

Supporting Report for Chapter 1

“Rehabilitation and Extension of Ma’an Wastewater Treatment Plant and Treated Wastewater Reuse of Five Existing Treatment Plant”

	page
Annex to 1.2 Existing System -----	SB1-1
Annex to 1.5.2.2 Preliminary Design of Treatment Plant -----	SB1-4
Annex to 1.12.3.1 Operation and Maintenance Cost for Sewage System and Treatment Plant (Ma’an) -----	SB1-9
Annex to 1.12.3.2 Operation and Maintenance Cost for Reuse System -----	SB1-13
Annex to 1.13.2 Economic and Financial Analysis -----	SB1-17
Annex to 1.13.3 Financial Statements -----	SB1-27
Annex to 1.15 Impacts of Wastewater Reuse on the Social and Natural Environment -----	SB1-28

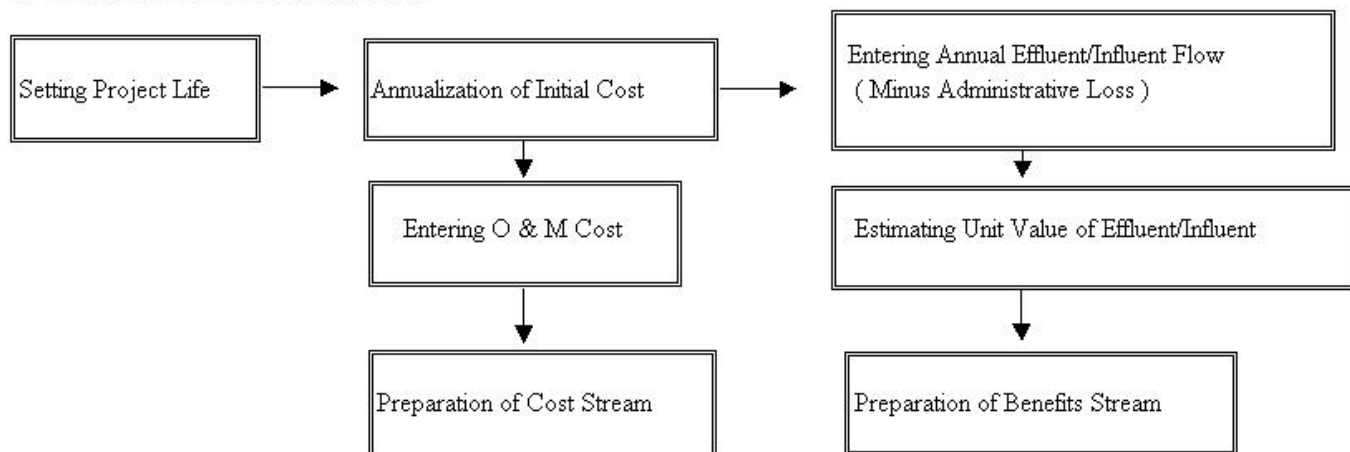
ANNEX to 1.13.2

Economic and Financial Analysis

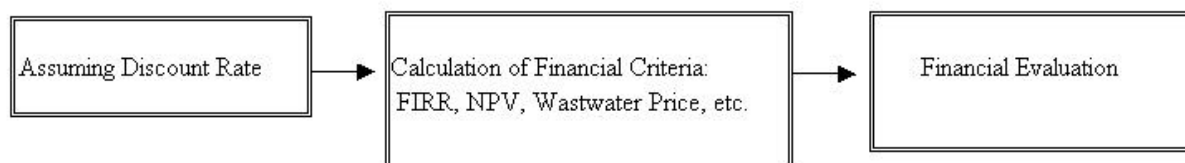
Economic and Financial Analysis

1. Financial Analysis

1) Preparation of Cost Benefits Streams



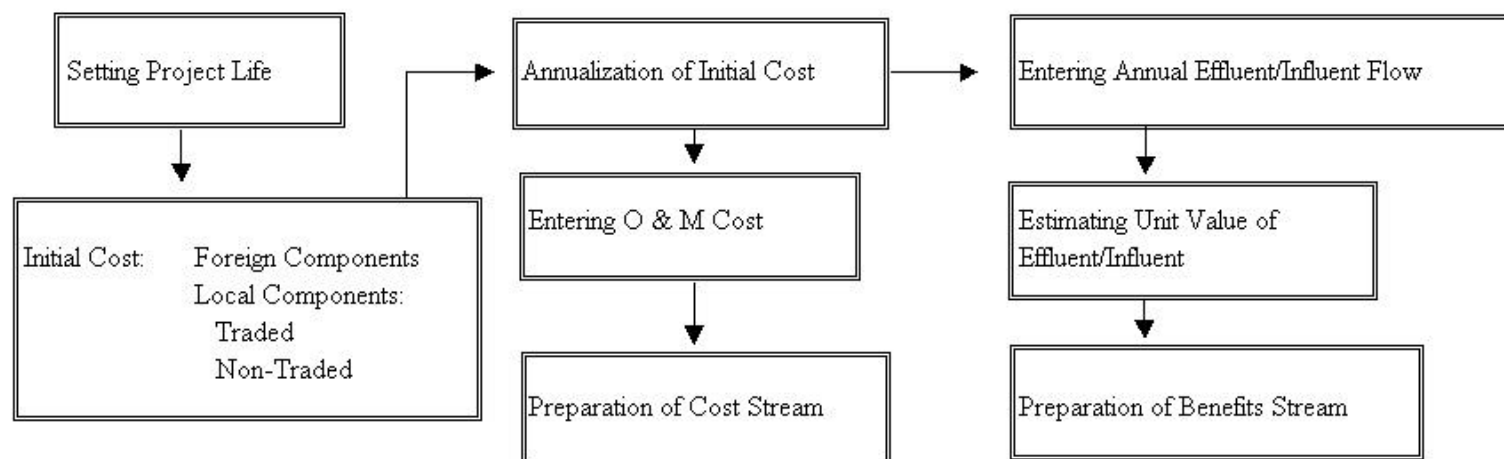
2) Calculation of Financial Criteria and Financial Evaluation



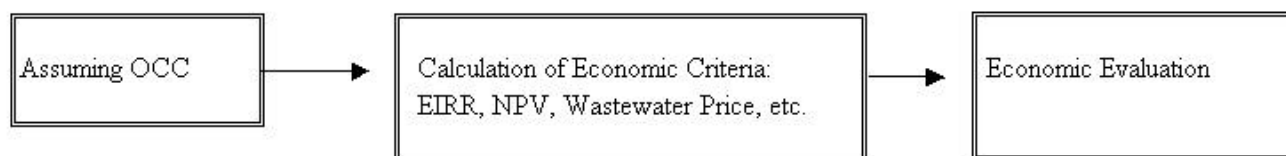
Methodology for Economic and Financial Analysis of Wastewater Reuse/Treatment Projects

2. Economic Analysis

1) Preparation of Cost Benefits Streams



2) Calculation of Economic Criteria and Economic Evaluation



Methodology for Economic and Financial Analysis of Wastewater Reuse/Treatment Projects

Financial Economic Analysis of Mo'as Waterwaster Reuse Project
Hydrolic Analysis (m³/yr)

Item	Allocation	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Water Produced			782,268	727,884	754,434	781,552	810,474	840,038	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677
Industrial Water	8.08		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Physical Losses (%)	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08
Physical Losses	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Administrative/Managerial Losses (%)	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Administrative/Managerial Losses	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Quantity Delivered	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Quantity Whose Bills are Collected	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Industrial Water	1.08		702,268	727,884	754,434	781,552	810,474	840,038	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677
Physical Losses (%)	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08
Physical Losses	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08
Administrative/Managerial Losses (%)	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Administrative/Managerial Losses	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Quantity Delivered	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Quantity Whose Bills are Collected	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14

Financial Analysis (JD at 2003 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components	38%	287,497	287,497	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Components	44%	145,931	145,931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		373,428	373,428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operating Costs																				
o & M Costs																				
Total Costs																				
			373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428	373,428
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			0	0	0	0	0	0	0	0	0	0	0	0	0					

