ІНІЦІАТИВА З ПИТАНЬ ЗМІНИ КЛІМАТУ
CLIMATE CHANGE INITIATIVE

DELIVERABLE № 6, 2000

Training Program

Module 8: Project Preparation and Financing

Prepared for:
The United States Agency for International Development
under Contract LAG-I-00-98-00005-00, Task Order 16

Prepared by:
PA Government Services Inc.
1750 Pennsylvania Avenue, NW Suite 1000
Washington, DC 200006-4506
USA
(202) 442-2000

September 2000
Updated September, 2002

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Module Contents

Overview

Background

This module is the eight in a series of training modules, which comprise the Climate Change Initiative's (CCI) near-term training program in Ukraine. As a complete package, these nine modules are intended to build awareness among a wide group of stakeholders, on climate change issues.

Module Eight, *Project Preparation and Financing*, is designed to provide an overview of the format and common information requirements that project proponents need to use when presenting climate change-related project proposals to potential investors. The course agenda focuses on discussion of the elements required to document that a project concept is viable, contributes significantly to sustainable development, and is worthy of investment. Materials for this module were developed specifically for Ukraine from both new and existing materials.

Participation

The ideal audience for this module includes entrepreneurial organization, financing agencies, industrial firms, government energy agencies, and other Ukrainian stakeholder organizations. Other participants with a technical background in project development and/or economics will also benefit.

Objectives

The objective of the course is to equip Ukrainian professionals with the methods and tools to enable them to a) assess the potential and cost-effectiveness of projects proposed under the Joint Implementation (JI) mechanism, and b) attract investors from industrialized countries to implement JI projects. The project preparation training course aims to enable Ukrainian project stakeholders to develop project proposals that are well prepared and can generate a favorable response.

Module Basics

- ***Duration***: 3 days
- ***Participants:*** up to 15
- ***Venue:*** Open
- ***Facilities (recommended):*** The module can be presented in any comfortable training facility. Adequate space for plenary presentations should be available.
- ***Format:*** Workshop; total of 15 sessions; consisting of a (typically) 30- to 45-minute long presentation, which includes a question and answer

period, panel discussions, and a working group exercises using a project preparation computer program

- ***Instructors:*** 1-2 international specialists, 1-2 Ukrainian specialists
- ***Audio/Visual Needs:*** Overhead projector, overhead monitor, personal computers
- ***Contacts:*** Natalia Kulichenko and Natalya Parasyuk of CCI, Dan Thompson (USAID), Bill Dougherty of Tellus Institute

Materials

The module provides several types of material for use during both the preparation of the workshop, and the workshop itself. This material is outlined below.

Session Overview: The session overviews are "blueprints" for each of the fifteen sessions. The overview of each session provides a summary of the session, listing basic information, such as the general objective, total time, and type of activities involved.

Overhead transparencies: OHTs are divided into sets according to sessions. Each set of OHTs is numbered consecutively and has titles based on their content. Presenters are encouraged to give participants sufficient time to read and understand each OHT.

Reading and Resources: Selected citations for key reports are included for further reference.

Evaluation Process

Module Eight will need be evaluated in order to improve the workshop package for more effective subsequent use. The evaluation can be conducted using a simple questionnaire. At the close of the day, the workshop organizer should ask the participants to take five to ten minutes to complete the evaluation form. Participants need to be asked to put down their names on the forms.

Module References

Material for this module was prepared specifically for Ukraine from a variety of sources by the international presenters

Recommended Agenda

The recommended agenda for Module Eight appears on the following pages.

PROPOSED AGENDA FOR MODULE 8: PROJECT PREPARATION AND FINANCING

Session	Day One: Topics to be covered	Time
Registration		9.00 –9.30
Opening Remarks to Group 1	**Welcome to participants**; overview of training, context in overall CCI	9:30 – 9.45
1. Introduction to Project Preparation for JI Projects	**Provide overview and context**: Discuss goals of training, elements of project preparation for JI projects. Discuss unique aspects of JI project investments, Summarize context of JI investments (UNFCCC, Kyoto)	9:45 – 10:30
Break		10:30– 10:45
2. Funding Sources for Climate Related Projects	Review sources for financing	10:45 – 11:30
3. Major Issues in Project Preparation for JI Projects	**Review steps and issues in project preparation:** Provide an overview of elements that need to be addressed in the development of JI project ideas (risk management, financial analyses, financing structures, etc)	11:45 – 12:30
Lunch		12:30 – 13:30
4. Key Points for JI projects	**Review baselines, additionality, MERVC**; discuss national aspects influencing review of JI project proposals	13:30 – 14:30
5. Case Studies	**Review case studies**: Focus on AIJ examples in Russia, and Latvia	14:30 – 15:15
Break		15.15 – 15.30
6. Project Presentations	Review major features of local projects	15:30 – 16:45
Day 1 wrap-up		16:45 – 17:00

Session	**Day Two:** Topics to be covered	Time
Introduction to Day 2 Sessions		9:30 – 9:45
7. Institutional Requirements for JI projects	**Review examples of project approval procedures**: Discuss authorizing unit, legal, regulatory guidelines, carbon credit sharing issues, preparation of documents	9:45 – 10.15
8. Economic and Financial Assessment of Projects (Part I)	**Provide an overview of the following**: Focus on cost/benefit analysis, developing project cash flow, economic versus financial assessment of projects	10.15 –11.15
Break		11.15 – 11.30
9. Economic and Financial Assessment of Projects (Part II, a,b)	**Provide an overview of the following:** Focus on sensitivity analysis, capital outlays and financing structure, income streams and expense projections	11.30– 12.30
Lunch		12:30 – 13:30
10. Introduction to Working Group Exercise	**Introduce training exercises:** Use of PROFORM in analyzing a specific project	13:30 – 14:30
Break		14.30 – 14.45
11. Group Exercise	**Conduct training exercises:** Split up into 5 working groups (i.e., 3 per computer) and conduct training exercise	14:45 – 16:45
Day 2 wrap-up for Group 1		16:45 – 17:00

Session	Day Three: *Topics to be covered*	Time
Introduction to Day 3 Sessions		10.00 – 10.15
Working Group Exercises	Working groups (cont'd)	10.15 – 11.15
Break		11.15 – 11.30
Working Group Exercises	Working groups (cont'd)	11.30 – 12.30
Lunch		12.30 – 13.30
12. Presentations of Results of Working Group Exercise	Working Group presentations	13:30 – 14:30
13. Group Exercise Review		14:30-15:15
Training Closure for Group 1		15.15 – 15.45

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 1: Overview and Context of the Workshop

General Objectives: Session 1 is intended to give a broad overview of the context for the workshop. It should discuss goals of training, elements of project preparation for JI projects., review unique aspects of JI project investments, and summarize context of JI investments (UNFCCC, Kyoto Protocol, etc). By the end of the session, participants should have a basic understanding of:

- The basic terminology that will be used throughout the course (e.g., pre-feasibility assessment, feasibility study)
- The various technical, economic, financial, environmental, social, risk, regulatory, and institutional aspects that underlie project preparation
- Why the development of guidelines for project preparation is essential.

Activities: Presentation, followed by period of questions and answers

Total Time: 45 minutes

Materials: Set of 20 OHTs

Overview and Context of the Workshop

Session 1

Module 8: Climate Change Project Preparation and Financing

1

Goals of the Workshop

- To provide methods and tools for preparing Joint Implementation (JI) projects
- Current discussions on criteria for JI projects
- Sources of finance for JI projects
- Assessment of JI projects: technical, economic, financial, environmental, etc.
- Preparation of a sample JI project

2

United Nations Framework Convention on Climate Change

Objective of the Convention

"Stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."

- The Convention was adopted on 9 May 1992 at United Nations Headquarters in New York. As of 7 September 2000, 186 Parties have ratified the Convention.

3

The Kyoto Protocol

- The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties in Kyoto, Japan on 11 December 1997.
- The Protocol will enter into force when not less than 55 Parties to the Convention, accounting for at least 55 percent of the 1990 total CO_2 emissions of the Annex 1 Parties, have *ratified* the Protocol.
- The overall emission reduction target for Annex 1 Parties as a group is *at least 5 percent below 1990 levels,* to be achieved by the commitment period 2008 to 2012 (averaged).
- The U.S. signed in 1997, but in 2001, the U.S. withdrew its support for the Protocol.

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Selected Quantified Emission Limitation

Industrialized Countries

- Australia 108
- Canada 94
- EC bubble 92
- (Germany 75)
- (Portugal 140)
- Japan 94
- Norway 101
- New Zealand 100
- [USA 93]
  original target in 1997

Economies in Transition

- Bulgaria 92
- Baltics 92
- Croatia 95
- Czech Republic 92
- Hungary 94
- Poland 94
- Romania 92
- Russia 100
- Ukraine 100

5

Joint Implementation Mechanism

Article 6 of the Kyoto Protocol

- *"For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy,… "*
- One of three flexibility mechanisms; the other two are the Clean Development Mechanism (CDM) and Emissions Trading.

6

Joint Implementation (JI)

- JI is a *project-based* instrument for reducing GHG emissions in Annex 1 Parties (i.e., not focused on macro-economic policies, regulations, institutions,etc.).
- Investors provide capital, financing, access to technology & technical support, etc.
- This makes possible a project that reduces host entity emissions.
- The emissions reductions are quantified, and credit is transferable to investor.
- Time period for crediting emission reductions: *2008 - 2012*

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Potential JI Activities: Energy

Emissions Abatement Activities: (new facilities and retrofits)

- ***Energy supply***
  - electricity production (renewables, plant efficiency, fuel switching)
  - natural gas extraction and distribution
  - oil extraction and refining
  - coal mining and processing
  - cogeneration of heat and power
  - district heating
- ***Energy demand***
  - transport (vehicle efficiency, maintenance, public transport, alternative fuels)
  - industrial energy efficiency
  - buildings (efficient building shells, windows, heating/cooling)
  - appliances (efficient lighting, heavy appliances, electronics)

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Potential JI Activities: Non-Energy Activities and Sinks

- Non-energy emissions
  - cement manufacturing
  - aluminum smelting
  - livestock rearing
  - waste management, etc.
- GHG sinks:
  - Afforestation
  - Forest protection and management
  - Agricultural practices: cropland and rangeland management

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Benefits of JI Activities

- **Economic benefits**
  - fuel cost savings (e.g., through energy efficiency)
  - foreign exchange savings (e.g., avoided imports)
- **Social and development benefits:**
  - poverty alleviation (e.g. job creation, income generation in rural and informal sector projects)
  - rural electrification (e.g., use of renewable electricity sources)
  - improved services (e.g., efficient buildings)
- **Environmental benefits:**
  - urban air pollution (e.g., vehicle maintenance)
  - waste management (e.g., waste to power)
  - land resource conservation and biodiversity (e.g., sustainable agriculture and forestry)

