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Interreg Balkan-Mediterranean PRO-ENERGY

PROJECT

PRO-ENERGY – PROMOTING ENERGY EFFICIENCY IN PUBLIC BUILDINGS OF THE BALKAN MEDITERRANEAN TERRITORY

Work Package:	5. Pilot actions & Sustainability
Activity:	5.2. Joint cost-benefit analysis modeller
Activity Leader:	Region of Epirus – Regional Unit of Thesprotia
Deliverable:	D5.6.2 Joint cost-benefit analysis modeller

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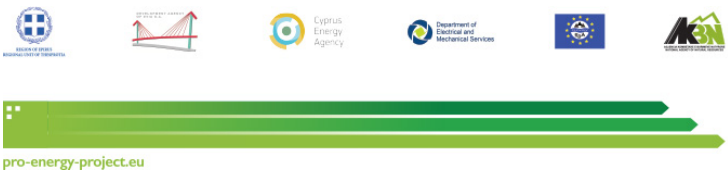
Editor:	**Roalb Studio shpk** 		



CONTENTS

IDENTIFICATION SHEET

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Project Full Title	'Promoting Energy Efficiency in Public Buildings of the Balkan Mediterranean territory'

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1. INTRODUCTION

PRO-ENERGY is a transnational cooperation project, co-financed by the Cooperation Programme "Interreg V-B Balkan Mediterranean 2014-2020", under Priority Axis 2, Specific Objective 2.2 Sustainable Territories. The project aims at promoting Energy Efficiency in public buildings in the Balkan Mediterranean territory and to create a practical framework of modelling and implementing energy investments interventions, through specific ICT monitoring and control systems, as well as through energy performance contracting (EPC). The specific objective of PRO-ENERGY is to reduce by more than 20% the energy spending in public buildings of the participating entities in one year after the implementation of pilot actions.

Based on the above, Work Package 5 (WP 5) "Pilot actions & Sustainability" includes the implementation of pilot actions designed & specified in the Joint Strategy (WP3) & the drafting of a follow-up plan for sustainability of results (pilot actions, trainings) & its consultation with stakeholders. Three types of pilot actions are foreseen:

1) Design & development of an open-source Joint ICT Platform,
2) The design & development of the Joint Cost-Benefit Analysis Modeller (open to all) &
3)The joint preparation of Energy Performance Contracts (open tendering). Pilot actions will valorise results (open to all) of WP3 energy audits on selected buildings.

One public building per area involved will be equipped with smart sensor systems. An integrated cloud-based joint ICT platform will measure & analyse energy consumed at any given period of the day from different sources. Then all data& measurements (available to the wide public) will be integrated & analysed, using specially designed ICT tools, algorithms, data analytics & statistical methods, thus producing the energy consumption profile of each building.

The Activity 5.3 "Joint cost-benefit analysis modeller" aims at supporting decision-making for retrofits, renovations, etc., which lead to increased energy efficiency in public buildings. Retrofits & investments will be planned using the cost-benefit analysis modeller to measure the net present value of energy efficiency interventions. These investments will be implemented outside the PRO-ENERGY project (mostly with the use of energy performance contracting), but their results & impact (energy savings) shall be monitored & measured with the use of the ICT platform.

1.1. Purpose

The present document provides the contribution of the AKBN in the JointCost-benefit Analysis tool. The first version of the CBA tool was designed and provided by the Region of Epirus – Regional Unit of Thesprotia to all Project Partners in order to contribute to the final version to be delivered at project level.

The AKBN tested the Cost-benefit tool (version 1) on its pilot building, following the energy audit and the Energy Performance Certificate issued in the previous activities of the PRO-ENERGY.

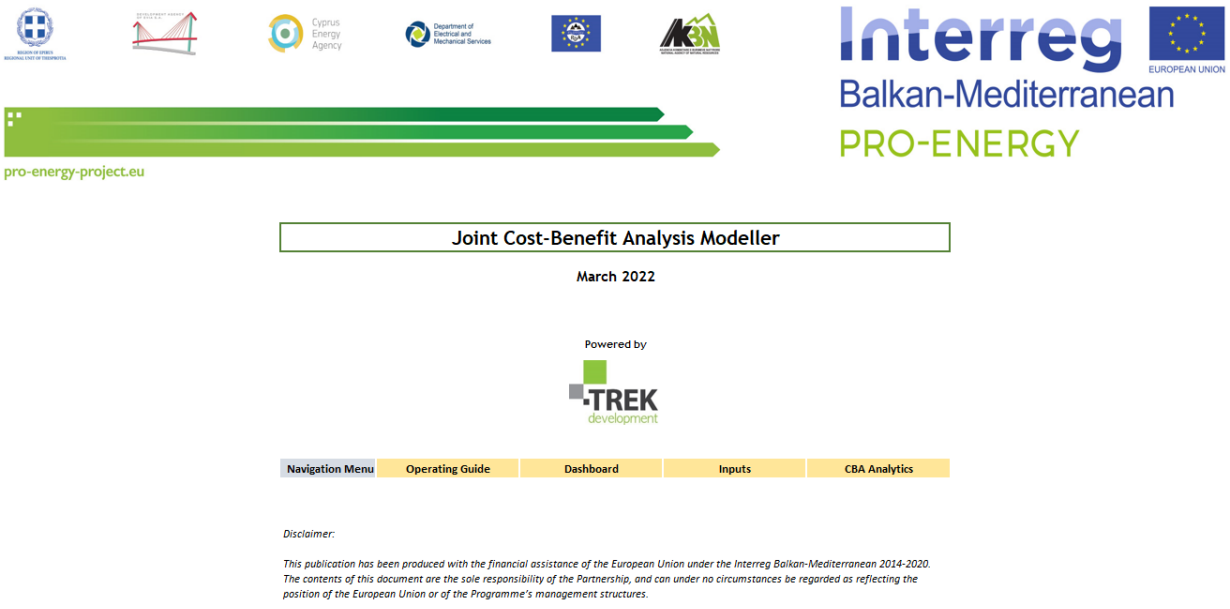
2. JOINT COST-BENEFIT ANALYSIS MODELLER

The present section of the document provides a detailed description of the designed and developed cost-benefit analysis modeller (CBA). The modeller is composed of the following key features (sheets):

- Cover page
- Operating guide
- Dashboard
- Inputs
- CBA analytics

1.2. Cover page

The cover page acts as the front page of the CBA tool and includes its key information (name of the tool, logos and visual identity, navigation menu, disclaimer, etc.). The cover page provides the key information of the designed tool to the end users.



The cover page also provides the Navigation Menu which will automatically lead the end users to all additional model features (sheets):

1. Operating Guide
2. Dashboard
3. Inputs
4. CBA Analysis

1.3. Operating Guide

The Operating Guide provides a detailed description of the architecture of the cost-benefit analysis modeller. Its acts as the manual prepared containing all operational procedures, instructions and other directives related to the use of the CBA tool. The Operating Guide provides the following information to the end users:

1. Introduction

The present sheet includes instructions of how to use Joint Cost Benefit Analysis Modeller tool, developed within the framework of the PRO-ENERGY project which is co-financed by the Interreg Balkan-Mediterranean Programme.

The CBA Modeller comprises five (5) separate sheets, is coded in Microsoft Excel Windows and is approximately 400 KB in size.

The tool is to be used in order to evaluate energy efficiency projects, both in financial and environmental terms. The project is modelled periodically on a year basis, both for construction and operations periods. All cashflows are assumed to take place at period end dates. An operations period must be inserted at the relevant cell at the "Inputs" sheet in order for the modeller to become operational.

2. Architecture

The CBA Modeller is laid out over five (5) sheets in order to enhance user's convenience and minimize calculations' time.

- Cover: Title page, including disclaimer. It also includes four (4) buttons for navigation to the additional model sheets.
- Operating Guide: The present sheet provides a manual on using the CBA tool.
- Dashboard: A simplified and snapshot presentation of the Key Inputs inserted, the CBA Key results and the Project's Financial Structure. Furthermore, the "Dashboard" sheet presents the main Operating and Investment Flows during both construction and operation periods, concluding to the Free Cash Flow per period examined.
- Inputs: The "Inputs" sheet has mainly to do with data entry. The user has to insert its estimations in this sheet.
- CBA analytics: It is a financials output sheet, thus presenting both the occurring financial KPIs of the analysis conducted.

