



WorleyParsons
resources & energy



ESMAP
Energy Sector Management Assistance Program

acclimatise
managing your climate risks

Climate Change Vulnerability and Adaptation Assessment **Workshop 2: Adaptation to meet the demands of the future**

Tashkent - April 20, 2010





Time	Item	Who
8.30 – 9.00	Registration, coffee and refreshments	
9.00 – 9.05	Welcome	Simon Croxton, World Bank
9.05 – 9.20	Introduction, workshop objectives and planning	Stuart Arch, Worley Parsons
9.20 – 9.40	Overview of the EcoNomics Analysis Process	Stuart Arch, Worley Parsons
9.40 – 10.40	Agreeing the “Objective of the EcoNomics Assessment”	All participants
10.40 – 11.00	Break	
11.00 – 11.30	Agreeing the boundaries/ limits and constraints of the assessment	All participants
11.30 – 12.30	Identifying options/ solutions to meet the assessment objective	All participants
12.30– 13.30	Lunch	
13.30 – 14.30	Identifying options/ solutions to meet the assessment objective... continued	All participants
14.30 – 15.30	Identifying risks and opportunities associated with each option	All participants
15.30 – 15.45	Break	
15.45 – 16.45	Identifying data gaps and ways to fill them	All participants
16.45 – 17.00	Summarize actions and timetable	Stuart Arch, Worley Parsons





1. Refresh our minds about:
 - ▶ The key issues affecting Uzbekistan's Energy Sector
 - ▶ The projections for climate change in Uzbekistan
2. Highlight the conclusions identified at Workshop 1
3. Confirm the purpose of the second phase of our mission
4. Introduce a process for cost benefit assessment of future options to support policy makers
5. Confirm the objective for the Cost Benefit Analysis
6. Identify adaptation options and confirm key aspects to enable options to be analysed after the workshop



