The Challenges and Opportunities of Sustainable Energy Finance

Eric Usher
Energy Programme Officer
UN Environment Programme

UNEP

Division of Technology Industry and Economics

Energy investment presents both a challenge and an opportunity to financial institutions.

UNEP

The challenge:

Energy is critical for maintaining our industrial societies and for meeting aspirations of developing countries:

- Energy essential for industry, transportation, agriculture, cooking, heating, lighting, communication ...

UNEP

But ...

Existing approaches to energy service delivery and use have large impacts on the environment:

- air and water pollution, acid precipitation, noise, biodiversity impacts, global warming and climate change, land use and visual impacts, and others.

Power example: impacts differ by generating source, but all power projects (thermal, hydroelectric, nuclear) have impacts.

UNEP

In the energy sector ...

- During the coming decades large capital investments are required in developing countries to offer even modest modern energy services to the worlds' poor.
- Developed countries as well will require large investments to replace and upgrade their aging energy infrastructure.

UNEP

How can financial institutions respond to the sustainable energy challenge?

LIABILITIES SIDE

– reduce support for environmentally unsound projects

OPPORTUNITIES SIDE

– increase support for sustainable energy projects

- energy efficiency
- renewable energy

UNEP

Liabilities side

- take a long term perspective
- *require* EIAs of supported projects
- *require* that environmental management plans be a part of supported projects
- *require* a monitoring plan

UNEP

Opportunities side

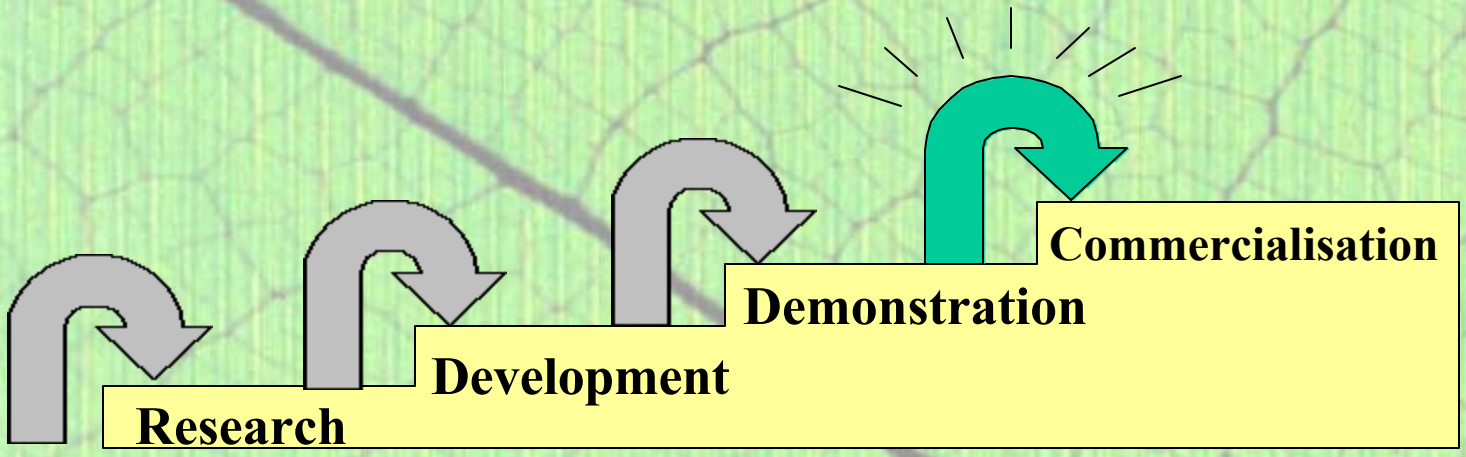
- Energy efficiency
- Renewable energy

Renewable Options

Wind Energy

Biomasse

UNEP targets financial decision makers with a focus on helping them become more aware of investment opportunities in the sustainable energy sector



UNEP

Division of Technology Industry and Economics

But supporting investment in this sector is not easy…..