3. Navigation

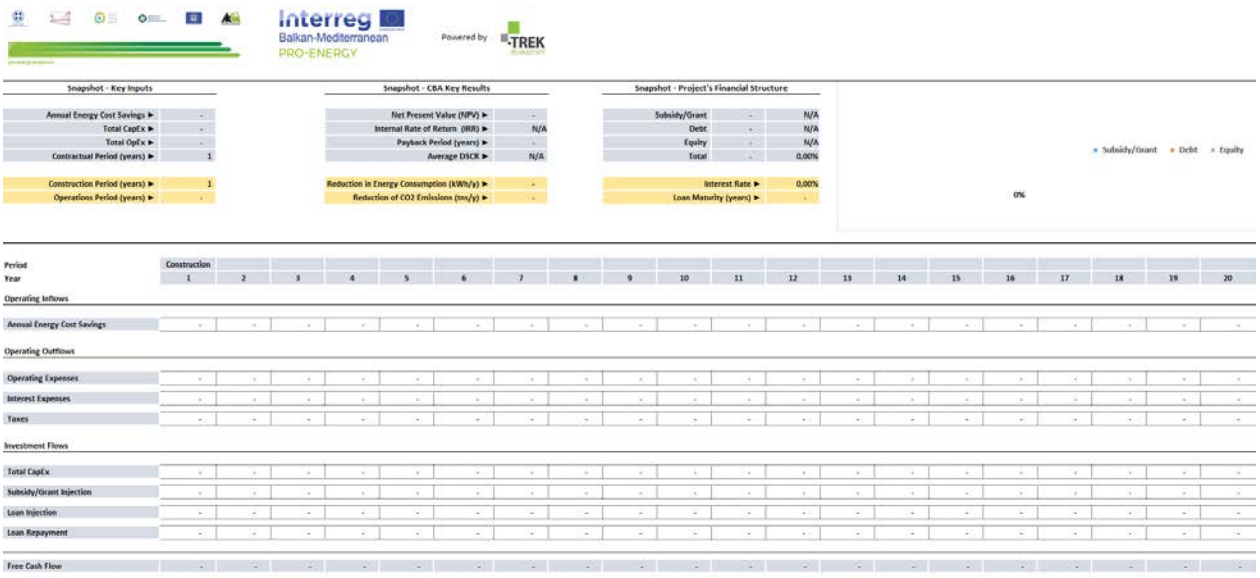
To aid movement around the model, navigation macros are incorporated in the “Cover” and “Inputs” sheets. Clicking on the options offered, transports the user directly to different locations in the Model.

4. Colour Coding

Data entry cells are yellow. They are located at the “Inputs” sheet and are the only cells which should be altered by a user. Negative amounts are presented in curved brackets (parenthesis) and are highlighted in red coloured text. In case NVP either/or DSCR ratios are negative, the relevant cells are marked in red colour and texting.

1.4. Dashboard

This sheet provides a simplified and snapshot presentation of the Key Inputs inserted, the cost-benefit analysis key results and the project’s financial structure. Furthermore, the “Dashboard” sheet presents the main Operating and Investment Flows during both construction and operation periods, concluding to the Free Cash per period examined.



1.5. Inputs

As described before, the present section of the modeller involves the input of data to be analysed in the next sections. The user has to insert its estimations regarding:

- Annual Energy Cost Savings: The estimated annual energy savings to be triggered by the project’s accomplishment, in currency terms.

- Total Capital Expenditure: The amount of the total capital expenditures for project's construction, in currency terms
- Subsidy/Grant Amount: The grant to be received for financing the project's construction.
- Debt: The debt % to be used to cover own financing.
- Loan inputs: Interest rate (the loan's interest rate), Maturity years (the loan's maturity period), Loan type, Grace period (if applicable), Total Operating Expenses (automatically calculated the sum of total operating expenses).
- Financial and Fiscal inputs: Inflation rate (according to the national CPI index), Energy Inflation rate, Tax rate, Discount factor.
- Environmental Inputs: Reduction in Electricity Consumption (kWh/y), Reduction in Diesel Consumption (kWh/y), Operations Period (the project's estimated operational period in years).

Besides the aforementioned data entry cells, the "Inputs" sheet also incorporates:

1. A presentation of the project's overall financial structure, taking into consideration the information provided by the user regarding the subsidy to be received and the amount of debt to be used to cover own financing. Within this framework, equity is automatically calculated.
2. The loan balance at the end of the grace period as well as the occurring interest, in case such a period is projected, according to the financing institution's term sheet. The aforementioned amounts are automatically calculated. Please note that in case the option

of “No” grace period is selected, the amount of the loan balance equals to the total debt amount, while no relevant interest is accruing.

3. A snapshot presentation of the CBA Results regarding financial KPIs, reductions in total energy consumption and reduction of CO2 emissions.
4. Three macros for navigating to the CBA Results’ Analytics, Dashboard and Operating Guide sheets.
5. Instructions for data entry in two ways: First, each data entry cell has an advice on filling-in, in excel comment format. Second, a color code is provided for user’s convenience.

1.6. CBA analysis

The present section provides a financial output sheet, thus presenting both the occurring financial KPIs of the analysis conducted, as well as Investor’s Profit & Loss statement, Investor’s Cash Flow statement, Payback Analysis and Debt Service Cover Ratio Analysis. The very analysis takes place under the Discounted Cash Flows investment valuation framework.

4. AKBN Use Case

The CBA tool designed by the Region of Epirus – Regional Unit of Thesprotia, was tested using the conclusions from the energy audit which was conducted in the pilot building of AKBN in a previous activity of the project (WP3), as well as the Energy Performance Certificate that was issued after the audit.

According to the Energy Performance Certificate of the pilot building the inputs for the Cost-benefit tool are being described in the following table:

CBA Inputs	School Koto Hoxhi
Annual Energy Cost Savings (euro)	65000
Total Capital Expenditure (euro)	137,640.9
Subsidy/Grant Amount (euro)	-
Debt (%)	-
Interest Rate (%)	-
Maturity (years)	-
Grace Period (years)	-
Maintenance Costs (euro)	0
Staff Costs (euro)	0
Managerial Costs (euro)	0
Insurance Costs (euro)	0
Other Expenses (euro)	7360
Inflation Rate (%)	1.5
Energy Inflation Rate (%)	-

Tax Rate (%)	-
Discount Factor (%)	3.5
Operations Period (years)	20

Therefore, after all the data were entered in the tool, separately for each building unit, the results listed in the table below were exported:

Proposals	School Koto Hoxhi
NPV (€)	768237
IRR (%)	43.50
Payback Period (years)	3
DSCR (average)	N/A

All the above data were extracted from the CBA tool provided (Annex 1 & Annex 2).

A. School Koto Hoxhi

Investor's P&L	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Revenues																				
Energy Cost Savings		65,000	65,975	66,965	67,969	68,989	70,023	71,074	72,140	73,222	74,320	75,435	76,567	77,715	78,881	80,064	81,265	82,484	83,721	84,977
Operating Expenses (OpEx)																				
Maintenance Costs		7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360
Staff Costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Managerial Fees		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insurance Costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Expenses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total OpEx		*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*	*7,360*
EBITDA		57,640	58,615	59,605	60,609	61,629	62,663	63,714	64,780	65,862	66,960	68,075	69,207	70,355	71,521	72,704	73,905	75,124	76,361	77,617
Total Depreciation		6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882
EBIT		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Total Interest		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBT		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Taxes		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Income		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735

***Table 1**: Investor's Profit and Loss – School*

Investor's Cash Flow	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Net Income		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Total Depreciation (+)		6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882
Loan Repayment (-)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capital Expenditure	(137,641)																			
Subsidy/Grant Injection	-																			
Loan Injection	-																			
Free Cash Flow (FCF)	(137,641)	57,640	58,615	59,605	60,609	61,629	62,663	63,714	64,780	65,862	66,960	68,075	69,207	70,355	71,521	72,704	73,905	75,124	76,361	77,617
Cumulative FCF	(137,641)	(80,001)	(21,386)	38,219	98,828	160,456	223,120	286,834	351,614	417,476	484,436	552,511	621,718	692,073	763,594	836,298	910,203	985,327	1,061,689	1,139,306
Discount Factor	1.00	0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52
Discounted Cash Flow (DCF)	(137,641)	55,691	54,718	53,760	52,817	51,890	50,977	50,078	49,195	48,325	47,469	46,628	45,800	44,985	44,184	43,396	42,621	41,859	41,110	40,373
Cumulative DCF	(137,641)	(81,950)	(27,232)	26,528	79,345	131,235	182,211	232,290	281,484	329,809	377,279	423,907	469,707	514,692	558,876	602,273	644,894	686,754	727,864	768,237

***Table 2**: Investor's Cash Flow – School*

Payback Analysis	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Cumulative FCF (CFCF)	(137,641)	(80,001)	(21,386)	38,219	98,828	160,456	223,120	286,834	351,614	417,476	484,436	552,511	621,718	692,073	763,594	836,298	910,203	985,327	1,061,689	1,139,306
Positive CFCF years	-	-	-	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00

***Table 3**: Payback Analysis - School*

5. Translation of the CBA tool

The Albania translation of the designed Joint Cost-benefit tool (version 1) is provided in the tables below:

***Table 7**: Translation – Cover page*

Cover	Kopertina
Joint Cost-Benefit Analysis Modeller	Modelues i përbashkët i analizës Kosto-Përfitim
Navigation Menu	Menuja e navigimit
Operating Guide	Udhëzues operativ
Dashboard	Paneli
Inputs	Inputet
CBA Analytics	Analiza CBA
Disclaimer	Mospranimi
This publication has been produced with the financial assistance of the European Union under the Interreg Balkan-Mediterranean Programme 2014-2020. The contents of this document are the sole responsibility of the Partnership and can under no circumstancesbe regarded as reflecting the position of the European Union or of the Programme's management structures.	Ky botim është prodhuar me ndihmën financiare të Bashkimit Europian në kuadër të Programit Interreg Ballkano-Mesdhetar 2014-2020. Përmbajtja e këtij dokumenti është përgjegjësi e vetme e Partneritetit dhe në asnjë rrethanë nuk mund të konsiderohet se pasqyron pozicionin e Bashkimit Europian ose të strukturave drejtuese të Programit.

