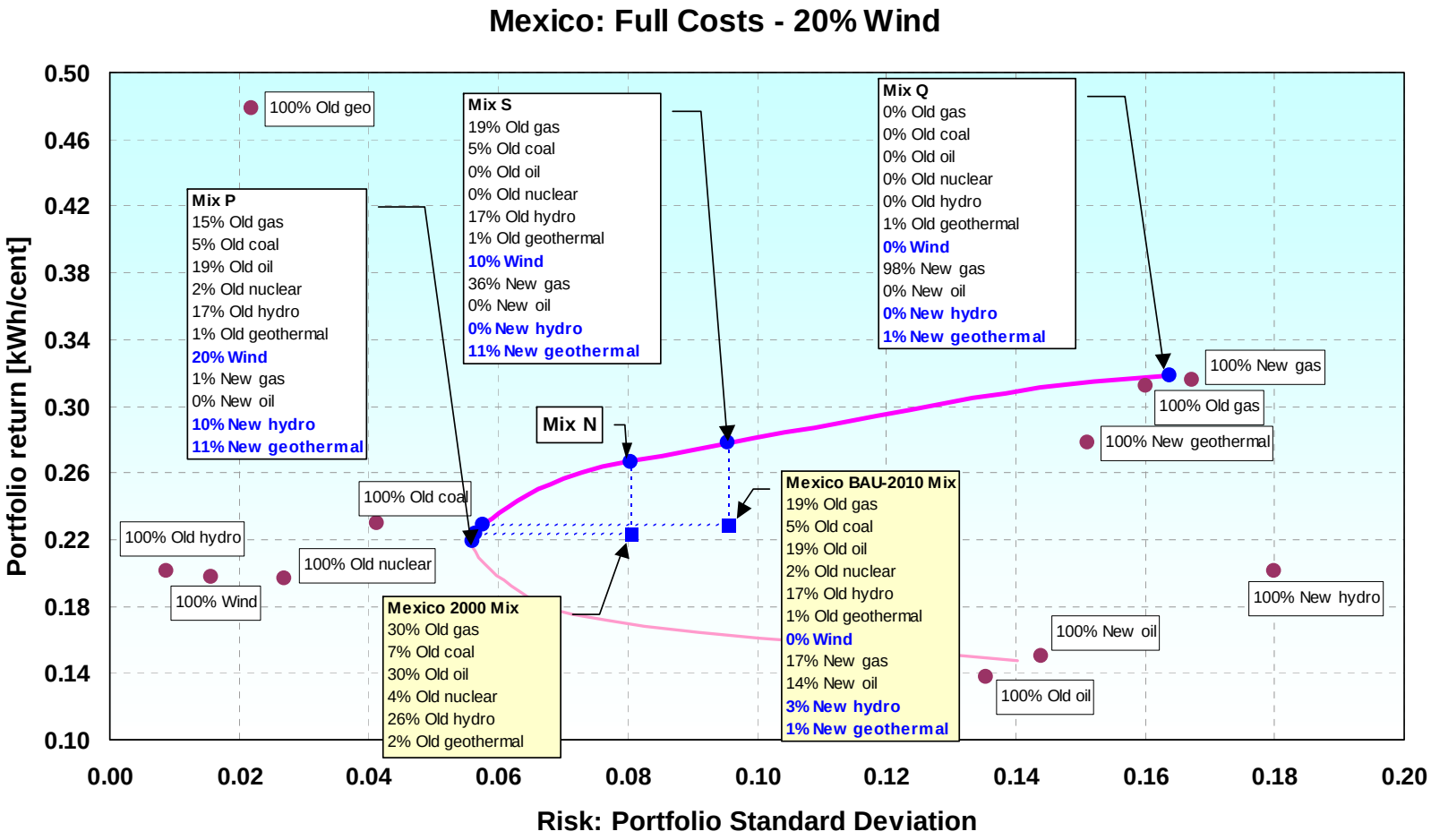
# 5. Portfolio Based Electricity Planning

## Portfolio Theory



# 5. Portfolio Based Electricity Planning

## Mexico Generating Portfolio



# 5. Conclusion

- Oil, coal and natural gas are fossil fuels with high price volatility, and therefore should be considered are risky cost-stream
- Traditional ‘least-cost planning’ discounting for cost of electricity calculations does not take into account fuel price risks which discriminate renewable energy technologies (RETs), but when levelized electricity costs are adjusted for risk, RETs become competitive
- Portfolio theory applied to levelized electricity cost estimates show that the addition of RET capacity reduce the overall (portfolio) risk while retaining the overall returns or cost of electricity

# 5. Conclusion

- Implications for Vietnam
  - Portfolio-based planning is an alternative approach and extension to the ‘traditional’ least-cost electricity planning
  - Portfolio-based techniques can guide policy makers towards developing effectively diversified minimum-cost generating portfolios with minimum exposure to fossil fuel risk
  - Portfolio-based planning promotes energy security and environmental protection by investing in generation portfolio which is less exposed to fuel cost risk and environmentally unsustainable.

# STRATEGIC ENVIRONMENTAL ASSESSMENT OF THE HYDROPOWER MASTER PLAN IN THE CONTEXT OF THE PDP VI

Quy Nhon, July 2010

*Tran Viet Hoa, Division Head*
*Department of Science & Technology*
*Ministry of Industry and Trade*

# CONTENTS

- Cooperation study on SEA development between ADB &MOIT
- SEA of hydropower development plan in PDP VI
- Some achievements