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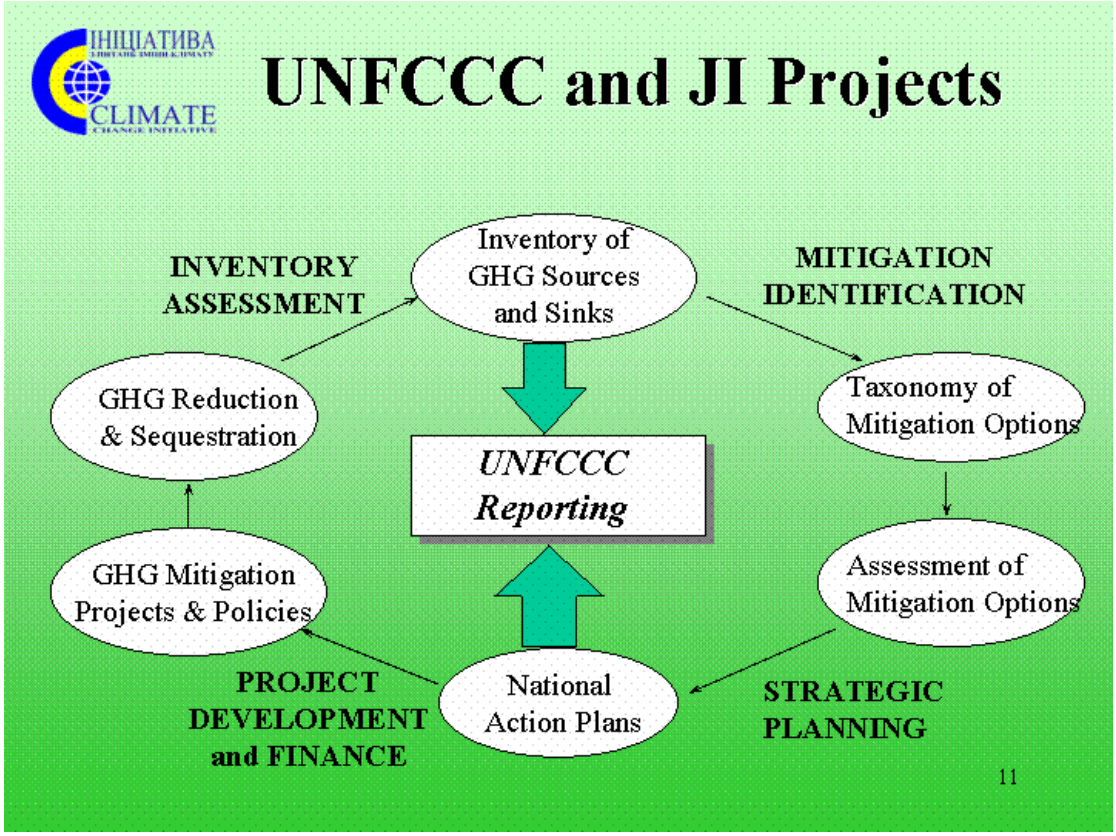
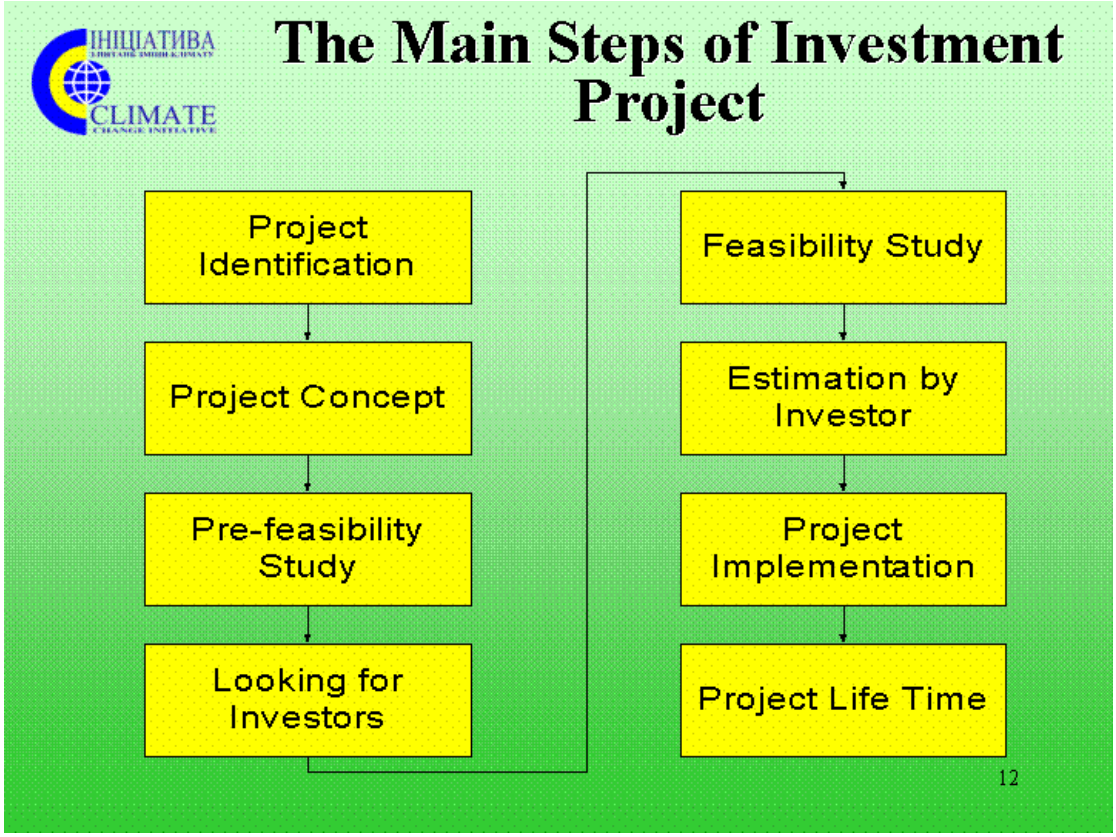
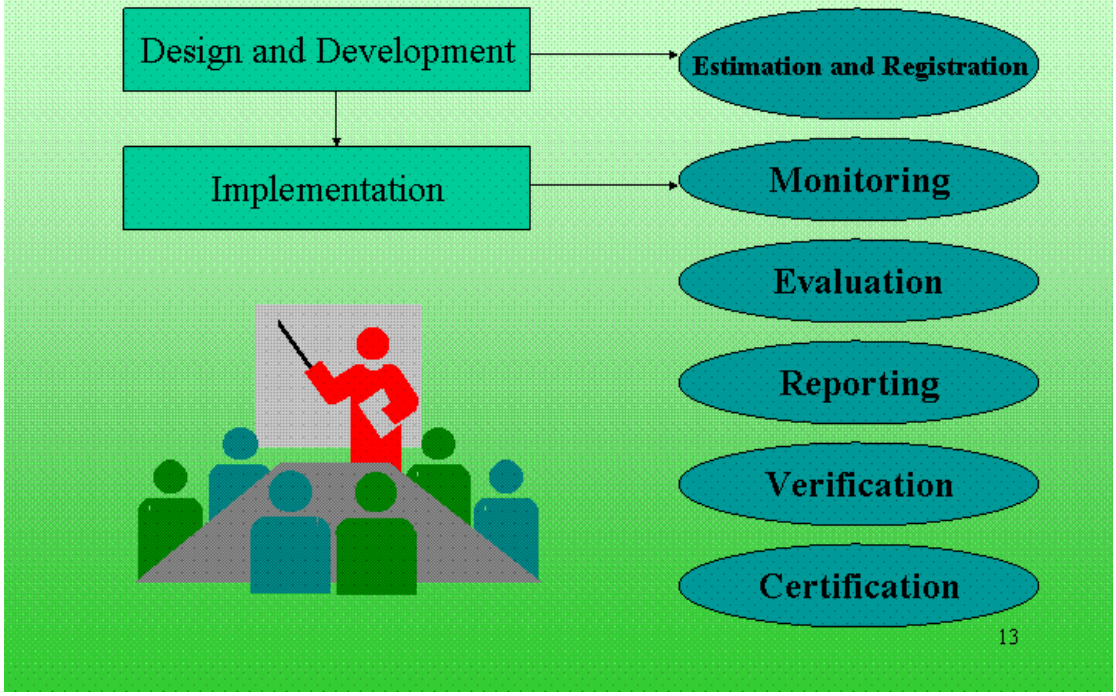

UNFCCC and JI Projects
INVENTORY ASSESSMENT
Inventory of GHG Sources and Sinks
MITIGATION IDENTIFICATION
GHG Reduction & Sequestration
Taxonomy of Mitigation Options
UNFCCC Reporting
GHG Mitigation Projects & Policies
Assessment of Mitigation Options
PROJECT DEVELOPMENT and FINANCE
National Action Plans
STRATEGIC PLANNING
11


The Main Steps of Investment Project
Project Identification
Project Concept
Pre-feasibility Study
Looking for Investors
Feasibility Study
Estimation by Investor
Project Implementation
Project Life Time
12

The Main Steps



Project Preparation and Design

- Project Identification Phase
  - Definition of project
  - GHG impact assessment: *net changes*
  - Cost estimate: *total capital cost,* FIRR, *cost per ton GHG*
  - Project Sponsors: *local, national, international*
  - Development of project prospectus or brief
- In-Country approval and coordination
  - Local, regional, national approval and participation
  - Demonstration of national benefits
- Project fundraising
  - Domestic and international sponsors

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Project Preparation and Design (cont.)

- Pre-feasibility Assessment
  - Market assessment (End Users)
    - Willingness to pay
    - Ability to pay
    - Size of market and demand profile
  - Technology and resource assessment
    - Availability of fuel/energy resource in the future
    - Reliability of current and projected data
    - Identification of appropriate technology
  - Preliminary technical, economic, financial, and environmental assessment

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Project Preparation and Design (cont.)

- Feasibility Study
  - Technical assessment
    - Engineering and technical design
    - Least-cost technology and equipment assessment
    - Feasibility of grid connection
  - Economic and financial/commercial assessment
    - Cost-benefit analysis
    - Project cash flow
    - Terms of power purchase agreement
  - Environmental impacts assessment
  - Risk assessment

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Elements of JI Projects

- Meet national social, economic and environmental development priorities;
- Fit within the national GHG mitigation action plan;
- Be country driven and have the support of key stakeholders;
- Have willing owners, implementers and recipient of outputs;
- Fit within an existing institutional framework or one that can be easily established;

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Elements of JI Projects *(cont.)*

- Meet the requirements and expectations of targeted financial supporters;
- Have the potential for wide national application;
- Have low unit costs of GHG abatement or help reduce future unit abatement costs;
- Help reduce financial, institutional and informational barriers; and
- Have a very high probability of success.

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Possible Participants in JI Projects

Host: private sector firm or government institution, affected community, NGO

Investor/Developer: Private sector, government, or other entity providing finance and submitting project

National JI office: Government authorizing agency - provides guidelines/approval; assists in project development

"Executive Board": Approve and register "rules" for projects, entities, baselines, MERV, etc.

"Operational Entities": accredited, (independent) institutions

Consultants/brokers: financial, engineering, legal support

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Recommendations for Developing JI Projects

- Identify Projects with high credibility, GHG impacts measurable, easy to monitor
- Get local, regional, national governments and participants support *early* in project development phase
- Target projects with local benefits
- Look for JI partners with expressed long-term interest and commitment
- Work closely with project stakeholders
- Monitor final implementation rules to be developed by the JI Supervisory Committee created at COP-7

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MODULE 8: PROJECT PREPARATION AND FINANCING

Session 2: International Funding Sources and Mechanisms

General Objectives: Session 2 is intended to give a broad overview of selected international financing mechanisms that are available to support JI activities that have global environmental climate change benefits. By the end of the session, participants should have a basic understanding of the characteristics of financing mechanisms available through the following:

- The Global Environment Facility (GEF)
- The Prototype Carbon Fund (PCF)
- Multilateral Agencies and Development Banks
- Bilateral Agencies
- Selected Large Private Sector Companies

Activities: Presentation, followed by period of questions and answers

Total Time: 45 minutes

Materials: Set of 29 OHTs

International Funding Sources and Mechanisms

Session 2

Module 8: Climate Change Project Preparation and Financing

1

Outline of the Session

- The objective of the session is to provide survey of selected international sources and mechanisms that are available to support climate related activities in Ukraine

2

The Main Funding Sources for Climate Related Projects

- Specialized Funds (Global Environmental Facility (GEF), Prototype Carbon Fund (PCF)
- Bilateral Agencies (USAID, TACIS, Dutch TA)
- Multilateral Agencies and Development banks (WB, EBRD, BSBTD)
- Private Investors
- Investment banks and Companies
- Commercial Banks

3

Financing required for climate Related Projects

- Assistance for project:
  - identification;
  - preparation of project concept;
  - pre-feasibility study;
  - feasibility study (business plan)
- Types financing for project implementation
  - grants
  - investments
  - loans

4

Global Environmental facility (GEF)

- The GEF is the main financial source of UNFCC and operates under guidance of the Conferences of Parties of the Convention
- *The Climate Change Focal Area of GEF includes four operational programs (OP):*
  - removing barriers to energy efficiency and energy conservation (OP 5);
  - promoting and adoption of renewable energy by removing the barriers and reducing implementation costs (PO 6);
  - reducing the long-term costs of low greenhouse gas emitting energy technologies (OP 7);
  - promoting environmentally sustainable transport (OP11)

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GEF: Other Climate related Activities

- ***Enabling Activities*** (preparation of national GHG inventories; identification and assessment of mitigation options; assessment of national mitigation and adaptation action plans; preparation of national communications)
- ***Short-term Response Measures*** (Some that do not qualify under the "long-term operational programs" or Enabling Activities but are high national priority and are cost effective may be considered under Short-term Response Measures)
- ***Small Grants Program*** is administrated by UNDP and provides grants up to US$ 50,000 for projects that are designed and implemented by local community organizations and NGOs and that meet the objectives of GEF

6

GEF Implementing Agencies

- *UNDP* primarily supports technical assistance, training, capacity building and pre-investment activities. UNDP coordinates the Small Grants Program
- *UNEP* provides scientific and technical advice and ensures that GEF policies and projects are consistent with existing environmental treaties
- *The World Bank* is responsible for investment projects and GEF funds administration

7

Steps in GEF Project Development

- Scope-out impeded win-win activities that have global environmental benefits
- Identify specific barriers that are currently impeding the option
- Perform incremental cost analysis for implementation of other option
- Propose GEF intervention
- Demonstrate sustainability

8

The Prototype Carbon Fund

- World Bank Trust Fund established in July 1999
- Portfolio or Mutual Fund approach
  - finance a portfolio of projects that reduce GHG emissions
  - financed by pooled funds contributed by public and private sector participants
  - In return, participants expect to earn "Emission Reductions" that can be used under the Kyoto Protocol

9

Purpose of the PCF

- To help create a market for carbon offsets within the framework of the ***Kyoto Protocol*** through:
  - demonstrating how JI and CDM trade can contribute to sustainable development
  - providing " learning by doing" experience for Parties to the Protocol on key policy issues;
  - building confidence that the trade can benefit both sellers and buyers

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PCF project Selection Criteria

- Consistency with UNFCCC/Kyoto Protocol
- Supports sustainable development, including generating of local environmental benefits
- ***Consistency with Banks' Country Assistance Strategy (energy sector, coal mining)***
- Low risk technology and sponsors
- Consistency with national JI criteria
- Complementarily with GEF Portfolio
- Consistency with Guidance from Participants
- Consistency with PCF Operating Principles 'portfolio" approach)

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Bilateral Aid Agencies

- **US Agency for International Development (USAID)**
- **Canadian International Development Agency (CIDA)**
- **Netherlands Ministry of Development Cooperation (DGIS)**
- **UK Department of International Development (DFID)**
- **Japan International Cooperation Agency (JICA)**
- **Technical Assistance for Commonwealth of Independent States (TACIS)**

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International Financial and Development Institutions

- United Nations Development Program (UNDP)
- The World Bank
- European Bank for Reconstruction and Development (EBRD)
- International Finance Corporation (IFC)
- Black Sea Bank for Trade and Development (BSBTD)

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Technical Assistance for Commonwealth of Independent States (TACIS)

- European Union is providing technical assistance for Ukraine in energy saving, energy efficiency and environmental issues
- European Union is concentrating in the areas of institution building in energy saving and energy efficiency (Advisory to governmental institutions, training courses in energy efficiency)
- Short-term assistance via ***BISTRO*** program (grants up to 100,000 EURO for small projects in energy efficiency and environmental issues)

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US Agency for International Development (USAID)

- USAID is the independent US government agency that provides economic development and humanitarian assistance to advance US economic and political interests internationally
- ***Climate Change Initiative*** includes technical assistance for JI office creation, training modules
- ***Ecolinks*** Provide grants up to $50,000 for climate change, clean production, water waste management. Separate presentation)
- Energy Efficiency Program (technical assistance)

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US Trade and Development Agency (TDA)

- The US Trade and Development Agency (TDA) provides grants for feasibility studies, and technical assistance for proposed projects in developing countries and countries in transition
- TDA grants for feasibility studies range from $ 20,000 to $1,000,000; approximately 125 feasibility studies are funded a year
- TDA provides funds for projects in energy, manufacturing, transportation, environmental services, and others
- Projects requesting TDA funds need to have a high chance for success result in sale of goods and services, of and be a priority project of the country

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Canadian International Development Agency (CIDA)

- CIDA is the main Canadian Agency for development and delivering of official technical assistance program
- CIDA is very active in the climate change program for Ukraine through Canadian-Ukrainian Cooperation Program
- Objectives:
  - to facilitate Ukraine's efforts to establish sound managerial infrastructure to support the development of 'flexible mechanisms'
  - to promote, develop and implement Canada-Ukraine JI projects

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Netherlands Ministry of Development Cooperation (DGIS)

- DGIS climate , energy, and environmental technology division support workshops and training programs that encourage the use of sustainable energy technologies.
- Types of activities supported:
  - policy formulation programs
  - project development for investment
  - technological innovation
  - training programs

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Netherlands Ministry of Development Cooperation (DGIS)

- Activities implementing in Ukraine:
  - energy saving and CO2 reduction at thermal power plants;
  - Energy saving project at Buchansky glass plant
  - Optimization of production process including energy saving at malt factory

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UK Department for International Development (DFID)

- DFID is the British government department responsible for promoting development and reduction of property
- ***Energy Efficiency Strategy***
  - Improve the efficiency of power production and distribution
  - Improve the energy efficiency of end users
  - Promote the introduction of appropriate renewable energy

20

Japan International Cooperation Agency (JICA)

- JICA provides technical assistance as part of Japan's Official Development Assistance programs
- Technical cooperation is aimed at the transfer of technology and knowledge that can assist in socioeconomic development
- JICA plans to put emphasis on environmental projects in areas including forest conservation and renewable energy and energy efficiency

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Multilateral Agencies and Development Banks

- International Bank for Reconstruction and Development (World Bank)
- European Bank for Reconstruction and Development (EBRD)
- International Financial Corporation (IFC)
- Black Sea Bank for Trade and Development (BSBTD)

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The World Bank

- The World Bank has a number of key programs and initiatives that particularly focus on beneficial global climate change activities
  - Global Climate Change Unit - coordinates the World Bank activities related to climate change including the World Bank-GEF climate change portfolio, UNFCCC and the Kyoto Protocol objectives, and the pilot AJI program
  - Coal Sector Restructuring for Ukraine
  - Currently World Bank /Swiss Government are implementing Joint Implementation Strategy for Ukraine

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International Finance Corporation (IFC)

- Invests in the private ventures in developing countries and countries in transition by providing debt and equity financing. Loans can not have a government guarantee.
- Usually finances no more then 25 % of project costs. Leverages co-financing of other parties by its involvement.
- Can take minority of equity position (5-10 %) and seat on the board of directors.
- Can provide working capital loans at below market rates, with multi-year grace period to enterprise cash flow needs.
- The IFC has invested in renewable energy and energy efficiency projects and wants to increase its financing sustainability.