***Table 8**: Translation – Operating Guide*

CBA Modeller Manual	Manuali i Modeluesit të CBA
1. Introduction	1. Hyrje
The present sheet includes instructions of how to use Joint Cost Benefit Analysis Modeller tool, developed within the framework of the PRO-ENERGY project which is co-financed by the Interreg Balkan-Mediterranean Programme. The CBA Modeller comprises five (5) separate sheets, is coded in Microsoft Excel Windows and is approximately 400 KB in size. The tool is to be used in order to evaluate energy efficiency projects, both in financial and environmental terms. The project is modelled periodically on a year basis, both for construction and operations periods. All cashflows are assumed to take place at period end dates. An operations period must be inserted at the relevant cell atthe “Inputs” sheet in order for the modeller to become operational.	Kjo fletë përfshin udhëzime se si të përdoret mjeti Modelues i Analizës së Përbashkët të Përfitimit të Kostos, i zhvilluar në kuadër të projektit PRO-ENERGY i cili bashkëfinancohet nga Programi Interreg Ballkano-Mesdhetar. Modeluesi CBA përbëhet nga pesë (5) fletë të veçanta, është i koduar në Microsoft Excel Windows dhe është afërsisht 400 KB në madhësi. Mjeti do të përdoret për të vlerësuar projektet e efiçencës së energjisë, si në aspektin financiar ashtu edhe në atë mjedisor. Projekti është modeluar periodikisht në baza vjetore, si për periudhën e ndërtimit ashtu edhe për periudhën e funksionimit. Të gjitha flukset monetare supozohen se ndodhin në datat e fundit të periudhës. Një periudhë operimi duhet të futet në qelizën përkatëse në fletën "Inputs" në mënyrë që modeluesi të bëhet funksional.
2. Architecture	2. Arkitekturë
The CBA Modeller is laid out over five (5) sheets in order to enhance user’s convenience and minimize calculations’ time.	Modeluesi CBA është paraqitur mbi pesë (5) fletë për të rritur komoditetin e përdoruesit dhe për të minimizuar kohen e llogaritjes .
Cover: Title page, including disclaimer.It also includes four (4) buttons for	Kopertina: Faqja e titullit, duke përfshirë mospranimin. Ai përfshin gjithashtu katër (4) butona

navigation to the additional model sheets.	për navigim në fletet shtese te modelit
Operating Guide: The present sheet provides a manual on using the CBA tool.	Udhëzuesi i funksionimit: Fleta e tanishme ofron një manual mbi përdorimin e mjetit CBA.
Dashboard: A simplified and snapshot presentation of the Key Inputs inserted, the CBA Key results and the Project's Financial Structure. Furthermore, the "Dashboard" sheet presents the main Operating and Investment Flows during both construction and operation periods, concluding to the Free Cash Flow per period examined.	Paneli: Një prezantim i thjeshtuar dhe fotografik i hyrjeve kryesore të futura, rezultateve kryesore të CBA dhe strukturës financiare të projektit. Për më tepër, fleta "Panali i kontrollit" paraqet flukset kryesore operative dhe të investimeve gjatë periudhës së ndërtimit dhe operimit, duke përfunduar me Fluksin e Parasë së Lirë për Periudhën e shqyrtuar.
Inputs: The "Inputs" sheet has mainly to do with data entry. The user has to insert its estimations regarding: Annual Energy Cost Savings: The estimated annual energy savings to be triggered by the project's accomplishment, in currency terms. Total Capital Expenditure: The amount of the total capital expenditures for the project's construction, in currency terms. Subsidy/Grant Amount: The grant amount to be received for financing the project's construction. Debt: The debt % to be used to cover own financing. Loans input, namely: Interest rate: The loan's interest rate. Maturity (years): The loan's maturity period. The amount cannot be higher than 19 years. Loan Type (1/2): Type 1 means that	Inputet: Fleta "Inputs" ka të bëjë kryesisht me futjen e të dhënave. Përdoruesi duhet të fusë vlerësimet e tij në lidhje me: Kursimet vjetore të kostos së energjisë: Kursimet vjetore të vlerësuara të energjisë që do të shkaktohen nga realizimi i projektit, në terma valutor. Totali i Shpenzimeve Kapitale: Shuma e totalit të shpenzimeve kapitale për ndërtimin e projektit, në terma valutor. Shuma e subvencionit/grantit: Shuma e grantit që do të merret për financimin e ndërtimit të projektit. Borxhi: % e borxhit që do të përdoret për të mbuluar financimin e vet. Hyrja e kredisë, përkatësisht: Norma e interesit: Norma e interesit të kredisë. Maturimi (vite): Periudha e maturimit të huasë. Shuma nuk mund të jetë më e madhe se 19 vjet. Lloji i kredisë (1/2): Lloji 1 do të thotë se

capital repayment takes place in equal amounts per year. Type 2 means that, each year, a fixed amount is used for debt (capital + interest) repayment. Grace period (Yes/No): Select “Yes” if a loan grace period is projected. Otherwise select “No”. Grace period (years): The time length of the grace period. In case the “No” option is selected for Grace Period assumption, the amount of years inserted is not taken into consideration by the modeller. Total operating expenses: The model automatically calculates the sum of the total expenses operating expenses. In order for the calculation to take place,the user has to insert in currency nominal terms the project Maintenance Costs, Staff Costs, Managerial Fees, Insurance Costs and Other Costs. Financial and Fiscal Inputs, namely: Inflation rate, according to the national CPI index. Energy Inflation Rate: The user’s estimation regarding electricity inflation rate. It can be set either equal to or different than the “Inflation Rate”. Tax Rate: The Corporate Income Tax rate. In case the project is to be developed by a public authority, the user shall set Tax Rate equal to “0”. Discount Factor: The discount factor shall resemble to the sector’s WACC (Weighted Average Cost of Capital), thustaking into account the risk for energy efficiency investments, the cost of capital assessment ant the country’s risk.	shlyerja e kapitalit bëhet në shuma të barabarta në vit. Lloji 2 do të thotë që çdo vit përdoret një shumë fikse për shlyerjen e borxhit (kapital + interes). Periudha e mospagimit (Po/Jo): Zgjidhni “Po” nëse është parashikuar periudha e mospagimit të kredisë. Përndryshe zgjidhni "Jo". Periudha e mospagimit (vite): Kohëzgjatja e periudhës së mospagimit. Në rast se opsioni "Jo" zgjidhet për supozimin e Periudhës së Mospagimit, shuma e viteve të futura nuk merret parasysh nga modeluesi. Shpenzimet totale operative: Modeli llogarit automatikisht shumën e shpenzimeve totale të shpenzimeve operative. Në mënyrë që të bëhet llogaritja, përdoruesi duhet të fusë në terma nominalë në monedhë projektin Kostot e Mirëmbajtjes, Kostot e Stafit, Tarifat e Menaxherit, Kostot e Sigurimit dhe Kostot e Tjera. Inputet financiare dhe fiskale, përkatësisht: Norma e inflacionit, sipas indeksit kombëtar të IÇK-së. Norma e inflacionit të energjisë: Vlerësimi i përdoruesit në lidhje me normën e inflacionit të energjisë elektrike. Mund të vendoset ose e barabartë ose e ndryshme nga "Norma e Inflacionit". Shkalla e tatimit: Norma e tatimit mbi të ardhurat e korporatave. Në rast se projekti do të zhvillohet nga një autoritet publik, përdoruesi do të vendosë Normën Tatimore të barabartë me “0”. Faktori i zbritjes: Faktori i zbritjes do t'i ngjajë WACC të sektorit (kostoja mesatare e ponderuar e kapitalit), duke marrë parasysh kështu rrezikun për investime në efiçencën e energjisë, koston e vlerësimit të kapitalit dhe rezikun e vendit.

