IRENA PROJECT NAVIGATOR

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International Renewable Energy Agency

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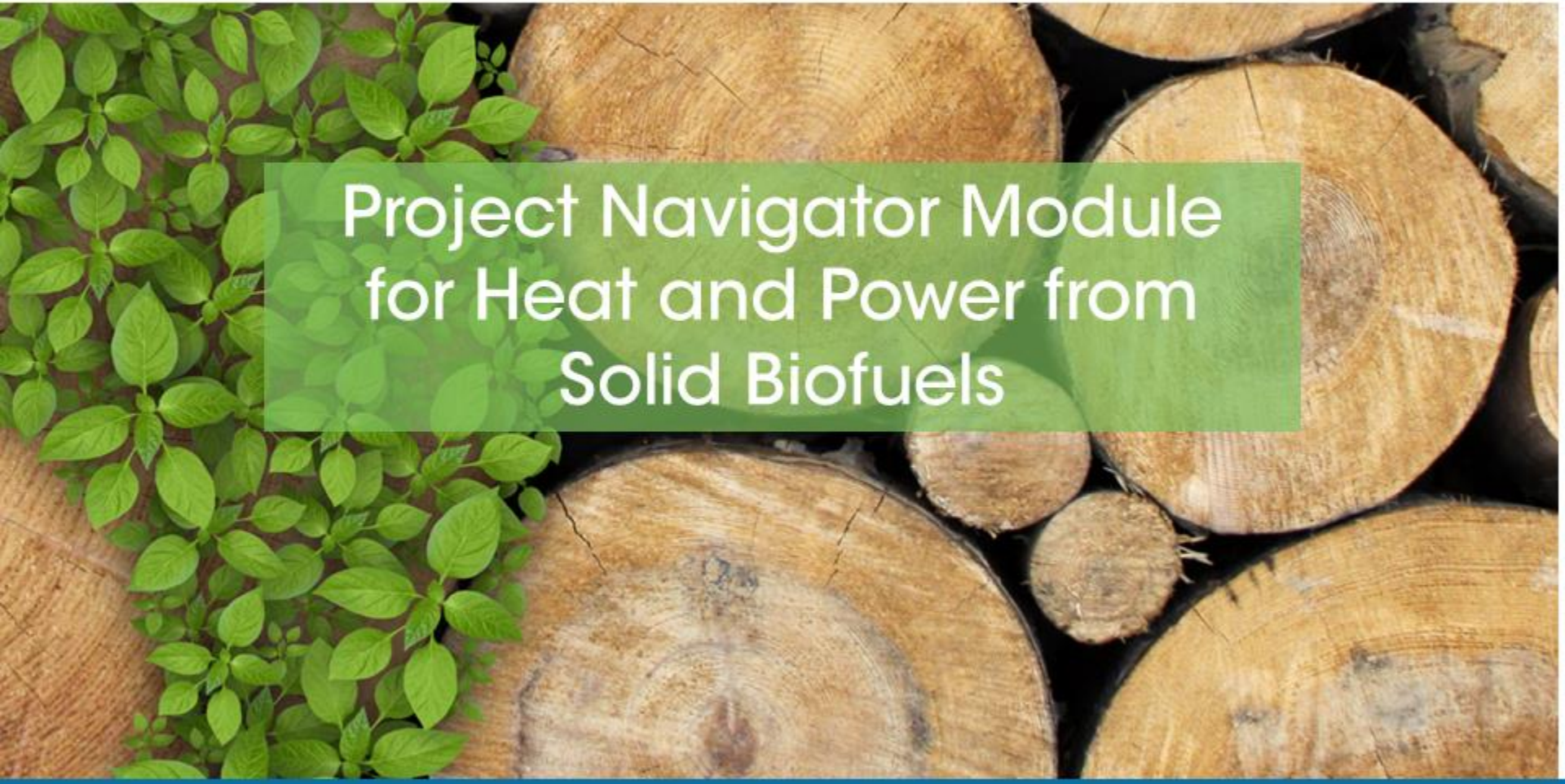

Project Navigator Module for Heat and Power from Solid Biofuels

IRENA 7th Assembly – January 13th 2017

Introduction to Project Navigator

Bankability requirements

Bioenergy project guidelines

IRENA PROJECT NAVIGATOR

Access practical information, tools and guidance for the development of bankable renewable energy projects

- A **learning section** with easy-to-access knowledge materials
- An **interactive workspace** to develop projects and track progress
- An **online search engine** to find renewable energy funding sources

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Bankability of a solid biofuel project

- Quality of projects proposals are often low and reduce the prospects for a "good" project to access financing instruments.
- A good structure & presentation of a bioenergy project may easier attract partners to join the project which increases its prospects to secure financing.