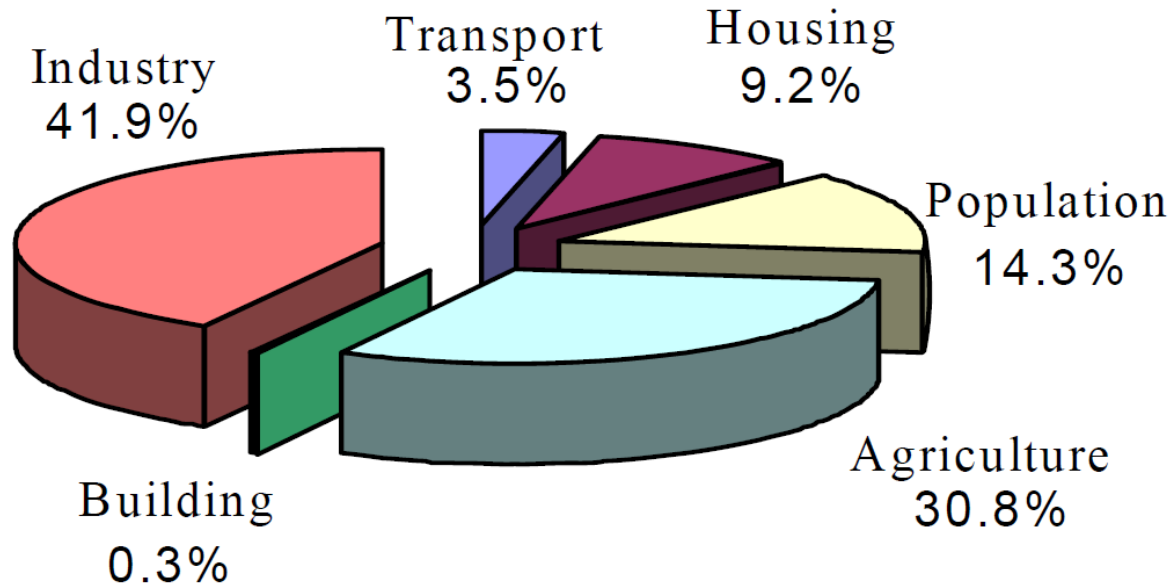


Background Information



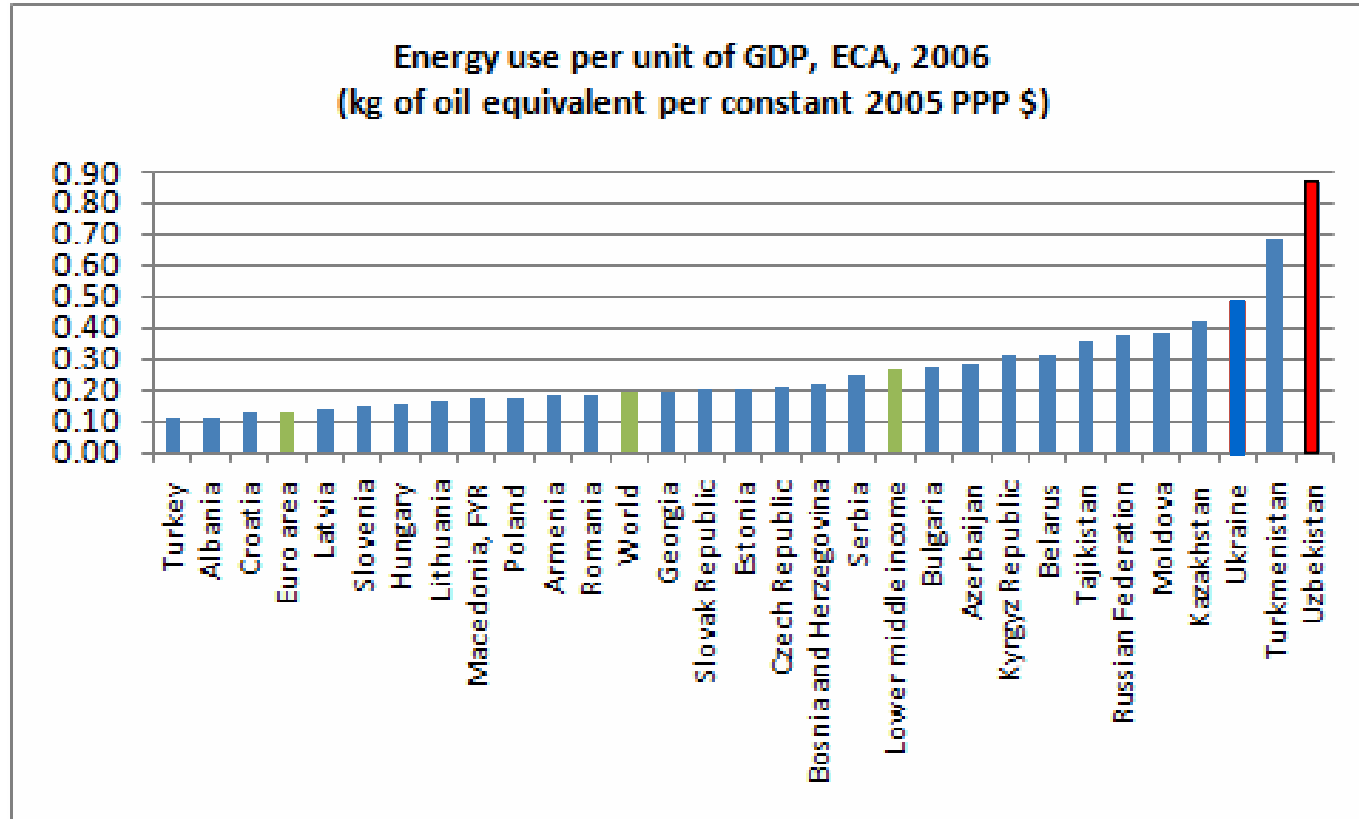


Electric power consumption in 2006



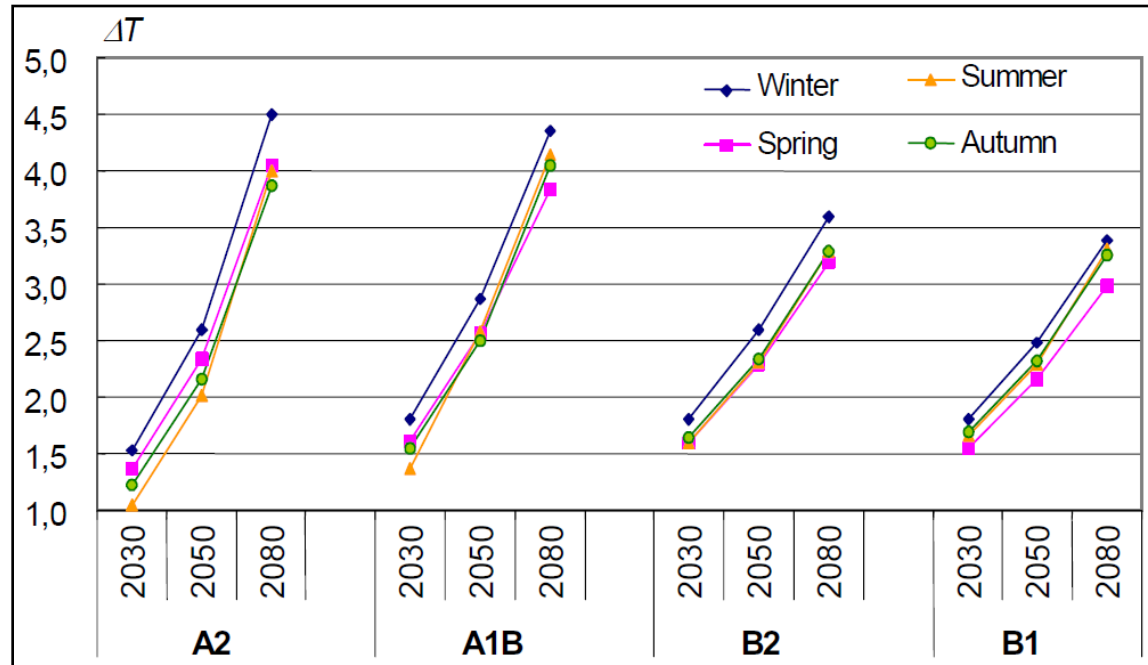
[Source: Uzbekistan 2NC]







