

Comprehensive Report on Client-Funded Renewable Energy Research and Innovation Projects

Renewable Energy Technical Incubator (CREP2522)

Funded by National Industrial Development and Logistics Program, Vision 2030

English Translation | Reporting Period 2022–2025

Renewable Energy Technical Incubator at King Fahd University of Petroleum and Minerals

Executive Summary

This report presents the management and outcomes of the Renewable Energy Technical Incubator at King Fahd University of Petroleum and Minerals, supported through the NIDLP program during 2022–2025. The initiative established applied-research facilities, supported prototype development, strengthened university–industry collaboration, developed local technical capabilities, and trained students, researchers, and entrepreneurs.

Dr. Atif Alzahrani served as the project manager and technical lead of the Renewable Energy Technical Incubator. He was responsible for overseeing the project's strategic direction, technical implementation, administrative coordination, and stakeholder engagement, ensuring the achievement of its objectives and the long-term sustainability of the incubator beyond the funding period.

Award criterion	Evidence in the report	Section
External funding and project significance	NIDLP-supported Renewable Energy Technical Incubator established at KFUPM, including laboratories, research equipment, prototype-development programs, student grants, and training activities.	Please refer to the end of the report; attached is the Ministry of Finance notification regarding the amount allocated for the project and its distribution.
Timely completion	Milestone tables provide planned and actual completion dates for infrastructure, equipment, prototypes, patents, cooperation agreements, scholarships, and workshops.	These milestones and deliverables were controlled by ADAA, (please refer to. Milestones associated with the programs tables)
Research outcomes	Five application-ready prototypes, five planned patents, publications, student projects, technical reports, three cooperation agreements, two startups, and training activities.	For further details, please refer to the output tables associated with each program and the publications section at the end of the report.
New technical capabilities	Three laboratories were allocated and equipped, including a smart-grid laboratory, solar-array simulator, hybrid solar system, power supplies, inverters, and voltage regulators.	The laboratory established under this initiative has become the primary hub for prototype development for researchers and faculty members. The equipment and materials procured through this project have contributed to the graduation of numerous undergraduate and graduate students, as well as the formation of joint ventures and startups.
Honors and awards	Gold medal at the 50th International Exhibition of Inventions Geneva, three best-poster awards, President's Badge awards, and other reported recognitions.	The project participated in the annual NIDLP program ceremony held in Riyadh on 29 December 2024, where it was recognized in the Human Capital Development and Entrepreneurship Award category. Refer to Media Program section
Client-oriented performance	Annual meetings with NIDLP and university stakeholders, joint exhibitions, project presentations, cooperation agreements, and delivery of project outputs.	Project progress was monitored on a quarterly basis by a third party, Adaa. All requirements were met, and the project was completed according to the plan. Please refer to the attachment at the end of the report, sourced from the Adaa website.
Commercialization and industry impact	Five application-ready prototypes, three cooperation agreements, two startups, patent activities, and collaborations with companies and external partners.	2 Joint ventures 2 Startups
Capacity building and human capital development	More than 470 trainees participated in 11 workshops; students, researchers, entrepreneurs, and university teams were supported through several programs.	Refer to training section

Initiative Scope

This initiative aims to establish a renewable energy incubator that contributes to advancing solutions, policies, and programs supporting the sector; enabling the commercialization of modern technologies; supporting the establishment of new startups; and attracting additional investment and companies to operate in the renewable energy field in the Kingdom of Saudi Arabia.

The specific objectives are:

1. Establish sustainable applied research facilities dedicated primarily to research, development, and innovation (RDI) projects in renewable energy, while also addressing enabling technologies such as energy efficiency and Fourth Industrial Revolution technologies.
2. Strengthen collaboration between industrial partners, including energy entities, local-content stakeholders, and private-sector developers, and university researchers and students. This collaboration is intended to facilitate technology transfer and commercialization in renewable energy and related enabling technologies, making them more effective and attractive.
3. Build local capacity and support startups in order to accelerate the adoption of renewable energy and energy-efficiency technologies and promote investment in Fourth Industrial Revolution technologies within the energy sector.

The Challenge

The incubator is intended to help address the following challenges:

- Fossil-energy consumption in Saudi Arabia is more than three times the global average, while the country has significant untapped potential in renewable energy and energy efficiency.
- The local market lacks a platform, facilities, and sufficient raw materials for renewable-energy technologies and their enabling technologies, including Fourth Industrial Revolution technologies and energy efficiency, to test or implement research, development, and proof-of-concept projects for university students, engineers, researchers, and early-stage entrepreneurs.
- Research, development, and proof-of-concept projects take longer to establish because of delays in locating or purchasing raw materials from abroad. The incubator is intended to provide these capabilities locally.
- There is a shortage of specialized human capacity and the broader human capital needed to initiate the development and deployment of renewable energy and energy-efficiency solutions.
- Dust and high temperatures are two principal factors limiting the cost-effective reliability, localization, and adoption of photovoltaic solar technologies.
- There is a need to develop renewable-energy-powered systems for cooling, water desalination, and water supply for farms, particularly in remote areas.

Target Group

The target groups for the incubator are postgraduate students, engineers, researchers at local universities, and early-stage entrepreneurs.

Contribution to the Strategic Objective

The initiative contributes to Strategic Objective 3.2.4, “Increasing the contribution of renewable energy sources to the energy mix,” by advancing solutions, policies, and activities and by supporting the commercialization of sector technologies and the launch of new businesses.