Bankability of a solid biofuel project

- Support the improvement of bankability prospects for viable projects and help meeting requirements from investors and banks. In effect, more bioenergy projects coming closer to implementation.
- Provide knowledge to shorten development lead time, reduce failure rate and the amount of the money necessary to develop a project portfolio.

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Bioenergy project development guidelines

The IRENA Project Navigator introduces a project lifecycle process structured in nine distinct phases designed to support the progressive development of renewable energy projects. These phases become increasingly more involved and detailed, commensurate with the requirements at that particular phase.

- Technical guidance from early business idea (identification) to end of life (decommissioning)
- Control boxes with actionable information for each phase
  - Major actions to be performed, control questions to answer, list of deliverables for each phase
- 13 Tools & Templates and 3 case studies

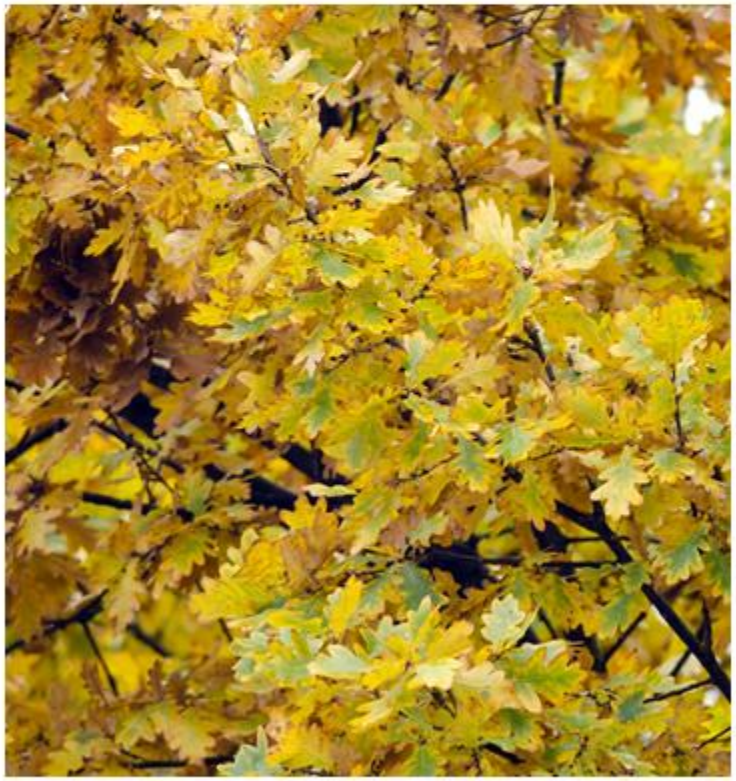
Bioenergy project development guidelines

Identification → Screening → Assessment → Selection → Pre-development → Development → Construction → Operations → Decommissioning

Identification	Stakeholders, potential feedstock, technologies, locations, markets, investors
Screening	Feedstock comparison, business models and related policies and programmes, screening of sites and feedstock materials **Tools: Screening checklists, Financial Analysis tool; calorific value tool**
Assessment	Feedstock assessment, community concerns, market data, cost estimates, preliminary financial assessment, project options, ranking of options **Tools: Assessment checklists; SWOT analysis template; CAPEX/OPEX and transportation cost worksheets; sizing tool**
Selection	Stakeholder involvement, matching feedstock and markets, business model choice, technology and site choices **Tools: Project valuation checklist; ranking scheme**
Pre-Development	Stakeholder communications, Memoranda of Understanding with feedstock providers and biofuel buyers, feasibility study, FEED study, business plan, plant design and detailed cost determination **Tools: Feedstock supply contract template; performance model template; financial model template;**
Development	Stakeholder consultations, off-take contracts, permitting, financing, engineering **Tools: Business plan template; project brief template; financial model template; project schedule template**

Bioenergy project development guidelines

- **Identification**
  - An idea is launched either by an individual, a local interest group, a small company, a local municipality or by a larger, possibly multinational corporation. The developer then turns this idea into a business case.
- **Screening**
  - Evaluating the combination of feedstock, technology and markets for their suitability and compatibility, matching a raw material to a market and a technology.