Environmental Inputs, namely: Reduction in Electricity Consumption (kWh/y): The amount of reduction of electricity consumption to be triggered through the project's implementation, inkWh per year. The user may use previous studies or energy audits' results. The CBA Modeller assumes a relevant emissions' factor (as per Covenant of Mayors guidelines), in order to calculate the consequent CO_2 reduction. Reduction in Diesel Consumption (kWh/y): The amount of reduction to be triggered through the project's implementation, in kWh per year. The user may use previous studies or energy audits' results. The CBA Modeller assumes a relevant emissions' factor (as per Covenant of Mayors guidelines), in order to calculate the consequent CO_2 reduction. Operations Period (years): The project's estimated operational period (Max years of operation = 19). In addition, please that for modelling purposes the construction period is considered to be equal to 1 year, resuming to year 0 of financial modelling.	Inputet mjedisore, konkretisht: Reduktimi i Konsumit të Energjisë Elektrike (kWh/v): Sasia e reduktimit të konsumit të energjisë elektrike që do të shkaktohet nga zbatimi i projektit, në kWh në vit. Përdoruesi mund të përdorë rezultatet e studimeve të mëparshme ose të auditimeve të energjisë. Modeluesi i CBA-së supozon një faktor përkatës të emetimeve (sipas udhëzimeve të Paktit të Kryetarëve të Bashkive), për të llogaritur reduktimin pasues të CO_2. Reduktimi i konsumit të naftës (kWh/v): Sasia e reduktimit që do të shkaktohet nga zbatimi i projektit, në kWh në vit. Përdoruesi mund të përdorë rezultatet e studimeve të mëparshme ose të auditimeve të energjisë. Modeluesi i CBA-së supozon një faktor përkatës të emetimeve (sipas udhëzimeve të Paktit të Kryetarëve të Bashkive), për të llogaritur reduktimin pasues të CO_2. Periudha e operimit (vite): Periudha e parashikuar e funksionimit të projektit (vitet maksimale të funksionimit = 19). Gjithashtu, ju lutemi që për qëllime modelimi periudha e ndërtimit të konsiderohet e barabartë me 1 vit, duke rifilluar në vitin 0 të modelimit financiar.

Besides the aforementioned data entry cells, the “Inputs” sheet also incorporates: 1. A presentation of the project’s overall financial structure, taking into consideration the information provided by the user regarding the subsidy to be received and the amount of debt to be used to cover own financing. Within this framework, equity is automatically calculated. 2. The loan balance at the end of the grace period as well as the occurring interest, in case such a period is projected, according to the financing institution’s term sheet. The aforementioned amounts are automatically calculated. Please note that in case the option of “No” grace period is selected, the amount of the loan balance equals to the total debt amount, while no relevant interest is occurring. 3. A snapshot presentation of the CBA Results regarding financial KPIs (NET Present Value, Internal Rate of return, Payback Period and Debt Service Cover Ratio), reduction in total energy consumption and reduction of CO_2 emissions. 4. Three macros for navigating to the CBA Results’ Analytics, Dashboard andOperating Guide sheets. 5. Instructions for data entry in two ways: First, each data entry cell has an advice on filling-in, in excel comment format. Second, a color code is provided	Përveç qelizave të mësipërme të futjes së të dhënave, fleta "Inputet" përfshin gjithashtu: 1. Një prezantim i strukturës së përgjithshme financiare të projektit, duke marrë parasysh informacionin e dhënë nga përdoruesi në lidhje me subvencionin që do të merret dhe shumën e borxhit që do të përdoret për të mbuluar financimin e vet. Brenda këtij kuadri, kapitali neto llogaritet automatikisht. 2. Gjendja e huasë në fund të periudhës së mospagimit si dhe interesat e ndodhura, në rast se parashikohet një periudhë e tillë, sipas fletës së afatit të institucionit financues. Shumat e lartpërmendura llogariten automatikisht. Ju lutemi vini re se në rast se zgjidhet opsioni i periudhës së mospagimit "Jo", shuma e tepricës së kredisë është e barabartë me shumën totale të borxhit, ndërkohë që nuk ka interes përkatës. 3. Një paraqitje e shkurtër e Rezultateve të CBA-së në lidhje me KPI-të financiare (Vlera aktuale neto, norma e brendshme e kthimit, periudha e shlyerjes dhe raporti i mbulimit të shërbimit të borxhit), reduktimi i konsumit total të energjisë dhe reduktimi i emetimeve të CO_2. 4. Tre makro për lundrimin te fletët e analitikës, panelit të kontrollit dhe udhëzuesit operativ të CBA-së. 5. Udhëzime për futjen e të dhënave në dy mënyra: Së pari, çdo qelizë e hyrjes së të dhënave ka një këshillë për plotësimin, në komentin excel format. Së dyti, një kod ngjyrash ofrohet

for user's convenience (please refer to section 4 "Color Coding").	për lehtësinë e përdoruesit (ju lutemi referojuni seksionit 4 "Kodimi i ngjyrave").
CBA analytics: It is a financials output sheet, thus presenting both the occurring financial KPIs of the analysis conducted (Net Present Value, Internal Rate of Return, Payback Period and DebtService Cover Ratio), as well as Investor's Profil & Loss statement, Investor's Cash Flow statement, Payback Analysis and Debt Service Cover Ratio Analysis. The very takes place under the Discounted Cash Flows investment valuation framework.	Analitika e CBA-së: Është një fletë e prodhimit financiar, duke paraqitur kështu si KPI-të financiare që ndodhin të analizës së kryer (Vlera aktuale neto, norma e brendshme e kthimit, periudha e shlyerjes dhe raporti i mbulimit të shërbimit të borxhit), si dhe pasqyrën e profilit dhe humbjes së investitorit, të investitorit Pasqyra e rrjedhës së parasë, Analiza e kthimit dhe analiza e raportit të mbulimit të shërbimit të borxhit. Vetë kjo ndodh nën kornizën e vlerësimit të investimeve të flukseve monetare të skontuara.
3. Navigation	3. Navigimi
To aid movement around the model, navigation macros are incorporated in the "Cover" and "Inputs" sheets. Clicking on the options offered, transports the user directly to different locations in the Model.	Për të ndihmuar lëvizjen rreth modelit, makrot e navigimit janë të përfshira në fletët "Cover" dhe "Inputs". Duke klikuar mbi opsionet e ofruara, përdoruesi transportohet drejtpërdrejt në vende të ndryshme në Model.
4. Color Coding	4. Kodimi i ngjyrave
Data entry cells are yellow. They are located at the "Inputs" sheet and are the only cells which should be altered by a user. Negative amounts are presented in curved brackets (parenthesis) and are highlighted in red coloured text. In case NVP either/or DSCR ratios are negative,	Qelizat e futjes së të dhënave janë të verdha. Ato janë të vendosura në fletën "Inputs" dhe janë të vetmet qeliza që duhet të ndryshohen nga një përdorues. Shumat negative paraqiten në kllapa të lakuara (paranteze) dhe theksohen me tekst me ngjyrë të kuqe. Në rast se NVP ose/ose raportet DSCR janë negative,

the relevant cells are marked in red colour and texting.	qelizat përkatëse janë shënuar me ngjyrë të kuqe dhe me tekst.

***Table 9**: Translation - Dashboard*

Currency Amounts in	Shumat e parave
Snapshot - Key input	Pasqyrim - Hyrjet kryesore
Annual Energy Cost Savings	Rezervat vjetore të kostos së energjisë
Total Capital Expenses	Shpenzimet totale Kapitale
Total Operational Expenses	Shpenzimet totale operative
Contractual Period (years)	Periudha kontraktuale (vitet)
Construction Period (years)	Periudha e ndërtimit (vitet)
Operations Period (years)	Periudha e punimeve (vitet)
Snapshot - CBA Key Results	Pasqyrim - Rezultatet kryesore të CBA
Net Present Value (NPV)	Vlera aktuale neto (NPV)
Internal Rate of Return (IRR)	Norma e brendshme e kthimit (IRR)
Payback Period (years)	Periudha e rimbursimit (vitet)
Average DSCR	DSCR mesatare
Reduction in Energy Consumption (kWh/y)	Reduktimi i konsumit të energjisë (kWh/vit)
Reduction in CO2 Emissions (tns/y)	Reduktimi i emetimeve të CO_2 (tns/vit)
Subside/Grant	Subvencion/Grant
Debt	Borxhi

Equity	Kapitali
Total	Totali
Interest Rate	Normat e interesit
Loan Maturity (years)	Afati i maturimit të huasë (vitet)
Construction Period (years)	Periudha e ndërtimit (vitet)
Period	Periudha
Year	Viti
Operating Flows	Levizjet operative
Annual Energy Savings	Kursimet vjetore të energjisë
Operating Outflows	Rrjedhjet/humbjet operative
Operating Expenses	Shpenzimet operative
Interest Expenses	Shpenzimet e interesit
Taxes	Taksat
Investment Flows	Qarkullimi i Investimeve
Total Capital Expenses	Totali i Shpenzimeve Kapitale
Subsidy/Grant Injection	Subvencionimi/Derdhja e Grantit
Loan Injection	Derdhja e kredise
Loan Repayment	Shlyerja e huasë
Free Cash Flow	Derdhja e parave pa pagesë

