



Kafaa for Energy Solutions

High-Level Feasibility Study

Submitted to:

The Ministry of Digital Economy and Entrepreneurship

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Founders and investors considering this project are advised to conduct further analysis on projected adoption rates, development costs, and ongoing operational expenses. This additional scrutiny will help mitigate potential risks related to technology challenges, changes in regulations, market penetration, and competitive pressures.

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A National Entrepreneurship Policy Project



Ministry of Digital Economy
and Entrepreneurship



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Table of Contents

Table of Tables	3
Table of Figures	3
Executive Summary	4
1. Introduction	4
2. Market Analysis	5
3. Business Model.....	8
4. Technical Analysis.....	12
5. Financial Analysis.....	15
5.1 Financial Study Assumptions	15
5.2 Financial Study:	16
5.2.1 Projected Working Capital	16
5.2.2 Project Initial Cost	16
5.2.3 Projected Income Statement	16
5.2.4 Projected Free Cash Flow Statement	17
5.3 Sensitivity Analysis.....	18
6. Integration with Other Sectors.....	19
7. Entrepreneur Persona	19
8. Stakeholders	20
9. Risk Assessment and Mitigation	20
10. Conclusion.....	22

Table of Tables

Table 1: Revenue projection	11
Table 2: Cost of Goods Sold – Five Year Projection	12
Table 3: Operational Expenditures – five-year projection	14
Table 4 : Manpower recruitment plan – five-year projection:	13
Table 5: Manpower total cost – five-year projection	13
Table 6: Capital Expenditures Cost – five-year projection	14
Table 7: Working capital projection (JOD)	16
Table 8: Initial Cost Summary (JOD)	16
Table 9: Projected Income Statement (JOD)	16
Table 10 : Free Cash Flow (FCF) Projection (JOD)	18
Table 11: Sensitivity analysis outcomes	19

Table of Figures

Figure 1: Product Mix by Quantity	11
Figure 2: Product Mix by Revenue.....	12
Figure 3: Gross vs Net Profit Margin	17
Figure 4: Return on Investment.....	17

Executive Summary

Kafaa for Energy Solutions proposes an advanced Energy Management Software tailored for industrial facilities in Jordan, aiming to optimize energy efficiency and reduce operational costs. The software automates energy management processes through AI-driven analytics, real-time monitoring, and predictive insights. Feasibility analysis indicates market potential, with 2,500 industrial facilities as potential clients.

Financial projections demonstrate a promising revenue forecast, with total revenues expected to reach JOD 452,750 by the fifth year of operation, supported by manageable operational expenses and a structured HR plan. Technical feasibility is ensured through strategic partnerships for software development and implementation. To mitigate risks, recommendations include conducting thorough market research, establishing contingency plans, and ensuring regulatory compliance.

The focus on robust customer support, ongoing technological advancements, and sound financial management will further strengthen Kafaa's market position. Leveraging AI and IoT technologies, Kafaa for Energy Solutions has the potential to contribute to the energy efficiency and economic resilience of Jordan's industrial sector. Based on these findings, proceeding with the project is recommended, leveraging market demand, technological innovation, and financial viability for sustainable growth in the energy management sector.

I. Introduction

In the industrial landscape, energy consumption represents a substantial portion of operational costs, yet many facilities still rely on outdated, manual processes for managing their energy usage. This inefficiency leads to unnecessary energy waste and higher expenses, posing a significant challenge for industrial facilities striving to optimize their operations and reduce costs. The final electricity consumption in Jordan reached 19,306 GWh in 2021, with the industrial sector consuming 21% of this total as the second highest consumer. As electricity is the dominant source of energy used in the industrial sector, the increasing demand highlights the critical need to improve energy efficiency in this area. The industry sector in Jordan is facing a difficult period because of the rise in electricity prices because electricity is a major input for its production process. The industry sector is the second largest contributor in GDP after services sector with a rate of 24%¹.

The impact of inefficient energy management is profound, particularly for industrial facilities that consume large amounts of energy. High energy costs not only strain financial resources but also hinder competitiveness and sustainability efforts. In Jordan, where industrial activity is important to the economy, the lack of advanced energy management solutions means that many facilities are missing out on opportunities to achieve substantial savings and enhance their operational efficiency. The need for practical solutions to address this problem is therefore critical.

Kafaa for Energy Solutions offers a comprehensive software designed specifically for the energy management needs of industrial facilities. The software facilitates automated data

¹ GIZ, "Study on Energy Efficiency Potentials in the Industrial Sector in Jordan". (n.d.). [online] Available at: <https://www.giz.de/de/downloads/EE%20potential%20in%20industry%20JOR.pdf>

collection, real-time monitoring, and predictive analytics, helping facilities make informed decisions to optimize energy usage and reduce costs. By automating data extraction and tracking, software enables efficient resources utilization and cost savings on energy bills.

Key features of Kafaa's software include automated data management via IoT sensors and smart meters, real-time monitoring with user-friendly dashboards and alerts, and predictive analytics to forecast energy usage patterns using machine learning. Additionally, the software provides tools for budgeting and forecasting, as well as efficiency project management to assess returns on investment (ROI) and set energy-saving targets.

By integrating artificial intelligence (AI) and IoT, Kafaa enhances energy management processes, improves overall efficiency, and offers economic and environmental benefits for industrial facilities.