# Cooperation study on SEA development between ADB &MOIT

# Context and objectives of study

PDP VI approved in 2007

Preparation of PDP VII

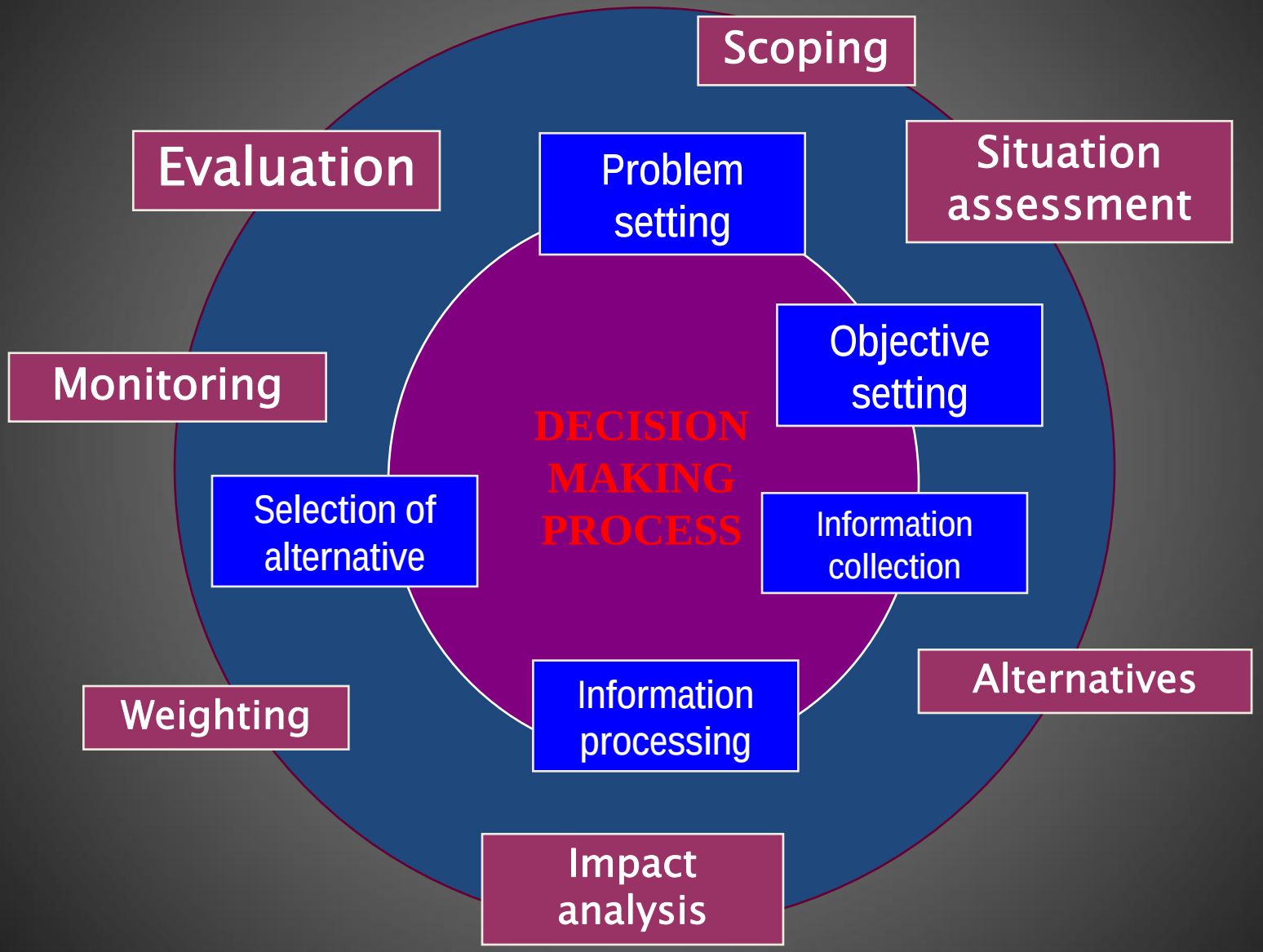
SEA ?

**Pilot study of SEA**

# SEA of hydropower development plan in PDP VI


# The Goal

To maximize the potential contribution of hydropower to national development through a strategic planning approach that balances economic development, social equity and environmental sustainability


Scoping
Evaluation
Problem setting
Situation assessment
Objective setting
Monitoring
DECISION MAKING PROCESS
Selection of alternative
Information collection
Alternatives
Weighting
Information processing
Impact analysis