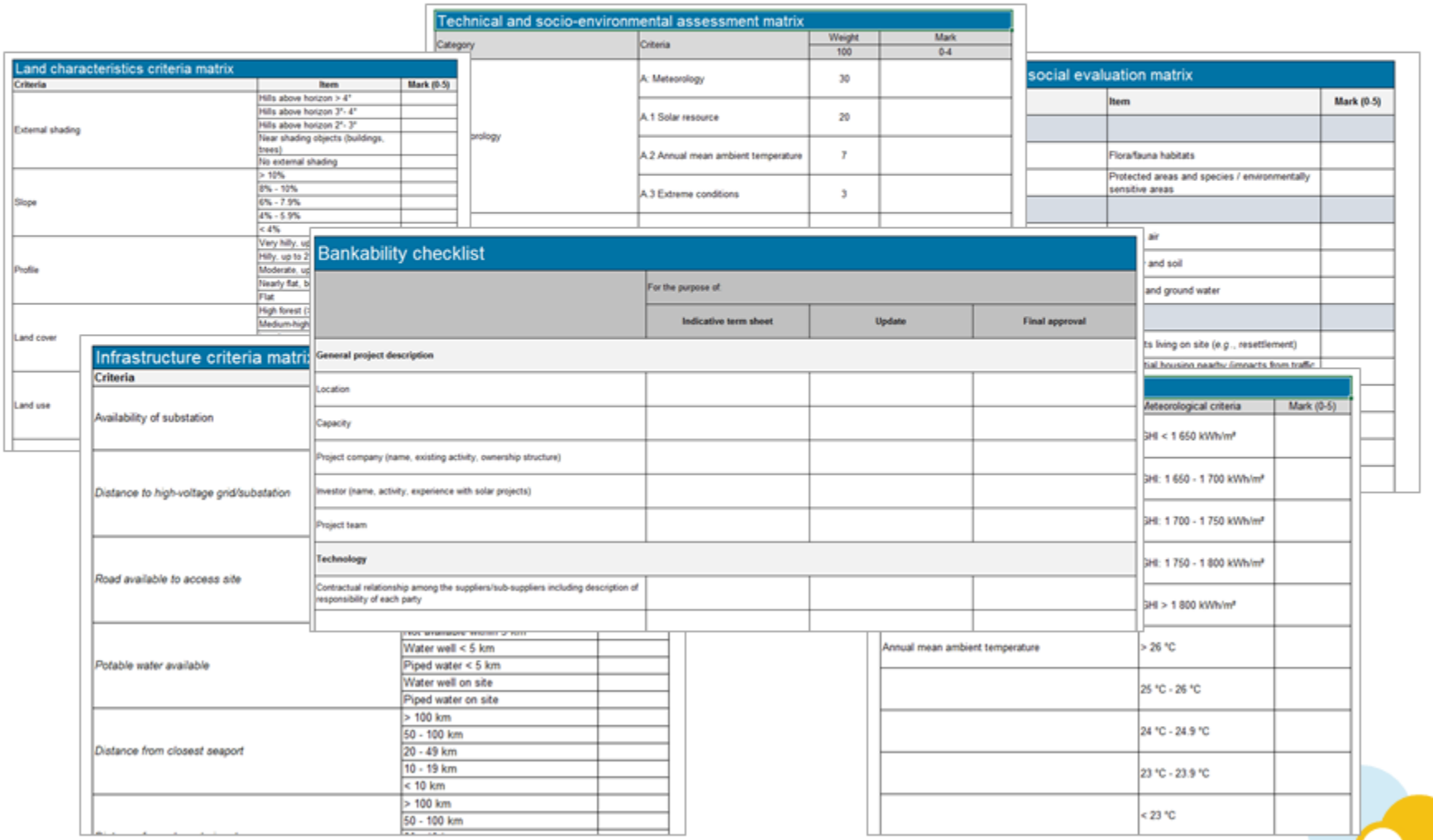
Bioenergy project development guidelines