2. Market Analysis

The economic climate in Jordan is shaped by several factors that can impact new start-ups, including Kafaa for Energy Solutions. As Jordan heavily relies on energy imports (about 97%)², making it vulnerable to fluctuations in international energy prices. This dependency impacts industrial operating costs and overall competitiveness. Jordan imports most of its energy needs, making it highly susceptible to fluctuations in international energy prices. This volatility leads to decreased competitiveness as companies struggle to maintain their positions in both local and global markets. On the positive side, the government's focus on sustainable development and energy efficiency presents opportunities for innovative solutions in the energy sector. The National Energy Efficiency Action Plan (NEEAP), which outlines strategic programs and projects for energy efficiency development in Jordan. Two NEEAPs have been published and implemented: the first NEEAP (2012-2014) targeted 100 GWh savings in the industrial sector and achieved 80.4 GWh (80% progress), while the second NEEAP (2017-2020) targeted 383 GWh but achieved only 2 GWh (0.5% progress)³, which opens room for improvement in this sector and increases the need for energy management startups. Furthermore, the Economic Modernization Vision, which aims to drive sustainable economic growth in Jordan, aligns well with Kafaa's mission. This vision includes several growth drivers relevant to the startup:

- **Smart Jordan:** Emphasizing digital transformation and the adoption of advanced technologies. This creates a conducive environment for Kafaa, which relies on IoT, AI, and machine learning for its energy management solutions. The push for digital transformation supports the integration of Kafaa's technologies across various industrial sectors.
- **High-Value Industries:** Promoting sectors that add significant value to the economy, such as energy management and technology. As an enabler of industries, Kafaa benefits from this focus, which encourages investment and development in sectors that drive

² <https://data.worldbank.org/indicator/EG.IMP.CON.S.ZS?locations=JO>

³Executive Summary National Energy Efficiency Action Plan. [online] found at: https://www.memr.gov.jo/EBV4.0/Root_Storage/AR/EB_Info_Page/2nd_NEEAP_Summary_2.pdf

economic growth and technological advancement. This focus can lead to increased policy support for Kafaa's target market.

- Sustainable Resources: Encouraging the efficient and sustainable use of resources, particularly energy, which aligns directly with Kafaa's objectives. This emphasis supports the startup's mission to improve energy efficiency and reduce operational costs for industrial facilities. Regulatory and financial incentives aimed at promoting sustainable practices can further enhance Kafaa's market position and adoption rates.

Global trends toward digital transformation, automation, and sustainability further enhance the market potential for advanced energy management systems like Kafaa.

The energy management industry in Jordan is at an early growth stage, characterized by increasing awareness and adoption of energy efficiency practices in the industrial sector. Market insights suggest that the revenues in the Energy Management market are projected to reach USD 1.4 million in 2024 and continue to grow at a CAGR of 5.93% from 2024 to 2028⁴. The industry shows significant growth potential driven by the need to reduce energy costs and improve sustainability. The regulatory environment is supportive, with the Jordanian government implementing policies to promote energy efficiency and renewable energy. Key regulatory frameworks include the Renewable Energy and Energy Efficiency Law No. (12) of 2012 and its amendments No. (33) for the year 2014. Several supporting bylaws advance energy efficiency policies, including:

- By-law No. (73) of 2012 on Regulating Procedures and Means of Conserving Energy and Improving Its Efficiency.
- By-law No. (50) of 2018 on Provisions and Conditions of Exempting Systems of Renewable Energy Sources and its Devices and Equipment from Customs Fees and Subjecting them to General Sales Tax at Zero Percent.
- By-law No. (49) of 2015 establishing the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).
- JSMO's JS 2243: 2019 Energy Audits Jordanian Standards, which outline comprehensive requirements and methodologies for energy audits.

The combination of regulatory support and evolving industry standards creates grounds for innovation and growth in the energy efficiency and management sector. As Jordan continues its journey towards sustainable development and resource optimization, start-ups like Kafaa for Energy Solutions are well-positioned to contribute by offering cutting-edge solutions that optimize energy consumption and operational efficiencies in industrial settings.

Key economic indicators relevant to the success of Kafaa for Energy Solutions include⁵:

- Energy prices and consumption trends: high electricity cost and growing electricity consumption drive the need for energy management solutions.
- Industrial sector's contribution to GDP: 24% contribution influences overall economic growth of Jordan.
- Government policies and regulations: create market opportunities for Kafaa and reduce its barrier to entry.

⁴ <https://www.statista.com/outlook/cmo/smart-home/energy-management/jordan>

⁵ <https://jsf.org/uploads/2022/12/manufacturing-1.pdf>

- Technological Adoption: The Economic Modernization Vision strongly supports the advancement of technology in the industrial sector as part of its work on Smart Jordan, this is aligned with Kafa's direction to utilize IoT and AI integration.

The target market for Kafa for Energy Solutions comprises industrial facilities in Jordan, which are critical to the national economy and. As the table below shows, electricity cost represents a significant portion of the total production inputs especially for the Plastic and Rubber, Leather and Garments, and Printing, Packaging, and Paper industries. These industries, among others, demonstrate demand for efficient energy management solutions to reduce operational costs and improve sustainability ⁶.

Sub Sector	Energy cost of total production inputs cost (exclude raw material)			# of Industrial Facilities	# of employees	Production 2015
	Electricity	Fuel	Total energy			Million JD
Construction	25%	54%	79.0%	183	9,258	1025
Plastic and Rubber	59%	14%	73.0%	201	6,893	526
Mining	34%	45%	79.0%	31	10,753	1,153
Leather and Garments	43%	21%	64.0%	183	49,120	621
Furniture	30%	46%	76.0%	88	3,736	275
Engineering	27%	28%	55.0%	421	29,433	2145
Therapeutic	11%	11%	22.0%	75	8,318	1,029
Chemical	19%	31%	50.0%	204	13,246	4,140
Food	13%	34%	47.0%	473	38,301	3,668
Printing and Packaging, Paper	48%	36%	84.0%	241	10,989	611

Different categories could be applied for the addressable market, allowing the business to adjust its solution based on the electricity rate and annual consumption of customers in ton of oil equivalent (toe):

- Facilities with an annual consumption rate exceeding 501 toe.
- Facilities with a consumption rate ranging from 200 to 500 toe.
- Facilities with a consumption rate of less than 200 toe.

The business can target specific segments within the addressable market, such as companies falling under a specific energy rate or located in particular regions like qualified industrial zones or dense industrial areas.