***Table 10**: Translation - Inputs*

Loan Balance at the end of Grace Period	Bilanci i kredisë në fund të Periudhës së Mospagimit

Interest during Grace Period	Interesi per Periudhen e Mospagimit
Loan Inputs	Inputet e huasë
Interest Rate	Norma e interesit
Maturity (years)	Maturimi (vitet)
Loan Type (1/2)	Lloji i kredisë (1/2)
Grace Period (Yes/No)	Periudha e mospagimit (Po/Jo)
Grace Period (years)	Periudha e mospagimit (vite)
Total Operating Expenses	Shpenzimet totale operative
Maintenance Costs	Shpenzimet e Mirëmbajtjes
Staff Costs	Shpenzimet e personelit
Managerial Costs	Kostot menaxheriale
Insurance Costs	Kostot e sigurimit
Other Expenses	Shpenzime të tjera
Financial & Fiscal Inputs	Inputet Financiare & Fiskale
Depreciation Rate	Norma e amortizimit
Inflation Rate	Norma e inflacionit
Energy Inflation Rate	Norma e inflacionit të energjisë
Tax Rate	Norma e tatimit
Discount Factor	Faktori i zbritjes
Environmental Inputs	Inputet mjedisore
Reduction in Electricity Consumption (kWh/y)	Reduktimi i konsumit të energjisë elektrike (kWh/vit)

Electricity CO2 Emissions Factor (kg CO2/kWh/y)	Faktori i emetimeve të CO2 të energjisë elektrike (kg CO2/kWh/vit)
Reduction in Diesel Consumption (kWh/y)	Reduktimi i konsumit të naftës (kWh/vit)
Diesel CO2 Emissions Factor (kg CO2/kWh)	Faktori i emetimeve të CO2 të naftës (kg CO2/kWh)
Contractual Inputs	Inputet kontraktuale
Construction Works Period (years)	Periudha e punimeve të ndërtimit (vite)
Operations Period (years)	Periudha e operimit (vite)
Total Contractual Period (years)	Periudha totale kontraktuale (vite)
CBA Results	Rezultatet e CBA
NPV (currency amounts)	NPV (shumat e parave)
IRR	IRR
Payback (years)	Shlyerja (vite)
DSCR (Debt Service Cover Ratio)	DSCR (Raporti i mbulimit të shërbimit të borxhit)
Reduction in Energy Consumption (kWh/y)	Reduktimi i konsumit të energjisë (kWh/vit)
Reduction of CO2 Emissions (tns/y)	Reduktimi i emetimeve të CO2 (tns/vit)
Show me the CBA Results' Analytics	Më trego analitikën e rezultateve të CBA-së
Get me back to Dashboard	Më kthe përsëri te Paneli
Instructions for "Inputs" sheet	Udhëzimet për faqen "Inputet".
Input cells. Please fill in the data required by the CBA Modeller.	Qelizat hyrëse. Ju lutemi plotësoni të dhënat e kërkuara nga Modeluesi i CBA.

Output cells. The amounts are autiomatically calculated and are used for CBA purposes.	Qelizat e daljes. Shumat janë llogariten automatikisht dhe përdoren për qëllime CBA.

***Table 11**: Translation – CBA Analytics*

CBA - Results' Analytics	CBA - Analiza e rezultateve	
NVP	NVP	
IRR (%)	IRR (%)	
Payback Period (years)	Periudha e kthimit (vite)	
DSCR (average)	DSCR (mesatare)	
Investor's Profit & Loss	Fitimi dhe humbja e investitorit	
Revenues	Të ardhurat	
Energy Cost Savings	Kursimet e kostos së energjisë	
Operating Expenses (OpEx)	Shpenzimet operative (OpEx)	
Maintenance Costs	Shpenzimet e Mirëmbajtjes	
Staff Costs	Shpenzimet e personelit	
Managerial Fees	Tarifat menaxheriale	
Insurance Costs	Kostot e sigurimit	
Other Expenses	Shpenzime të tjera	
Total OpEx	Totali OpEx	
Total Depreciation	Amortizimi total	
Total Interest	Interesi total	
Taxes	Taksat	

Net Income	Të ardhurat neto
Investor's Cash Flow	Derdhja e parave te investitorit
Net Income	Të ardhurat neto
Total Depreciation (+)	Amortizimi total (+)
Loan Repayment (-)	Shlyerja e kredisë (-)
Capital Expenditure	Shpenzimet kapitale
Subsidy/Grant Injection	Subvencionimi/Derdhja e Grantit
Loan Injection	Derdhje kredie
Free Cash Flow (FCF)	Derdhja e parave pa pagesë (FCF)
Cumulative FCF	FCF kumulative
Discount Factor	Faktori i zbritjes
Discounted Cash Flow (DCF)	Derdhja e zbritur e parasë (DCF)
Cumulative DCF	DCF kumulative
Payback Analysis	Analiza e rimbursimit
Cumulative FCF (CFCF)	FCF kumulative (CFCF)
Positive CFCF years	Vitet CFCF pozitive
Debt Service	Shërbimi i borxhit
Debt Service Cover Ratio (DSCR)	Raporti i mbulimit të shërbimit të borxhit (DSCR)

6. Conclusions and recommendations

Following the testing that the AKBN conducted by using its pilot building data identified during the energy audit, a slight deviation was observed from the conclusions extracted by the Energy Performance Certificate. Considering this, there are no comments on the technical and functional specifications of the designed tool (version 1). In terms of improvement, the AKBN proposes that more graphics can be used for the CBA results.

7. Annexes

7.1 Annex 1. School case

Cover	Kopertina
Joint Cost-Benefit Analysis Modeller	Modelues i përbashkët i analizës Kosto-Përfitim
Navigation Menu	Menuja e navigimit
Operating Guide	Udhëzues operativ
Dashboard	Paneli
Inputs	Inputet
CBA Analytics	Analiza CBA
Disclaimer	Mospranimi
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CBA Modeller Manual

1. Introduction

The present sheet includes instructions of how to use Joint Cost Benefit Analysis Modeller tool, developed within the framework of the PRO-ENERGY project which is co-financed by the Interreg Balkan-Mediterranean Programme.

The CBA Modeller comprises five (5) separate sheets, is coded in Microsoft Excel Windows and is approximately 400 KB in size.

The tool is to be used in order to evaluate energy efficiency projects, both in financial and environmental terms. The project is modelled periodically on a year basis, both for construction and operations periods. All cashflows are assumed to take place at period end dates. An operations period must be inserted at the relevant cell at the "Inputs" sheet in order for the modeller to become operational.

2. Architecture

The CBA Modeller is laid out over five (5) sheets in order to enhance user's convenience and minimize calculations' time.

Cover: Title page, including disclaimer. It also includes four (4) buttons for navigation to the additional model sheets.

Operating Guide: The present sheet provides a manual on using the CBA tool.

Dashboard: A simplified and snapshot presentation of the Key Inputs inserted, the CBA Key results and the Project's Financial Structure. Furthermore, the "Dashboard" sheet presents the main Operating and Investment Flows during both construction and operation periods, concluding to the Free Cash Flow per period examined.

Inputs: The "Inputs" sheet has mainly to do with data entry. The user has to insert his estimations regarding:

Annual Energy Cost Savings: The estimated annual energy savings to be triggered by the project's accomplishment, in currency terms.

Total Capital Expenditure: The amount of the total capital expenditures for the project's construction, in currency terms.

Subsidy/Grant Amount: The grant amount to be received for financing the project's construction.

Debt: The debt % to be used to cover own financing.

Loans input, namely:

Interest rate: The loan's interest rate.

Maturity (years): The loan's maturity period. The amount cannot be higher than 19 years.

Loan Type (1/2): Type 1 means that capital repayment takes place in equal amounts per year. Type 2 means that, each year, a fixed amount is used for debt (capital + interest) repayment.

Grace period (Yes/No): Select "Yes" if a loan grace period is projected. Otherwise select "No".

Grace period (years): The time length of the grace period. In case the "No" option is selected for Grace Period assumption, the amount of years inserted is not taken into consideration by the modeller.

Total operating expenses: The model automatically calculates the sum of the total expenses operating expenses. In order for the calculation to take place, the user has to insert in currency nominal terms the project Maintenance Costs, Staff Costs, Managerial Fees, Insurance Costs and Other Costs.

Financial and Fiscal Inputs, namely:

Inflation rate, according to the national CPI index.

Energy Inflation Rate: The user's estimation regarding electricity inflation rate. It can be set either equal to or different than the "Inflation Rate".

Tax Rate: The Corporate Income Tax rate. In case the project is to be developed by a public authority, the user shall set Tax Rate equal to "0".