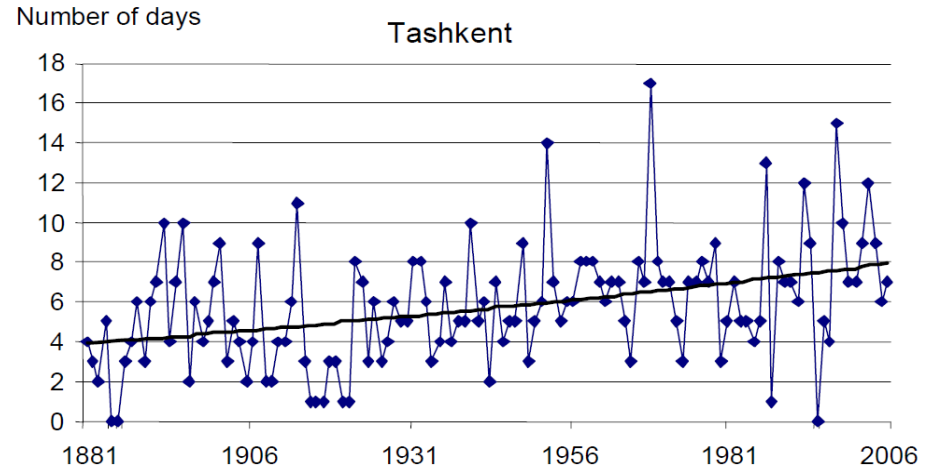
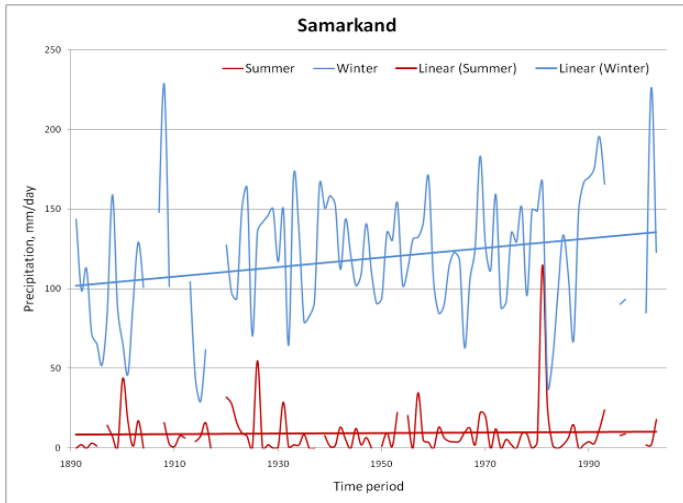
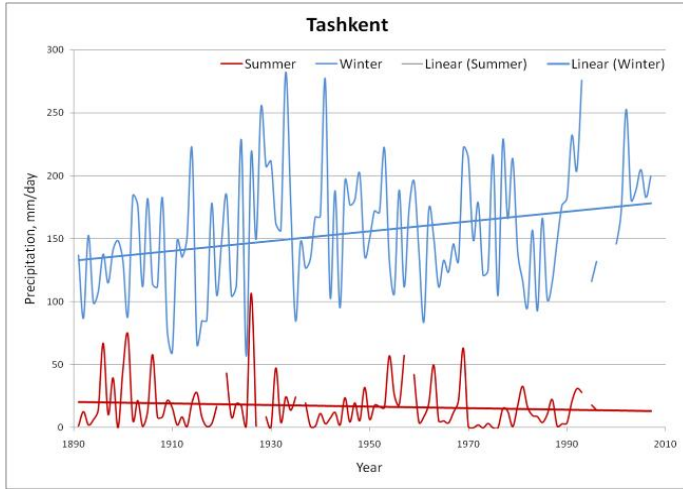
- ▶ 2030s: 1 to 2°C warmer
- ▶ 2050s: 2 to 3°C warmer
- ▶ Less cold periods
- ▶ More heat waves



[Source: Uzbekistan 2NC]



- ▶ Increased winter precipitation
- ▶ Decreased summer precipitation
- ▶ Increased precipitation intensity



Number of days with precipitation >15mm

[Source: KNMI & Uzbekistan 2NC]





- ▶ Increase in temperature:
 - ⇒ Melting of snow reserves and glaciers
 - ⇒ Larger & earlier spring snow melt
- ▶ Future changes in river flows – uncertain:
 - ⇒ 2030s – not a large change?
 - ⇒ 2050s – Amudarya could decline 15%?
- ▶ Eutrophication and salinisation

[Sources: Uzbekistan 2NC, Haag et al., 2007, Agaltseva, Uzhydromet 2008]

