

PROJECT Biogas



Livestock residues



Development phase

DEVELOPER

BIOENERGY Ltd.

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## ASSESSOR

Name: J.D.

Assessment date: 2016-05-07 00:00:00.0

Assessment institution: EBRD

Contact details:

Address: One Exchange Square, London EC2A 2JN, UK

Phone: +44 20 7629 9400

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## PROJECT DEVELOPER

Name: BIOENERGY Ltd.

Country: Turkey

Contact details:

Address: Mevlana Bulvari No 10, Ankara

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Email: bioenergy@com.tr

## DESCRIPTION OF THE PROJECT

Project name: Biogas

Project type: biogas plant using manure and silage, construction of silage storage

Project is in Development/Operation? Development

Feasibility study prepared? Yes

Does the project developer have a (certified) Environmental and Social Management System and will it be implemented in this project? Yes

## LOCATION

Country: Turkey

City/Village: Konya

Coordinates: Longitude: 37.88496665253639 Latitude: 32.415618896484375

(Link)

Is the project in line with the relevant spatial development plans? Yes

Is an EIA required? Yes

Is an EIA conducted? Yes



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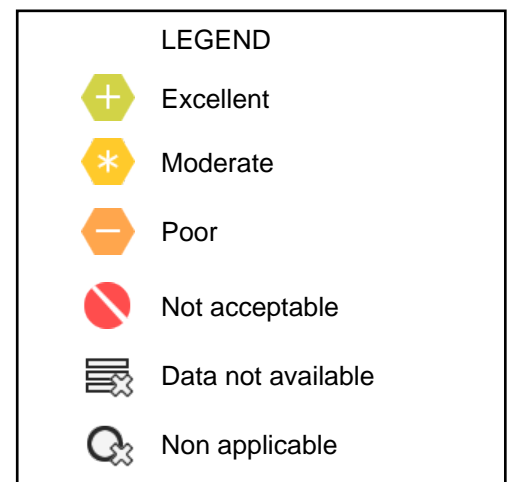
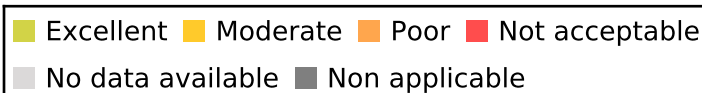
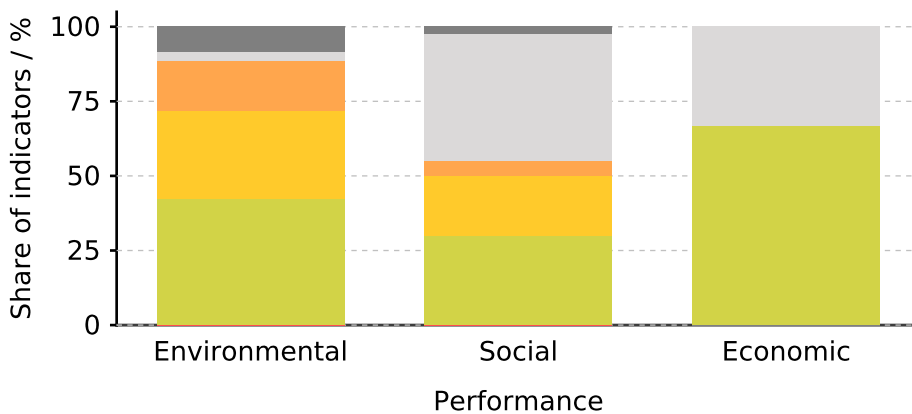
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## ASSESSMENT OVERVIEW

Sustainability pillar			
	Environmental	Social	Economic
Performance	Moderate	Moderate	Excellent
	Total: Excellent		

Project maturity indication: Within the assessment, 19% of data was not available.