# Steps of SEA

Scoping

Baseline assessment

Development of scenarios

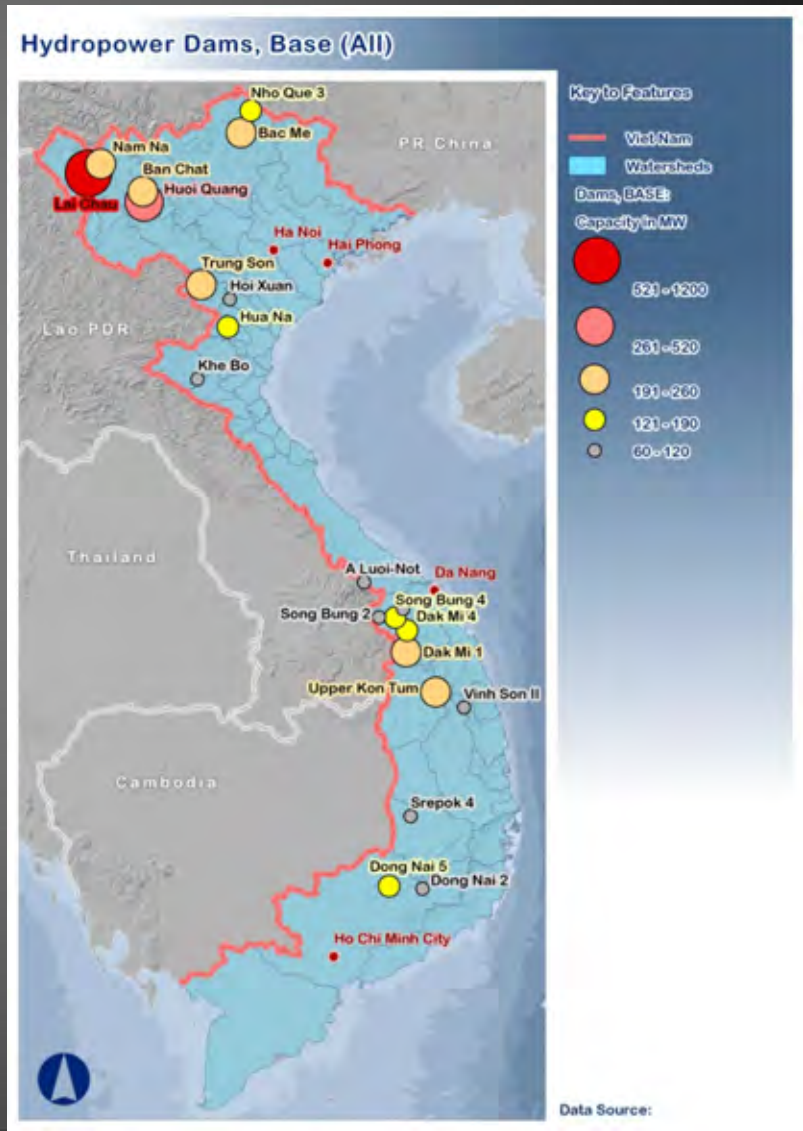
Impact analysis

Comparison and selection

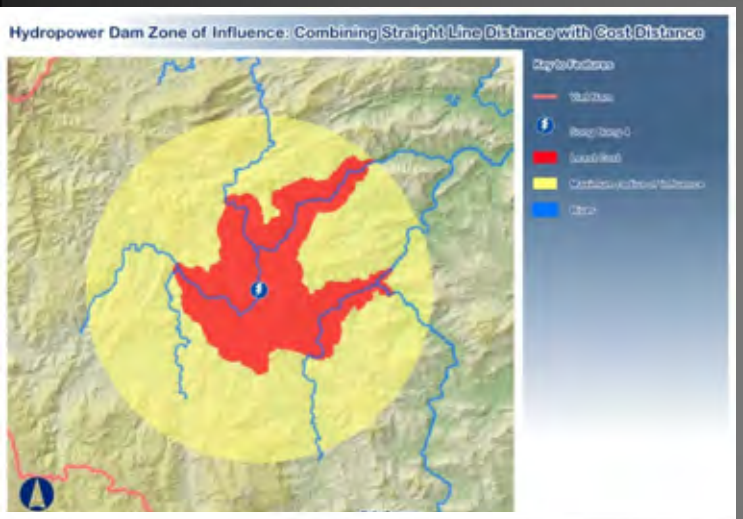
Report

# Scenarios of Future Power Generation Mixes

- Base Case: all hydropower planned up to 2025 goes ahead
- 3 Scenarios where hydropower replaced with thermal power
- Scenario: all hydro replaced with thermal power
- Zero case: no hydro & no thermal
- Analysed economic, social and environmental costs for each of the scenarios



# Steps in Assessing Impacts

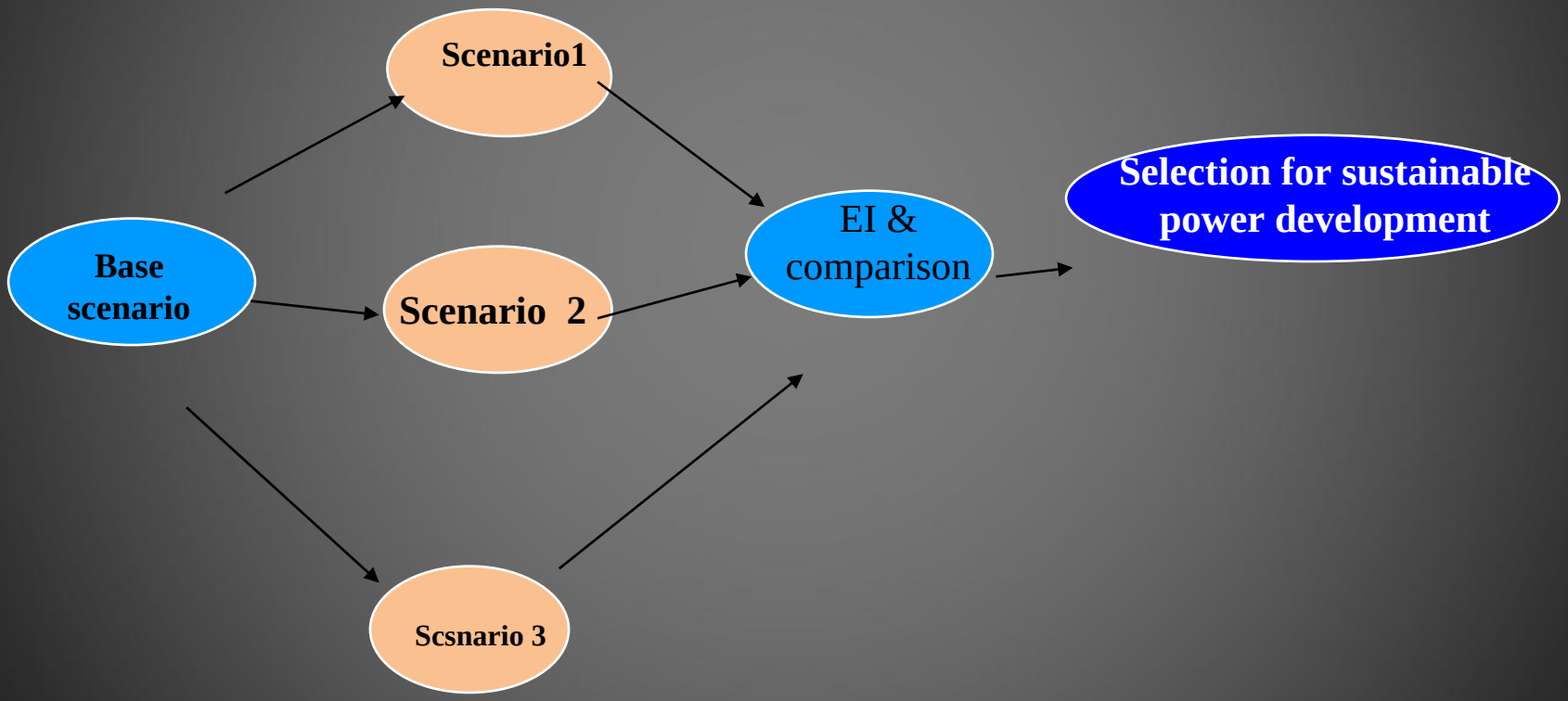




Three Components:

1. Reservoir Area: land lost and people displaced
2. Zone of Influence: social and environmental impacts in the area of the dam and resettlement area
3. Wider Impacts: impacts beyond the zone of influence: air pollution & changes to hydrology in key river basins

# Economic, environmental, social cost analysis for each scenario



# Total Cost of Supply and Environmental Costs

| Scenario | Present Value of Supply MUSD | Present Value of Environmental Cost Higher Bound MUSD | Present Value of Environmental Cost Lower Bound MUSD | Total Present Value Higher Bound MUSD | Difference Total Present Value Higher Bound MUSD | Total Present Value Lower Bound MUSD | Difference Total Present Value Lower Bound MUSD |
|---|---|---|---|---|---|---|---|
| Base | 5,435.65 | 19.47 | 5.37 | 5,455.12 | 0 | 5,441.02 | 0 |
| Alternative 1 | 5,445.48 | 1,882.51 | 477.32 | 7,327.98 | 1,872.86 | 5,922.80 | 481.78 |
| Alternative 2 | 5,729.46 | 4,785.67 | 1,212.80 | 10,515.13 | 5,060.01 | 6,942.26 | 1,501.24 |
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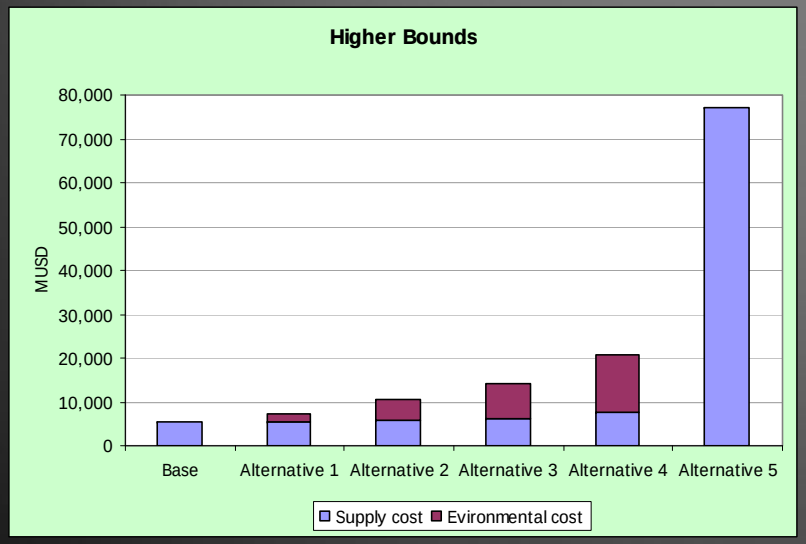
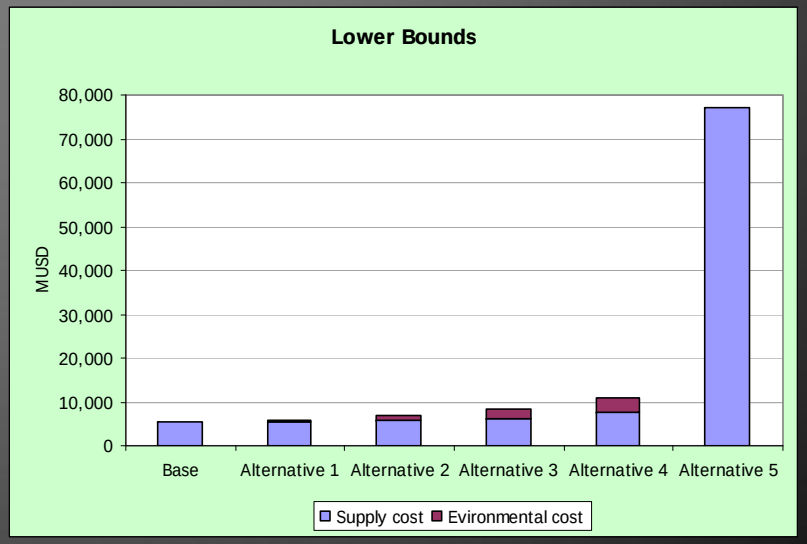
| Alternative 4 | 7,741.38 | 12,810.12 | 3,245.75 | 20,551.49 | 15,096.37 | 10,987.13 | 5,546.11 |
| Alternative 5 | 76,937.87 | 0 | 0 | 76,937.87 | 71.482.75 | 76,937.87 | 71,496.85 |



# Results and Recommendations

- Overall results show that a full package of social and environmental mitigation costs would not compromise the overall economic viability of the hydropower schemes in PDP VI
- Environmental costs of alternatives (thermal) are so high that the most favourable scenario is the full hydropower development
- SEA provides a means for developing a balanced analysis and constructing a consensus amongst stakeholders based on the best evidence available

# Results and Recommendations (continued)

- Recommendations to improve the effectiveness and sustainability of hydropower without compromising their economic viability or generating potential:
  1. A full social development package for displaced people
  2. Improved multi-purpose reservoir management
  3. More effective identification of risks to ecosystems integrity at the strategic planning level within whole river basins
  4. More local participation in hydropower planning and better links to local development planning and programmes
  5. The integration of SEA into the power development planning cycle, including necessary changes to rules and regulations
  6. Capacity building to enhance SEA capabilities for the sector and for other sectors in Viet Nam

# Some achieved results

# Thanks for Listening

# STRATEGIC ENVIRONMENTAL ASSESSMENT OF THE HYDROPOWER MASTER PLAN IN THE CONTEXT OF THE PDP VI
# POLICY RESPONSES FOR MITIGATION OF IMPACTS