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United Nations Development Program

- UNDP provides technical assistance, capacity building and pre-investment support
- In 1996, UNDP launched the UNDP Initiative for Sustainable Development (UNISE). The Initiative includes:
  - Building indigenous capacity;
  - Improving the policy environment for sustainable energy development;
  - Supporting new technologies, approaches;
  - formulating and implementing national sustainable energy action program.
  - UNDP is a GEF implementing agency and also provides project level assistance through the Energy Account in collaboration with bilateral donors

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European Bank for Reconstruction and Development (EBRD)

- EBRD provides loans and investments in Power and energy, energy efficiency, municipal and environmental infrastructure
- The Energy Efficiency team was established in 1995 for financing: district heating, energy savings in public sector, energy efficiency improvements in industrial processes and renewable. (For energy efficiency project in Ukraine is allocated 25,7 mio EURO for UkrEsco)
- Improvement of municipal and environmental infrastructure through the region during last decades closely connected with regulatory reform and changes in municipal finance.

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Black Sea Trade and Development Bank (BSTDB)

- The Bank takes proactive Steps to identify projects with co-financing possibilities. The key elements of the Bank's strategy include:
  - co-financing from regional sources in order to strengthen regional development and cooperation between the member countries;
  - co-financing from the market sources on a joint, but preferably parallel;
  - co-financing with other international financial institutions, both joint and parallel, on term and conditions, which avoid the imposition of conditionalities of the loans on the governments.

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Private Investors

- Shell Renewable (division of Shell International)
- BP Solar (Including BPSolarex)
- Enron Wind Corporation
- Japaness, US and Canadian electric companies (TRANSOLTA, SUNCOR)

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Investment Banks and Companies, Commercial Banks

- Export-Import Bank of USA
- National Agencies for the Promotion of National Export
- International Commercial Banking Institutions
- International Investment Banks and Companies

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MODULE 8: PROJECT PREPARATION AND FINANCING

Session 3: Major Issues in Project Preparation for JI Projects

General Objectives: Session 3 is intended to give participants an overview of the major issues that are specific to JI project preparation. The session will begin with a review of the major lessons that have been learned by project developers who have participated in the pilot phase. It will then continue through a review of the types of documentation required for JI projects, including information on technology, host country local markets, and the project development entity/team. By the end of the session, participants should have a basic understanding of the following:

- The major documentation and analytical elements of a project preparation effort
- The importance of adequately describing the host country situation.
- The role of risk in project preparation from both the investor and host perspective

Activities: Presentation, followed by period of questions and answers

Total Time: 45 minutes

Materials: Set of 21 OHTs

Major Issues in Project Preparation for JI Projects

Session 3

Module 8: Climate Change Project Preparation and Financing

1

Major Issues Overview

- Project Goals and Driving Forces
- Host Country Investment Climate
- Product and Technology
- Participant and Management
- Environmental and Social Appraisal
- Financial Projections
- Risk Identification and Mitigation Plan
- Related Documents

2

Stages of the JI Project Cycle

Stage	Some Activities and Tasks
1. Identification	Identify viable project opportunity; prepare a project proposal (pre-feasibility study); get host government support, seek grant for full-feasibility study
2. Preparation	Identify potential partners; develop financial plan; prepare environmental assessment; fine-tune project design; prepare full-feasibility study
3. Appraisal	Get formal host country certification; get formal investor country certification
4. Development, Negotiation, and Approval	Form project company; pay in-equity capital, complete loan agreements, conclude construction contract
5. Implementation	Construct facility; install equipment; train workforce; complete performance/acceptance testing
6. Operation	Complete technology transfer obligations
7. Evaluation	Compare actual performance/benefits with plan; verification of GHG avoided/saved annually

3

Lessons from Project Developers

- The host government must support the project
- The legal and institutional framework must be workable and stable
- The technology must be appropriate and proven
- The sponsors must be reliable and experienced
- The project must be financially sound
- The foreign exchange issue must be resolved
- Adequate security must be provided to lenders
- Project risks must be allocated rationally among the participants

4

Project Goals and Driving Forces

- The driving force for all JI partners is pursuit of self interest and mutual benefits
- Outline of the specific and and measurable project objectives:

  List major deliverables in both qualitative and quantitative terms
- Describe clearly but briefly benefits to the host nation:

  Relate the benefits to the national economic and environmental development plans

5

Host Country Investment Climate

- Describe where the project fits within the host country nation's national development and environmental action plans
- Cover the status of the project's acceptance as official JI by the host nation
- Convince the potential investor that she will clearly benefit from entering the named market now

6

Information That Could Submitted re the Host Country Investment Climate

- Copy of national economic/political review report by respected institution
- Copy of relative portions of national/environmental development action plans
- Local inflation rates
- Local commercial Bank overdraft rates
- Local market bond yields for 6, 12, and 36 months
- Description of how the host nation is involved into the project
- Investment funds availability as source of long term capital
- National investment climate rating by Institutional Investor Journal
- Sovereign bond credit rating by Moody's or Standard & Poors
- Special investment incentive, support programs and subsidies available
- Exchange rate stability, convertibility and regulations on capital flow

7

Market for Product

- Product

  -- The final product of JI could be electricity, heat, energy avoided (energy efficiency service), mass transit systems, a forest carbon absorption sink, or anything that the customer is willing to purchase.

- Most investors are interested in new and growing markets to expand the profit from their core competencies

8

Information that Could Be Submitted to Describe the Market

- Generic product description
- Price per kWh for electricity (industrial and residential)
- Industrial volume data and trend projection
- Industry price data and outlook
- Listing of major prospective customers
- International price comparisons
- Influence of subsidies and taxes
- Details on major competitors, including market share estimates
- Marketing methods with description of distribution channels

9

Technology

- Description of the key technology
- Names of sources of equipment and expertise
- References to successful applications or pilot cases
- Production process (location, facilities/equipment, process, inputs, outputs, and labor
- GHG emission specifications for the process
- Cost-effectiveness of technology in planned application
- Description of how technology is GHG friendly compared to normal practice

10

Team/Participants

- In order to maximize the probability of success it is necessary that:
  - each participant is creditworthy, I.e. have a proven ability to meet all its commitments
  - critical resources are represented by equity investors
  - key participants must be able to work together as a harmonious team under the leadership of an effective manager

11

Information Needed on Key Participants

- Brief business history of the company
- Description of operations
- Number of employees and annual revenue
- Core expertise(s)
- Relevant experience in similar projects
- Environmental profile or credentials (especially GHG)
- Banking references
- Supplier references
- Financial information (3 years of audited financials requested for major project proponents and customers)

12

Environmental and Social Appraisal

- Include data available from Environmental Impact Assessment (EIA), Environmental Analysis or Environmental Audit
- Environmental Appraisal always includes an estimate of the amount of emissions associated with the operation.

13

Environmental and Social Appraisal (cont.)

If the above studies are not available estimates could be based on the following information:

- Technology installed
- Quantities of annual usage of materials and goods
- Environmental installations and their abatement efficiency
- Chemical characteristics of materials and fuels (calorific value, content of major pollutants, content of dust, etc.)

14

Global GHG Analysis and Benefits

- Emissions "additionality"
- Baseline-reference case GHG emissions projections (w/o measures)
- Project case GHG emissions projections (with measures)
- GHG "credit period of project in years
- Plan for monitoring GHG emissions and updating projections
- Plan for (annual) external verification of emissions and "credits"

15

Plan for Monitoring GHG Emissions and Updating Projections

- The Specific data items that will be controlled
- Data collection methodologies and equipment
- Proposed monitoring schedule
- Name of organization responsible for accuracy

16

Plan for External Verification

- Acknowledge that "certified external professionals" will be given access to the appropriate data and facilities to verify actual GHG emissions during the specified period
- Suggest a convenient procedure and time schedule for the regular verification process
- Suggest an independent and credible organization that could perform the verification service

17

Financial Projections

- Capital Outlays and Financial Structure/Sources
- Income Stream and Expense Projections
- Cash Flow Analysis
- Cost-Benefit Analysis

18

Risk Identification and Mitigation Plan

- Enforceability of state support (concession agreement) -- enhanced by strong local partners
- Enforceability of agreement in general, regulatory risk and some adverse political risks -- covered by insurance by an Annex I entity
- Potential devaluation risk -- mitigated by either export earnings or by indexing prices to international levels
- Currency convertibility risk -- mitigated by agreement with host government and/or by insurance with Annex I entity

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Risk Identification and Mitigation Plan (cont.)

- Expropriation risk -- taken by the International Finance Corporation (IFC) or Overseas Private Investment Corporation
- Market (off-take) risk that sales will be less than projected -- reduced by having a market study (including review of competitive situation) completed by independent professionals
- Payment risk that customers will pay late or not at all -- addressed through bank guarantees, an escrow account, a special direct claim on a portion of the client's own revenue stream or a government guarantee

20

Implementation Schedule

List of major milestones could include:

Item	Major Task Deliverable or Milestone	Completion Date	Date
1	Initial written concept proposal completed		
2	Approved by host nation as JI		
3	Approved by Annex I nation as JI		
4	Bankable proposal completed		
5	Equity funds paid-in		
6	Commitment for long-term funds received		
7	Turnkey construction contract awarded		
8	Agreements for supply of utilities/raw materials completed		
9	Construction begins		
10	Initial payment tranche for construction contract made		
11	Plant testing and commissioning completed		
12	Start of commercial operation and GHG "credit" period		
13	End of GHG "crediting" period		

21

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 4: Key Points for JI Projects

General Objectives: Session 4 is intended to give an overview of the various criteria that are involved is establishing a JI project. The session will describe key criteria that investors will scrutinize at the project identification stage, and will review concepts that have been addressed in other training modules (e.g., baselines, MERVC). This session will also include a discussion of national issues/aspects that influence the review of JI project proposals. By the end of the session, participants should have a basic understanding of:

- The various approaches using in defining project baselines.
- The various issues relating to the notion of "additionality."
- The central role of MERVC (Monitoring, Evaluation, Reporting, Verification, and Certification) guidelines
- The various issues relating to the notion of “supplementarity” and the GHG credits market
- Compliance and liability in GHG credit trades

Activities: Presentation, followed by period of questions and answers

Total Time: 60 minutes

Materials: Set of 25 OHTs

Key Points for JI Projects

Session 4

Module 8: Climate Change Project Preparation and Financing

1

Outline of the Presentation

- Approaches to defining project baselines.
- Issues relating to additionality.
- Monitoring, Evaluation, Reporting, Verification, and Certification (MERVC) guidelines
- "Supplementarity" and the GHG Credits Market
- Compliance and liability in GHG credit trades

2

Defining Project Baselines

- Who has the responsibility for defining the baseline?
  - The ultimate responsibility must be with the host country.
  - The actual responsibility will fall to the project developer / investor.
  - Validation and certification will discourage inflating of baselines.
- What factors should be considered in defining the baseline?
  - Current trends in technology and practice.
  - Financial optimums.
  - Economic optimums.
  - Projections / simulations of future expectations.
- When should the baseline be defined?
  - During project preparation and design
  - Possibly in advance to attract JI investments.

3

Baseline Methods under Consideration

- **Project-specific** vs. **multi-project** (benchmarks)
- Standardized vs. ad hoc;
- **Static** vs. **dynamic**
- Stringency, technology matrices, exclusions, etc.
- Financial and other "additionality tests"
- Methods must be: **credible**, **transparent**, and **practical** and balance between
  - **environmental integrity** (minimize free riders and unwarranted credits, opportunities for gaming)
  - **investor incentive** (low transaction cost, maximum reasonable credits)

4

Steps for Defining the Project Baseline

1) Establish clear project boundaries that are the same for the baseline as they are for the JI project.

2) Clearly define the proposed JI project and identify the "normal" economic benefits/outputs of the project (e.g., kWh, lumens, tons of steam, passenger kilometers, etc.).

3) Define the baseline project that will result in similar economic benefits/outputs.

4) Ensure that the "normal" economic benefits / outputs of both the JI project and Baseline project are equal so that we are not comparing "apples against oranges".

5

Project Baseline Issues

Measurability of baseline GHG emissions – the baseline project is counterfactual and does not exist if the JI project is selected. Thus the emission profile of the baseline project is hypothetical. However, the emission profile of similar baseline projects may be substituted.

Changes in expected baseline project emissions may occur due to political, economic, technical and institutional uncertainties. Dealing with these uncertainties in the baseline definition phase is not practical. They should be evaluated during the verification processes for emissions from JI projects.

Validity period for baseline emissions – the period for which baseline emissions are valid should be equivalent to the period for which the baseline project is in fact replaced by the JI project. However, it should not exceed the economic life of the baseline project.