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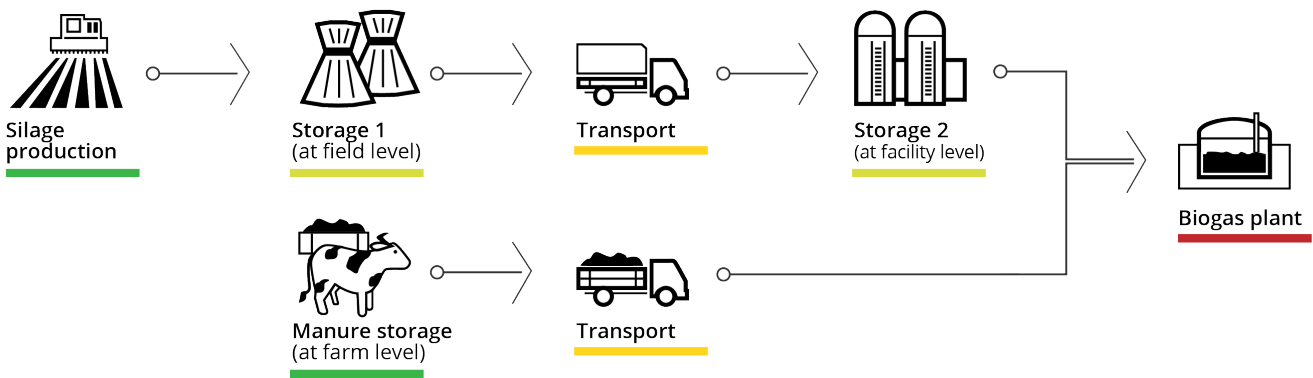
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## ASSESSED COMPONENTS

### LIVESTOCK RESIDUES



	COMPONENT	ASSESSED	TOTAL
	Silage production	Yes	
	Silage storage at farm level	No	
	Silage transport	Yes	
	Silage storage at biogas plant	Yes	
	Manure storage at farm level	Yes	
	Manure transport	Yes	
	Biogas plant	Yes	

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SCORES OVERVIEW

ENVIRONMENTAL INDICATORS	Atmosphere	Water	Biodiversity	Land cover / land use	Soil	Waste	Energy efficiency	Noise	Mechanical efficiency	Total
Silage production	*	+	+	⚙️	*	+	*		*	*
Silage storage at farm level										
Silage transport	*			+			+	+		+
Silage storage at biogas plant	+	*	+	+		*		+		*
Manure storage at farm level	*	-	-	+		*				*
Manure transport	*			+			-	*		*
Biogas plant	*	*	+	+		+	*	+	*	+
Total	*	*	+	+	*	+	*	+	*	*

SOCIAL INDICATORS	Impact assessment and management	Labour	Health and safety	Land acquisition	Information disclosure	Feedstock use competition	Total
Project	+	+	+	+	*	⚠️	*

ECONOMIC INDICATORS	Risk management	Total
Project	+	+

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LIST OF NOT ACCEPTABLE

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## SILAGE PRODUCTION



Type of crop produced: Maize silage

Crop rotation implemented: Monoculture

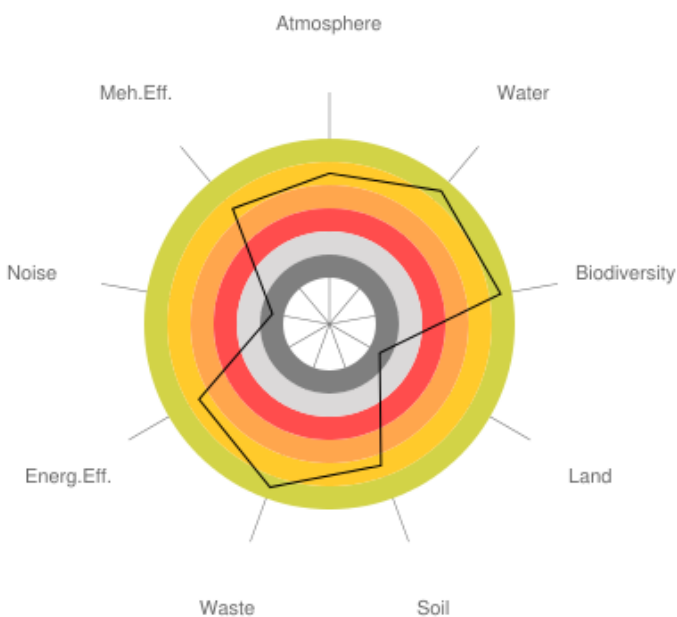
Production area (ha): 150.00

Production (t/year): 6500.00

Nitrogen application rates - mineral fertilizers (kgN/ha yr): 75.00

Nitrogen application rates - organic fertilizers (kgN/ha yr): 75.00

	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
SILAGE PRODUCTION	*	+	+		*	+	*		*	*