Ministry of Industry and Trade & Ministry of Natural Resources and the Environment
In partnership with the Stockholm Environment Institute
Supported by the Asian Development Bank

# The Goal

To maximize the potential contribution of hydropower to national development through a strategic planning approach that balances economic development, social equity and environmental sustainability

# Five Scenarios of Future Power Generation Mixes

- Base Case: all hydropower planned up to 2025 goes ahead
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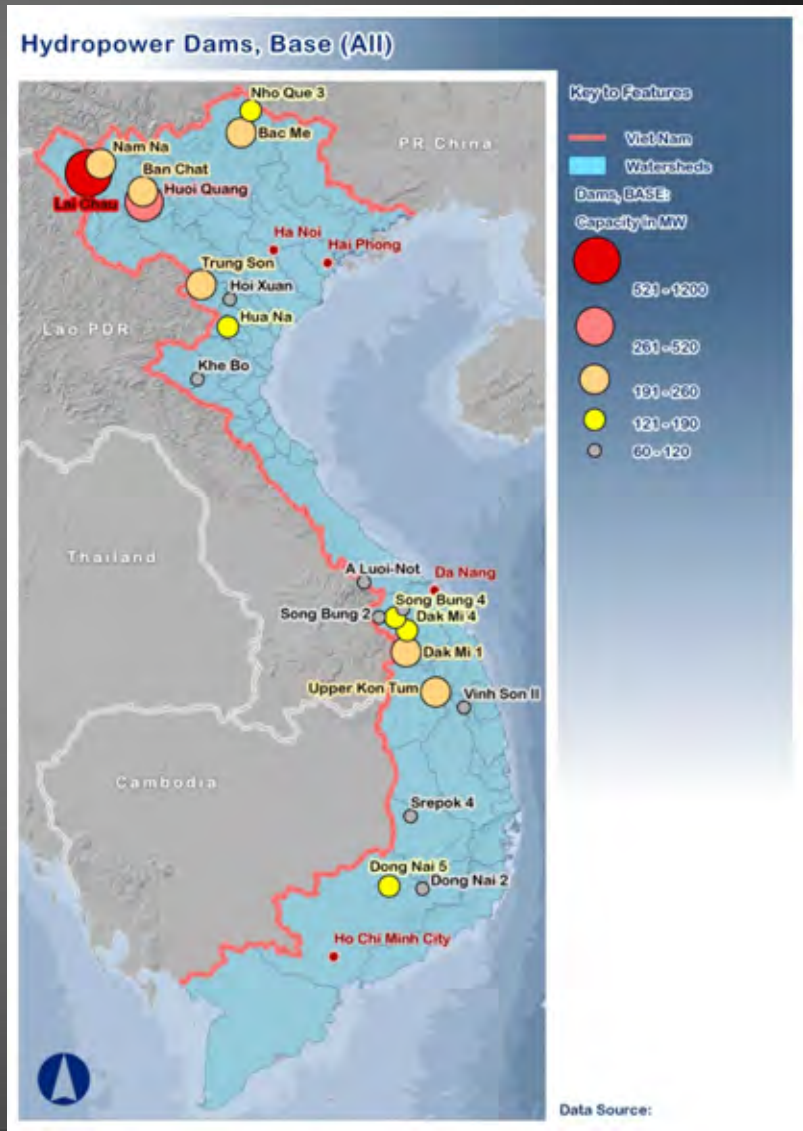

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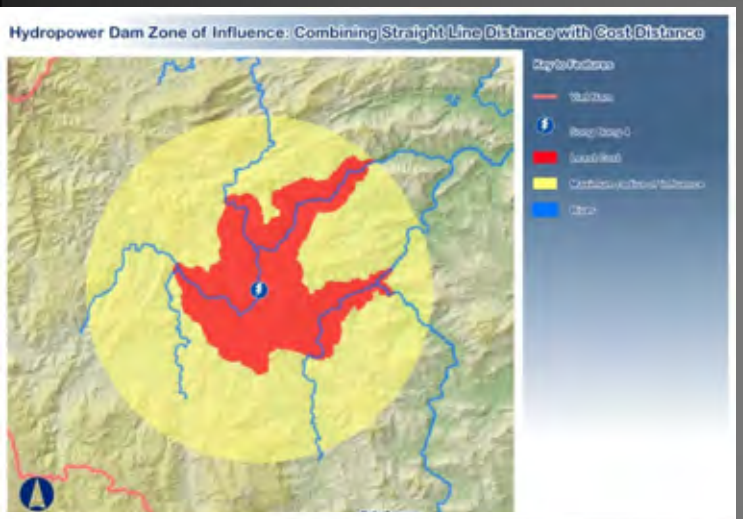



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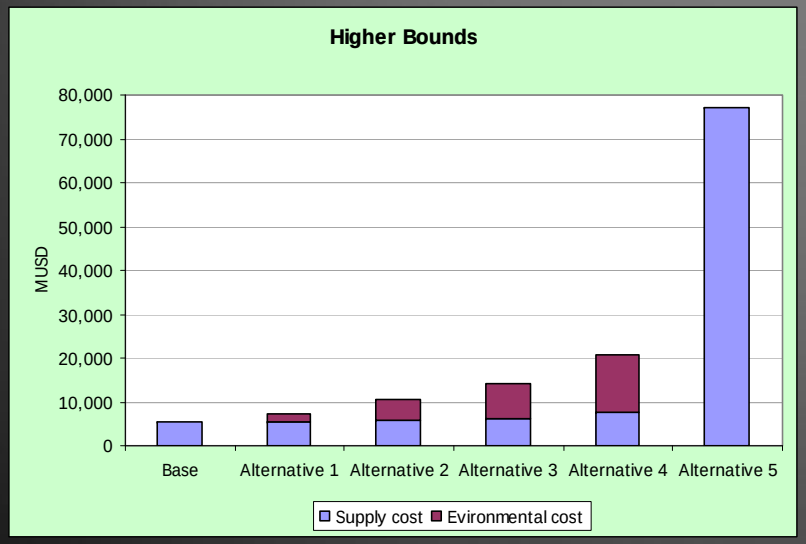