- **Assessment**
  - Compares and assesses in detail the project options that have passed the screening process. At this phase, economic considerations, such as the cost of feedstock and the market price of the biofuel, come into play.
- **Selection**
  - Questions external decision makers may evaluate the bankability of the project alternative by asking clarifications on the relative financial viability of each alternative, potential "show-stoppers", long-term feedstock availability, the availability of human resources.

Bioenergy project development guidelines

- **Pre-Development**
  - Major engineering studies are performed, including the conceptual design of the processing plant. A business plan template is available in the Guidelines and should be backed up by project agreements with feedstock providers and product off-takers detailing terms and conditions for pricing, quality and deliveries.
- **Development**
  - Outputs of the work undertaken are a bankable financial model, technical design of the facility and a land purchase or leasing agreement. They are supported by tools and templates available in the Guidelines.

Tools & Templates



Technical and socio-environmental assessment matrix

Category	Criteria	Weight	Mark
		100	0-4
	A. Meteorology	30	
	A.1 Solar resource	20	
	A.2 Annual mean ambient temperature	7	
	A.3 Extreme conditions	3	

Land characteristics criteria matrix

Criteria	Item	Mark (0-5)
External shading	Hills above horizon > 4°	
	Hills above horizon 3°- 4°	
	Hills above horizon 2°- 3°	
	Near shading objects (buildings, trees)	
	No external shading	
Slope	> 10%	
	8% - 10%	
	6% - 7.9%	
	4% - 5.9%	
	< 4%	
Profile	Very hilly, up	
	Hilly, up to 2	
	Moderate, up	
	Nearly flat, b	
	Flat	
Land cover	High forest (>	
	Medium-high	
Land use		

Bankability checklist

	For the purpose of:		
	Indicative term sheet	**Update**	**Final approval**
General project description			
Location			
Capacity			
Project company (name, existing activity, ownership structure)			
Investor (name, activity, experience with solar projects)			
Project team			
Technology			
Contractual relationship among the suppliers/sub-suppliers including description of responsibility of each party			

Infrastructure criteria matri

Criteria		
Availability of substation		
Distance to high-voltage grid/substation		
Road available to access site		
Potable water available	Water well < 5 km	
	Piped water < 5 km	
	Water well on site	
	Piped water on site	
Distance from closest seaport	> 100 km	
	50 - 100 km	
	20 - 49 km	
	10 - 19 km	
	< 10 km	
	> 100 km	
	50 - 100 km	

social evaluation matrix

	Item	Mark (0-5)
	Flora/fauna habitats	
	Protected areas and species / environmentally sensitive areas	
	air	
	and soil	
	and ground water	
	ts living on site (e.g., resettlement)	
	ial housing nearby (impacts from traffic	

	Meteorological criteria	Mark (0-5)
	GHI < 1 650 kWh/m²	
	GHI: 1 650 - 1 700 kWh/m²	
	GHI: 1 700 - 1 750 kWh/m²	
	GHI: 1 750 - 1 800 kWh/m²	
	GHI > 1 800 kWh/m²	
Annual mean ambient temperature	> 26 °C	
	25 °C - 26 °C	
	24 °C - 24.9 °C	
	23 °C - 23.9 °C	
	< 23 °C	

Case Studies

- Case study #1: Abellon Clean Energy Ltd, India
- Case study #2: Briquette production in the Itajaí Valley (Brazil)
- Case study #3: Wood briquettes and charcoal in Tanzania

Tools & templates

- Financial Evaluation Tool
- Technical Evaluation Tool
- Initial Financial Opportunity Assessment
- Feedstock procurement template
- Project Teaser Template
- Project Business plan
- Feedstock assessment Checklist
- Market assessment Checklist
- Process assessment Checklist
- Site assessment Checklist
- Feedstock environmental assessment Checklist
- Social project assessment Checklist
- Bankability requirements Checklist

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Thank you for your attention!

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