Barriers to RE finance

- small project size
- higher real and/or perceived risk
- absence of sound operational data
- limited access to reliable technical information
- lack of in-house skills to evaluate/negotiate projects
- increased transaction costs with initial investments
- lack of internal rewards or incentives
- many RE companies are small

UNEP

Biomass

- 10% of world energy…up to 90% in certain parts of the world
- Enormous variety of technology choices, some well established and "bankable" like bagasse to energy
- Projects range from small self consumption at $100 per household to $50 million "inside the fence" plus export projects
- Fuel choice and control, combined with power use and sale arrangements are key issues

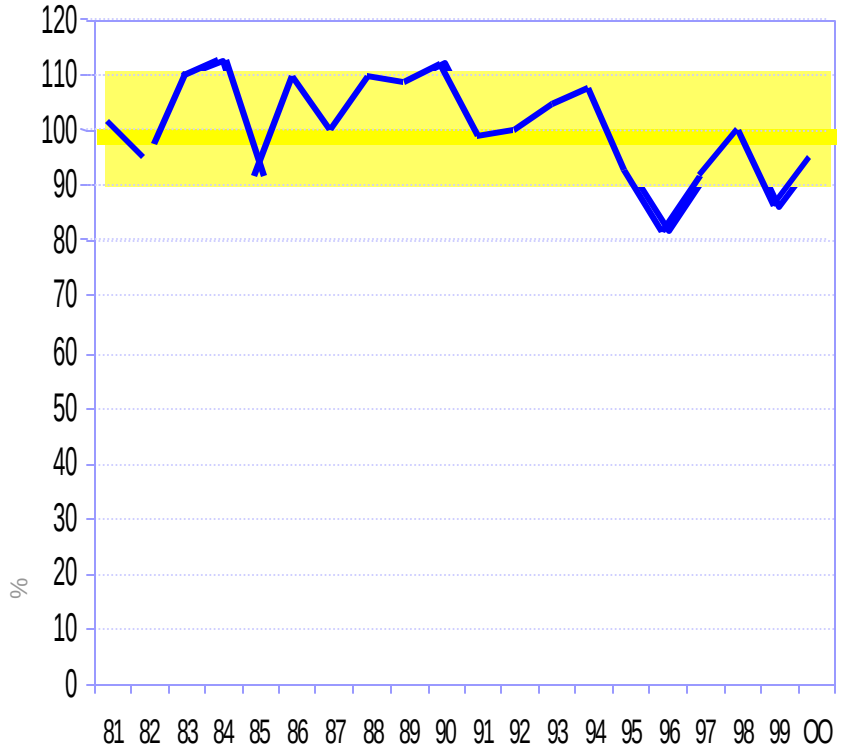
Wind Energy

- Long history
- Fastest growing energy sector
- Large and small scale applications, alone or in connection with other technologies (so-called “hybrids”)
- Wind resource data, power sale arrangement, EPC and O&M issues are key

UNEP

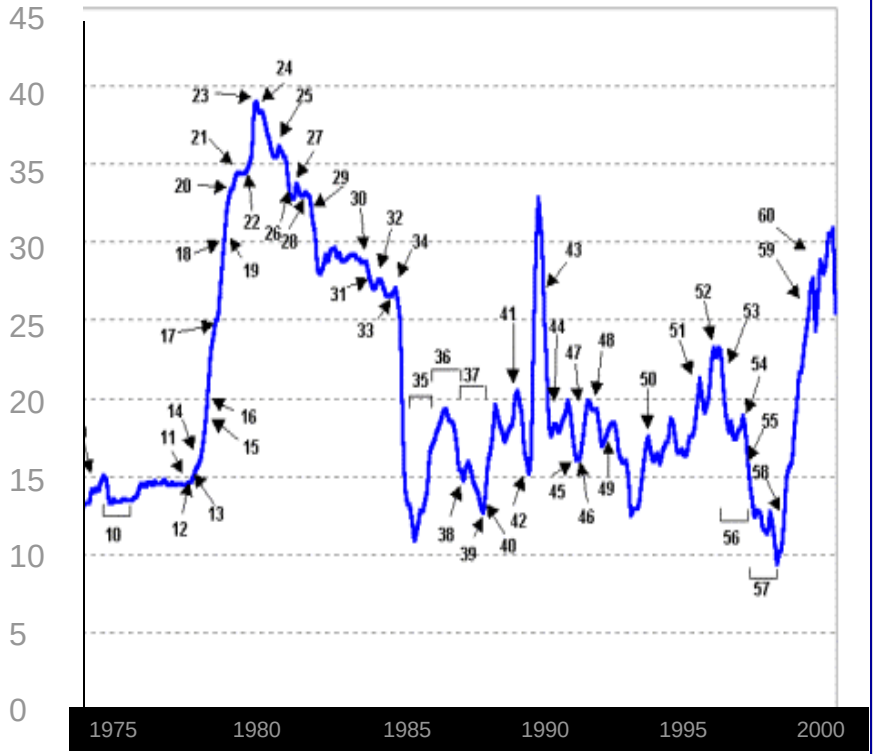
Wind energy output varies by less than 10% per year while the price of thermal fuels can vary wildly