As the energy efficiency market continues to grow, automated energy management solutions are emerging, with limited direct competitors. One such competitor is "Algebra Intelligence," a startup specializing in software development that provides digital technologies to enhance facility environments. However, what differentiates Kafa is its specialization in industrial facilities and its comprehensive focus on automated energy management. Kafa's software is

⁶ <https://www.giz.de/de/downloads/EE%20potential%20in%20industry%20JOR.pdf>

designed specifically to meet the complex needs of industrial environments by offering features such as automated data management, real-time monitoring, predictive analytics, and efficiency project management. This focus allows Kafaa to provide tailored solutions that optimize energy usage and reduce costs for industrial facilities, setting it apart from competitors that may have a broader and less specialized approach.

In addition to direct competitors, there are several indirect competitors in the market, primarily offering energy efficiency services such as energy auditing. This segment includes nine licensed energy auditing companies operating in Jordan. The energy auditing market in Jordan features a variety of participants:

- The Royal Scientific Society (RSS)/National Energy Research Center (NERC), which conducts energy audits.
- Certified professionals who work individually or as freelancers on energy efficiency projects.
- In-house energy auditing departments within the industrial facility's organization
- Large or international energy consultancy firms who perform energy assessments before industrial facility construction.

While these competitors provide valuable energy efficiency services, they do not offer the comprehensive, ongoing benefits of Kafaa's automated energy management software. Energy auditing is typically a one-time service that provides a snapshot of a facility's energy usage at a specific point in time. In contrast, Kafaa offers continuous energy monitoring and predictive analysis, allowing facilities to proactively manage their energy consumption and achieve sustained efficiency improvements. This continuous, data-driven approach ensures that industrial facilities can maintain the desired energy performance and realize long-term cost savings.

3. Business Model

Kafaa for Energy Solutions operates under a structured model integrating software development, energy engineering, and business development to deliver comprehensive energy management solutions to industrial facilities in Jordan. The core operations include two main revenue streams: subscription fees and implementation/integration fees. Subscription fees are set at JOD 100 annually per industrial facility, granting access to Kafaa's full suite of software features and services. These include automated data management, real-time monitoring facilitated by IoT sensors and smart meters, predictive analytics using advanced machine learning algorithms, precise budgeting and forecasting tools, and efficiency project management. The second revenue stream, implementation and integration fees totaling JOD 3,500 per facility, covers setup costs and includes a one-time energy audit/assessment. Kafaa's approach empowers facilities to optimize resource utilization, reduce operational costs, and achieve sustainable energy efficiency through automated processes and proactive management strategies.

Kafaa for Energy Solutions offers a range of products and services tailored specifically for industrial facilities in Jordan, aimed at optimizing energy management and enhancing operational efficiency.

1. **Energy Management Software (Kafaa - كفاءة):** Kafaa's flagship product is its advanced Energy Management Software, designed to automate and streamline energy management processes within industrial environments. Key features include:
 - **Automated Data Management:** Kafaa automates the collection and management of energy data from various sources such as machinery, HVAC systems, and lighting. This eliminates manual data extraction and tracking, ensuring accuracy and efficiency.
 - **Real-time Monitoring:** Facilities can access live energy consumption data through intuitive dashboards. Real-time alerts notify managers of abnormal energy usage, enabling immediate corrective actions to optimize energy efficiency.
 - **Predictive Analytics:** Utilizing advanced machine learning algorithms, Kafaa forecasts energy usage patterns based on historical data and external variables like weather conditions and production schedules. This predictive capability helps facilities anticipate peak demand periods and adjust operations to mitigate costs.
 - **Budgeting and Forecasting:** Kafaa enables facilities to generate precise energy budgets based on historical consumption data and operational variables. Forecasting tools provide insights into future energy costs, supporting strategic financial planning.
 - **Efficiency Project Management:** The software tracks and evaluates the effectiveness of energy efficiency projects, offering data-driven assessments of return on investment (ROI). Facilities can benchmark performance against industry standards and set achievable energy-saving targets.

2. **Implementation and Integration Services:** Kafaa offers comprehensive implementation and integration services to industrial facilities. This includes:
 - **Setup and Configuration:** Professional setup and configuration of the Kafaa software to ensure seamless integration with existing systems and infrastructure within the facility.
 - **Energy Audit/Assessment:** As part of the implementation process, Kafaa conducts a thorough energy audit/assessment. This assessment identifies potential energy savings opportunities and provides recommendations for optimizing energy usage and reducing operational costs.

3. **Customization and Expansion:**
 - Kafaa offers customization options to meet specific needs and requirements of industrial facilities, ensuring the software aligns perfectly with operational objectives.
 - Future expansions of Kafaa's offerings may include additional modules and features based on market feedback and technological advancements in energy management.

By providing these products and services, Kafa for Energy Solutions aims to enable industrial facilities in Jordan to achieve energy savings, enhance operational efficiency, and contribute to sustainable business practices.

Key personnel at Kafa for Energy Solutions play essential roles in the company's business model. The Chief Technology Officer (CTO) oversees the technological direction and development of Kafa's software platform, ensuring it meets industry standards and aligns with customer needs. The Energy Engineer leads energy auditing and assessment processes, providing expert insights into energy efficiency strategies tailored to each industrial facility and coordinating with technical officers to implement energy-saving recommendations. Technical Officers support the CTO and Energy Engineer in software development, implementation, and technical support for industrial clients, maintaining software functionality and providing ongoing technical assistance. The Business Development Manager drives growth by identifying and pursuing business opportunities, negotiating contracts, and building strategic partnerships with industrial clients, focusing on expanding Kafa's market presence and increasing revenue streams.

Kafa for Energy Solutions ensures the delivery of its technical solutions by outsourcing software setup and development to a trusted third-party vendor. The company's marketing strategy targets industrial facilities across Jordan, emphasizing the transformative benefits of Kafa's energy management solutions in reducing operational costs and enhancing sustainability through advanced technology. In sales, Kafa engages industrial decision-makers using a consultative approach to tailor solutions to each facility's unique energy management challenges, thereby enhancing the value proposition of its software. Additionally, Kafa is committed to providing customer support which includes proactive troubleshooting of technical issues and regular reviews to optimize energy efficiency gains.