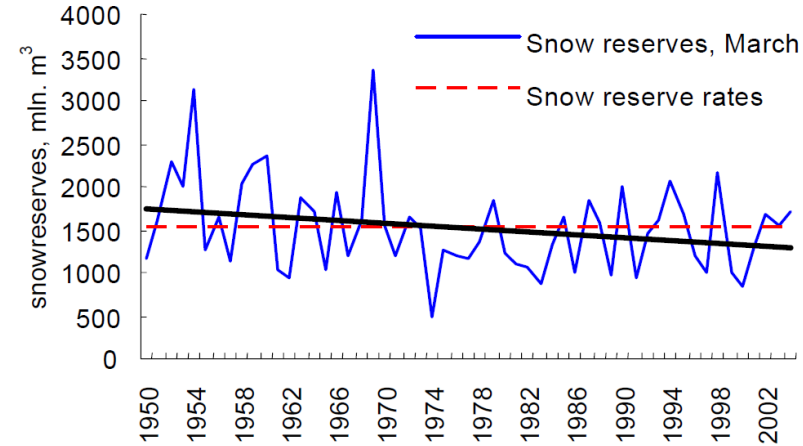


Figure 5.2.2 Long-term changes of the snow reserves estimated for the end March

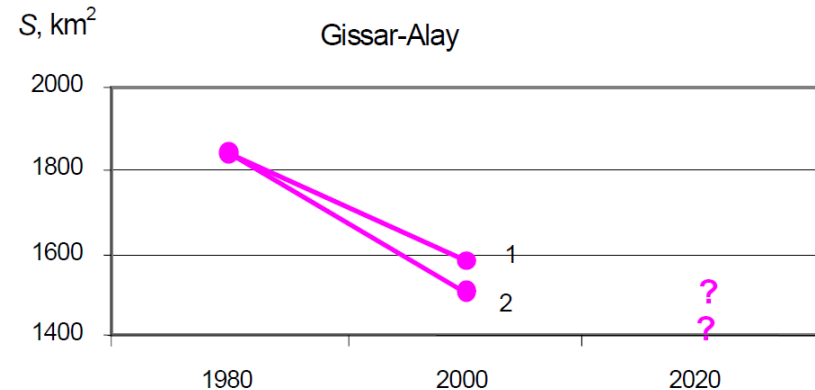


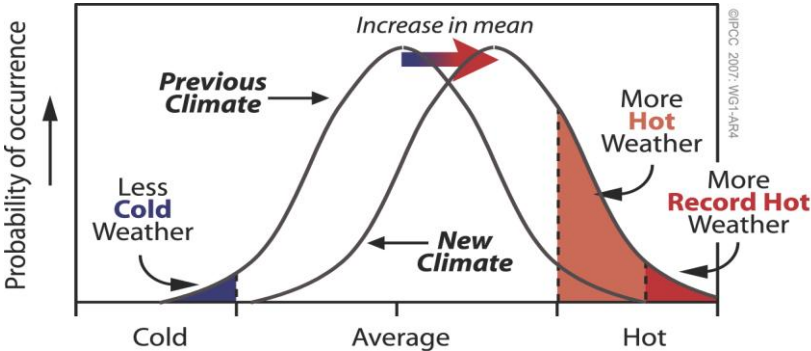
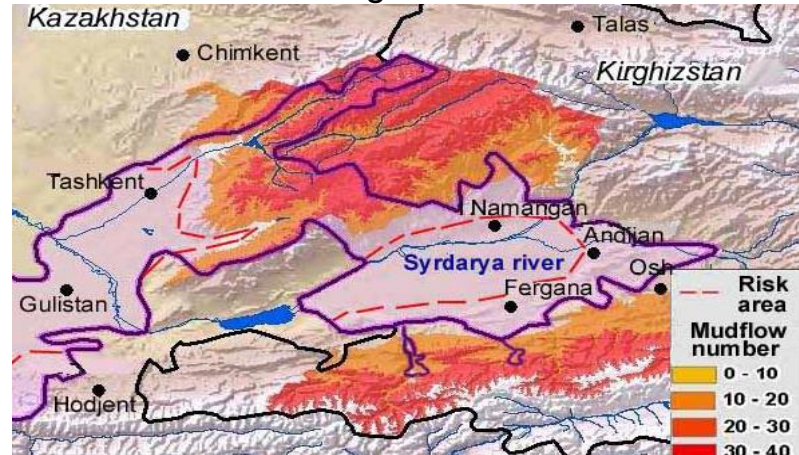
Figure 5.2.3 Changes of the glacier areas (km²), calculated via various methods





- ▶ More heat waves
- ▶ Less cold weather
- ▶ More summer droughts
- ▶ Heavier rains or rapid snowmelt – lake outbursts, floods and mudflows
- ▶ Reduction in avalanche hazard

Mudflow number per century & mudflow risk areas in Fergana Valley & Chirchik-Akhangaran Basin



[Source: Uzbekistan 2NC]





- ▶ How will energy demand change?
 - Space heating and cooling
 - Electricity for agricultural irrigation
 - Other large energy users?





- ▶ The objective of the 1st workshop was to build greater understanding of potential climate risks

- ▶ Plenary sessions and four breakout group discussions looking at climate risks:
 - Oil, gas and coal exploration, production, transmission and distribution;
 - Thermal power plants and electricity transmission and distribution;
 - Hydropower generation and other forms of renewable energy generation; and,
 - Energy Demand

- ▶ Each of these working groups focused their discussions around three key areas:
 - Overall strategies and objectives for Uzbekistan's energy sector,
 - Climatic vulnerabilities of existing and planned energy sector assets,
 - Climate change risks.





- ▶ **Top priority issues voted by group**
 1. Shortage of water for technical processes;
 2. Increase in extreme weather conditions;
 3. Impact on workforce health and safety;
 4. Impact on gas processing units; and,
 5. Increase in equipment failure frequency.





▶ **Top priority issues voted by group**

– Risks.

- Inconsistency of standards: Existing standards do not take account of climate change.
- Increase of electricity prime cost, mainly due to increased house loads and decreased efficiency.
- Potential conflicts over water use between agriculture and energy sectors

– Opportunities

- Implementation of new technologies and innovative ideas.
- Power generation from renewable sources
- Optimization of power plant work load.





▶ **Top priority issues voted by group**

– Risks

- Variations in river flows already affect HPP and climate change will increase uncertainties.

– Opportunities

- Renewables do not produce pollutant emissions.
- There is enormous unexploited potential for solar power generation in Uzbekistan





▶ **Top priority issues voted by group**

- Climate change impacts on water could result in a lack of power in Uzbekistan.
- Modernization of thermal power plants to increase their efficiency and reduce their consumption of fuel and water is essential.
- Climate change could cause population migration and this could mean that power is not being generated in the most efficient locations.
- More energy will be required for pumping water for agricultural consumption, and for other industry that uses energy inefficiently





- ▶ Climate change impact on water resources may impact operation of energy facilities
- ▶ Energy efficiency and efficient water use in Agriculture are key aspects
- ▶ Cross border water agreements may exacerbate climate change effects and impact water availability / hydropower generation
- ▶ Diversification away from reliance on natural gas power plants is seen as important
- ▶ There is potential for renewable energy (particularly solar energy) and possibly more hydropower





Today's Workshop





- ▶ This is the second phase of our mission
- ▶ The purpose is to:
 - Examine an issue of energy sector policy that needs to adapt to the challenges of climate change
 - Identify ways in which this issue can be managed
 - Compare the management options to assist Uzbekistan's policy makers
- ▶ The intention of today's workshop is to:
 - Agree the policy issue that we should be examining;
 - Identify management options;
 - Identify any constraints; and,
 - Agree parameters to be included in the analysis of the options.