6

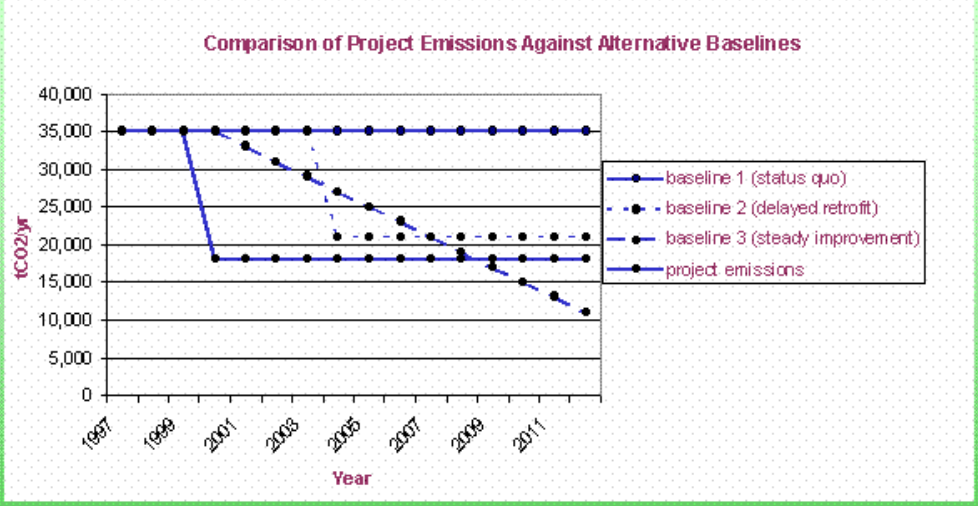
Project Baselines: Example

JI Project: Energy efficiency retrofit at a manufacturing plant :

- Baseline 1: Status quo situation (no change expected at plant)
- Baseline 2: Future improvement expected at plant (retrofit anticipated, but at later date -- say, 2005)
- Baseline 3: Sector-wide improvement expected (steady improvement in sector efficiency)

7

Project Baselines: Example



	Baseline 1	Baseline 2	Baseline 3	Project Emissions
cumulative emissions	455,000	329,000	299,000	234,000
total credit	221,000	95,000	65,000	-

8

Recommendations for Project Baselines

- The process for defining project baselines should be simple and transparent.
- Project baselines may be preferable to national or sectoral baselines, technology matrices or benchmarks as they provide a direct means of assessing the additionality of proposed projects.
- Project baselines should provide sufficient information to allow for the determination of both emissions reduction and financial additionality.
- The period of validity of project baselines should be of sufficient length to minimize uncertainty for project investments.

9

Possible "Additionality" Criteria

- **Environmental "additionality"** - emissions reduction in addition to any that would occur in the absence of the JI project.
- **Financial and economic "additionality"** - Present value of all financial and economic capital and O&M costs for the JI project is greater than the baseline. *Should no-regrets options qualify under the JI mechanism?*
- **Additional development assistance resource** - financial resources in addition to ODA, GEF, and other development assistance.
- **Technology "additionality"** - would all project types (*i.e., nuclear power, fossil fuels*) qualify as JI projects.
- **Stringent baseline** - to prevent rewarding inefficient policies

10

MERVC

Monitoring, evaluation, reporting, verification, and certification:

- **Monitoring**: measurement of the technical and environmental performance of the project (i.e., energy produced, GHG emissions, etc.)
- **Evaluation**: analysis of project performance data to determine project environmental and economic benefits (i.e., GHG emissions reduction, cost of per tone of carbon, etc.)
- **Reporting**: formal presentation of project performance and analyzed results. May be presented periodically during project implementation.
- Monitoring, evaluation, and reporting are likely performed by project implementers.

11

MERVC (*cont.*)

Monitoring, evaluation, reporting, verification, and certification:

- **Verification**: independent periodic auditing of the reported project performance and claimed emissions reduction against validated baseline.
- **Certification**: formal endorsement of the verified project results. Certifier may be liable for emissions reduction credits it certifies.
- Verification and certification will need to be performed by a third party.
- MERVC process needs to be credible, simple, transparent, and cost-effective.

12

Issues in MERVC

- Agreement on the MERVC process
- Access to information and data on baselines and project performance (e.g., emissions and other project data)
  - Proprietary data
  - Baseline leakage
- Certification of independent agencies and third party verifiers.
- Technical capacity to carry out MERVC
- Possible high transaction cost
- Non-conformance cases

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Demand for GHG Credits

- Most of the OECD-Annex B countries are unlikely to meet their first commitments (2008-2012) of the Kyoto Protocol.
- A number of studies estimate that the baseline scenario for these countries will exceed their commitments:
  - North America by 21% to 30%
  - Pacific OECD by 19% to 29%
  - Western Europe by 16% to 27%
- Globally, the demand for GHG credits is estimated at
  - Low of 621 MtC/yr in 2010
  - High of 1,300 MtC/yr in 2010
- *These illustrative estimates and those in the following slides are from earlier studies that assume that the U.S. is participating in the Kyoto Protocol*

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Estimated Demand for GHG Credits

Source:	Estimated Demand in 2010 for GHG Credits (MtC/yr)
EPPA	1312
Haites	985-1000
G-Cubed	1102
GREEN	1298
SGM	1053
Vrolijk	669
Austin, et al.	1200-1300
Zhang	621
Ellerman, et al.	328-1049
US Administration	750

Sources: Zhang (1999); Edmonds et al. (1998); Ellerman et al. (1999); Vrolijk (1999); Haites (1998).

15

Estimated Domestic Marginal Abatement Cost for Deficit Annex B Parties

Source	Cost / Ton C
Massachusetts Institute of Technology (September 1998)	$ 584 (Japan) $ 186 (USA) $ 273 (European Union) $ 233 (other OECD countries)
Pacific Northwest National Laboratory (Oct. 98)	$350 (Canada) $458 (Japan) $168 (U.S.) $130 (W. Europe) $117 (Australia)
Zhang (1999)	$9.1 (EU) $312 (Japan) $160 (U.S.) $33 (Other OECD)
US EIA (Oct. 98)	$67-$348
CRA (June 1998)	$295

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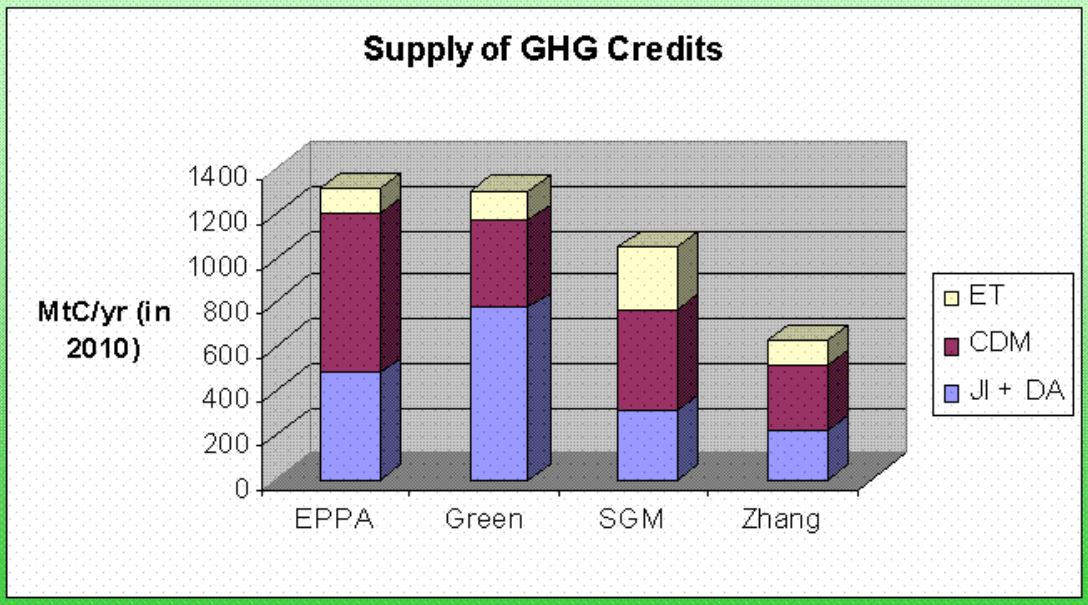
Estimates of the Supply of GHG Credits

Source	JI + DA	CDM	ET	Total
EPPA	478	723	111	1312
Green	771	397	130	1298
SGM	310	454	289	1053
Zhang	224	292	105	621
IEA	NA	NA	156	NA
EIA	NA	NA	374	NA
Haites	NA	265-575	NA	NA

DA=Domestic Actions;
Source: Derived from Data in Zhang (!999)

17

Estimates of Supply of GHG Credits



18

Estimated International Price for GHG Credits

Source	Assumptions	Price (US$/tC)
MIT	Global Trading-no limits	$24
PNNL	Global Trading-no limits	$26
US CEA	Global Trading-no limits	$14-$23
Charles River Assoc	Global Trading-no limits	$50
Zhang	Global Trading-no limits Limited demand –50% from Annex I Limited demand –EU proposed ceilings Limited supply– no hot air traded	$9.6 $4.7 $3.5 $12.6

- The MAC for GHG credits from ET = $0/tC

19

Supply and Demand Uncertainties

- There is a wide variation in the estimates of demand, supply and price (marginal abatement costs) data for GHG credits.
- The variation derives from uncertainties in:
  - projected growth in GHGs to 2012;
  - MAC of domestic actions;
  - the level of domestic actions required;
  - the rules for the flexibility mechanisms; and
  - MAC for JI and CDM projects.
- The uncertainty is spawning a lot of speculation.

20

Risk Factors Affecting GHG Credit Prices

- Assurance of host government to transfer of credits - host government guarantee;
- Validation of project and baseline by host government;
- Ability to monitor and verify credits;
- Project output market risks;
- Technology/project operation risks;
- Risks associated with the project owner;
- Financial soundness of the buyer; and
- Political and other risks.

21

Issues in Compliance and Liability

- Parties participating in trading must have strong inventory monitoring system in place.
- Eligibility requirements help ensure that trading party:
  - meets standards for emissions data quality
  - has comprehensive and transparent inventory system
  - fulfils reporting requirements
  - has adopted and enforced compliance regime
  - has established a "compliance reserve"
- These and other issues will be addressed in final JI implementation rules to be determined by the JI Supervisory Committee created by COP-7

22

Arguments for Flexibility Mechanisms

- Lower cost of compliance with targets (allows negotiation of lower targets)
- Mobilize private capital for GHG mitigation
- Facilitate technology transfer and foreign investment
- Echoes prevailing belief in benefits of free trade and trade liberalization
- Consistent with the prominent roles of transnational actors

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MODULE 8: PROJECT PREPARATION AND FINANCING

Session 5: Case Studies

General Objectives: Session 5 is intended to give participants perspective on project implementation experiences in other parts of Eastern Europe. The focus of this session can be on any specific projects that have been implemented in the recent past and for which the project developers needed to complete the same set of project preparation materials that are being discussed in this course. In the presentation that is included in this training package, discussion centers on boiler replacements and co-generation of heat and electricity in the Adazi and Lielvard municipalities in Latvia. By the end of the session, participants should have a basic understanding of the following:

- The type of projects and some details regarding cost and performance
- The credit sharing agreement that was implemented
- Basic details regarding the determination of the project GHG baseline
- Basic details regarding the monitoring and evaluation system in place.

Activities: Presentation, followed by period of questions and answers

Total Time: 45 minutes

Materials: 2 sets of OHTs

Modernizing Heat Supply in Nizhniy Novgorod Region Through AIJ

Session 5a

Module 8: Climate Change Project Preparation and Financing

1

Modernizing Heat Supply in Nizhniy Novgorod Region Through AIJ

- in the framework of the Russian-Netherlands AIJ cooperation a demonstration project on modernizing the heat supply system was implemented in Bolshoye Murashkino
- the project aims at replacing a number of electrical and coal-fired low-efficiency boilers with gas-fired boilers.

2

Project Participants

- The Nizhniy Novgorod Adminidtration
- The Bolshoye Murashkino Administration, and
- the Dutch Agency Senter International

3

Project Components

- The modernization of the heat supply system
- Specific JI simulation elements -- determining a baseline for GHG emissions, preparing the project for mutual approval via the Letter of Intent, and setting up a monitoring system
- Training component

4

The heat system modernization

- The project dismantles one electrical and twelve coal-fired boilers in seven boiler houses
- Three modern gas-fired boilers are installed in the central boiler house
- The new connection of the main boiler houses to the gas distribution system is provided

5

GHG Emissions Reduction

- The project baseline is based on available data for the year 1998
- Data used includes the fuel type; the structure of the coal used; the amount of the coal used; the efficiency level of the old boilers; and the average temperature in the region calculated for a number of years

6

GHG Emissions Reduction (cont.)

- Without the project -- 4,500 tCO_2-eq. per year during the 15-year project lifetime
- With the equipment installed -- the emissions are reduced to 1,500 tCO_2-eq. per year with the exception of the first year (2 months of operation)
- The total reduction -- 45 k tCO_2 estimated over a 15-year period

7

Approval

- The project was approved as a AIJ project through the Letter of Intent
- Signing parties -- the Federal Service of RF for Hydrometeorology and Environmental Monitoring, the Nyzhniy Novgorod Regional Administration, and the Netherlands' Ministries of Housing, Spatial Planning and the Environment, and of Economic Affairs

8

Approval (cont.)

The Letter of Intent stated:

"…80% of the emission reduction units generated by the project within the established period of operation of the boiler house … will be transferred to the Netherlands and 20% to the Russian Federation, taking into account any further decisions on the rules and guidelines and credit sharing still to approved by the CoP."

9

Implementation Costs

(in US$$_{\text{march 2000}}$)

• Equipment	235,000
• Salaries related to construction	108,000
• Raw materials	18,000
• Maintenance	11,750
• Other direct costs	145,800
JI demonstration part :	
• Baseline determination	48,450
• Monitoring	98,700
• Training component	85,460
Total	751,960

10

Cost Effectiveness

- From the total project cost -- the cost per ton CO_2-eq. US$16.7

However

- The use of gas instead of coal results in an operational & fuel cost reduction of $938 in the first year and $1872 annually during the reminder of the project lifetime
- The total cost reduction will result in the cost per ton CO_2-eq. US$16.

11

Other Environmental Benefits

Reductions

- Dust 98%
- SO_2 99%
- NO_X 85%
- CO completely

The phase-out of the solid waste material connected to burning coal (ash and slag) -- appr. 230 t/year

12

Monitoring and Reporting

- Annual monitoring studies
- The studies are curried out by the Nizhniy Novgorod Innovation Center for Energy Savings (NGO)
- The data are transferred to the Dutch JI Registration Center (JIRC)
- A positive evaluation by JIRC will result in a certificate

13

Session 5 (b): Case Studies

Boiler Replacement and Co-generation (Latvia & the Netherlands)

Session 5b

Module 8: Climate Change Project Preparation and Financing

1

Project participants

- EDON International B.V. of the Netherlands -- private infrastructure project developer. JI project developer and owner
- EDON Latvia, Latvian subsidiary of EDON International B.V. JI project operator
- EKODOMA, Latvian NGO. JI monitoring consultant

2

Activity Description

- Project type:
  fuel switching and energy efficiency
- Project description:
  installation of gas fired high efficiency small co-generation systems in two boiler houses. The boiler houses supply heat to the public district heating networks. The production facilities also produce electricity for sales to Latvenergo.