Rated Wind Output, 1981-2000



Wind energy output in Denmark as percentage of 20-year predicted output.
Source: Danish Wind Turbine Manufacturers Association

Price of Crude Oil, 1975-2000



Source: U.S. Dept. of Energy

UNEP

Division of Technology Industry and Economics

Solar Photovoltaics (PV)

- Enormous market potential and easy to enter business for small and medium sized entrepreneurs
- Technology well established, prices have declined and economies of scale finally being realized…ability to pay is NOT the problem in most rural settings
- Alone or combined with sale of fuel for cooking this makes”an excellent small business sector
- In “cash” markets consumer financing is key…most promising sub-sector is “fee for service”

Hydroelectricity

- Already large base of plants in operation
- Enormous untapped potential
- There are “good” and there are “bad” hydro projects from an environmental perspective
- Base-load and peaking potential
- Hydrological data, geo-technical data and power sale details are key issues

Business Models

- On-grid
  - PPA
  - Wholesale Market
  - Inside the Fence
- Off-grid (REDco's)
  - Concession Based
  - Competitive Market Based
- Energy Efficiency ESCO's
  - Performance Contracts
  - Cash and Credit

On-grid: Power Purchase Agreements

- Lenders favorite, phasing out
- Price benchmarks are key
- Utility or purchaser creditworthiness
- Recourse for non-payment
- Country energy plan information crucial
- Regulatory evolution must be understood

On grid Self Generators

- Creditworthiness of underlying business
- What is Plan B?
- Excess power sale
- Alternative Fuel Supplies
- Alternative Buyers
- Wheeling

On-grid Wholesale Market

- The future
- Least cost generators, by hour
- Dispatch and regulatory set-up is key
- Incentives for renewable energy
- Niche market opportunities

Off-grid Rural Energy Delivery Companies

- Cash and Credit Models
  - Micro-credit
  - Corporate credit
  - Banks, traditional lenders
- Product Diversity
- Using presence to expand business base
- Cash sales entry point requires low capital and little risk

Off-grid Rural Energy Delivery Companies

- Fee-for-service
  - Capital intensive
  - Much larger business base
  - Greater product diversification opportunities
  - Local presence crucial
  - Grid extensions and non-payment issues now manageable
  - The poor pay!

UNEP

Planning, Risk Management and Financial Analysis Issues

- Location and technology
- Agreements
- Sponsors and advisors
- Market
- Implementation plan
- Finance
- Impacts
- Risks

Business Plan for Grid Connected Project

- Inputs (fuel), process, outputs
- Site control, sale of output, permits, EPC and O&M, pre-construction
- Customers, local and country market issues and regulatory regime
- Management, insurance, permitting, construction and operations
- Economic activity and local employment,pollution and GHG impact

Prototype Carbon Fund

- $145 million
- Will purchase carbon
- Specific project requirements
- $20 per ton of carbon, $5 per ton of CO2
- Central American request for proposals underway
- The price of carbon in the future?

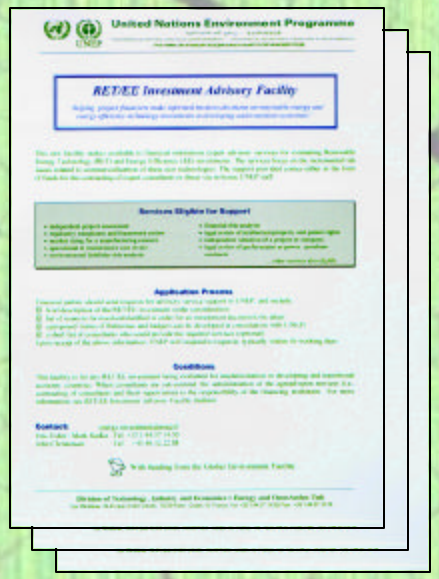
REEF

- Renewable Energy and Energy Efficiency Fund
- $65 million of equity for on-grid, off-grid and energy efficiency
- GEF support for smaller and more innovative