How best to meet Uzbekistan's future power demand in the face of a changing climate?



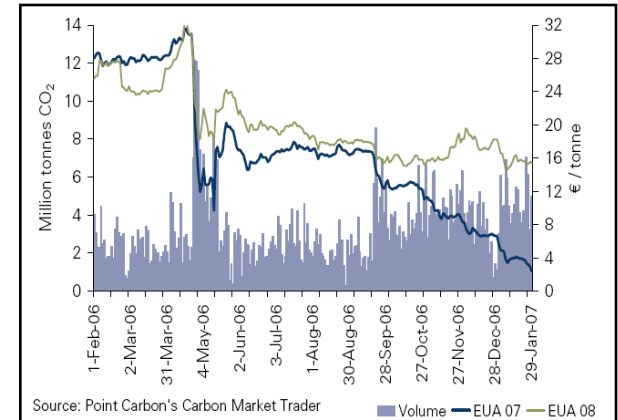


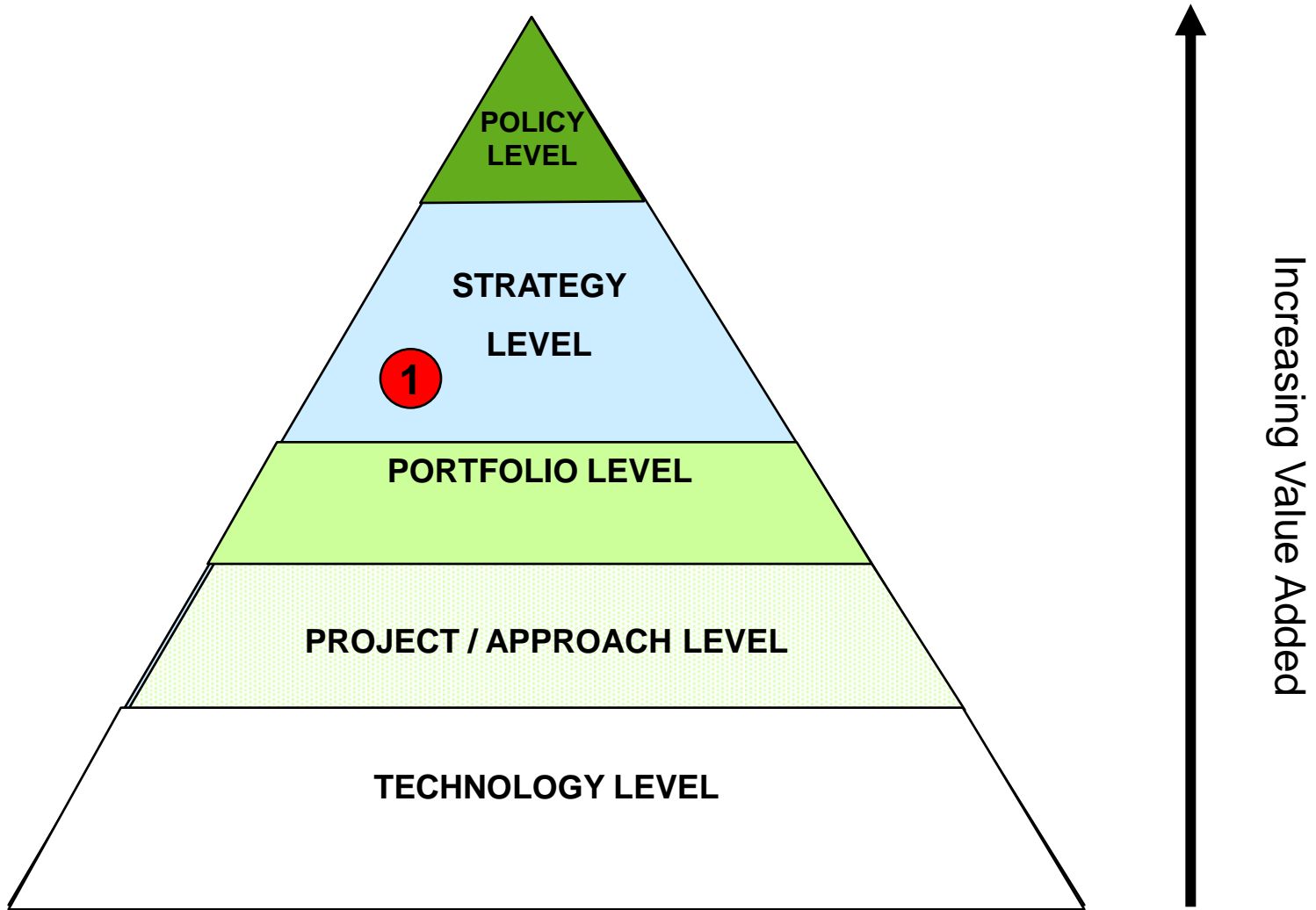
Our Assessment Process

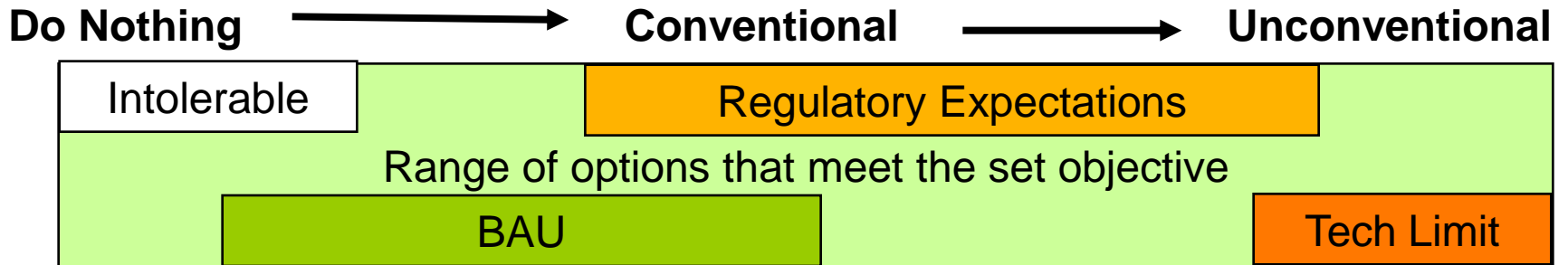
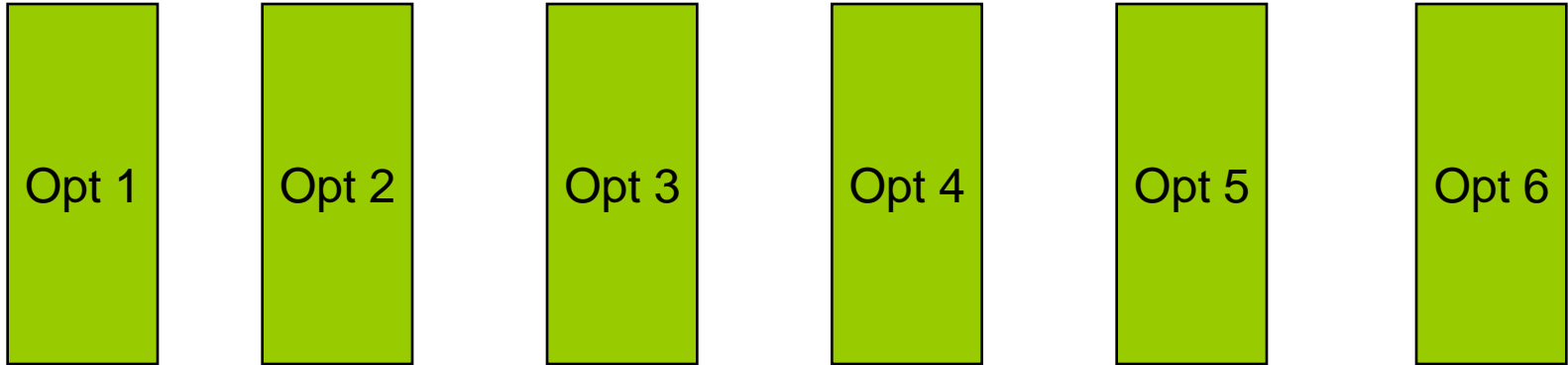




- ▶ Climate Change is a **business reality**
- ▶ Sustainability is an emerging **business driver**
