Challenges in Financing Renewable Energy Projects

Workshop Overview and Introduction to Renewable Energy

Tbilis, 01 June 2012
Agenda

1. Presentation of the Green for Growth Fund
2. Introduction to Renewable Energy
3. Introduction to the specifics of Hydro Power Plants
4. Case study of a hydro project
5. Financing of Renewable Energy Projects
6. Regulatory Conditions for Bankability
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Key Features

Mission statement

The mission of the Fund is to contribute, in the form of a public private partnership with a layered risk/return structure, to enhancing energy efficiency and fostering renewable energies in the Southeast Europe region including Turkey, predominantly through the provision of dedicated financing to businesses and households via partnering with financial institutions and direct financing.

- **Initiators**: European Investment Bank and KfW Entwicklungsbank, supported by the European Commission
- **Domicile**: Luxembourg SICAV-SIF
- **First closing**: 17 December 2009
Donors / Investors

Current Shareholders

- Committed Fund Volume: ~ EUR 170 mil
- Prospective Fund Volume over the next five years: EUR 420 mil
Target Region

Wide geographic reach

• GGF currently operates in 8 countries in SEE
• Advanced Planning for expansion to 6 countries in ENR
• Investment Management Consortium has offices throughout the region

= Finance in Motion offices
Objectives and Instruments

Objectives

• Minimum 20% reduction in energy consumption
• Minimum 20% reduction in CO₂ emissions
• Promotion of renewable energy

Instruments

• Medium to long-term senior loans
• Subordinated loans
• Letters of credit
• Guarantees
• Mezzanine debt instruments
• Local debt securities
• Equity
• Technical Assistance support

Partners

• Financial Institutions (min. 70%)
• Direct Investments (Project Finance) in RE projects, ESCO’s etc.
Direct Investment – Project Finance

Eligible Renewable Energy Projects

- Small hydro (< 30 MW)
- Small wind farms (< 30 MW)
- Biomass (including Biogas)
- Solar (thermal and photovoltaic)
- Geothermal
- Methane recovery

Technical Aspects

- Specific to project type
- Transparent procurement
- Social and environmental impact assessment
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Renewable Energy

Definition

• Renewable energy is derived from natural processes that are replenished constantly.

(...) Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources. (Source: http://en.wikipedia.org/)
Renewable Energy Investments – World-wide

Investment (bn. US$)

- Europe
- USA
- Latin America
- Asia & Oceania
- Africa & Middle East

2004 2005 2006 2007 2008 2009
Barriers for Investments in Renewable Energy

- New and unproven technologies
- Scale effects
- Imperfect financial markets
- Regulatory risks
- Investment conditions in developing / transition countries
Renewable Energy: Types of Financing

**Corporate Finance**

- **Bank(s)**
- **Investor**
- **Biomass Project SPV**
  - Investor develops the project and/or evaluates the project risk
  - Investment (with bank funds and own equity)
  - Provision of investor data for corporate due diligence
  - Disbursement of funds

**Project Finance**

- **Bank(s)**
- **GGF**
- **Investor**
- **Biomass Project SPV**
  - Investor develops the project and/or evaluates the project risk
  - Provision of project data for project due diligence
  - Equity contribution
  - Equity Debt
  - Disbursement of senior and/or mezzanine funds directly to the SPV
Renewable Energy: Types of Financing

Advantages of Corporate Finance

• Cheaper if good corporate rating available / Lower transaction costs
• No deep due diligence of the financing parties
• Additional cash flows to the corporate / better diversification

Advantages of Project Finance

• Newly created economic entity (SPV)
• High level of risk allocation, therefore higher leverage possible
• Separation of corporate core-business from RE revenues (good for financing party if corporate fails / good for corporate if project fails)
• Also weaker corporates (typically small developer) have a chance to get financing even if corporate profile is weak
• Relief of the corporate balance sheet (possibly better Debt/Equity ratio)
Stakeholders of a Renewable Energy Project
Renewable Energy Project Development