By implementing a structured operational model and leveraging a team of dedicated professionals, Kafa for Energy Solutions aims to contribute to Jordan's emerging energy management market. The company is dedicated to delivering tangible benefits to industrial clients through technology and energy management strategies.

Kafa for Energy Solutions relies on two primary revenue streams: annual subscription fees and implementation/integration fees, both of which are crucial for the start-up's financial growth and sustainability.

- **Subscription Fees:** The first revenue stream is derived from annual subscription fees, set at JOD 100 per industrial facility. This fee grants facilities access to Kafa's full suite of software features, including automated data management, real-time monitoring, predictive analytics, and efficiency project management. In the first year, the projected demand is modest, with only 10 facilities subscribing. However, the number is expected to grow substantially to 187 facilities by year five. The revenues from this stream begin at JOD 1,000 in the first year and increase to JOD 18,750 by the fifth year. This demonstrates the scalability and the increasing market penetration of Kafa's offerings. The total number of subscribers is accumulated over the years and is modelled as an optional additional service from the initial installation.
- **Implementation and Integration Fees:** The second, and more substantial, revenue stream comes from implementation and integration fees, which include a one-time setup fee of JOD 3,500 and an energy audit/assessment for potential savings. The

projected demand starts with 30 facilities in the first year and grows to 124 facilities by the fifth year. Revenues from this stream begin at JOD 105,000 in the first year and escalate to JOD 434,000 by Year 5. This revenue stream highlights the significant initial investment required by facilities to integrate Kafaa's system, which is justified by the cost savings and efficiency gains the system promises.

Combining both revenue streams, total revenues start at JOD 106,000 in the first year and surge to JOD 452,750 by the fifth year. This growth underscores the market demand and the value proposition of Kafaa's energy management solutions. With the total number of industrial facilities in Jordan being 2,500, targeting 13% of these facilities over five years indicates the need for strong market penetration and a promising outlook for the start-up's expansion.

Table 1: Revenue projection

Description / Year	1	2	3	4	5
Projected Demand (Quantity) Subscription	10	25	75	125	188
Price / Unit Subscription	100	100	100	100	100
Sub-total Subscription	1,000	2,500	7,500	12,500	18,750
Projected Demand (Quantity) Implementation and Integration Fees	30	36	50	80	124
Price / Unit Implementation and Integration Fees	3,500	3,500	3,500	3,500	3,500
Sub-total Implementation and Integration Fees	105,000	126,000	175,000	280,000	434,000
Total Revenues	106,000	128,500	182,500	292,500	452,750