- ▶ **Resource costs and taxes** are increasing
- ▶ **Stakeholder expectations** are rising
- ▶ The purpose of today is to think about business, environmental and social **risk management in the face of a changing climate**

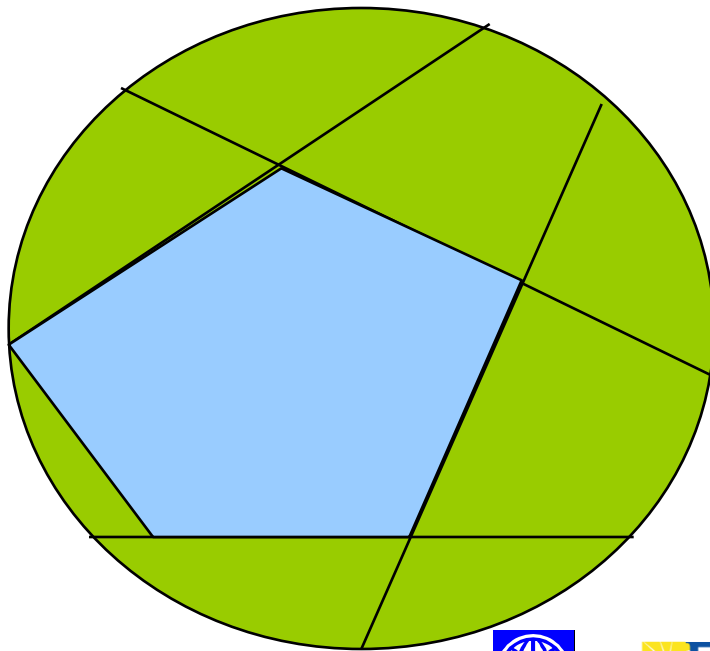








What constraints limit the range of practical options?