	Excellent	4
	Moderate	5
	Poor	2
	Not acceptable	0
	Data not available	2
	Non applicable	0
	<b>Total</b>	<b>13</b>

ASSESSMENT RESULT:

Moderate

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SILAGE STORAGE AT FARM LEVEL



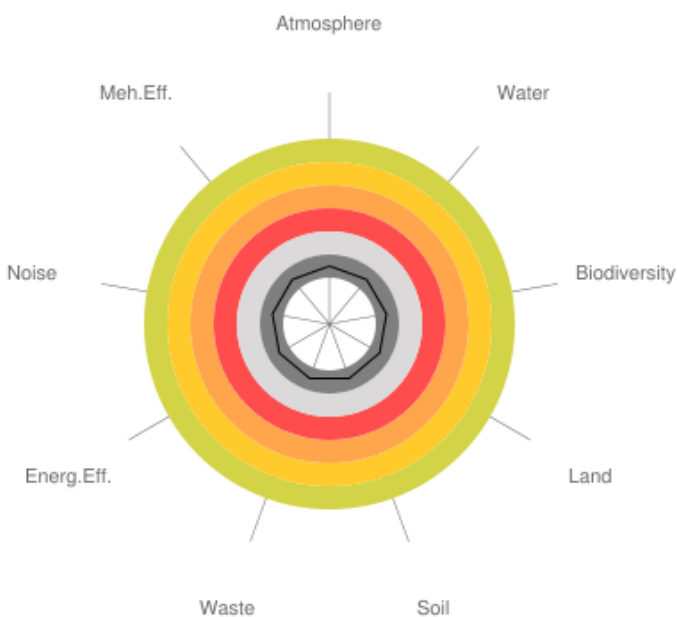
Type of feedstock stored: null

null

null

null

	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
SILAGE STORAGE 1										



	Excellent	nu
	Moderate	nu
	Poor	nu
	Not acceptable	nu
	Data not available	nu
	Non applicable	nu
	Total	nu

ASSESSMENT RESULT:  
null

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## SILAGE TRANSPORT - INITIAL QUESTIONS



Tractor

Distance for transport: **3 km**

How many months per year is silage transported? **1**

How many loads of silage are transported per month? **650**

Is transport cross-border? **No**



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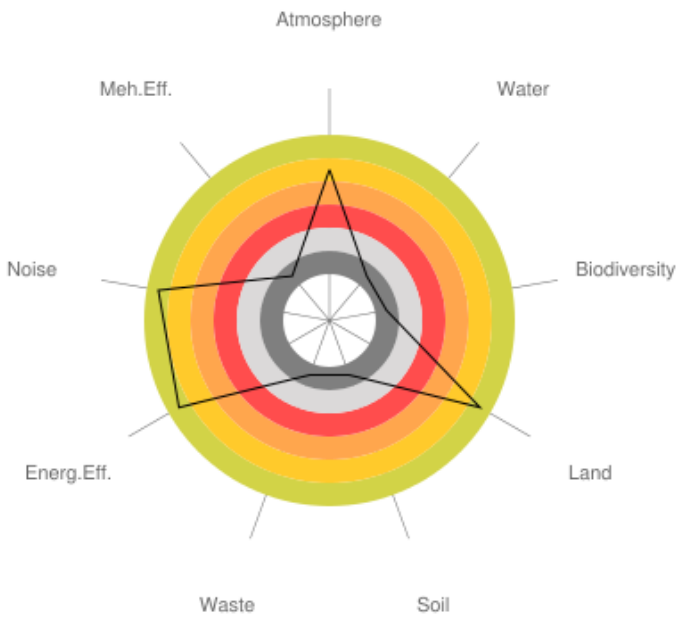
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SILAGE TRANSPORT - RESULTS



	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
SILAGE TRANSPORT										



	Excellent	4
	Moderate	1
	Poor	1
	Not acceptable	0
	Data not available	0
	Non applicable	0
	Total	6