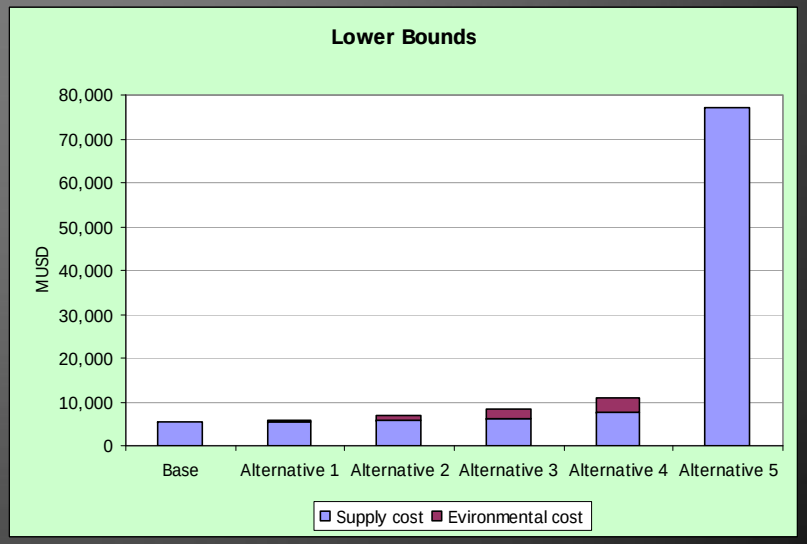

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  6. Capacity building to enhance SEA capabilities for the sector and for other sectors in Viet Nam

# Thanks for Listening

# Governmental Policies on Forestry Environment Services (PFES) in Vietnam

Nguyen Tuan Phu
Director of Department
Government Office

# CONTENTS

# I. Necessity of PFES

1. Need of jobs, created livelihood for people, social live for ethnic minority communities in mountainous, forestry areas.

2. Needs for environmental protection biodiversity preservation, natural disaster prevention of natural disasters, flood, typhoons, land slides, diseases.

3. Needs of forestry resources and lands.

# II. Basic concepts

***1.*** **Forestry environment:** Consists of components of erotological forests; vegetables, animals, water, air, land, natural landscapes… which have value (**called as forestry environmental use values) …**

***2.*** **Forest environmental services:** Supply of forest environmental values (water for hydropower plants, water for production and life; air, natural landscapes, gene preservation, biodiversity).

***3.*** **Payment for forestry environmental services:** It is the payment paid by users of forestry environmental services to providers

# lll. Governmental orientations on development of forestry environment services.

1. Goods on forestry environmental services market are *forestry environmental use values* (Such as trees, animals, water, land, air and natural landscapes…),
2. The service providers are laborers in the forestry sector, direct investors, forest protectors and developers .

# III. Governmental orientations on development of forestry environment services.

**3. Buyers of forestry environmental services**

Buyers of forestry environmental services are: Hydropower plants, water producing plants, services companies… which use forestry environmental services for producing products such as electricity, clean water, tourist products …

The end users are consumers of electricity, water, tourist products… who buy these products and pay money to providers of forestry environmental services.

# III. Governmental orientations on development of forestry environment services

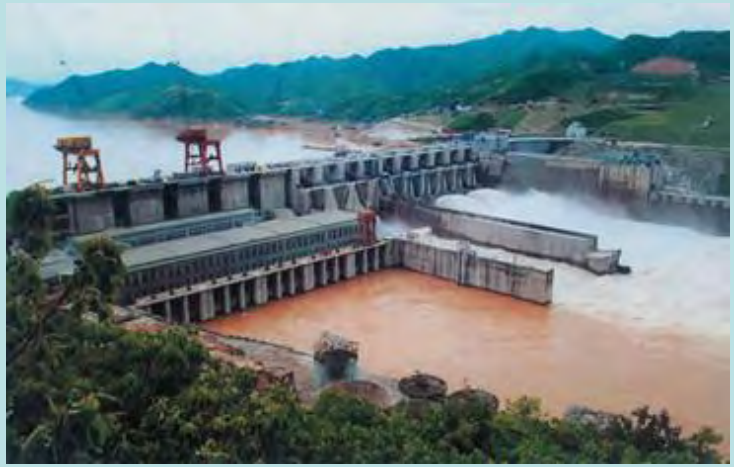
4. **Promoting socialization of forestry livelihood through application of policies on land;**

Giving forestry lands to organizations, households, individuals and rural communities, facilitating access of people to the forestry environment services.

# 5. Establishment of financial mechanism system for activities in the forestry environmental services market.

## 5.1. Mechanism of payment for forestry environmental services.

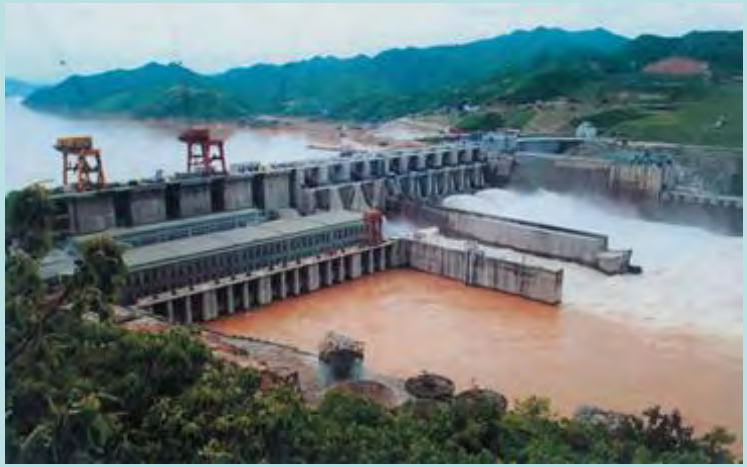
"Purchase - buy" takes place in society. Sellers and buyers need support from "the State".