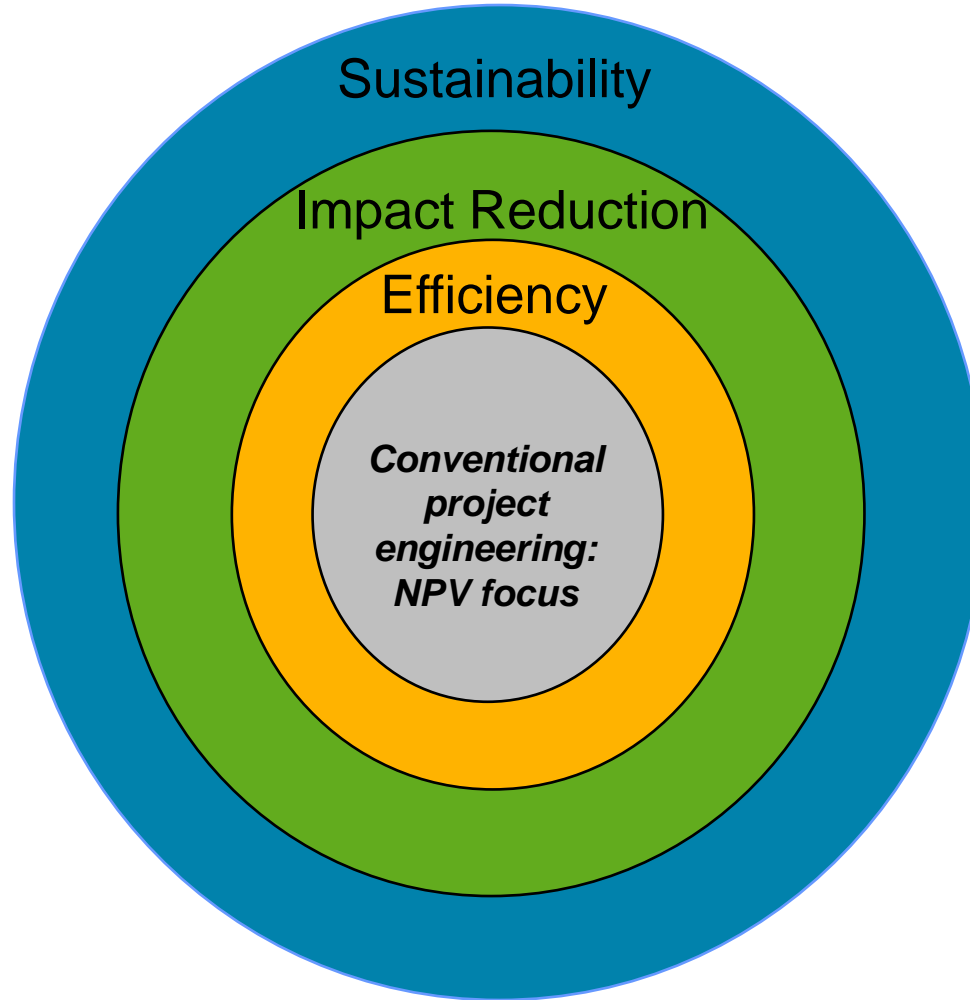


- Physical
- Temporal
- Regulatory
- Social
- Corporate
- Financial/budgetary
- other



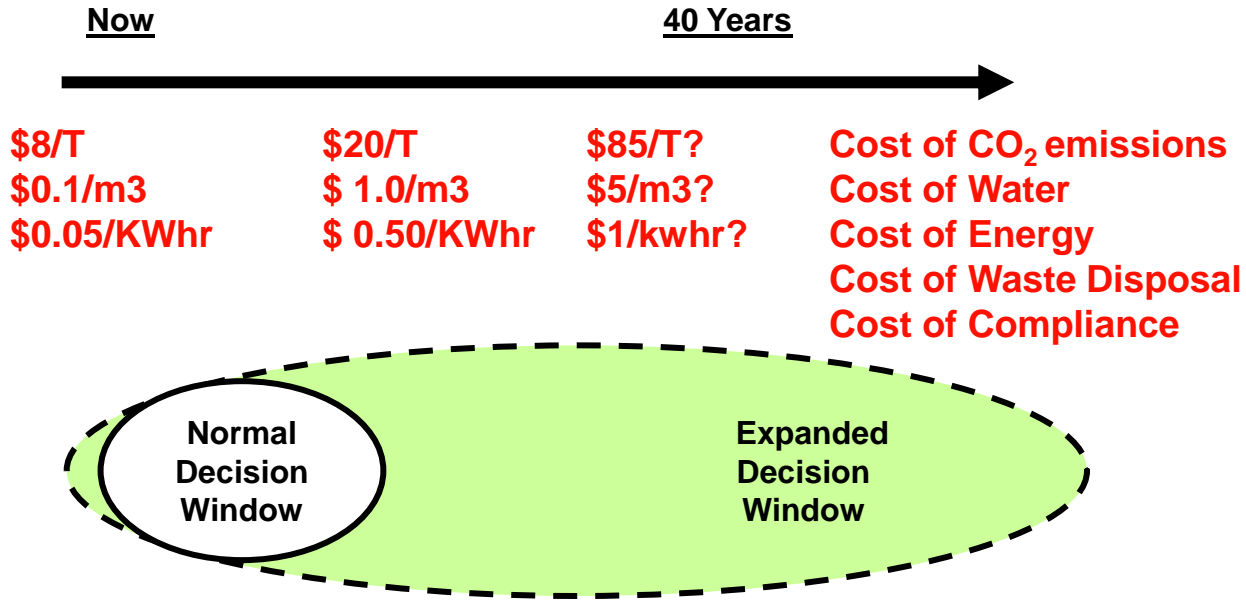


*Strategic economic
analysis*





- planning horizon
- discount rate
- phasing
- sensitivity analysis

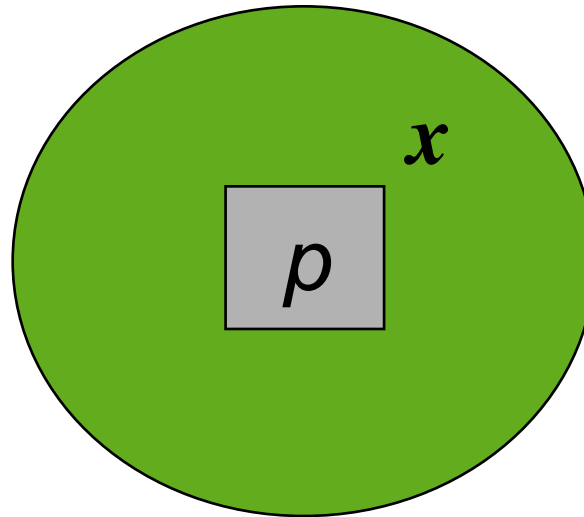




$$NPV = \sum_0^t \left[\frac{(B_p + B_x) - (C_p + C_x)}{(1+i)^t} \right]$$

P = project (internal)

x = society and environment (External)