ASSESSMENT RESULT:

Excellent

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## SILAGE STORAGE AT BIOGAS PLANT



Type of storage facility: A5

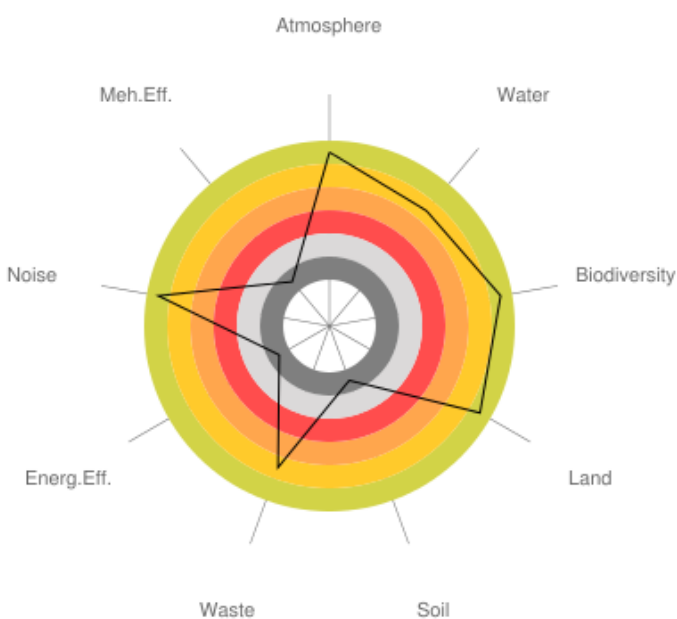
Total storage capacity (t): 6500.00

Area occupied by the storage (m<sup>2</sup>): 500.00

Number of feedstock suppliers: 1

Feedstock country and region of origin: Turkey

	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
SILAGE STORAGE 2	+	*	+	+		*		+		*



	Excellent	6
	Moderate	6
	Poor	1
	Not acceptable	0
	Data not available	1
	Non applicable	1
	<b>Total</b>	<b>15</b>

ASSESSMENT RESULT:

Moderate

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## MANURE STORAGE AT FARM LEVEL - INITIAL QUESTIONS



Type of livestock which generates manure:

Cattle: 2400

Pigs

Poultry

Transport from housing to storage: A2

Total storage capacity (m<sup>3</sup>): 10000

Storage capacity (months): 4

Area occupied by the storage (m<sup>2</sup>): 100.00

Type of storage: A2

What material is used? concrete

Which good farming practices are implemented at the farm?

Effective health care programme for animals is in place: Yes

Farm products are harvested and stored under hygienic conditions: Yes

Animals feed and water is of suitable quality: Yes

Animal welfare is taken in consideration: Yes

Farm production is managed in balance with the local environment surrounding the farm: Yes

Dairy farming provides economic and social benefits to farmers and their wider communities:

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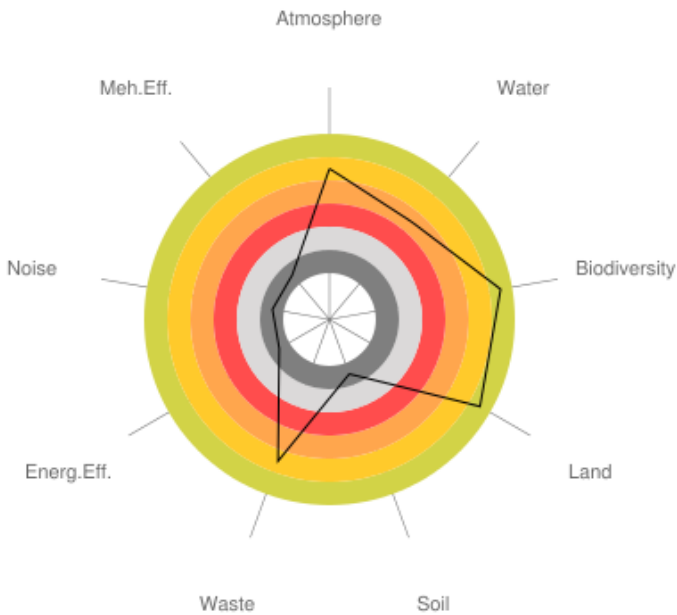
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MANURE STORAGE AT FARM LEVEL - RESULTS