**Comprehensive Analysis prior a RE projects starts**

- Equity requirement
- Long-term financing of at least 10-20 years
- Adequate collateral package (i.e. pledge of shares in project company, assignment of claims, mortages, pledge of project accounts, debt service reserve accounts)
- Adequate Debt Service Coverage Ratio:
  \[(\text{Net operating income} / \text{Total Debt Service}) > 1\]
- Technical and legal due diligence with positive outcome
- Independent assessment of renewable energy source (wind, hydro, solar, biomass)
- Environmental and Social Impact Analysis (ESIA)
- Relevant approvals and permits
- ...
Technology Profiles: Hydro Power

Typical size: 1-30 MW
Investment per MW: ~ 2,000 – 3,000 k EUR
High potential in: Albania, Armenia, Bosnia and Herzegovina, Montenegro, Macedonia, Georgia, Serbia, Ukraine

Advantages
• Low-to-medium electricity production cost (~ 5-10 EURct per KWh) – basically no “fuel” cost
• Almost grid parity (in comparison to traditional power plants)
• Easy to operate & maintain
• Project lifetime up to 50 years
• Daily production well predictable

Disadvantages
• High environmental impact
• High capital expenses with high risks during the construction
• Limitation as only very selected geographical areas suitable
• Several drought seasons could bring difficulties in serving the loans
Technology Profiles: Wind Power

Typical size: 10 - 30 MW
Investment per MW: ~ 1,500 k EUR
High potential in: All countries

Advantages
- Low-to-medium electricity production cost (~ 8 euro cents per KWh) – no “fuel” cost
- Easy to operate and maintain (especially as manufacturers provide full service contracts)
- Low-to-medium environmental impact

Disadvantages
- High capital expenses
- Wind installations are only possible with a wind speed of at least 6-7 m/sec
- Requires sufficient grid capacity and good grid management due to spontaneous fluctuations
- Long term predictions of revenue are often too high
- Dependency on the feed in tariff
Technology Profiles: Biomass Power

Typical size: < 10 MW_{el}
Investment per MW: ~ 2,000 k EUR
High potential in: All countries

Advantages
• Very stable and predictable output (if raw material supply secured) – base load
• Co-generation due to the production of electrical and thermal energy
• Biomass residuals (wood, straw etc.) is often a waste that can be used reasonably
• Large number of working hours per year

Disadvantages
• Logistical challenges for “fuel” supply in quantity and quality aspects
• Fuel cost for biomass are variable
• Constant demand for thermal output desirable
• Dependence on electricity feed-in-tariff especially if thermal heat cannot be sold
Technology Profiles: Biogas Power Plants

Typical size: < 2 MW
Investment per MW: ~ 1,500 k EUR
High potential in: All countries

Advantages

• Very stable and predictable output – base load
• Co-generation due to the production of electrical and thermal energy
• Can be used as a way of waste control (residuals of farming, slaughtering, saw mill, ...)
• Large number of working hours per year

Disadvantages

• Some logistical challenges for “fuel” supply in quantity and quality aspects
• Biological process rather difficult to manage (usual farmers have to become “energy farmers”)
• Usage of silage (corn, wheat) brings up ethical questions
• Fuel cost for biomass are variable
• Dependence on electricity feed-in-tariff especially if thermal heat cannot be sold
Technology Profiles: Solar Power (PV)

Typical size: few kW – 10 MW
Investment per MW: ~ 1 500 k EUR
High potential in: All countries with sufficient solar irradiation

Advantages
- Easy to maintain
- Easy to predict annual production, when solar data are available
- Very limited impact on the environment
- Price per KWp has been constantly decreasing
- Long-term running

Disadvantages
- Limited number of yearly full-load-hours
- High production volatility
- Still relatively expensive and only feasible with feed-in-tariff
- Some modules contain problematic contents, especially thin film modules
Thank you for your attention!