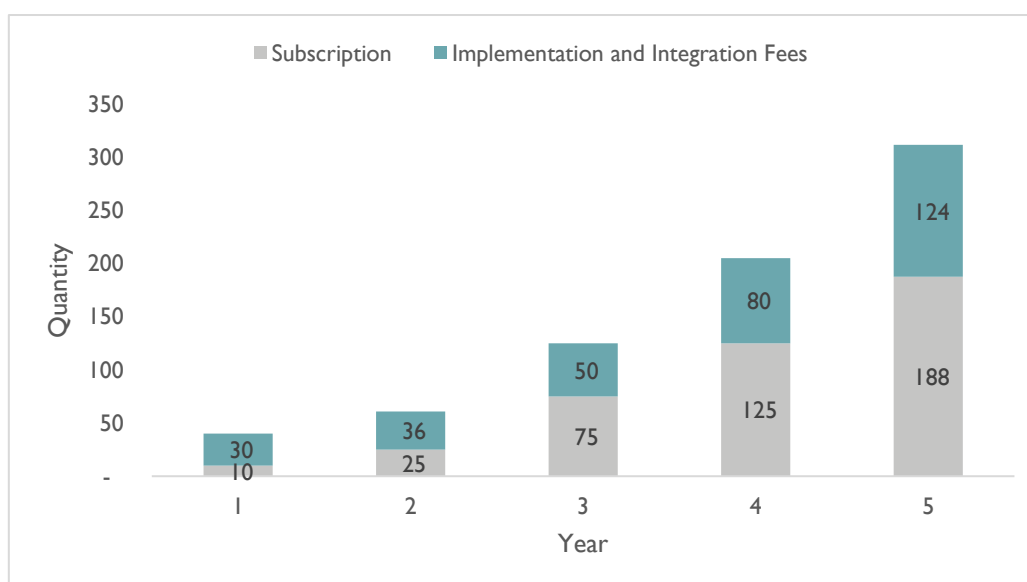


Figure 1: Product Mix by Quantity

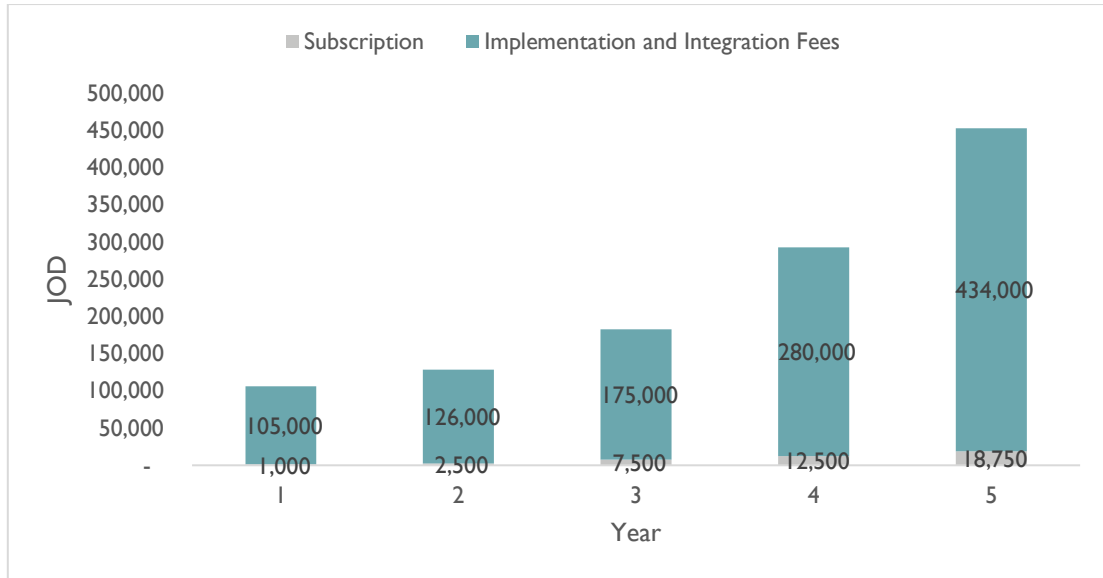


Figure 2: Product Mix by Revenue

4. Technical Analysis

The Cost of Goods Sold (COGS) table for Kafaa Energy Solutions highlights the costs associated with the implementation and integration fees, which constitute the second revenue stream. The table reveals that the COGS for the subscription-based revenue stream is zero, indicating that there are no direct costs tied to these annual fees. However, the implementation and integration fees, which include setup and a one-time energy audit/assessment, have a significant cost associated with them.

In Year 1, with a projected demand of 30 implementations, the COGS is JOD 36,000 (30 units at JOD 1,500 per unit). This cost increases each year as the number of implementations rises, reaching JOD 54,000 in Year 2, JOD 75,000 in Year 3, JOD 120,000 in Year 4, and JOD 186,000 in Year 5. These increasing costs reflect the growing scale of the business and the corresponding rise in service provision. The high COGS in the implementation and integration phase underscores the resource-intensive nature of these services, emphasizing the importance of managing these costs effectively to ensure profitability as the business expands.

Table 2: Cost of Goods Sold – Five Year Projection

Description / Year	1	2	3	4	5
Projected Demand (Quantity) Subscription	10	25	75	125	188
COGS / Unit Subscription					
Sub-total Subscription	-	-	-	-	-
Projected Demand (Quantity) Implementation and Integration Fees	30	36	50	80	124
COGS / Unit Implementation and Integration Fees	1,500	1,500	1,500	1,500	1,500
Sub-total Implementation and Integration Fees	45,000	54,000	75,000	120,000	186,000
Total COGS	45,000	54,000	75,000	120,000	186,000

Human resources management for Kafa Energy Solutions is outlined in this section, providing crucial financial and organizational details for operational planning. Kafa allocates a company contribution of 14.25% to social security and provides health insurance coverage of USD 300 per person annually. These provisions demonstrate Kafa's emphasis on employee welfare and compliance with statutory obligations.

The staffing projections for Kafa Energy Solutions highlight strategic planning for growth and operational needs over five years. The roles of Chief Technology Officer, Energy Engineer, Technical Officer, and Business Development Manager are structured to ensure consistent leadership and support for technological advancement, business expansion, and operational demands. The position of Energy Engineer remains stable at one for the first three years and increases to two by Year 4, reflecting the growing demand for specialized energy management expertise. Technical Officers are maintained at one throughout the five years to support operational demands. Overall, the cumulative number of human resources starts at four and increases to five by Year 4, aligning with the company's expansion and service offerings.

Table 3 : Manpower recruitment plan – five-year projection:

Title / Year	1	2	3	4	5
Chief Technology Officer	1	1	1	1	1
Energy Engineer	1	1	1	2	2
Technical Officer(s)	1	1	1	1	1
Business Development Manager	1	1	1	1	1

The total annual salaries according to the above staffing plan is provided in the table below.

Table 4: Manpower total cost – five-year projection

Title / Year	1	2	3	4	5
Chief Technology Officer	14,400	15,120	15,876	16,670	17,503
Energy Engineer	9,600	10,080	10,584	22,226	23,338
Technical Officer(s)	5,400	5,400	5,400	5,676	5,952
Business Development Manager	9,600	10,080	10,584	11,112	11,664
Total HR Salaries	39,000	40,680	42,444	55,684	58,457
Social Security Cost	5,558	5,797	6,048	7,935	8,330
Health Insurance Cost	1,200	1,200	1,200	1,500	1,500
Total HR Cost	45,758	47,677	49,692	65,119	68,287

The Operating Expenses (OpEx) for Kafa Energy Solutions show a consistent increase over five years, starting at JOD 57,285 in the first year and rising to JOD 82,068 by the fifth year. Key expenses include rent and web hosting, each at JOD 2,000 annually, highlighting their significance in the budget. The incremental rise in total OpEx reflects the growing operational needs and additional costs as the business expands.

The table below also accounts for the manpower cost.

Table 5: Operational Expenditures – five-year projection

Description / Year	1	2	3	4	5
Electricity	300	300	300	300	300
Rent	2,000	2,000	2,000	2,000	2,000
Water	30	30	30	30	30
Stationary	30	30	30	30	30
Maintenance	100	100	100	100	100
Telecommunication	100	100	100	100	100
Website Charges	10	10	10	10	10
Advertising	2,000	2,000	2,000	2,000	2,000
Cleaning Material & Consumbles	50	50	50	50	50
Hospitality Exp.	900	900	900	900	900
Legal & Accounting Fees	800	800	800	800	800
Sub-total OpEx	52,078	53,997	56,012	71,439	74,607
Other Costs	5,208	5,400	5,601	7,144	7,461
Total OpEx	57,285	59,397	61,613	78,583	82,068

Kafaa Energy Solutions allocates CapEx strategically across its software development phases to enhance its specialized energy management platform for industrial facilities. Starting with an initial investment of JOD 5,000 in Year 0, the focus lies on foundational software development. Year 1 sees a substantial increase to JOD 20,000 to expand features such as automated data management and predictive analytics, crucial for real-time monitoring and efficiency improvements. By Year 2, an additional JOD 15,000 is invested to further refine scalability and usability. These investments leverage advanced technologies like AI, ML, and IoT integration to ensure robust performance and security. Beyond Year 2, CapEx remains minimal as the software matures, with ongoing operational expenses covering maintenance and updates.