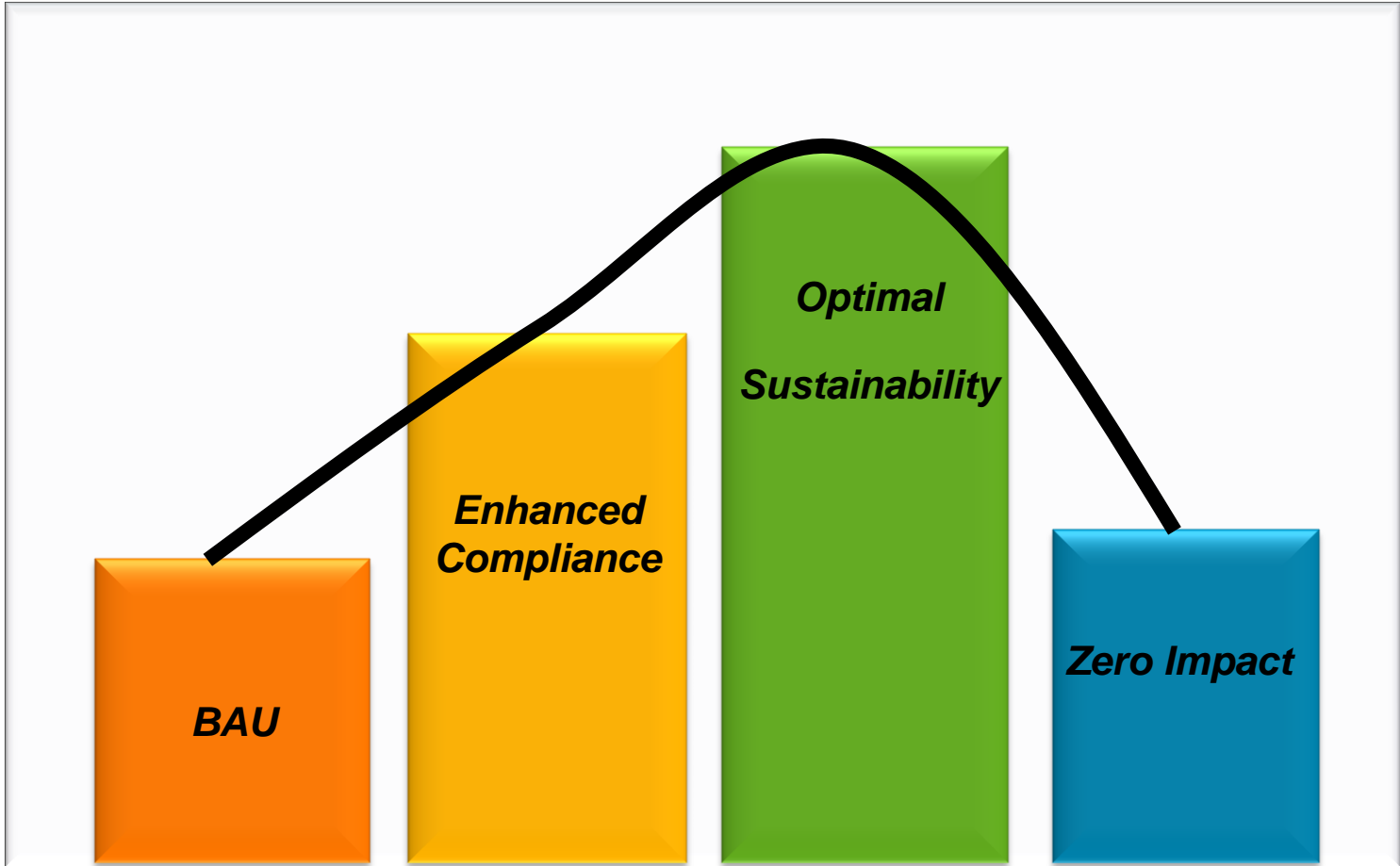
- ▶ Financial (internal) aspects
 - OPEX and CAPEX
 - Energy costs / revenue
 - Industry standard information
 - Factored for Uzbekistan's market

- ▶ Social and Environmental Aspects
 - Impact of Climate change on efficiency
 - Green house gas emissions
 - Total Economic Value of Water
 - Pollution





Full Societal Net Benefit (NPV)



INCREASING LEVEL OF ACTION





- ▶ ***Open Discussion***
- ▶ ***Not Solving the Problem today***
- ▶ ***Participation***
- ▶ ***Challenge Preconceptions***
- ▶ ***No such thing as a bad idea***
- ▶ ***Make sure that all possible avenues are explored***





- ▶ Follow-up after the workshop
 - Complete the definition of options to achieve the objective
 - Conduct a high level cost benefit analysis
 - Provide a summary of the outcomes for consideration by Uzbekistan's policy / decision makers





Thank You