3

Credit Sharing Agreement

- The Netherlands
  100% of carbon credits for the first five years of commercial operation
  20% of carbon credits for the subsequent five years
- Latvia
  0% of carbon credits for the first five years of commercial operation
  80% of carbon credits for the subsequent five years

4

Technical Data - Adazi

The system:

one co-generator and two boilers. The heat is transferred to the district heating network through a heat exchanger. The thermal power is 3.6 MW, the electrical power is a maximum of 350kW - delivered to the grid.

In case the circulation pumps do not function due to absence of electrical power, the co-generator supplies electricity to the pumps. The system is monitored telemetrically.

5

Technical Data - Lielvarde

The system:

one co-generator and two boilers. The thermal power is at least 1.6 MW. The electrical power is a maximum of 165 kW. The thermal capacity of each boiler is 740 kW. The thermal capacity of the co-generator is 270 kW.

The system is monitored telemetrically.

6

Baseline Study Outline

- A detailed description of the boiler house and district heating systems before the project commencement (boilers, piping, sub-stations, electricity consumption, heat and electricity losses, etc.)
- A description of the fuel used in the previous two years (heat value, composition, quality and cost price)
- An overview of the fuel used for firing the boilers, the system energy conversion efficiency and the estimated gaseous emissions related to the heat load

7

Baseline Study Outline (cont.)

- Measurements of the energy efficiency for different heat loads for the old boiler in case of the Adazi project. Estimation of the efficiency of the previous boiler in Lielvarde.
- Potential overview of measurements made on air pollution and gaseous emissions in the previous two years
- An overview of the realized heat load (load duration curve) for the previous two years and one load duration curve indexed to normal temperature days.

8

Baseline Study Outline (cont.)

- An overview of the emissions of NOx, CO, CO_2 and SO_2 and small dust particles related to the heat load duration curve
- An analysis of the relation between heat consumption and other socio-economic factors such as economic growth, inflation, consumer purchase power, heat quality and consumer energy awareness.

9

Baseline Study Outline (cont.)

- A projection of the gaseous emissions for a period of 10 years, taking the estimated socio-economic developments into account and also indicating the range for uncertainty under a reliability of 95%.
- Determination of the average yearly gaseous emissions per kWh produced by the mix of power (oil shale, peat, hydro) and import facilities(oil shale and nuclear) for the comparable electricity base load in Latvia.
- Projection of the savings in gaseous emissions due to a higher energy conversion efficiency, the effect of fuel switching and the substitution produced by the normal base load facilities for a period of 10 years (reliability of 95%).

10

Monitoring Study Outline

The monitoring study consists of two parts

- The environmental monitoring

  measurements of the emissions of GHG, small dust particles and other environmental effects for several heat loads during the day

  the results of the measurements, the reliabilities and uncertainties, the research methodology (instruments and procedures), analysis of results and comparison with the projected gaseous emissions

11

Monitoring Study Outline (cont.)

- The socio-economic monitoring

  Survey among the households and businesses who use the heat produced at the modernized boiler houses.

  The survey assesses the household attitude towards heat pricing, billing, quality of heat, present energy usage for hot tap water and for heating, perception of reduction of air pollution and awareness of energy savings and international cooperation

12

Environmental Benefits

- Less use of primary energy
- Less water and chemical losses in the boiler house
- Significant reduction of GHG
- Reduction of the emission of hazardous gasses
- Better landscape, due to lower lower chimney stacks

13

Economic Benefits

- Municipalities are enabled to re-locate and concentrate local resources for improvements in the district heating network.
- Investment for the boiler houses are picked up by a private developer creating new jobs in the community

14

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 6: Project Presentations or Panel Discussion

General Objectives:	Session 6 is intended to give an opportunity for participation by the group. Two options are available. In the first option, several presentations can be given by either individual or groups regarding a specific project in which they have been involved with. Advance coordination between the instructor and the presenter will be needed in this case in order that presentations are harmonized in terms of content and format. The second option is to have a panel discussion. This would be in lieu of the project presentations and the focus should be on a discussion of issues important to Ukraine regarding project development.
Activities:	Presentations, followed by period of questions and answers; or panel discussion moderated by the instructor
Total Time:	75 minutes
Materials:	As needed

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 7: Project Approval Procedures

General Objectives: Session 7 is intended to give an overview of project approval procedures for JI projects. The session will describe the key issues in project approval, and will introduce practical aspects of project eligibility and validation as addressed in Eastern Europe country examples of project guidelines or of Western Europe procurement tender guidelines. By the end of the session, participants should have a basic understanding of:

- Key issues related to project approval (e.g., eligibility, validation, negotiation of credit transfer)
- JI project institutional requirements (i.e., clear, transparent, with clear legal recourse for failed or delayed transactions
- Needed functions of national JI governance institutions

Activities: Presentation, followed by period of questions and answers

Total Time: 30 minutes

Materials: Set of 13 OHTs

Project Approval Procedures

Session 7

Module 8: Climate Change Project Preparation and Financing

1

Outline of Presentation

- Institutional requirements for JI project implementation
- Functions of national JI governance institutions
- Poland JI project guidelines for the pilot phase
- Czech Republic JI project guidelines for the pilot phase
- JI emission reduction unit procurement tender of the Netherlands
- Key issues in project approval

2

JI Project Institutional Requirements

- Clear and transparent rules of the game
- Need to link Governance functions of validation, verification and certification to implementation
- Legal recourse for failed or delayed transactions and alleviation of risks
- Investor's attitudes, behavior and requirements must be reflected in JI Governance
- Efficient operation of the market: simple and transparent regulations and low transaction cost

3

Functions of National JI Governance Institutions

- Validate eligible JI projects that meet national priorities
- Validate baselines using international rules and national environmental criteria
- Facilitate investments in approved JI projects
- Establish rules and guidelines for monitoring JI projects and criteria for verification
- Track and register the production and transfer of Emissions Reduction Units (ERUs)

4

Poland JI Project Guidelines for the Pilot Phase

- Projects that *directly* reduce GHG emissions will qualify as JI projects (TA, education, and training do not qualify).
- Project that sequester carbon by planting trees qualify as JI projects.
- JI projects need to meet the standards adopted by the CoP.
- Projects need to be consistent with the National Environmental Policy of Poland.
- JI projects need to be *economically efficient* projects.
- The Minister of Environmental Protection, Natural Resources and Forestry approves JI projects in Poland.

5

Secretariat for Joint Implementation of Poland

- Poland established the Secretariat for Joint Implementation to facilitate and monitor the implementation of JI projects.
- The Secretariat provides information to foreign companies and governments on
  - Identifying Polish partners for JI projects and
  - Procedures and requirements for approval of JI projects.
- The Secretariat also coordinates the monitoring and reporting of project performance
- It also arranges audits and inspection of project sites.

6

Czech Republic JI Project Guidelines for the Pilot Phase

- JI Projects must have real, measurable, long-term positive, and additional benefits.
- The Ministry of the Environment is the relevant authority that approves JI projects in the Czech Republic.
- Project baseline must be established to determine the emissions reduction credits that will be generated.
- A self-reporting monitoring mechanism needs to be implemented.
- Reported emissions reduction credits will be verified by the Government of Czech Republic, the investor government, and the UNFCCC.

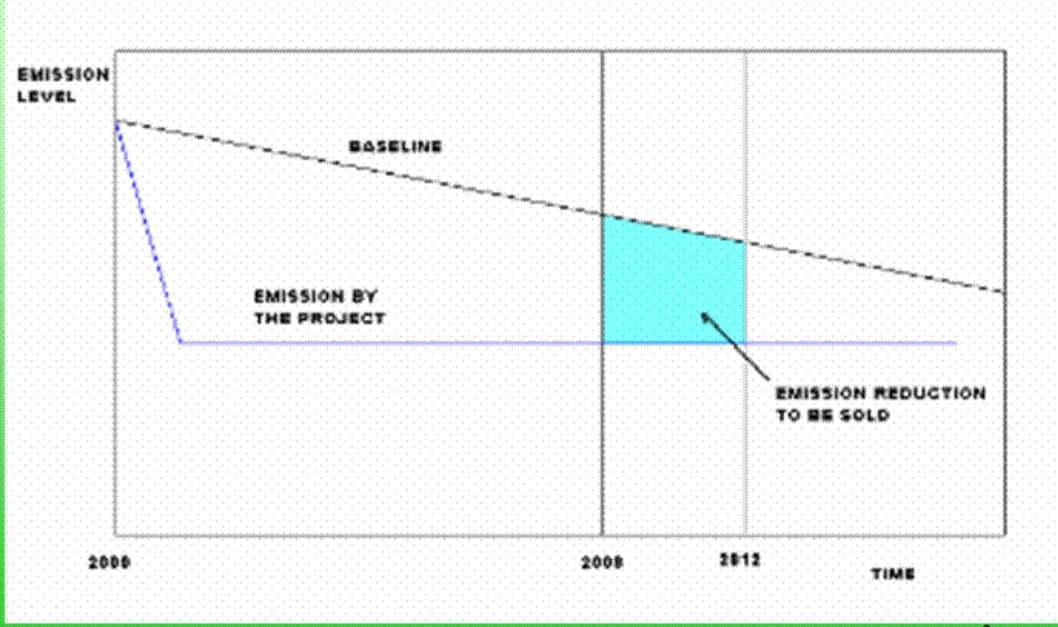
7

JI Emission Reduction Unit Procurement Tender of The Netherlands

- The Ministry of Economic Affairs of the Netherlands through Senter International issued a procurement tender for Emissions Reduction Units (ERUs) in the summer of 2000.
- Requirements for ERUs:
  - Must be project based
  - Project emissions reduction should be significantly larger than reductions that would occur otherwise (e.g., low cost options and good housekeeping measures do not qualify)
  - ERUs must be generated during the first commitment period (2008-2012)

8

Qualified ERUs



9

Types of Projects under the Netherlands ERU Tender

- **Renewable energy:** biomass, micro-hydropower, geothermal, wind and solar energy;
- Co-generation;
- Fuel switching;
- **Waste processing**: landfill gas extraction, biogas applications;
- Afforestation and reforestation activites;
- **Energy efficiency** in industrial, residential and transport related applications

10

Requirements of the Netherlands ERU Tender

- Need to obtain host government approval for transfer of ERUs to the Government of the Netherlands.
- The baseline study needs to be validated by an independent verification organization that is recognized by the Ministry of Economic Affairs of the Netherlands.
- An offer for the tender should be at least 500,000 tones of CO_2-equivalent (or 500,000 ERU as defined in the tender).
- Projects may be bundled and will be evaluated initially using two criteria:
  - price per ERU; and
  - feasibility of the project.

11

Payment and Price of ERUs

- The Government of the Netherlands estimates that the market price of ERUs will be in the range of 10 - 20 NLG per tonne of CO_2.
- As much as 80 percent of the contract price for the ERUs may be disbursed prior to delivery of ERUs in 2008-2012, dependent on milestones reached by the project.
- Sale of ERUs may finance as much as 10 to 40 percent of the project funding requirement.
- The first call for tender ended in July 2000. The second call for tender may be announced in early 2001.

12

Key Issues in Project Approval

- Clear and simple project approval procedures
- Eligibility and validation of JI Projects
- Safeguards against baseline cheating
- Certification of claimed credits
- Negotiation of transfer of credits between the investor and the host
- Recourse from the risk of failed projects
- Liability of traded ERUs
- Cost of project preparation, verification and management

13

MODULE 8: PROJECT PREPARATION AND FINANCING

Sessions 8 and 9: Financial and Economic Assessment (Parts I, II)

General Objectives: Sessions 8 and 9 are intended to provide an overview of the goals and objectives of financial and economic analysis. Session 8 will begin with a review of the differences between conducting a financial analysis and conducting an economic analysis. By necessity, the session will need to introduce and discuss what may be to at least some of the participants new terminology such as discount rate cash flows, and net present value. The session will also provide an overview of the basic tools and steps involved in financial and economic analysis. Session 9 is intended to directly follow Session 8 and will provide an overview of sensitivity analysis, capital outlays and financing structure, income streams and expense projections. By the end of both sessions, participants should have a basic understanding of:

- The key indicators involved in the assessment of project financial performance
- The issues and concepts involved in converting from project financial to economic analysis
- The basic steps in determining project financial and economic additionality income streams, expense projections)

Activities: 2 Presentations, followed by period of questions and answers

Total Time: Total of 90 minutes

Materials: 2 sets of OHTs

Financial & Economic Assessments of Projects (Part I)

Session 8
Module 8: Climate Change Project Preparation and Financing

1

Outline of Topics -1

- Objectives of financial and economic (F&E) analysis.
- Differences between F&E analysis.
- Introduction to project F&E analysis terminology.
- What is a discount rate? / time value of money?
- How to determine the applicable discount rate?
- Discounting cash flows for net present value.
- Setting up the project cash-flow pro forma.

2

Outline of Topics -2

- Differentiating sources of project finance:
  - Debt / Subordinated Debt / Equity / Grant.
- Basic tools for project financial analysis.
- Basic steps in project financial analysis.
- Key indicators of project financial performance.
- Converting project financial to economic analysis.
- Key indicators of project economic performance.
- Determining project financial and economic additionality.

3

Objectives of Project F&E Analysis

- Project **financial analysis** is used as a tool by project developers, owners, investors and others to rank and make investment decisions.
- Project **economic analysis** is used by government agencies, multilateral development institutions and NGOs to rank or determine the "social values" or "benefits" to society of project investments.
- Project F&E analysis helps make decisions about and between projects - helps set priorities.

4

Differences Between F&E Analysis

- **Financial analysis** accounts for the perspective or concerns of the individual participants, investors or organizations in the project:
  - Uses actual market prices that include taxes and subsidies;
  - Accounts for interests paid to external suppliers of capital;
  - Accounts for all taxes, royalties, license fees, development grants and other transfer payments.

5

Differences Between F&E Analysis

- **Economic analysis** accounts for the perspective or concerns of society or the national economy.
  - Uses "economic prices" -i.e., prices that remove the transfer payments of taxes, subsidies, etc.;
  - Does not account of the interests on capital which is a transfer of payments to the owners of capital;
  - Adjusts to economic values for artificial or fixed exchange rates, labor rates, rents, etc.;
  - Adjusts for regulations, market constraints or "externalities".