# 5. Establishment of financial mechanism system for activities in the forestry environmental services market.

## 5.2. Mechanism of sharing Forestry Protection and Development Fund.

Trust fund of PFES is shared by ratios: (10 + 10 + 80) in the pilot period, of which :

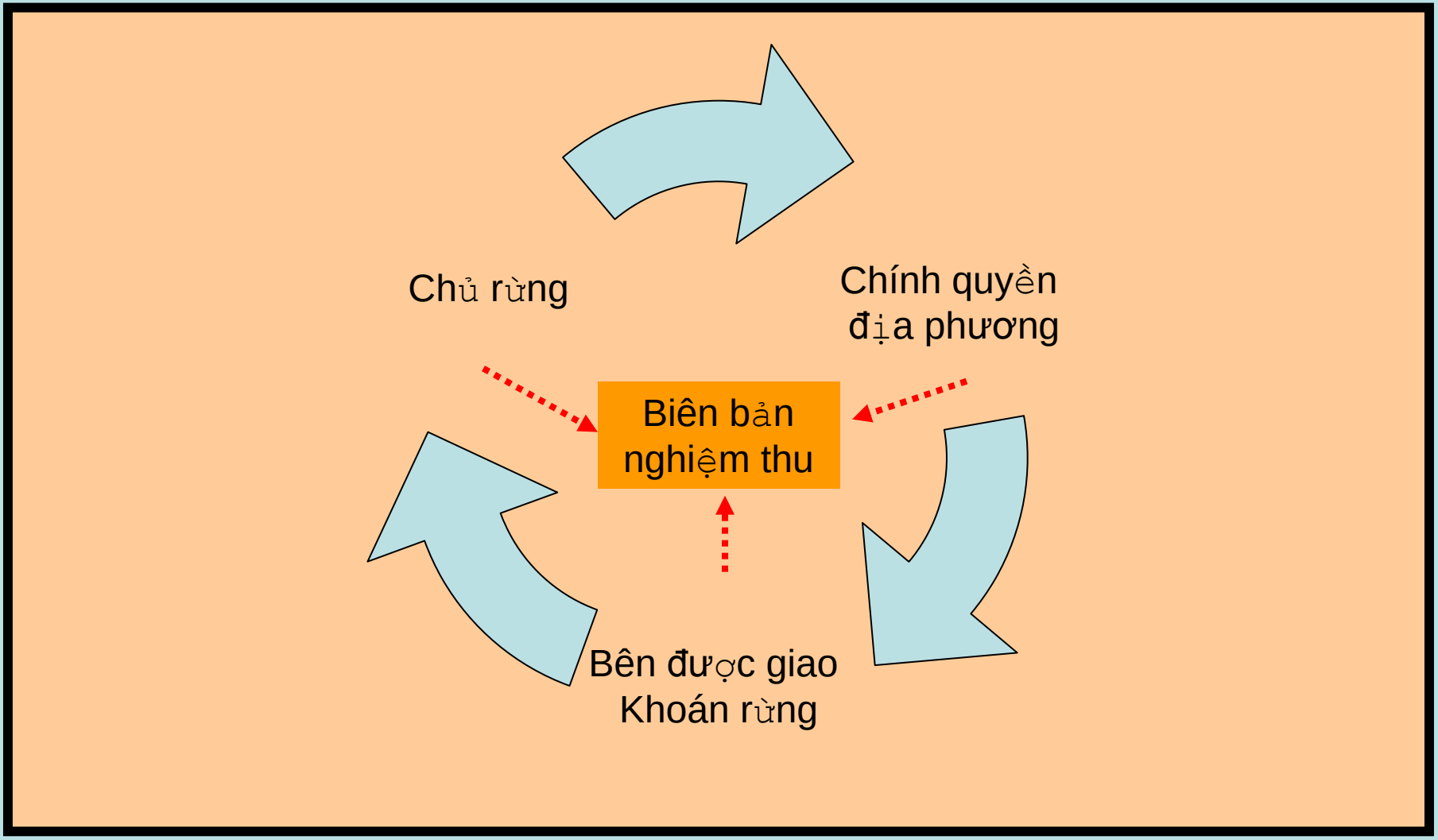


# 5. Establishment of financial mechanism system for activities in the forestry environmental services market.

**5.3. Mechanism of commissioning, assessment of quantity and quality of forests.** The periodical payments for forestry environmental services shall base on contract of land delivery, forests assigned (long terms for organizations, households, individuals and communities in rural areas) as the legal background for evaluation of quality, quantities of forests; the inspecting team consists of 3 parties