Table 6: Capital Expenditures Cost – five-year projection

Description / Year	0	1	2	3	4	5
Portal Development	5,000	20,000	15,000			
Total CapEx	5,000	20,000	15,000			

5. Financial Analysis

5.1 Financial Study Assumptions

The feasibility study is based on the following key assumptions:

Discount Rate: The study employs a conservative discount rate of 14%, reflecting a cautious approach to valuation.

Financing Structure: The project is entirely financed by equity. This conservative approach avoids the financial leverage and thus underestimates project value, given the lower cost of debt compared to equity.

Terminal Value: The project assumes a zero-terminal value at the end of year five, aligning with the study's conservative outlook.

Cash Flow Projection: Cash flows beyond year five are excluded from the analysis, focusing on the initial project phase.

Tax Rate: The assumed tax rate of 20% complies with Jordan's income tax law.

Depreciation Rate: Capital expenditure (CapEx) is depreciated at an annual rate of 20%. Any deviation from this rate may impact projected profitability but not project feasibility, as depreciation is a non-cash expense.

Working Capital Assumptions

Operational liquidity requirements are guided by the following assumptions:

- **Cash Reserves:** The project will maintain cash equivalent to 30 days of projected annual operational expenses, ensuring robust liquidity management.
- **Accounts Receivable (A/R) Collection Period:** The average collection period for receivables is 45 days, reflecting expected credit sales conversion into cash.
- **Accounts Payable (A/P) Payment Period:** The average payment period for payables is 0 days, indicating the timeframe for settling supplier obligations.
- **Inventory Management:** Inventory levels will be maintained to cover an average of two months of sales quantity, ensuring optimal stock levels to meet demand efficiently.

Capital expenditures expected to be incurred in the first year were included as part of the initial costs of the project.

Provisions were made within the initial cost to cover any potential negative net free cash flow that may arise during the first five years of operation, if needed.

5.2 Financial Study:

5.2.1 Projected Working Capital

This table shows that the net working capital needed for the project for the first year of operation is JOD 25,524, which has to increase steadily year over year to reach JOD 94,433 in the fifth year of operation. The steady increase in the working capital comes to cover the rapid increase in the project operations and mainly the increase in the projected revenues.

Table 7: Working capital projection (JOD)

Description / Year	1	2	3	4	5
Cash	4,774	4,950	5,134	6,549	6,839
Accounts Receivable (A/R)	13,250	16,063	22,813	36,563	56,594
Inventory	7,500	9,000	12,500	20,000	31,000
Accounts Payable (A/P)	-	-	-	-	-
Net Working Capital	25,524	30,012	40,447	63,111	94,433
Change in Working Capital	-	4,488	10,435	22,664	31,322

5.2.2 Project Initial Cost

The project's initial cost is projected to be JOD 52,358, comprising JOD 25,000 as CapEx, JOD 1,834 as provisions for the second-year negative free cash flow and JOD 25,524 as net working capital.

Table 8: Initial Cost Summary (JOD)

Description / Year	JOD
CapEx	25,000
Provisions for first year(s) negative free cash flows	1,834
Net Working Capital	25,524
Total Initial Cost	52,358

5.2.3 Projected Income Statement

The projected income statement indicates that the project will generate a loss of JOD 1,285 in the first year of operation. However, net profits are expected to be positive and increase gradually over the study period starting from the second year of operation, reaching JOD 141,346 in the fifth year of operation.

Table 9: Projected Income Statement (JOD)

Description / Year	1	2	3	4	5
Total Revenues	106,000	128,500	182,500	292,500	462,750
COGS	45,000	54,000	75,000	120,000	186,000
Gross Profit	61,000	74,500	107,500	172,500	266,750
OpEx	57,285	59,397	61,613	78,583	82,068
Net Profit Before Tax and Depreciation	3,715	15,103	45,887	93,917	184,682
Depreciation	5,000	8,000	8,000	8,000	8,000
Net Profit Before Tax	-1,285	7,103	37,887	85,917	176,682
Tax Expense	-	1,164	7,577	17,183	35,336
Net Profit	-1,285	5,940	30,309	68,734	141,346

In the first year of operation, the project is expected to generate negative profit margins of 1.2%. However, the gross and net profit margins in the following years are expected to be positive and increase gradually. In the fifth year of operations, the gross profit margin is expected to be 58.9%, and the net profit margin is 31.2%.

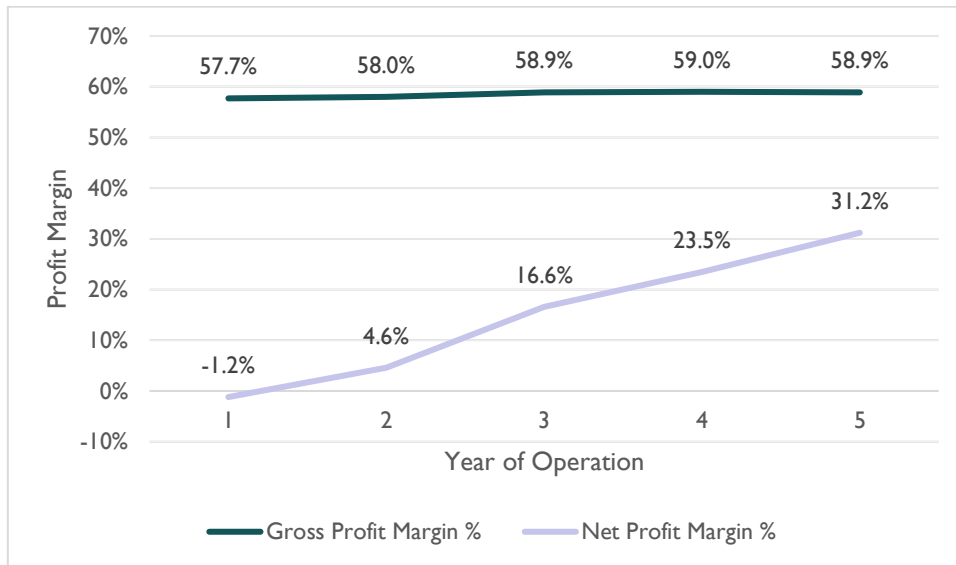


Figure 3: Gross vs Net Profit Margin

On the asset management side, the study shows that the return on investment will increase steadily from -2.5% in the first year of operation to 215.7% in the fifth year.