6

Project F&E Analysis Terminology-1

- Costs - the payments made in the project for equipment/capital, land, labor and management:
  - Payments are made in the form of prices, interests, rents, wages and salaries;
  - Costs can be divided into fixed costs and variable costs.
- Revenues/Income -the money returns from the outputs of a project.
- Benefits - includes the monetary and non-monetary returns from the outputs of a project.

7

Project F&E Analysis Terminology-2

- Cash Flow - the accounting of project costs and income over time (e.g., daily, weekly, monthly, annually).
- Interest Rate - the price paid for borrowing money represented usually as an annual rate or percentage of the amount borrowed.
- Discount Rate - a measure of the "time value" of money - the interest rate used to determine the present value of a future value by discounting.
- Inflation Rate- the rate of increase in prices.

8

Project F&E Analysis Terminology-3

- Benefit-Cost (B/C) Ratio - the ratio of all benefits from a project to the costs of a project.
- Present Value (PV) - the value in year 0 (present) of a discounted flow of money (costs or revenues).
- Net Present Value (NPV) - the discounted value of the difference between the revenues and costs.
- Internal Rate of Return (IRR)- a measure of the discounted worth of the projects net benefits- i.e., the discount rate that makes the NPV of the project equal to zero (NPV=0)

9

Confused? - Don't Worry!!!

- F&E analysis requires a good understanding of the terminology.
- F&E analysis can be done with the aid of computer spreadsheets:
  - Spreadsheets are only accurate when the data inputs are accurate;
  - Spreadsheets are only accurate when the formulas used are correct;
  - Spreadsheets are only accurate when you understand what you are doing.

10

What is a Discount Rate?

- The Discount Rate is a measure of the "time value of money" or the "opportunity cost of capital".
- The Discount Rate will vary among different entities:
  - private or individual discount rate - usually high because of immediate needs;
  - corporate or organizational discount rate - varies but usually below individual rates and above bank loan rates;
  - investor discount rate - usually equal to the market interest rates for long term borrowing;
  - society or government discount rate - usually equal to international borrowing rates.

11

Using the Discount Rate

- The discount rate is used to determine the present value (PV) of a future value (FV) as follows:

  $$PV = FV*(1/(1+d)^n)$$

  where:

  d = the discount rate (in percentage) per period;

  n = number of periods (e.g., years).
- Similarly, the future value (FV) of a PV is:

  $$FV = PV*(1+d)^n$$

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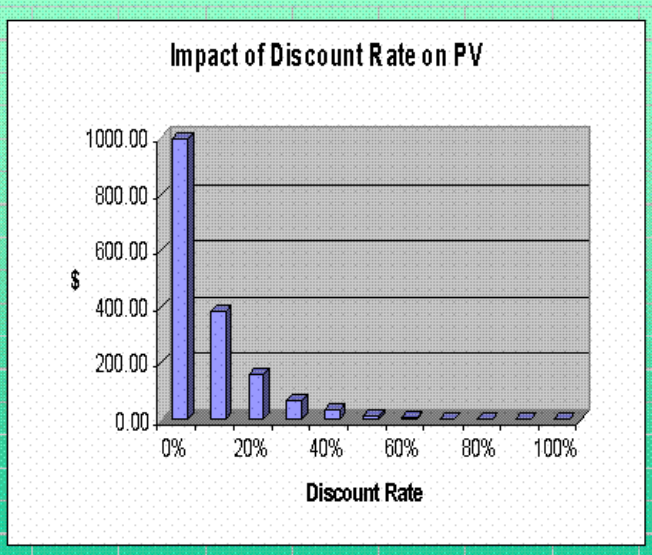
Effect of the Discount Rate on the PV of FV of $1000 in 10 Years

Future Value	$1,000.00
in year	10
Discount Rate	PV
0%	1000.00
10%	385.54
20%	161.51
30%	72.54
40%	34.57
50%	17.34
60%	9.09
70%	4.96
80%	2.80
90%	1.63
100%	0.98



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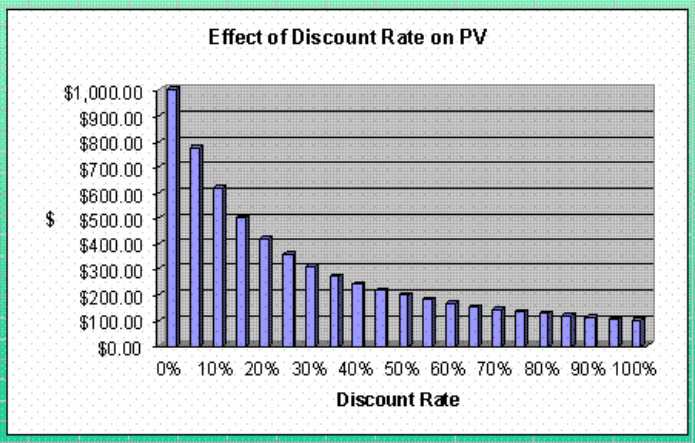
Effect of Discount Rate on the PV of a 10 year Annuity of $100

Year	0	1	2	3	4	5	6	7	8	9	10
Income		100	100	100	100	100	100	100	100	100	100

Discount Rate	PV
0%	$1,000.00
5%	$772.17
10%	$614.46
15%	$501.88
20%	$419.25
25%	$357.05
30%	$309.15
35%	$271.50
40%	$241.36
45%	$216.81
50%	$196.53
55%	$179.55
60%	$165.15
65%	$152.82
70%	$142.15
75%	$132.84
80%	$124.65
85%	$117.40
90%	$110.93
95%	$105.13
100%	$99.90



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Setting Up Project Cash Flow / Pro-Forma

- First step in project financial analysis is to estimate the cash flow.
- The cash flow is the time representation of all money flows out (costs) and into (revenue /income) a project.
- Net cash flow is the difference between income and costs.
- Cash flow is different from the accounting done to determine profits. For example it ignores depreciation or outstanding loans.

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Cash Flow vs. Financial Accounting

Item	Cash Flow	Accounting
Expenditures	When cash is paid out	When order is placed
Revenues	When cash is received	When sale occurs
Loan	When loan is received	Noted as a liability
Interest on loan	When paid	When due
Depreciation	Not included	Included
Taxes	When paid	When incurred
Wages	When paid	When work is done

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Cash Flow Projections-Main Concepts

- Project costs and revenues of project in terms of actual cash flow NOT earnings
- Convention: assume cash flows occur at end of each period unless otherwise stated.
- Include all capital, rent, operation, maintenance and fuel costs when incurred
- Include all revenues from sales of project outputs, services or salvage value of equipment.

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Example Cash Flow Statement

Year	1	2	3	4	5	6	7	8	9	10
Costs										
Capital	-1000.0					-500.0				
O&M	-100.0	-105.0	-110.3	-115.8	-121.6	-127.6	-134.0	-140.7	-147.7	-155.1
Fuel	-200.0	-210.0	-220.5	-231.5	-243.1	-255.3	-268.0	-281.4	-295.5	-310.3
Other	-50.0	-52.5	-55.1	-57.9	-60.8	-63.8	-67.0	-70.4	-73.9	-77.6
Total Costs	-1350.0	-367.5	-385.9	-405.2	-425.4	-946.7	-469.0	-492.5	-517.1	-543.0
Revenues										
Electricity Sales	400.0	420.0	441.0	463.1	486.2	510.5	536.0	562.8	591.0	620.5
Carbon Credits	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other (e.g, heat)	100.0	105.0	110.3	115.8	121.6	127.6	134.0	140.7	147.7	155.1
Total Revenues	500.0	525.0	551.3	578.8	607.8	638.1	670.0	703.6	738.7	775.7
Net Cash Flow	-850.0	157.5	165.4	173.6	182.3	-308.6	201.0	211.1	221.6	232.7
IRR	7.6082%									
Discount Rate	5%	7.6082%	10%							
NPV	$103.08	$0.00	($75.36)							

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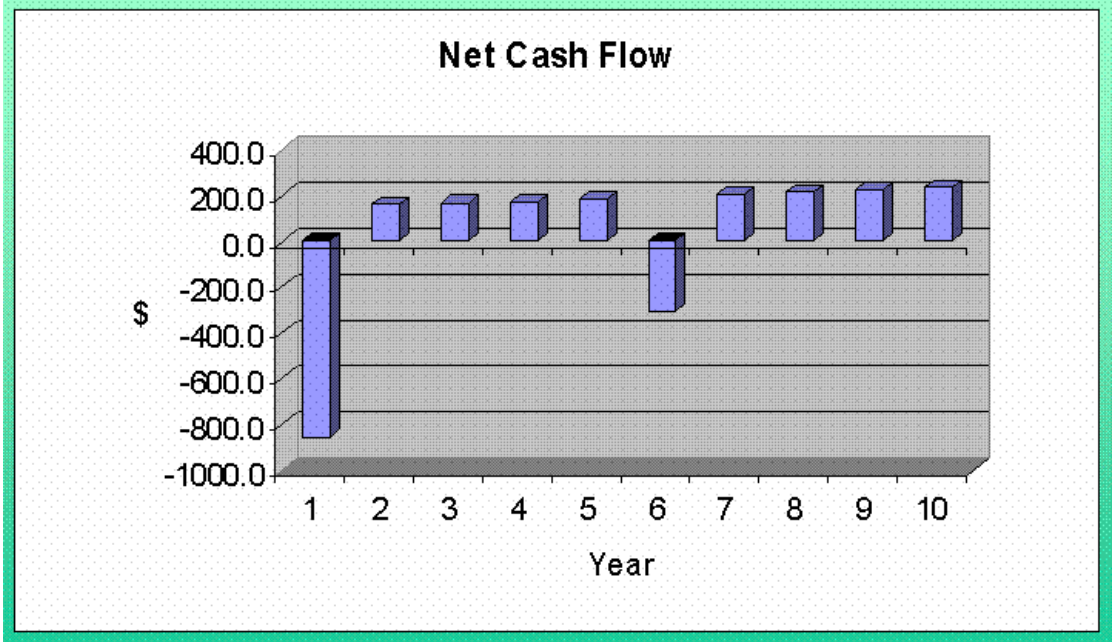

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Financing the Project

- A company/developer can finance a project in a number of ways:
  - Equity or self-financing--use internal funds--cash reserves. Risks are borne by the company/developer.
  - Debt-financing-- borrow a loan to finance the project. Requires security - recourse vs. non-recourse.
  - Convertible/Subordinated debt -- loans that can convert to equity in the project if not repaid.
  - Financial leases -- usually available for major equipment, land and buildings.
  - Supplier credits -- available for major equipment and inventory.

20

Project Finance

- Most MDBs and banks use Project Finance--means that the lender does not finance the company, but finances the project itself.
- Investors look to the anticipated cash flow of the project itself for repayment of the principal and interest on the loan and for the return on the investment.
- Non-recourse financing--project's assets, contracts and cash flow serve as collateral and not the assets of the company or project developer.

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Key Requirements for Project Finance-1

- Detailed and precise cost estimates and contracts for construction, O&M and fuel to control the cost stream.
  - Reputable project contractors;
  - Reliable project operator;
  - Predictable O&M Expenses;
  - Proven technology and performance;
  - Long-term fuel contracts;
  - Long-term labor contracts;
  - Stable prices of non-contracted inputs.

22

Key Requirements for Project Finance-2

- Detailed and precise long-term contracts for sale of outputs and services to secure the minimum revenue stream:
  - Secure and predictable revenue flow;
  - Long term purchase contracts for outputs and services;
  - Assured payment of revenues (take or pay contracts);
  - Stable prices for outputs and services;
  - Currency convertibility;
  - Reliable and creditable buyers of outputs and services.

23

Key Requirements for Project Finance-3

- Technical viability of project operations;
  - proven equipment/process conversion efficiencies;
  - proven equipment/process reliabilities;
  - proven equipment life/salvage value;
- Financial viability of project operations:
  - Sufficient cash-inflow to fund operations and service debt at all times;
- Stable regulatory and legal framework.

24

Basic Tools for Project Financial Analysis

- A well defined project cash flow / pro-forma.
- Excel spreadsheet or understandable financial analysis models: - Proform; RETScreen;
- Defined and defensible basic financial indicators including:
  - inflation rates;
  - interest rates;
  - discount rate;
  - currency exchange rates.

25

Basic Steps in Project Financial Analysis

- Get all your input data for the project pro-forma.
- Determine the type of financial indicators your want to use to analyze project financial performance.
- Carry out the analysis;
- Identify principal areas of project risk.
- Conduct sensitivity analysis to assess project risk.
- If assessing JI project, define baseline project and assess financial additionality of JI project.

26

Key Indicators of Project Financial Performance {Simple Payback}

- Simple Payback (SP) = measures the number of years it will take for un-discounted net cash flow (revenues) to repay the initial investment.
  - Criterion is set to accept projects that have a simple payback within the shortest period of time.
  - Difficult to use for projects with complex cash-flows (investments in more than one period).
  - Not necessary that projects with the shortest payback period is the financially the most attractive or profitable.
  - Biased against projects with high capital cost and long gestation periods - e.g, renewable energy projects.

27

Key Indicators of Project Financial Performance {Discounted Payback}

- Discounted Payback (DP) = measures the number of years it will take for discounted net cash flow (revenues) to repay the initial investment.
  - Criterion is set to accept projects that have a discounted payback within the shortest period of time.
  - Difficult to use for projects with complex cash-flows (investments in more than one period).
  - Not necessary that projects with the shortest payback period is the financially the most attractive or profitable.
  - Biased against projects with high capital cost and long gestation periods - e.g, renewable energy projects.

28

Key Indicators of Project Financial Performance {Financial Net Present Value}

- Financial Net Present Value (FNPV) = the present value of the discounted net cash flow.
  - Criterion is to accept all independent projects[1] with a FNPV >0 when discounted at a "suitable" discount rate.
  - The analysis is highly dependent on the assumed discount rate - usually the estimate of the opportunity cost of capital for the project proponent.
  - When assessing mutually exclusive alternatives[2] - the criteria is to accept the project with the highest NPV.
  - Does not ensure that the project with the highest NPV will also yield the highest IRR or be the most profitable.

1. Independent projects indicate that undertaking one project does not preclude or prevent undertaking the others. As opposed to Mutually Exclusive projects which imply that if one project is undertaken by its very nature the other alternative cannot be undertaken.

29

Key Indicators of Project Financial Performance {Financial Benefit/Cost Ratio}

- Financial Benefit/Cost Ratio (FBCR) = the financial present value of the benefit (revenue or income) flow divided by the financial present value of the cost flow
  - FBCR = FPV of Income / FPV of Revenues.
  - Criterion is to accept all independent projects with a FBCR>1 when discounted at a "suitable" discount rate.
  - The analysis is highly dependent on the assumed discount rate - usually the estimate of the opportunity cost of capital for the project proponent.
  - May give incorrect ranking for independent projects and cannot be used for choosing among mutually exclusive alternatives.