	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
MANURE STORAGE										



	Excellent	2
	Moderate	4
	Poor	4
	Not acceptable	0
	Data not available	3
	Non applicable	0
	<b>Total</b>	<b>13</b>

ASSESSMENT RESULT:

Moderate

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## MANURE TRANSPORT - INITIAL QUESTIONS



Means of transport used for transportation of manure

Pipeline

Vacuum tanker: 100

Tractor

Tanker - how many months per year is silage transported? 12

Tanker: How many loads of silage are transported per month? 68.00

Tanker - Is transport cross-border? No

Tanker - from which countries is feedstock imported? null

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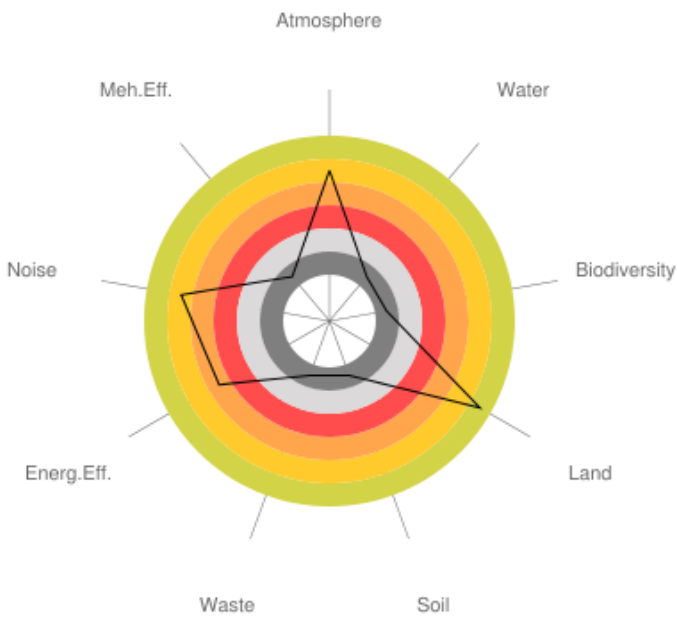
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MANURE TRANSPORT - RESULTS



	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
MANURE TRANSPORT	*			+			-	*		*



	Excellent	1
	Moderate	2
	Poor	1
	Not acceptable	0
	Data not available	0
	Non applicable	0
	<b>Total</b>	<b>4</b>

ASSESSMENT RESULT:

Moderate

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BIOGAS PLANT - INITIAL QUESTIONS



What kind of anaerobic digestion will be implemented? **A3**

Biogas production (Nm<sup>3</sup>/yr): **1700000.00**

Digester capacity (m<sup>3</sup>): **4100.00**

Gas storage capacity (m<sup>3</sup>): **1200.00**

Digestate storage capacity (m<sup>3</sup>): **10000.00**

Technology of CHP plant: **A1**

Power capacity (kWe): **410.00**

Heat capacity (kWt): **440.00**

Unit: **MWh**

Power generation (MWh/yr): **3000.00**

Heat production (MWh/yr): **1700.00**

Power generation: **GJ/yr**

Type of feedstock used: **Cattle manure, maize silage**

Quantity of feedstock required (t/yr): **18800.00**

Share of methane production from a feedstock type in total methane production: **52.50%**

Number of feedstock suppliers: **4**

Feedstock country and region of origin: **Turkey**

How is long-term and sustainable feedstock supply ensured? **long-term contract for 12 years with feedstock**

What is the use of electricity produced?

Internal use: **7**

Supply to the grid: **93**

Other:

What is the use of heat produced?