Discount Factor: The discount factor shall resemble to the sector's WACC (Weighted Average Cost of Capital), thus taking into account the risk for energy efficiency investments, the cost of capital

Besides the aforementioned data entry cells, the "Inputs" sheet also incorporates:

1. A presentation of the project's overall financial structure, taking into consideration the information provided by the user regarding the subsidy to be received and the amount of debt to be used to cover own financing. Within this framework, equity is automatically calculated.
2. The loan balance at the end of the grace period as well as the occurring interest, in case such a period is projected, according to the financing institution's term sheet. The aforementioned amounts are automatically calculated. Please note that in case the option of "No" grace period is selected, the amount of the loan balance equals to the total debt amount, while no relevant interest is occurring.
3. A snapshot presentation of the CBA Results regarding financial KPIs (NET Present Value, Internal Rate of return, Payback Period and Debt Service Cover Ratio), reduction in total energy consumption and reduction of CO2 emissions.
4. Three macros for navigating to the CBA Results' Analytics, Dashboard and Operating Guide sheets.
5. Instructions for data entry in two ways: First, each data entry cell has an advice on filling-in, in excel comment format. Second, a color code is provided for user's convenience (please refer to section 4 "Color Coding").

Manuali i Modeluesit të CBA

1. Hyrje

Kjo fletë përfshin udhëzime se si të përdoret mjeti Modelues i Analizës së Përbashkët të Përfitimit të Kostos, i zhvilluar në kuadër të projektit PRO-ENERGY i cili bashkëfinancohet nga Programi Interreg Ballkano-Mesdhetar. Modeluesi CBA përbëhet nga pesë (5) fletë të veçanta, është i koduar në Microsoft Excel Windows dhe është afërsisht 400 KB në madhësi. Mjeti do të përdoret për të vlerësuar projektet e efiçencës së energjisë, si në aspektin financiar ashtu edhe në atë mjedisor. Projekti është modeluar periodikisht në baza vjetore, si për periudhën e ndërtimit ashtu edhe për periudhën e funksionimit. Të gjitha flukset monetare supozohen se ndodhin në datat e fundit të periudhës. Një periudhë operimi duhet të futet në qelizën përkatëse në fletën "Inputs" në mënyrë që modeluesi të bëhet funksional.

2. Arkitekturë

Modeluesi CBA është paraqitur mbi pesë (5) fletë për të rritur komoditetin e përdoruesit dhe për të minimizuar kohen e llogaritjes

Kopertina: Faqja e titullit, duke përfshirë mospranimin. Ai përfshin gjithashtu katër (4) butona për navigim në fletet shtese te modelit

Udhëzuesi i funksionimit: Fleta e tanishme ofron një manual mbi përdorimin e mjetit CBA.

Paneli: Një prezantim i thjeshtuar dhe fotografik i hyrjeve kryesore të futura, rezultateve kryesore të CBA dhe strukturës financiare të projektit. Për më tepër, fleta "Panali i kontrollit" paraqet flukset kryesore operative dhe të investimeve gjatë periudhës së ndërtimit dhe operimit, duke përfunduar me Fluksin e Parasë së Lirë për Periudhën e shqyrtuar.

Inputet: Fleta "Inputs" ka të bëjë kryesisht me futjen e të dhënave. Përdoruesi duhet të fusë vlerësimet e tij në lidhje me: Kursimet vjetore të kostos së energjisë: Kursimet vjetore të vlerësuara të energjisë që do të shkaktohen nga realizimi i projektit, në terma valutor. Totali i Shpenzimeve Kapitale: Shuma e totalit të shpenzimeve kapitale për ndërtimin e projektit, në terma valutor. Shuma e subvencionit/grantit: Shuma e grantit që do të merret për financimin e ndërtimit të projektit. Borxhi: % e borxhit që do të përdoret për të mbuluar financimin e vet. Hyrja e kredisë, përkatësisht: Norma e interesit: Norma e interesit të kredisë. Maturimi (vite): Periudha e maturimit të huasë. Shuma nuk mund të jetë më e madhe se 19 vjet. Lloji i kredisë (1/2): Lloji 1 do të thotë se shlyerja e kapitalit bëhet në shuma të barabarta në vit. Lloji 2 do të thotë që çdo vit përdoret një shumë fikse për shlyerjen e borxhit (kapital + interes). Periudha e mospagimit (Po/Jo): Zgjidhni "Po" nëse është parashikuar periudha e mospagimit të kredisë.

Përndryshe zgjidhni "Jo".

Periudha e mospagimit (vite): Kohëzgjatja e periudhës së mospagimit. Në rast se opsioni "Jo" zgjidhet për supozimin e Periudhës së Mospagimit, shuma e viteve të futura nuk merret parasysh nga modeluesi.

Shpenzimet totale operative: Modeli llogarit automatikisht shumën e shpenzimeve totale të shpenzimeve operative. Në mënyrë që të bëhet llogaritja, përdoruesi duhet të fusë në terma nominalë në monedhë projektin Kostot e Mirëmbajtjes, Kostot e Stafit, Tarifat e Menaxherit, Kostot e Sigurimit dhe Kostot e Tjera.

Inputet financiare dhe fiskale, përkatësisht: Norma e inflacionit, sipas indeksit kombëtar të IÇK-së.

Norma e inflacionit të energjisë: Vlerësimi i përdoruesit në lidhje me normën e inflacionit të energjisë elektrike. Mund të vendoset ose e barabartë ose e ndryshme nga "Norma e Inflacionit".

Shkalla e tatimit: Norma e tatimit mbi të ardhurat e korporatave. Në rast se projekti do të zhvillohet nga një autoritet publik, përdoruesi do të vendosë Normën Tatimore të barabartë me "0". Faktori i zbritjes: Faktori i zbritjes do t'i ngjajë WACC të sektorit (kostoja mesatare e ponderuar e kapitalit), duke marrë parasysh kështu rrezikun për investime në efiçencën e energjisë, koston e
vlerësimit të kapitalit dhe rezikun e vendit.

Përveç qelizave të mësipërme të futjes së të dhënave, fleta "Inputet" përfshin gjithashtu: 1. Një prezantim i strukturës së përgjithshme financiare të projektit, duke marrë parasysh informacionin e dhënë nga përdoruesi në lidhje me subvencionin që do të merret dhe shumën e borxhit që do të përdoret për të mbuluar financimin e vet. Brenda këtij kuadri, kapitali neto llogaritet automatikisht. 2. Gjendja e huasë në fund të periudhës së mospagimit si dhe interesat e ndodhura, në rast se parashikohet një periudhë e tillë, sipas fletës së afatit të institucionit financues. Shumat e lartpërmendura llogariten automatikisht. Ju lutemi vini re se në rast se zgjidhet opsioni i periudhës së mospagimit "Jo", shuma e tepricës së kredisë është e barabartë me shumën totale të borxhit, ndërkohë që nuk ka interes përkatës. 3. Një paraqitje e shkurtër e Rezultateve të CBA-së në lidhje me KPI-të financiare (Vlera aktuale neto, norma e brendshme e kthimit, periudha e shlyerjes dhe raporti i mbulimit të shërbimit të borxhit), reduavigating to the CBA Results' Analytics, Dashboard and Operating Guide sheets.

5. Instructions for data entry in two ways: First, each data entry cell has an advice on filling-in, in excel comment format. Second, a color code is provided for user's convenience (please refer to section 4 "Color Coding").

Currency Amounts in	Shumat e parave
Snapshot - Key inputs	Pasqyrim - Hyrjet kryesore
Annual Energy Cost Savings	Rezervat vjetore të kostos së energjisë
Total Capital Expenses	Shpenzimet totale Kapitale
Total Operational Expenses	Shpenzimet totale operative
Contractual Period (years)	Periudha kontraktuale (vitet)
Construction Period (years)	Periudha e ndërtimit (vitet)
Operations Period (years)	Periudha e punimeve (vitet)
Snapshot - CBA Key Results	Pasqyrim - Rezultatet kryesore të CBA
Net Present Value (NPV)	Vlera aktuale neto (NPV)
Internal Rate of Return (IRR)	Norma e brendshme e kthimit (IRR)
Payback Period (years)	Periudha e rimbursimit (vitet)
Average DSCR	DSCR mesatare
Reduction in Energy Consumption (kWh/y)	
Reduction in CO2 Emissions (tns/y)	Reduktimi i emetimeve të CO_2 (tns/vit)
Subside/Grant	
Debt	
Equity	Kapitali
Total	Totali
Interest Rate	Normat e interesit
Loan Maturity (years)	Afati i maturimit të huasë (vitet)
Construction Period (years)	Periudha e ndërtimit (vitet)
Period	Periudha
Year	
Operating Flows	Levizjet operative
Annual Energy Savings	Kursimet vjetore të energjisë
Operating Outflows	Rrjedhjet/humbjet operative
Operating Expenses	Shpenzimet operative
Interest Expenses	Shpenzimet e interesit
Taxes	Taksat
Investment Flows	
Total Capital Expenses	Totali i Shpenzimeve Kapitale
Subsidy/Grant Injection	Subvencionimi/Derdhja e Grantit
Loan Injection	Derdhja e kredise
Loan Repayment	Shlyerja e huasë
Free Cash Flow	Derdhja e parave pa pagesë