UNEP

UNEP RE/EE Investment Advisory Facility (IAF)

"helping project financiers make informed business decisions on renewable energy and energy efficiency investments in developing and transition economies"



A Global Environment Facility Supported Initiative

UNEP

Division of Technology Industry and Economics

Investment Advisory Facility

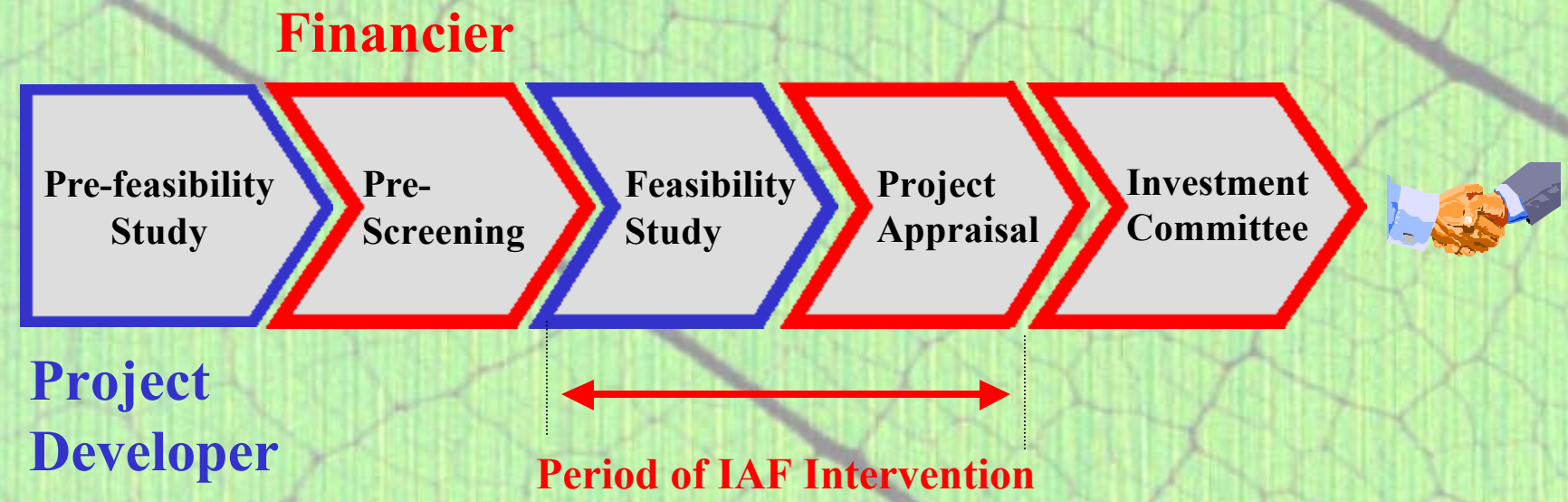
provides contracted support to financiers evaluating debt and equity investments in specific RE /EE projects

Example Services Eligible for Support

- **independent valuations**
- **PPA contract negotiations**
- **environmental risk analysis**
- **market sizing for a manufacturing operation**
- **legal reviews**
- **financial risk analysis**

UNEP

Typical Investment Evaluation Process



UNEP

Tanzanian Bioenergy Investment

Clients: **FMO (Dutch), DEG (German) development banks**

Project: **sustainable plantation to provide wood supply to a privatised salt mine**

Support: **forestry expert advised on plantation viability ($26K)**

Outputs:

- **Banks agreed to finance the plantation, which will displace 1 million trees being taken from local forests.**
- **Plantation program began operations in 2000**

UNEP

Latin American Energy Services Fund

Client: **Inter-American Development Bank and FondElec**

Project: **Market sizing for fund pipeline development.**

Support: **($25K of $50K total)**

- **hired a consultancy to advise on regulatory framework and assist with project pipeline assessment**

Results:

- **IADB commited $10 million from its Multilateral Investment Fund as initial participation, with an additional $15 million required for first closing.**

UNEP