# Mechanism of commissioning, assessment of quantity and quality of forests

# Diagram of operation of inspecting team on quantity and quality of forests

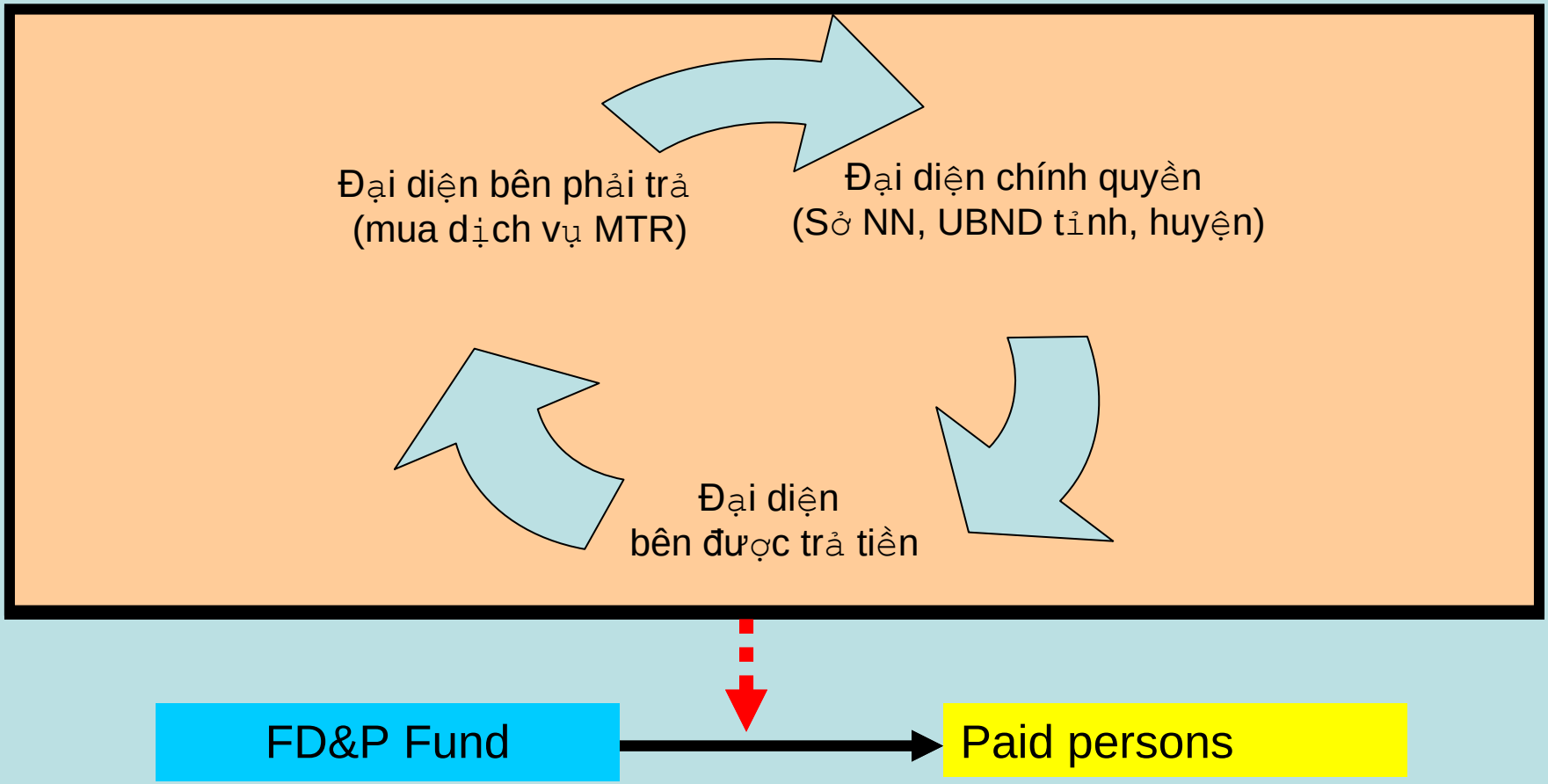


# 5. Establishment of financial mechanism system for activities in the forestry environmental services market.

## 5.4. Mechanism for checking, inspecting, monitoring payments from trust fund.

**In case of necessity, local governments shall establish supervising council for monitoring fund operation :**

# Diagram of monitoring payments



# IV. Relation between PFES and EVN

Point 2, Article 4 of the Decree: there are 5 service types .

- a) Land protection, erosion prevention and prevention of reservoir, river, and stream sedimentation.
- b) Regulation and maintenance of water resource for production and life.
- c) Carbon absorption and capture by forests, GHG emission reduction by measures to prevent depreciation and reduction of forest areas.

# IV. Relation between PFES and EVN

**Article 7 of the Decree stipulates payers for forestry environmental services.**

- 1. Hydropower producers.
- 2. Clean water producers and distributors.
- 3. Industrial producing facilities using water from water resources.
- 4. Organizations, individuals who do tourist business, and are beneficiaries from forestry environmental services.
- 5. Objects which have to pay for forest environmental services.

# Payers and type of FES

| | | |
|---|---|---|
| **Hydropower** | → | land protection – water regulation |
| **Clean water** | → | maintenance – regulation of water |
| **Industry** | → | maintenance – regulation of water |
| **Tourist service** | → | landscapes protection |
| **Carbon** | → | **MARD ➔ PM** |

# V. Proposed cooperation between MARD and EVN

**1**

## Formulation of Project

"EIA in development of power sector" for thermal power and hydropower projects

**Product :**

- Project reports approved by the Government
- Cost estimates, personnel plan, engineering plan, time schedule

**Implementers :**

EVN in charge + Forestry General Department under MARD

**2**

# Formulation of Project

"Study on impacts of hydropower plants on reduction of forest area, biodiversity and lifetime of hydropower projects"

## Products:

- Project report defining work contents.
- Cost estimates, personnel plan, engineering plan, time schedule

## Implementers:

EVN + Forestry General Department
+ Provincial People Committee

**3**

# Formulation of Project

"Study on environmental impacts
of GHG emission from thermal power plants"

## Products:

- Project report defining work contents.
- Cost estimates, personnel plan, engineering plan, time schedule

## Implementers:

EVN + Forestry General Department
+ Provincial People Committee

# Implementation steps

- Getting permission from Prime Minister for formulation of Project
- Establishment of working group for each task.
- Formulation of Project, defining work contents, assignment of persons responsible for implementation.
- Consulting experts for each task
- Holding workshop on project outlines
- Submission to the Prime Minister for approval and carrying our implementation works
- Procedures for getting budget for project implementation
- Holding workshops for each project
- Submission to competent authorities for approval of projects

# Time schedule

**7-8/2010**
Est. WGs
+consultants

**9-10/2010**
Project
outlines

**11/2010**
Workshop
on outlines

**12/2010**
Submission
to PM

**1-5/2011**
Outlines
of projects

**6/2011**
Workshop
on projects

**7/2011**
Submit projects
to competent
authorities

**8/2011**
Project
implementation

**8/2012**
Sum up on
project
implementation

# Thank you for attention

# Rừng tự nhiên Kon Tum

# Sếu đầu đỏ VQG Tràm Chim

# NỘI DUNG TRÌNH BÀY