CBA Inputs	Inputet CBA
Annual Energy Cost Savings	Rezervat vjetore të kostos së energjisë
Total Capital Expenditure	Shpenzimet totale Kapitale
Subsidy/Grant Amount	Shuma e subvencionit/grantit
Own Financing	Vetefinancim
Upon Own Financing	Me vetefinancim
Debt	
Equity	Kapitali
Total	Totali
Loan Balance at the end of Grace Period	Bilanci i kredisë në fund të Periudhës së Mospagimit
Interest during Grace Period	Interesi per Periudhen e Mospagimit
Loan Inputs	Inputet e huasë
Interest Rate	Norma e interesit
Maturity (years)	
Loan Type (1/2)	Lloji i kredisë (1/2)
Grace Period (Yes/No)	Periudha e mospagimit (Po/Jo)
Grace Period (years)	Periudha e mospagimit (vite)
Total Operating Expenses	Shpenzimet totale operative
Maintenance Costs	Shpenzimet e Mirëmbajtjes
Staff Costs	
Mmanagerial Costs	Kostot menaxheriale
Insurance Costs	Kostot e sigurimit
Other Expenses	Shpenzime të tjera
Financial & Fiscal Inputs	
Depreciation Rate	Norma e amortizimit
Inflation Rate	Norma e inflacionit
Energy Inflation Rate	Norma e inflacionit të energjisë
Tax Rate	
Discount Factor	
Envirinmental Inputs	Inputet mjedisore
Reduction in Electricity Consumption (kWh/y)	
Electricity CO2 Emissions Factor (kg CO2/kWh/y)	Faktori i emetimeve të CO2 të energjisë elektrike (kg CO2/kWh/vit)
Reduction in Diesel Consumption (kWh/y)	Reduktimi i konsumit të naftës (kWh/vit)
Diesel CO2 Emissions Factor (kg CO2/kWh)	
Contractual Inputs	
Construction Works Period (years)	Periudha e punimeve të ndërtimit (vite)
Operations Period (years)	Periudha e operimit (vite)
Total Contractual Period (years)	Periudha totale kontraktuale (vite)

CBA Results	
NPV (currency amounts)	
IRR	
Payback (years)	
DSCR (Debt Service Cover Ratio)	DSCR (Raporti i mbulimit të shërbimit të borxhit)
Reduction in Energy Consumption (kWh/y)	Reduktimi i konsumit të energjisë (kWh/vit)
Reduction of CO2 Emissions (tns/y)	Reduktimi i emetimeve të CO2 (tns/vit)
Show me the CBA Results' Analytics	Më trego analitikën e rezultateve të CBA-së
Get me back to Dashboard	Më kthe përsëri te Paneli

Instructions for "Inputs" sheet	
Input cells. Please fill in the data required by the CBA Modeller.	
Output cells. The amounts are autiomatically calculated and are used for CBA purposes.	Qelizat e daljes. Shumat janë llogariten automatikisht dhe përdoren për qëllime CBA.

CBA - Results' Analytics	
NVP	
IRR (%)	
Payback Period (years)	
DSCR (average)	
Investor's Profil & Loss	
Revenues	
Energy Cost Savings	
Operating Expenses (OpEx)	
Maintenance Costs	
Staff Costs	
Managerial Fees	
Insurance Costs	
Other Expenses	
Total OpEx	
Total Depreciation	
Total Interest	
Taxes	
Net Income	Të ardhurat neto
Investor's Cash Flow	
Net Income	
Toatl Depreciation (+)	
Loan Repayment (-)	Shlyerja e kredisë (-)
Capital Expenditure	
Subsidy/Grant Injection	
Loan Injection	
Free Cash Flow (FCF)	
Cumulative FCF	
Discount Factor	Faktori i zbritjes
Discounted Cash Flow (DCF)	Derdhja e zbritur e parasë (DCF)
Cumulative DCF	DCF kumulative
Payback Analysis	
Cumulative FCF (CFCF)	
Positive CFCF years	
Debt Service	
Debt Service Cover Ratio (DSCR)	

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EUROPEAN UNION

Joint Cost-Benefit Analysis Modeller

March 2022

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Navigation Menu	Operating Guide	Dashboard	Inputs	CBA Analytics

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CBA Modeller Manual

1. Introduction

The present sheet includes instructions of how to use Joint Cost Benefit Analysis Modeller tool, developed within the framework of the "Pro-Energy" project which is co-financed by the Interreg Balkan-Mediterranean Programme.
The CBA Modeler comprises five (5) separate sheets, is coded in Microsoft Excel for Windows and is approximately 400 KB in size.
The tool is to be used in order to evaluate energy efficiency projects, both in financial and environmental terms. The project is modelled periodically on a year basis, both for construction and operations periods. All cashflows are assumed to take place at period end dates. An operations period must be inserted at the relevant cell at the "Inputs" sheet in order for the modeller to become operational.

2. Architecture

The CBA Modeller is laid out over five (5) sheets in order to enhance user's convenience and minimize calculations' time.

- **Cover**: Title page, including disclaimer. It also includes four (4) buttons for navigation to the additional model sheets.

- **Operating Guide**: The present sheet. It provides a manual on using the CBA tool.

- **Dashboard**: A simplified and snapshot presentation of the Key Inputs inserted, the CBA Key Results and the Project's Financial Structure. Furthermore, the "Dashboard" sheet presents the main Operating and Investment Flows during both construction and operation periods, concluding to the Free Cash Flow per period examined.

- **Inputs**: The "Inputs" sheet has mainly to do with data entry. The user has to insert its estimations regarding:

  Annual Energy Cost Savings: The estimated annual energy savings to be triggered by the project's accomplishment, in currency terms.

  Total Capital Expenditure: The amount of the total capital expenditures for project's construction, in currency terms.

  Subsidy/Grant Amount: The grant amount to be received for financing the project's construction.

  Debt: The debt % to be used to cover own financing.

  Loan Inputs, namely:

  Interest Rate: The loan's interest rate.

  Maturity (years): The loan's maturity period. The amount cannot be higher than 19 years.

  Loan Type (1/2): Type 1 means that capital repayment takes place in equal amounts per year. Type 2 means that, each year, a fixed amount is used for debt (capital + interest) repayment.

  Grace Period (Yes/No): Select "Yes" if a loan grace period is projected. Otherwise select "No".

  Grace Period (years): The time length of the grace period. In case the "No" option is selected for Grace Period assumption, the amount of years inserted is not taken into consideration by the modeller.

  Total Operating Expenses: The model automatically calculates the sum of total operating expenses. In order for the calculation to take place, the user has to insert in currency nominal terms the projected Maintenance Costs, Staff Costs, Managerial Fees, Insurance Costs and Other Costs.

  Financial & Fiscal Inputs, namely:

  Inflation Rate: The Inflation rate, according to the national CPI index.

  Energy Inflation Rate: The user's estimation regarding electricity inflation rate. It can be set either equal to or different than the "Inflation Rate".

  Tax Rate: The Corporate Income Tax rate. In case the project is to be developed by a public authority, the user shall set Tax Rate equal to "0".

  Discount Factor: The discount rate to be used for DCF analysis. The discount factor shall resemble to the sector's WACC (Weighted Average Cost of Capital), thus taking into account the risk for energy efficiency investments, the cost of capital assessment and the country's risk.

  Environmental Inputs, namely:

  Reduction in Electricity Consumption (kWh/y): The amount of reduction in electricity consumption to be triggered through the project's implementation, in kWh per year. The user may use previous studies or energy audits' results. The CBA Modeller assumes a relevant emissions' factor (as per Covenant of Mayors guidelines), in order to calculate the consequent CO2 reduction.

  Reduction in Diesel Consumption (kWh/y): The amount of reduction in diesel consumption to be triggered through the project's implementation, in kWh per year. The user may use previous studies or energy audits' results. The CBA Modeller assumes a relevant emissions' factor (as per Covenant of Mayors guidelines), in order to calculate the consequent CO2 reduction.

  Operations Period (years): The project's estimated operational period (Max years of operation = 19). In addition, please note that for modeling purposes the construction period is considered to be equal to 1 year, resuming to year 0 of financial modeling.