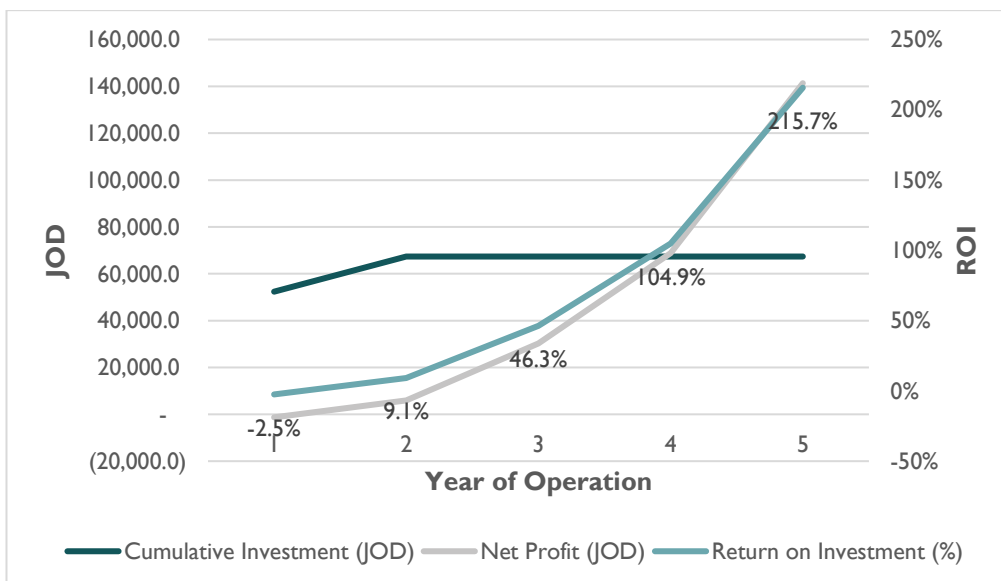


Figure 4: Return on Investment

5.2.4 Projected Free Cash Flow Statement

The table below demonstrates that the project can generate a positive free cash flow from the first year of operation, JOD 3,715. However, due to the projected expansion in business operations, in the second year, the project needs to inject JOD 15,000 and JOD 4,488 as additional CapEx and working capital, resulting in the second year's free cash flow being

negative. However, in the following years, the project is expected to generate positive free cash flows that increase gradually to reach JOD 118,024 in the fifth year of operation.

Table 10 : Free Cash Flow (FCF) Projection (JOD)

Description / Year	0	1	2	3	4	5
Cash-In Flow						
Net Profit	-	-1,285	5,940	30,309	68,734	141,346
Depreciation	-	5,000	8,000	8,000	8,000	8,000
Injected Capital	52,358					
Total Cash-In Flow	52,358	3,715	13,940	38,309	76,734	149,346
Cash-Out Flow						
Initial Cost	50,524	-	15,000	-	-	-
Changes in Working Capital	-	-	4,488	10,435	22,664	31,322
Total Cash-Out Flow	50,524	-	19,488	10,435	22,664	31,322
Free Cash Flow	1,834	3,715	-5,549	27,874	54,070	118,024

Based on these results, the project's feasibility indicators demonstrate its viability, with a net present value of JOD 58,757.1 and a profitability index of 2.12. Moreover, the project's internal rate of return (IRR) is expected to be 35.77%, indicating feasibility is not sensitive to changes in market conditions.

Feasibility Indicators	
Net Present Value (NPV)	58,757
Profitability Index (PI)	2.12
Internal Rate of Return (IRR)	35.77%

5.3 Sensitivity Analysis

To assess the project's sensitivity to market conditions, a sensitivity analysis was conducted involving six unfavourable scenarios:

- Decrease projected revenues by 5% while keeping other variables constant.
- Decrease projected revenues by 10% while keeping other variables constant.
- Increase operational expenditure by 5% while keeping other variables constant.
- Increase operational expenditure by 10% while keeping other variables constant.
- Increase initial costs by 5% while keeping other variables constant.
- Increase initial costs by 10% while keeping other variables constant.

Table 11: Sensitivity analysis outcomes

Sensitivity Scenario	Net Present Value (NPV)	Profitability Index (PI)	Internal Rate of Return (IRR)
Original Case	58,757	2.12	35.77%
Drop in revenue by 5%	19,036	1.30	20.57%
Drop in revenue by 10%	34,355	0.61	3.72%
Increase in OpEx by 5%	44,646	1.78	29.64%
Increase in OpEx by 10%	29,263	1.46	23.62%
Increase in initial cost by 5%	54,305	1.96	33.18%
Increase in initial cost by 10%	41,904	1.61	27.17%

The sensitivity analysis shows that, in general, the project is feasible and not sensitive to unfavourable market conditions. Apart from the 10% drop in the revenue’s scenario, the project's economic feasibility is strong and viable under all the above-mentioned scenarios. The drop in revenues has a more dramatic impact on the project viability than the increase in the OpEx or initial cost by the same magnitude. It is recommended that investors check and further study the market to ensure that the projected revenues are achievable within the thresholds of the proposed initial cost and operational expenditures.

6. Integration with Other Sectors

Kafaa for Energy Solutions can integrate effectively with other sectors of the economy, particularly in Jordan's industrial and technological landscape. Collaborations with sectors such as manufacturing, construction, and technology can yield significant synergies. For instance, in manufacturing, Kafaa's energy management software can optimize production processes by reducing energy costs, enhancing efficiency, and ensuring compliance with environmental regulations. In construction, integrating Kafaa can promote sustainable building practices through efficient energy use, aligning with green building certifications and reducing operational expenses over time. Furthermore, partnerships with technology sectors can leverage Kafaa's predictive analytics and IoT integration to advance smart city initiatives, offering real-time energy insights for urban infrastructure. By integrating with these sectors, Kafaa not only enhances operational efficiencies but also strengthens its market position by addressing broader economic and environmental challenges, thereby increasing its attractiveness and impact in the marketplace.