Economic Analysis (JD at 2003 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components		189,218	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137
Foreign Components		165,931	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		355,149	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137	137
Operating Costs		353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349	353,349
O & M Costs		0	8,745	8,740	8,735	8,730	8,725	8,720	8,715	8,710	8,705	8,700	8,695	8,690	8,685	8,680	8,675	8,670	8,665	8,660
Total Costs		353,349	8,881	8,877	8,872	8,867	8,862	8,857	8,852	8,847	8,842	8,837	8,832	8,827	8,822	8,817	8,812	8,807	8,802	8,797
Revenues																				
Industrial Usage Qty (m³)		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use Revenues of Industrial Water (JD/m³)	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740
Industrial Revenues (JD)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Impingement Usage Qty (m³)		782,268	727,884	754,434	781,552	810,474	840,038	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677
Use Revenues of Impingement Water (JD/m³)	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810
Impingement Revenues (JD)	0	28,234	28,592	28,950	29,308	29,666	30,024	30,382	30,740	31,098	31,456	31,814	32,172	32,530	32,888	33,246	33,604	33,962	34,320	34,678
Total Revenues (JD)	0	28,234	28,950	29,666	30,382	31,098	31,814	32,530	33,246	33,962	34,678	35,394	36,110	36,826	37,542	38,258	38,974	39,690	40,406	41,122
Net Cash Flow (JD)		-355,148	10,352	11,068	11,784	12,500	13,216	13,932	14,648	15,364	16,080	16,796	17,512	18,228	18,944	19,660	20,376	21,092	21,808	22,524
Discounting (Df=8%)		8.89008	0.20465	0.25132	0.30381	0.36280	0.42847	0.50118	0.58140	0.66951	0.76591	0.87101	0.98611	1.11151	1.24771	1.39511	1.55391	1.72451	1.90731	2.10281
Total Qty Delivered (m³)		8	702,268	727,884	754,434	781,552	810,474	840,038	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677	870,677
NPV																				
NPV (JD)	-75,007	-332,803	8,556	8,314	8,072	7,830	7,588	7,346	7,104	6,862	6,620	6,378	6,136	5,894	5,652	5,410	5,168	4,926	4,684	4,442
Pay of Total Costs (JD)	485,122	332,803	8,183	7,435	6,787	6,139	5,491	4,843	4,195	3,547	2,899	2,251	1,603	955	307	-341	-689	-1,037	-1,385	-1,733
Pay of Total Qty Delivered (m³)	6,981,617	0	588,387	546,870	505,353	463,836	422,319	380,802	339,285	297,768	256,251	214,734	173,217	131,700	90,183	48,666	7,149	-33,368	-106,885	-179,902
Use Water Price (JD/m³)	50																			

Financial Economic Analysis of Abu Nuhud Wastewater Reuse Project
Hydrolic Analysis (m³/yr)

Item	Allocation	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Water Produced		173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041	173,041
Industrial Water	8.08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physical Losses (%)	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08
Physical Losses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Administrative/Managerial Losses (%)	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Administrative/Managerial Losses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quantity Delivered	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quantity Whose Bills are Collected	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Impurities Water	1.08	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041
Physical Losses (%)	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08	8.08
Physical Losses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Administrative/Managerial Losses (%)	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14	8.14
Administrative/Managerial Losses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quantity Delivered	0.0	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041
Quantity Whose Bills are Collected	0.0	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041	737,041

Financial Analysis (JD at 2003 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components	77%	173,041	173,041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Components	23%	53,185	53,185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duty & Taxes	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Capital Costs		227,048	227,048	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Operating Costs																				
o & M Costs																				
Total Costs																				
Benefits																				
Industrial Usage Qty (m³)																				
Industrial Tariff (JD/m³)	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008	1.008
Industrial Revenues (JD)																				
Impurities Usage Qty (m³)																				
Impurities Tariff (JD/m³)	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810
Impurities Revenues (JD)																				
Total Revenues (JD)																				
Net Cash Flow (JD)																				
Discounting (Df=5%)																				
Total Qty Whose Bills are Collected (m³)																				
NPV (JD)	12.0%																			
Pay of Total Costs (JD)																				
Pay of Total Qty Delivered Qty (m³)																				
Use Water Price (JD/m³)	21																			

Economic Analysis (JD at 2003 Prices)

Item	Percent	Amount	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Costs																				
Local Components																				
Foreign Components																				
Duty & Taxes																				
Total Capital Costs																				
Operating Costs																				
o & M Costs																				
Total Costs																				
Benefits																				
Industrial Usage Qty (m³)																				
Unit Benefits of Industrial Water (JD/m³)	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740	2.740
Industrial Benefits (JD)																				
Impurities Usage Qty (m³)																				
Unit Benefits of Impurities Water (JD/m³)	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810	8.810
Impurities Benefits (JD)																				
Total Benefits (JD)																				
Net Cash Flow (JD)																				
Discounting (Df=10%)																				
Total Qty Delivered (m³)																				
NPV (JD)	19.1%																			
Pay of Total Costs (JD)																				
Pay of Total Qty Delivered (m³)																				
Use Water Price (JD/m³)	21																			

ben

Financial Analysts (JO at 2001, Politics)

km

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Economic Analysis (JD at 2012 Prices)

100

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1. **Identify the main components of the system.**

1997