Besides the aforementioned date entry cells, the "Inputs" sheet also incorporates:

- A presentation of the project's overall financial structure, taking into consideration the information provided by the user regarding the subsidy to be received and the amount of debt to be used to cover own financing. Within this framework, equity is automatically calculated.
- The loan balance at the end of the grace period as well as the occurring interest, in case such a period is projected, according to the financing institution's term sheet. The aforementioned amounts are automatically calculated. Please note that in case the option of "No" grace period is selected, the amount of the loan balance equals to the total debt amount, while no relevant interest is occurring.
- A snapshot presentation of the CBA Results regarding financial KPIs (Net Present Value, Internal Rate of Return, Payback Period and Debt Service Cover Ratio), reduction in total energy consumption and reduction of CO2 emissions.
- Three macros for navigating to the CBA Results' Analytics, Dashboard and Operating Guide sheets.
- Instructions for data entry in two ways: First, each data entry cell has an advice on filling-in, in excel comment format. Second, a color code is provided for user's convenience (please refer to section 4 "Color Coding").

- **CBA Analytics**: It is a financials output sheet, thus presenting both the occurring financial KPIs of the analysis conducted (Net Present Value, Internal Rate of Return, Payback Period and Debt Service Cover Ratio), as well as Investor's P&L statement, Investor's Cash Flow statement, Payback Analysis and Debt Service Cover Ratio Analysis. The very analysis takes place under the Discounted Cash Flows investment valuation framework.

3. Navigation

To aid movement around the Model, navigation macros are incorporated in the "Cover" and "Inputs" sheets. Clicking on the options offered, transports the user directly to different locations in the Model.

4. Color Coding

Data entry cells are yellow. They are located at the "Inputs" sheet and are the only cells which should be altered by a user.
Negative amounts are presented in curved brackets (parenthesis) and are highlighted in red coloured text.
In case NPV either/or DSCR ratios are negative, the relevant cells are marked in red colour and texting.

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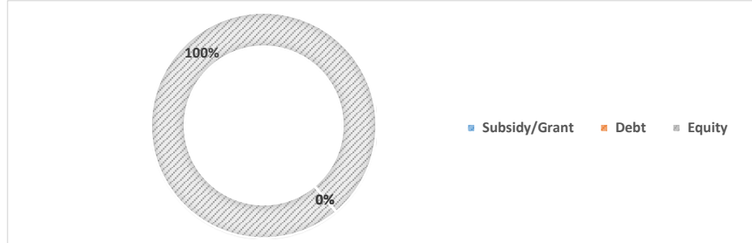
Currency Amounts in ' 000

Snapshot - Key Inputs	
Annual Energy Cost Savings ▶	65
Total CapEx ▶	138
Total OpEx ▶	7
Contractual Period (years) ▶	21
Construction Period (years) ▶	1
Operations Period (years) ▶	20

Snapshot - CBA Key Results	
Net Present Value (NPV) ▶	768
Internal Rate of Return (IRR) ▶	43.50%
Payback Period (years) ▶	3.00
Average DSCR ▶	N/A
Reduction in Energy Consumption (kWh/y) ▶	-
Reduction of CO2 Emissions (tns/y) ▶	-

Snapshot - Project's Financial Structure		
Subsidy/Grant	-	0.00%
Debt	-	0.00%
Equity	138	100.00%
Total	138	100.00%
Interest Rate ▶		0.00%
Loan Maturity (years) ▶		-



Period	Construction	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation	Operation
Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Operating Inflows																				
Annual Energy Cost Savings	-	65	66	67	68	69	70	71	72	73	74	75	77	78	79	80	81	82	84	85
Operating Outflows																				
Operating Expenses	-	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)	(7)
Interest Expenses	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Investment Flows																				
Total CapEx	(138)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subsidy/Grant Injection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan Injection	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Loan Repayment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Free Cash Flow	**(138)**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**72**	**73**	**74**	**75**	**76**	**78**

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CBA Inputs

Annual Energy Cost Savings ►	**65,000**
Total Capital Expenditure ►	**137,641**
Subsidy/Grant Amount ►	
Own Financing ►	**137,641**
Upon Own Financing:	
Debt ►	
Equity ►	**100.00%**

Project's Financial Structure

Subsidy/Grant	0.00%	-
Debt	0.00%	-
Equity	100.00%	137,641
Total	***100.00%***	***137,641***

Loan Blance at the end of Grace Period	**-**
Interest during Grace Period	**-**

Loan Inputs

Interest Rate	
Maturity (years)	
Loan Type (1/2)	**1.00**
Grace Period (Yes/No)	**No**
Grace Period (years)	

Total Operating Expenses	**7,360**
Maintenance Costs	*7,360*
Staff Costs	
Managerial Fees	
Insurance Costs	
Other Expenses	

Financial & Fiscal Inputs

Depreciation Rate	**5.00%**
Inflation Rate	
Energy Inflation Rate	**1.50%**
Tax Rate	
Discount Factor	**3.50%**

Environmental Inputs

Reduction in Electricity Consumption (kWh/y)	
Electricity CO2 Emissions Factor (kg CO2/kWh)	**0.989**
Reduction in Diesel Consumption (kWh/y)	
Diesel CO2 Emissions Factor (kg CO2/kWh)	**0.264**

Contractual Inputs

Construction Works Period (years) ►	**1**
Operations Period (years) ►	**20**
Total Contractual Period (years) ►	**21**

CBA Results

NPV (currency amounts)	**768,237**
IRR	**43.50%**
Payback (years)	**3.00**
DSCR	**N/A**
Reduction in Energy Consumption (kWh/y)	**-**
Reduction of CO2 Emissions (tns/y)	**-**

Show me the CBA Results' Analytics
Get me back to Dashboard

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CBA - Results' Analytics

NPV (€)	768,237
IRR (%)	43.50%
Payback Period (years)	3.00
DSCR (average)	N/A

Investor's P&L

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Revenues																				
Energy Cost Savings		65,000	65,975	66,965	67,969	68,989	70,023	71,074	72,140	73,222	74,320	75,435	76,567	77,715	78,881	80,064	81,265	82,484	83,721	84,977
Operating Expenses (OpEx)																				
Maintenance Costs		7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360	7,360
Staff Costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Managerial Fees		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insurance Costs		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Expenses		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total OpEx		***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***	***7,360***
EBITDA		**57,640**	**58,615**	**59,605**	**60,609**	**61,629**	**62,663**	**63,714**	**64,780**	**65,862**	**66,960**	**68,075**	**69,207**	**70,355**	**71,521**	**72,704**	**73,905**	**75,124**	**76,361**	**77,617**
Total Depreciation		6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882
EBIT		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Total Interest		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBT		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Taxes		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Income		**50,758**	**51,733**	**52,723**	**53,727**	**54,747**	**55,781**	**56,832**	**57,898**	**58,980**	**60,078**	**61,193**	**62,325**	**63,473**	**64,639**	**65,822**	**67,023**	**68,242**	**69,479**	**70,735**

Investor's Cash Flow

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Net Income		50,758	51,733	52,723	53,727	54,747	55,781	56,832	57,898	58,980	60,078	61,193	62,325	63,473	64,639	65,822	67,023	68,242	69,479	70,735
Total Depreciation (+)		6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882	6,882
Loan Repayment (-)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Capital Expenditure	(137,641)																			
Subsidy/Grant Injection	-																			
Loan Injection	-																			
Free Cash Flow (FCF)	(137,641)	57,640	58,615	59,605	60,609	61,629	62,663	63,714	64,780	65,862	66,960	68,075	69,207	70,355	71,521	72,704	73,905	75,124	76,361	77,617
Cumulative FCF	(137,641)	(80,001)	(21,386)	38,219	98,828	160,456	223,120	286,834	351,614	417,476	484,436	552,511	621,718	692,073	763,594	836,298	910,203	985,327	1,061,689	1,139,306
Discount Factor	1.00	0.97	0.93	0.90	0.87	0.84	0.81	0.79	0.76	0.73	0.71	0.68	0.66	0.64	0.62	0.60	0.58	0.56	0.54	0.52
Discounted Cash Flow (DCF)	(137,641)	55,691	54,718	53,760	52,817	51,890	50,977	50,078	49,195	48,325	47,469	46,628	45,800	44,985	44,184	43,396	42,621	41,859	41,110	40,373
Cumulative DCF	(137,641)	(81,950)	(27,232)	26,528	79,345	131,235	182,211	232,290	281,484	329,809	377,279	423,907	469,707	514,692	558,876	602,273	644,894	686,754	727,864	768,237

Payback Analysis

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Cumulative FCF (CFCF)	(137,641)	(80,001)	(21,386)	38,219	98,828	160,456	223,120	286,834	351,614	417,476	484,436	552,511	621,718	692,073	763,594	836,298	910,203	985,327	1,061,689	1,139,306
Positive CFCF years	-	-	-	*3.00*	*4.00*	*5.00*	*6.00*	*7.00*	*8.00*	*9.00*	*10.00*	*11.00*	*12.00*	*13.00*	*14.00*	*15.00*	*16.00*	*17.00*	*18.00*	*19.00*

Debt Service

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Debt Service Cover Ratio (DSCR)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A