Internal use for heating (space and water): **10**

Internal use for drying or other technological purposes:

Sale for district heating:

Sale for industrial (technological) purposes: **18**

Other:

Quantity of digestate produced (t/yr): **17800**

For which purposes is digestate used, and what is the share of digestate used for specific purpose? **fertilization 100%**

Technology used for the separation of liquid and solid fraction of digestate (if implemented): **Screw type separator**

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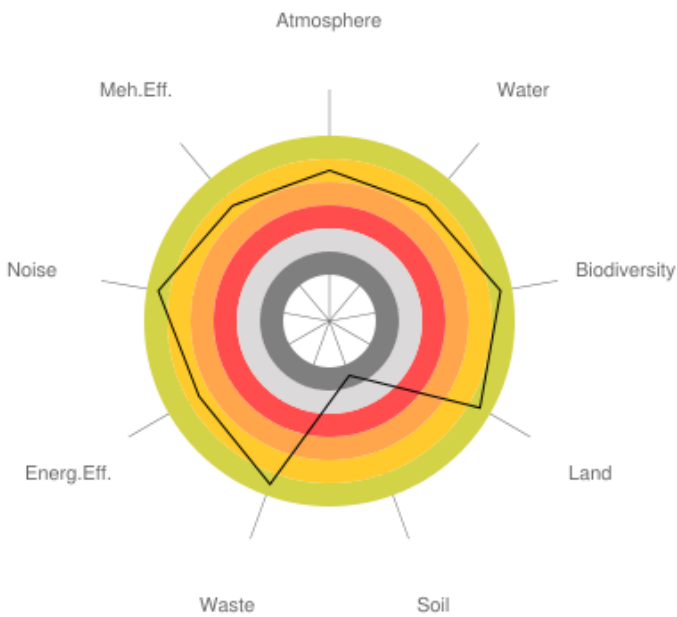
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BIOGAS PLANT - RESULTS



	ATMOSPHERE	WATER	BIODIVERSITY	LAND COVER / LAND USE	SOIL	WASTE	ENERGY EFFICIENCY	NOISE	MECHANICAL EFFICIENCY	TOTAL
BIOGAS PLANT	✳	✳	+	+		+	✳	+	✳	+



+	Excellent	13
✳	Moderate	3
-	Poor	3
⊘	Not acceptable	0
⊘	Data not available	0
⊘	Non applicable	1
	<b>Total</b>	<b>4</b>

ASSESSMENT RESULT:

**+** Excellent



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## SOCIAL - INITIAL QUESTIONS



The nature and level of coverage of the organisation's insurance provisions in relation to environmental and social coverage:  
**worker insurance**

Is there an unavoidable displacement of income generating and subsistence activities, namely subsistence farming, sale of goods and services, wage employment, land lease contract? **No**

Does the company have management plans and resources for any of the followings and are these action plans budgeted?

Yes, for Human Resources Management: 1000€

Yes, for Health and Safety Management: 1000€

Yes, for Communications/stakeholder engagement: 1000€

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## SOCIAL - RESULTS



SOCIAL INDICATORS		IMPACT	LABOUR	HEALTH	LAND	INFO	FEEDSTOCK	TOTAL
	PROJECT							

ASSESSMENT RESULT:

Moderate

	Excellent	12
	Moderate	8
	Poor	2
	Not acceptable	0
	Data not available	1
	Non applicable	17
	Total	40

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## ECONOMIC - INITIAL QUESTIONS



Description of the project - Project developer (for at least previous three years)

Net income: 300000

Break-even point:

Net cash flow:

**Project information**

CAPEX: 2000000

OPEX: 200000

IRR: 7.5

NPV: 1000000

Payback time: 1000000

Energy selling price: 123 Euro/MWh

Net income:

Cost of production (COGM) per unit of production (per kWh):

Break-even point:

Net cash flow:

**Management**

Is there a thoroughly developed business plan which risk identification and risk mitigation strategy?

**Production**

Please list the total production costs and costs per unit of production:

Is there a strategy for dealing with supply shortage? E.g. are there pre-contracts with additional suppliers?

**Local procurement**

Where are the feedstock and materials supplied from? Are there regional suppliers represented in the project?

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## ECONOMIC - RESULTS



### ECONOMIC INDICATORS

ECONOMIC INDICATORS		RISK MANAGEMENT	TOTAL
PROJECT			

ASSESSMENT RESULT:

Excellent

	Excellent	2
	Moderate	0
	Poor	0
	Not acceptable	0
	Data not available	0
	Non applicable	1
	Total	4