7. Entrepreneur Persona

An ideal entrepreneur for Kafaa for Energy Solutions possesses a robust background in energy management, software development, and AI technology. This leader would bring strategic insights into optimizing industrial energy efficiency through innovative software solutions tailored for complex operational environments. Their expertise in energy management ensures a deep understanding of the challenges and opportunities within the sector, enabling them to effectively steer Kafaa's development and implementation phases. Proficiency in

software development equips them to oversee the creation of advanced features like real-time monitoring and predictive analytics, essential for meeting the evolving needs of industrial clients. Additionally, a strong grasp of AI technology allows for the integration of machine learning algorithms, enhancing Kafaa's ability to provide actionable insights and proactive energy management strategies. This entrepreneurial persona not only drives technical excellence but also fosters partnerships across sectors, positioning Kafaa as a contributor to energy efficiency practices and sustainability efforts in Jordan and beyond.

8. Stakeholders

In establishing Kafaa for Energy Solutions, several stakeholders play important roles in its success and growth. Primary stakeholders include industrial facility owners and managers who benefit from Kafaa's energy management software, enhancing operational efficiency and cost savings. Government entities, such as regulatory bodies and energy departments, are also crucial stakeholders, influencing policy frameworks and providing incentives for energy efficiency initiatives. Financial institutions and investors support the start-up's growth and expansion by providing funding and financial expertise. Technology partners and software developers are essential for maintaining and advancing Kafaa's software capabilities, ensuring it remains competitive and aligned with technological advancements. Additionally, industry associations and advocacy groups promote awareness of energy management solutions and foster collaboration within the sector. Engaging and collaborating with these stakeholders strategically enhances Kafaa's market penetration, operational effectiveness, and overall sustainability in the energy management industry.

9. Risk Assessment and Mitigation

Risk	Impact	Likelihood (High/Medium/Low)	Risk Mitigation Technique
Market Acceptance	Low initial adoption rate may slow growth	Medium	Conduct extensive market research and pilot testing with early adopters. Implement robust marketing and educational campaigns to showcase benefits and differentiate from competitors.
Technological Dependency	Reliance on third-party software development	High	Establish backup plans and contingency agreements with multiple vendors. Invest in continuous monitoring and updates to ensure compatibility and minimize downtime.
Operational Scalability	Difficulty scaling operations as customer base grows	Medium	Implement scalable infrastructure from the outset. Develop operational processes and systems that can handle increased demand. Hire and train additional

			personnel as needed.
Financial Viability	Insufficient revenue to sustain operations	High	Create detailed financial projections and contingency budgets. Secure additional funding sources or lines of credit. Monitor and manage cash flow rigorously.
Regulatory Compliance	Changes in energy regulations or policies	Medium	Stay updated with regulatory changes and maintain compliance through ongoing legal consultations. Develop flexibility in software to adapt quickly to regulatory updates.
Data Security and Privacy	Breach of customer data	Medium	Implement robust data encryption and security protocols. Conduct regular security audits and provide ongoing staff training on data protection best practices.

To ensure the successful launch and sustained growth of Kafa for Energy Solutions, it is important to adopt a well-rounded strategy addressing key risks and operational challenges. Extensive market research and pilot testing with early adopters will provide valuable insights, allowing for the refinement of the product to meet user needs effectively. Additionally, robust marketing and educational campaigns will help in showcasing the software's benefits and distinguishing it from competitors.

To mitigate technological dependency, it is advisable to establish contingency plans and agreements with multiple vendors for the IoT sensors. Continuous monitoring and updates are essential to ensure compatibility and minimize downtime. Implementing scalable infrastructure and developing efficient operational processes from the outset will support growth. Training and hiring additional personnel as needed will further facilitate smooth scaling of operations.

Financial viability is critical for the project's success. Close monitoring and management of financial performance will ensure the company remains on a stable financial footing. Sensitivity analysis indicates that a 10% drop in revenues would result in a profitability index of less than 1, meaning the business would not be profitable under these conditions, highlighting the need for accurate financial forecasting and contingency planning.

Regulatory compliance is another important aspect, particularly given the evolving nature of energy regulations. Staying updated with regulatory changes through ongoing legal consultations and maintaining flexibility in the software to adapt to these changes will ensure continued compliance. Additionally, implementing strong data encryption and security protocols, along with regular security audits and staff training on data protection best practices, will safeguard customer data and maintain trust.

By following these recommendations and addressing potential risks, Kafa for Energy Solutions can establish itself as a reliable and effective player in the energy management industry,

contributing to improved operational efficiency and sustainability for industrial facilities in Jordan.

10. Conclusion

Kafaa for Energy Solutions is well-positioned to address the energy management needs of industrial facilities in Jordan. Its advanced software platform offers solutions that enhance operational efficiency and reduce energy costs. By following strategic recommendations, such as conducting thorough market research, establishing contingency plans, and ensuring regulatory compliance, Kafaa can effectively mitigate risks and support sustainable growth. The company's focus on robust customer support, ongoing technological advancements, and sound financial management will further strengthen its market position. Leveraging AI and IoT technologies, Kafaa for Energy Solutions has the potential to make a significant contribution to the energy efficiency and economic resilience of Jordan's industrial sector.

In conclusion, the project demonstrates promising feasibility indicators under very restrictive assumptions. Nonetheless, investors are advised to conduct additional analysis on projected demand, initial costs, and operational expenses to mitigate potential risks associated with adverse market conditions that could jeopardize its viability.

Disclaimer

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Founders and investors considering this project are advised to conduct further analysis on projected adoption rates, development costs, and ongoing operational expenses. This additional scrutiny will help mitigate potential risks related to technology challenges, changes in regulations, market penetration, and competitive pressures.

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