30

Key Indicators of Project Financial Performance {Financial Internal Rate of Return}

- Financial Internal Rate of Return (FIRR) = the interest rate or rate of return on on capital outstanding per period while it is invested in the project. Sometime also referred to as the FIRR on equity.
  - Criterion is to accept all independent projects with an FIRR that is greater than an "acceptable cut-off rate" which is usually the opportunity cost of capital of the investors.
  - May give incorrect ranking among independent projects.
  - Cannot be used directly for choosing among mutually exclusive projects.
  - The IRR indicates the maximum interest rate a project can pay for the resources used if the project is to recover its investment and operating expenses and still break even. It is equal to the discount rate that makes the NPV of the net cash flow equal zero.

31

Key Indicators of Project Financial Performance {Least Cost or Cost Effectiveness Ratio}

- Cost Effectiveness Ratio = The NPV of costs divided by the output of benefits that are measured in non-monetary units.
  - Usually used for analyzing projects that provide benefits that cannot be reasonably measured in monetary terms (e.g, measuring the cost effectiveness of GHG mitigation).
  - Criterion is to select the project with the least cost or lowest cost effectiveness ratio for a given type of benefit assuming all other project benefits are held constant.
  - It is impossible to obtain a full measure of "project worth" from cost effectiveness analysis since the analysis is done without reference to the value to users of the project output.

32

Converting from Financial to Economic Analysis

- Economic analysis is carried out from the perspective of society or the national economy.
- To convert a financial analysis to an economic analysis one needs to omit all ***transfer payments*** and value all items at their ***opportunity cost to society***. Thus
  - eliminate credit transactions or payment of interests;
  - eliminate taxes, subsides and other price distortions or supports;
  - value all inputs and outputs at their opportunity cost to society - usually international border prices or unregulated prices;
  - use free market exchange rates or "shadow" exchange rates;
  - use free market labor rates, rents, commodity prices, etc.

33

Key Indicators of Project Economic Performance

- Once the the financial pro-forma has been adjusted to eliminate all transfer payments and reflect economic costs, project economic performance indicators, that mirror the financial performance indicators can be developed.
- The most common project economic performance indicators used include:
  - Economic Net Present Value (ENPV);
  - Economic Internal Rate of Return (EIRR);
  - Economic Benefit/Cost Ratio (EBCR);
  - Economic Cost Effectiveness Ratio (ECER).
- The project selection criterion and restrictions are similar to those given for the financial performance indicators.

34

Determining the Financial and Economic Additionality of Projects

- Estimating the financial and economic additionality of projects requires defining a baseline against which the "additionality" of the alternative can be measured.
- Who has the responsibility for defining the baseline for JI projects?
  - The ultimate responsibility must be with the host country.
  - The actual responsibility will fall to the project developer / investor.
  - Validation and certification will discourage inflating of baselines.
- What factors should be considered in defining the baseline?
  - Current trends in technology and practice.
  - Financial optimums.
  - Economic optimums.
  - Projections / simulations of future expectations.

35

Project Financial and Economic Additionality

- ***Financial Additionality*** - define the financial present value of all capital and O&M costs (FPVC) for the JI project and the baseline project. Determine if the financial present value of the costs for the JI project is greater than the present value of the costs for the baseline project. If $\mathbf{FPVC_{JI}} > \mathbf{FPVC_b}$, then the JI project is financially additional to the baseline. If not, the JI project is not financially additional.
- ***Economic Additionality*** - define the economic present value of all capital and O&M costs (EPVC) for the JI project and the baseline project. Determine if the economic present value of the costs for the JI project is greater than the present value of the costs for the baseline project. If the $\mathbf{EPVC_{JI}} > \mathbf{EPVC_b}$, then the JI project is economically additional to the baseline. If not, the JI project is not economically additional.

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Determining the GHG Additionality of a Project

- GHG Additionality – define the net greenhouse gas (GHG) emissions for the JI and the baseline project. Determine if the GHG emissions for the JI project are less than the GHG emissions for the baseline project. That is: $GHG_{JI} < GHG_b$.
  - If not, the JI project is not environmentally additional to the baseline project.
- ERs of the JI Project – the emission reductions (ERs) of the JI project can simply be represented as:
  - $ER_{JI} = GHG_b - GHG_{JI}$.

37

Determining the Cost Effectiveness of JI Projects

- The financial cost effectiveness (FEC_{JI}) of GHG mitigation for a JI project is simply:

$$FEC_{JI} = (FPVC_{JI} - FPVC_b)/ER_{JI}$$

- The economic cost effectiveness (EEC_{JI}) of GHG mitigation for a JI project is simply:

$$EEC_{JI} = (EPVC_{JI} - EPVC_b)/ER_{JI}$$

- The resulting cost effectiveness of GHG is represented by:
  - \$/ton CO_2 equivalent mitigated.

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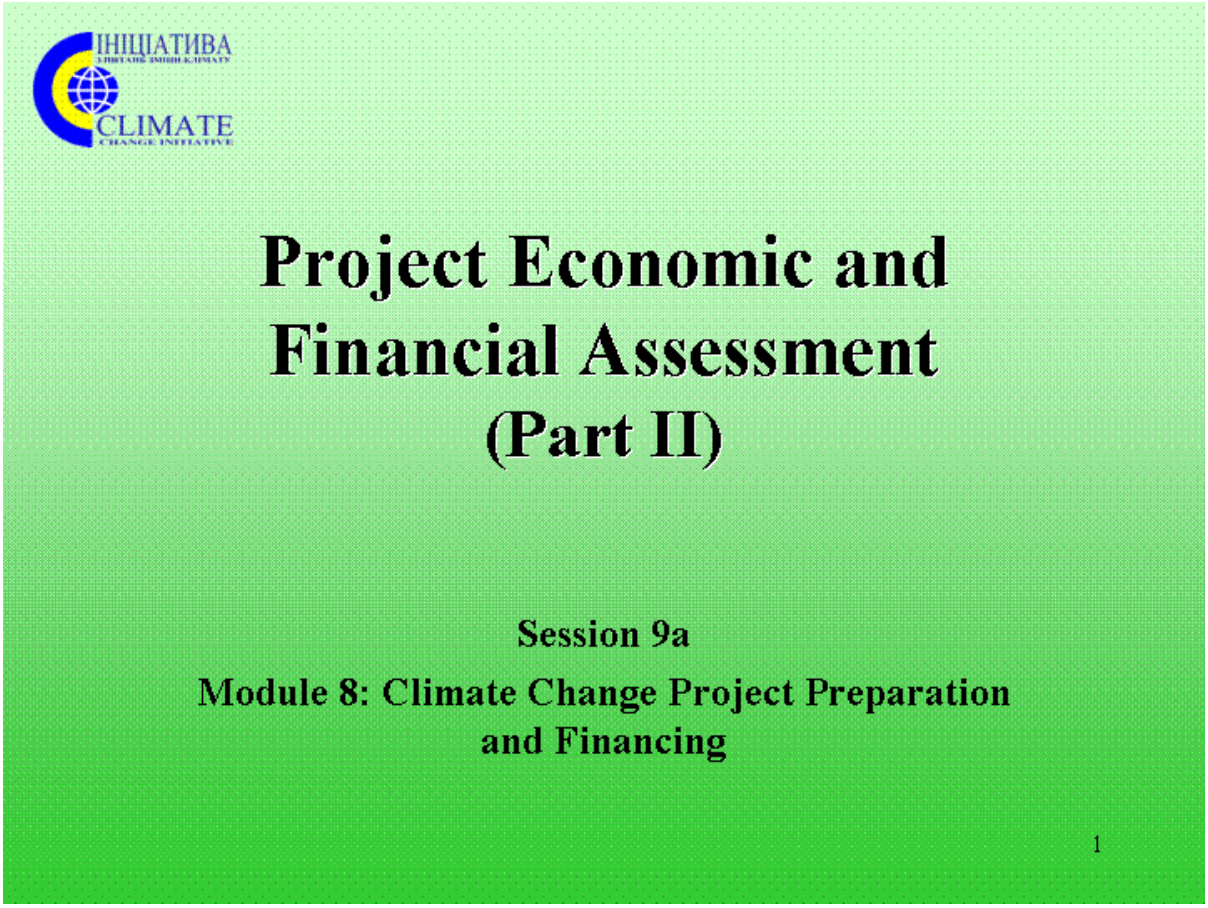
MODULE 8: PROJECT PREPARATION AND FINANCING

Session 9: Economic and Financial Assessment



Capital Outlays and Financing Structure/Sources

- Project Investment Breakdown Schedule (Use of Proceeds)
- Capital Structure and Sources of Funding
- Financial "Additionality"

2

Project Investment Breakdown Schedule (Use of Proceeds)

Item	Local Currency	Foreign Currency	Date and comments
Start-up expenses			
Land			
Interest during construction			
Equipment & Machinery			
Training & testing			
Incremental portion attributed to GHG avoidance			
Grand Total			

3

Project Investment Breakdown Schedule (Use of Proceeds)

Other Items to be included:

- land
- site preparation
- building
- installation and start-up
- inventory
- receivables and other working capital

4

Capital Structure and Sources of Funding

Class of funding and named source	Local currency	Foreign currency	Loan duration	Interest rate	Security/ collateral
Paid in equity					
-- Local project proponent					
-- Foreign expert					
-- International finance					
Short-term lines					
Long-term lines					
Totals					

5

Capital Structure and Sources of Funding

- Short-term lines:
  Leading local bank
  Equipment supplier
  Export credit line/co-financing
- Long-term lines:
  Local bonds
  Special JI financing
- WB/Regional Development Bank financing

6

Financial "Additionality"

- The financing of JI projects (or incremental components of larger projects) be additional to the official development assistance (ODA)
- Enhancing a project proposal in the identification or development stage by adding a discrete new component (sub-project) funded by a new and additional funding is within the spirit of the Convention

7

Income Stream and Key Assumptions

Critical not to overestimate income

The income stream of a JI venture would normally include at least two major components:

- Income from sale of energy such as electricity and heat supplied or saved
- Income from sales of GHG "credits" to the head office, partner or third party

8

Expense Projections

- Rough estimates of different categories of expenses
- Breakdown of operating expenses, e.g. by major category, such as labor , raw material, transport, utilities, sales/administration and taxes
- Margin and break-even analysis
- Transaction costs
- Cost-effectiveness of JI, e.g. the relative cost of avoiding CO_2 in the host country

9

Cash Flow Analysis

- Cash Flow Projections
- Net Present Value
- Internal Rate of Return

10

Present Value Concept

Year end	Cashed Rec'd	PV @10%	PV@15%	PV@20%
1	100,000	90,909	86,957	83,333
2	100,000	82,645	75,614	69,444
3	100,000	75,131	65,752	57,870
.....				
10	100,000	38,554	24,718	16,151
Total Rec'd	1,000,000			
Present Value		614,457 @10%	501,877 @15%	419,247 @20%

11

Cash Flow Projections

	Category	Year 0	Year 1	Year 2	Year 3	Year …
In (+)	Product sold					
	Waste sold					
	GHG credits					
Out (-)	Start-up					
	Machinery					
	Supply					
Net						

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Sensitivity Analysis

Sensitivity Analysis is a simulation study of the **effect of changes** in critical planning assumptions and/or projections such as sales, cost of equipment, level of expense, and revenue starting date **on the financial viability** of the project

13

Project's IRR Sensitivity to Changes in the Level of Income

Year end	Cash out	Cash in Scenario A	Cash in Scenario B	Cash in Scenario C
0	(1,000,000)			
1		150,000	200,000	250,000
.....				
10		150,000	200,000	250,000
Totals	(1,000,000)	1,500,000	2,000,000	2,500,000
Net Present Value @ 15%		(214,943)	278	221,471
Internal Rate of Return		IRR of the Cash Flow=8%	IRR of the Cash Flow=15%	IRR of the Cash Flow=21%

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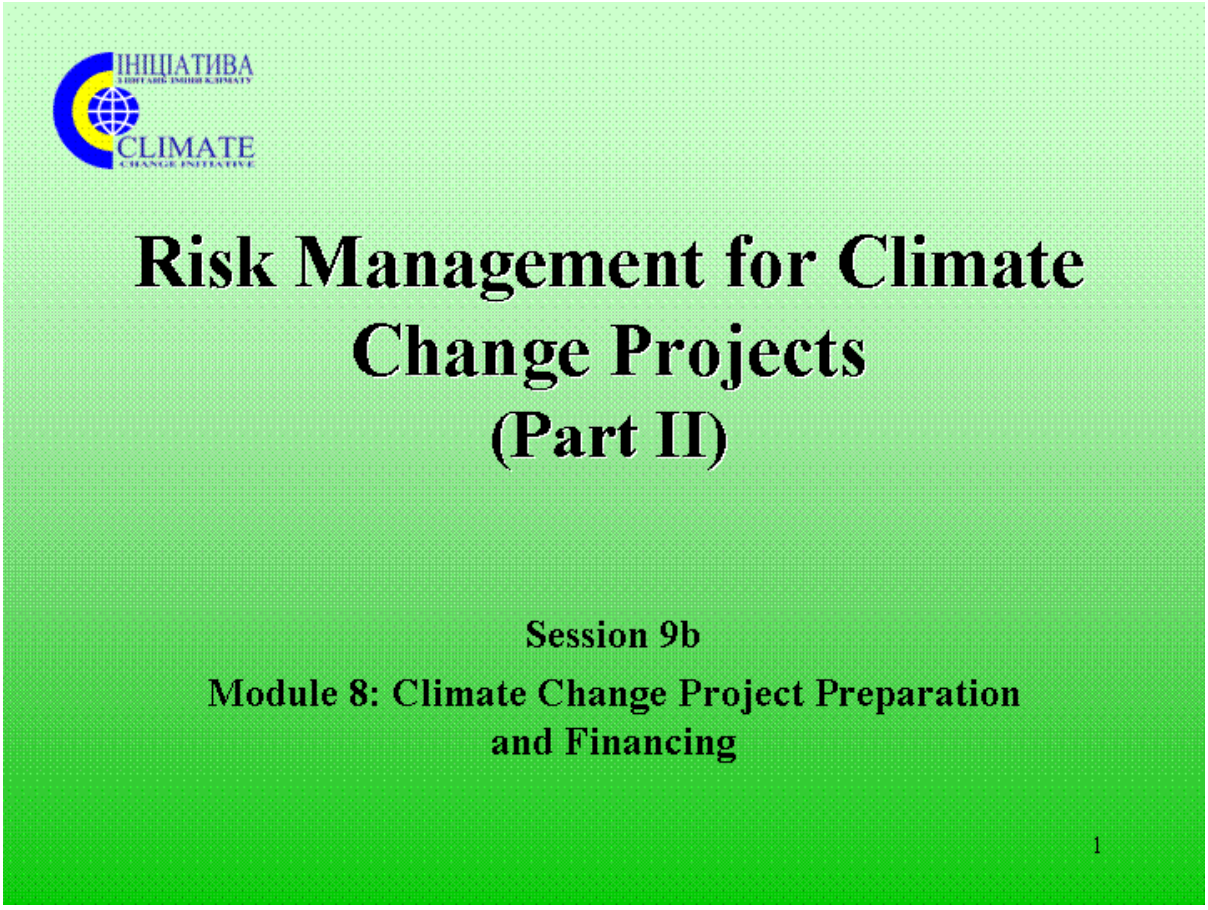
MODULE 8: PROJECT PREPARATION AND FINANCING

Sessions 9b: Risk Management for Climate Change Projects



Session Overview

- Risk Management Principles
- Common Risks of Climate Change Energy Projects
- Analyzing and Managing Specific Energy Efficiency Project Risks

2

Risk Management Principles

- Risk is the chance of injury of injury or loss
- Risks are faced by lenders, but all project participants have to be concerned about reducing risks to lenders
- The party best able to influence risks should be responsible for managing risks

3

Risks can be minimized by reducing either:

- The amount or probability of loss through sound project development, or
- a party's exposure to loss through risk management mechanisms

4

Climate Change Energy Projects Face Three Types of Common Risks of a Project's Life Cycle

- Project development risks

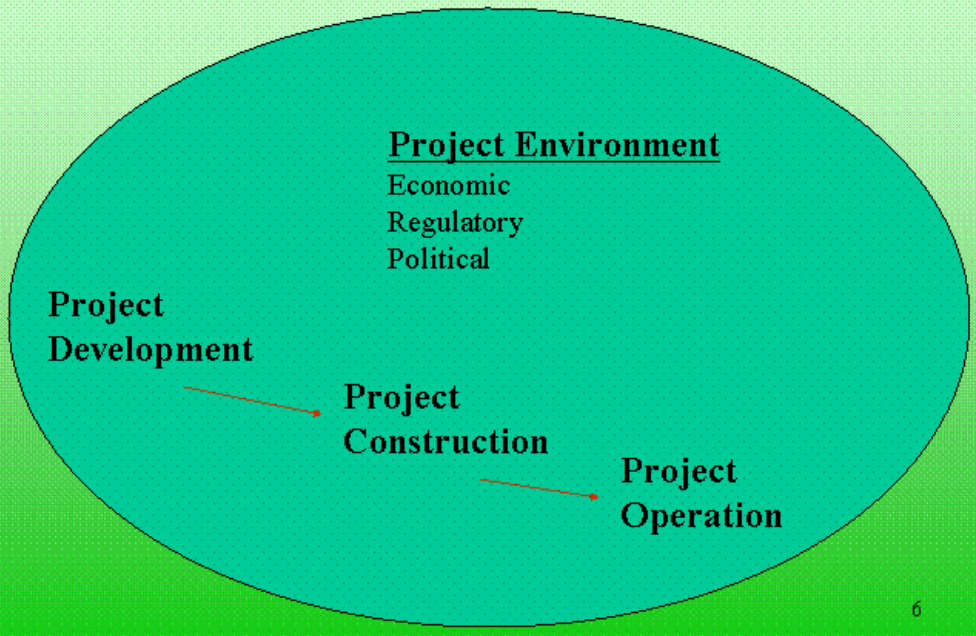
  the first phase of a project's life cycle, includes the risks of obtaining consents, permits, and other agreements necessary for financial closure
- Technical risks

  construction and operation phases, include construction delays, cost over-runs, higher than expected costs and lower-than-expected production or savings
- Project environment risks

  the economic, regulatory, and political factors

5

Project Life Cycle and Environment



6

Managing Technical Risks

- Traditional Mechanisms:

  warranties, turnkey contracts (both construction contracts and O&M contracts), commercial insurance, a letter of credit, an O&M fund, reserved funds

- Non-traditional Mechanisms:

  special insurance funds, and subordinated government loan funds

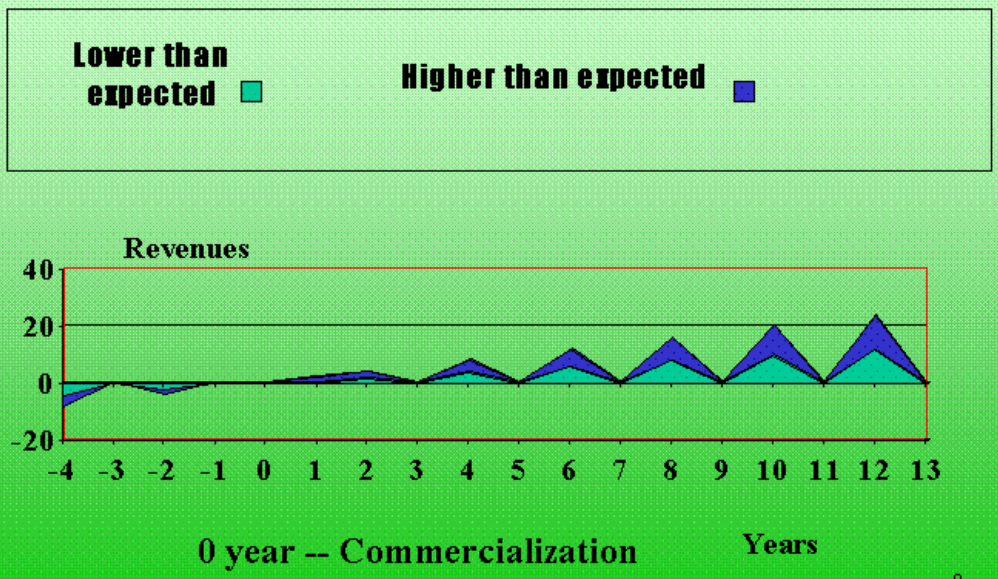
7

Climate Change Energy Projects are most vulnerable to:

- Three sources of economic risks: interest rate risk, inflation risk and foreign exchange risk
- One form of regulatory risk: energy prices
- Three types of political risks: expropriation, political violence and changes in law

8

Inflation Risks for Energy Efficiency Projects



9

Specific Energy Efficiency Project Risks

- Energy savings persistence
- Energy savings verification, and
- Market response

10

Energy Efficiency Project Types

- Commercial loan
- Equipment lease
- ESCO project
- Utility program
- Vendor Program

11

Technical and behavioral deteriorating factors

- Changes in equipment operation procedures
- Declining equipment use
- Changes in building occupancy levels or facility usage patterns
- Poor maintenance of energy-efficient equipment that results in a deterioration in the performance of the equipment

12

Risk Management for Energy Efficiency Projects

- Through Project Development
  energy accounting
  monitoring and performance evaluation
  strong operations and maintenance programs
  staff knowledgeable about their customer's problems
- Through Risk Management Mechanisms
  risk pooling
  performance contracting

13

Non-Traditional Risk Management Mechanisms

- Market reserved funds
- Multilateral development bank credit enhancements
- Alternative to energy efficiency project finance

14

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 10: Introduction to Working Group Exercise

General Objectives: Session 10 is intended to give an overview of the use of the PROFORM model in analyzing various economic and financial aspects of potential project investments. The model was developed by the Lawrence Berkeley Laboratory in the USA (and was translated into the Ukrainian language with permission) and will be used by participants in the working group sessions that follow. PROFORM was developed for the assessment of energy projects that involve electricity generation or non-electric energy production, or energy efficiency projects that save electricity and/or fossil fuels. By the end of the session, participants should have a basic understanding of:

- What PROFORM does (financial assessments, environmental assessments)
- How to navigate in the model (structure of the model, getting help with methodology and calculations)
- The specific tasks that participants will undertake in the working group exercises

Activities: Demonstration of PROFORM, followed by period of questions and answers

Total Time: 60 minutes

Materials: PROFORM model only

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 10: PROFORM Model. Help

GENERATION DISPLACED BY PROJECT

One can approximate the electricity generation expected to be displaced by a project using varying degree of realism with respect to actual system operation. In cases where the electricity system consists of multiple power sources, it is helpful to have some knowledge of how the sources will be dispatched.

If a multiple-source system uses only fossil fuels for electricity generation, the error introduced in estimating avoided GHG emissions through under- or over-weighting one fossil fuel technology relative to another is not likely to be very large, since the difference in CO2 emissions per kWh generated among the different technologies are moderate. If, on the other hand, the system has significant reliance on power generation from zero-CO2 sources such as hydro or nuclear power, the potential error from under- or over-weighting one source relative to others could be large.

The examples below assume an electricity system with the following characteristics, which remain roughly constant over the lifetime of the project. The system uses coal-fired power plants to serve low load (midnight to 6 a.m.), natural gas-fired combined cycle power plants to meet intermediate load (6 a.m. to 6 p.m. and 10 p.m. to midnight), and gas-fired gas turbines to meet the peak load in the evening (6-10 p.m.).

Renewable energy project: The output of the renewable power plant is roughly constant over an average 24-hour period. Thus, the wind power plant will displace the coal power plants for six hours (25 percent), gas combined cycle for 14 hours (58 percent), and gas turbines for four hours (17 percent).

Electricity end-use efficiency project: A project to improve lighting efficiency at a large office building will reduce electricity demand primarily during daytime and early evening hours. The analyst assumes that the project will reduce electricity demand evenly from 8 a.m. to 8 p.m. Since the peak load begins at roughly 6 p.m. on an annual average basis, the analyst assumes that the project will displace diesel-fired gas turbines for two of the 12 hours of building operation, and natural gas-fired combined cycle power plants for the remaining 10 hours. Thus, the electricity generation displaced would be allocated 17 percent to diesel-fired gas turbines and 83 percent to natural gas-fired combined cycle power plants.

Electricity end-use efficiency program: A program to promote CFLs in homes will reduce electricity demand primarily during evening hours. The analyst assumes that the average CFL will operate daily from 6 to 10 p.m. Since most of this period corresponds with the system's peak load, the analyst assumes that each CFL will displace diesel-fired gas turbines for three of the four hours of its operation, and natural gas-fired combined cycle power plants for the remaining hour. Thus, the electricity generation displaced would be allocated 75 percent to diesel-fired gas turbines and 25 percent to natural gas-fired combined cycle power plants.

EFFICIENCY PROJECT

Baseline End-Use Data

Investment in Baseline Technology per Project Unit.

Example: The project will build a high-efficiency new cement plant. The baseline investment is the cost of the cement plant that would have been built without the project.

Example: The project will promote energy-efficient refrigerators. The baseline cost is the cost of a typical standard refrigerator that presumably would have been purchased without the project.

Total Investment in Replacement Equipment in Baseline

Example: The project will replace an existing boiler that is still operational. The baseline investment is the cost of a new boiler, entered in the year that it would have been purchased without the project.

MODULE 8: PROJECT PREPARATION AND FINANCING

Sessions 11: Working Group Exercises

General Objectives: Session 11 is to be used as time for participants to work in small groups and analyze project investments using the PROFORM model. Participants should split up into small groups of around 2-3 per computer. Beforehand, the instructor should prepare a set of projects that are to be analyzed. During the first working group session, the instructor should distribute, in hard copy form, the small group assignments. These assignments should include the project investment description and specific model inputs that will be needed (e.g., for a cogeneration project, the instructor should provide information regarding capacity, quantity of electricity produced, electricity price assumptions, capital costs, inflation rate, debt interest rate, etc). By the end of the three sessions, participants should have a basic understanding of how to conduct a financial assessment of a potential project investment and determine the following:

- Net present value of investment with/without carbon credits and before/after taxes
- Internal rate of return of investment with/without carbon credits and before/after taxes
- Energy performance description of the investment (e.g., average electricity production/savings per year, average energy output/savings per year, average electricity savings per year)
- Emission performance description of the investment (e.g., total carbon emissions avoided, total pollutant emissions of NOx, SO_2, and particulates avoided)

Activities: Small group work using the PROFORM model. Instructor should monitor group work closely, moving from group to group and addressing issues and questions that arise.

Total Time: 4 hours and 45 minutes

Materials: PROFORM model and instructor input materials

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 12: Presentations of Results of Working Group Exercise

General Objectives:	Session 12 is an opportunity for small groups to present the results of their analyses. Ideally, this session should be an interactive time in which the experience gained by each participant in conducting the analyses can be shared and applied in a constructively critical way to the presentation of results from the rest of the groups. Thus, it is important that the instructor moderates the presentations and solicits feedback from other groups.
Activities:	Small group presentations
Total Time:	60 minutes
Materials:	PROFORM model results for the small groups

MODULE 8: PROJECT PREPARATION AND FINANCING

Session 13: Group Exercise Review

General Objectives:	Session 13 is an opportunity for the instructor to give a brief summary of the results for each of the small groups presentation, provide a constructive critique of results, and indicate what are the implications for how such a project can be followed up.
Activities:	Informal presentation/review by instructor, followed by questions and answers
Total Time:	45 minutes
Materials:	None

MODULE 8: PROJECT PREPARATION AND FINANCING

Selected List of References – Project Preparation

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The World Bank Group, *Evaluation Guidelines for Potential World Bank Activities Implemented Jointly (AIJ) Pilot Projects.*
Treasury Board of Canada. 1991. *Program Evaluation Methods: Measurement and Attribution of Program Results.* Ottawa: Program Evaluation Branch, Office of the Comptroller General.
U.S. Government Accounting Office (GAO), 1991. *Designing Evaluations,* Washington, D.C.: GAO Program Evaluation and Methodology Division.

Training Module Evaluation Form

Title of Module: Project Preparation and Financing
Date: **Module # 8**

For each statement below, mark the circle on the scale that corresponds to your opinion.

		Evaluation score					
		1	**2**	**3**	**4**	**5**	
1. The presentation of this module was	Unclear	O	O	O	O	O	Clear
2. The objectives of this module were	Not important	O	O	O	O	O	Important
3. The information presented in this module was	Not sufficient	O	O	O	O	O	Sufficient
4. The information presented in this module was	Not useful	O	O	O	O	O	Useful
5. The exercises in this module were	Not interesting	O	O	O	O	O	Interesting
6. The knowledge acquired through this module was	Insignificant	O	O	O	O	O	Important
7. Participating in this module enable you to learn	Nothing new	O	O	O	O	O	Many new things

What did you like most about this module? _____

_____

What did you like least about this module? _____

_____

What is your opinion on presenters? _____

_____

What is your opinion on organization of this module? _____

_____

On what themes presented in the module would you like to get more information? _____

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What module themes would be interesting for you in the future? _____

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Comments: _____

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