Expected Impact

The expected impact is a transition toward more sustainable energy sources, broader deployment of renewable-energy technologies and applications, stronger technical support for local companies and industries, and increased attraction of investors.

Final Outputs

- Completion of the incubator's infrastructure, research devices, and equipment (one platform).
- Development of five application-ready prototypes resulting from RDI projects in renewable-energy technology

Introduction

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Final Outputs

- Completion of the incubator's infrastructure, research devices, and equipment (one platform).
- Development of five application-ready prototypes resulting from RDI projects in renewable-energy technology.
- Registration of five patents through the Prototype Development Program.
- Signing of three cooperation agreements between companies and the incubator for the use of locally developed research and development results.
- Training of 200 students through graduation projects, ten graduate theses, and ten workshops and training programs.

1. Establishing the Incubator Premises and Equipping the Research Facilities

The university allocated three laboratories to support the research incubator and redesigned these spaces to meet the needs of research teams. Advanced research equipment was also purchased to support project implementation.

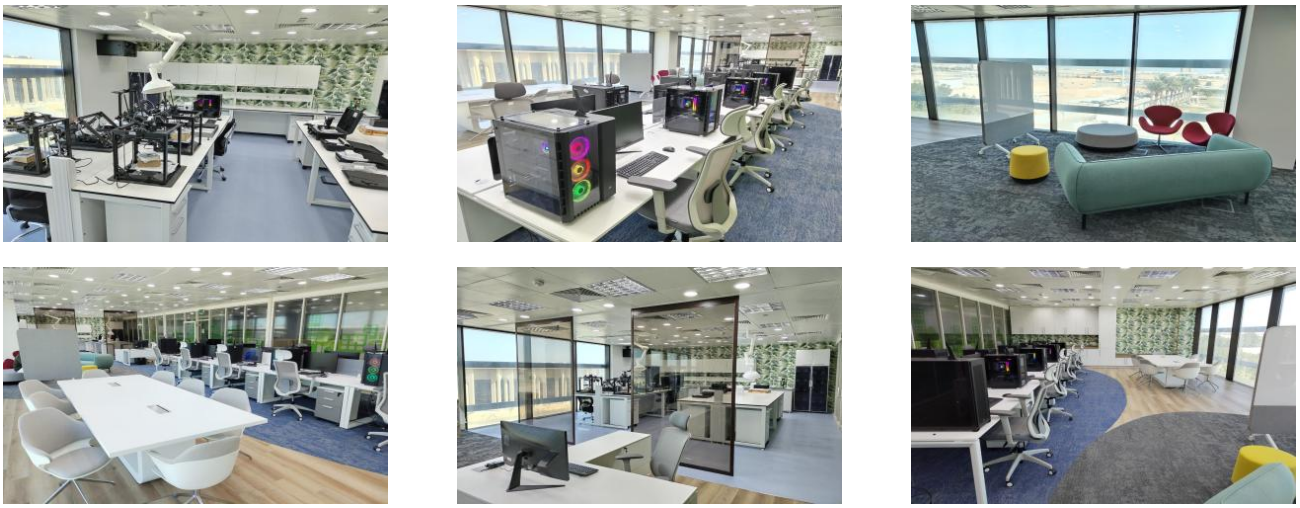
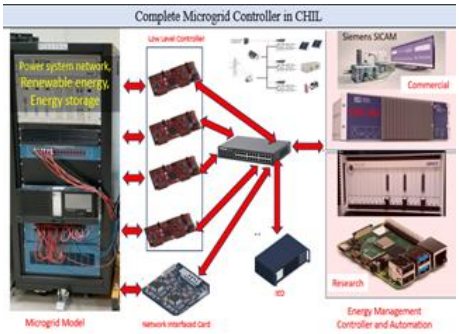


Figure 1. Multifunctional laboratory facilities.





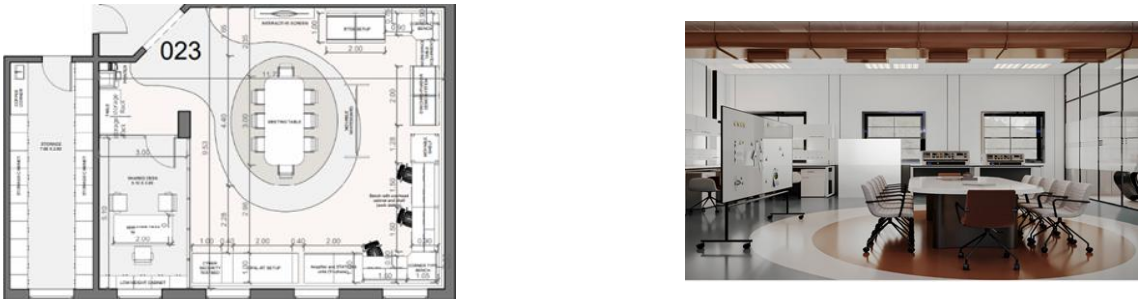


Figure 2. Smart-grid laboratory and associated equipment.

The principal equipment associated with the smart-grid laboratory includes:

1. Contact-type voltage regulator.
2. Three-phase bridge inverter.
3. MTP Series switching-mode DC power supply.
4. 5 kW hybrid solar system.
5. Solar array simulator.

Research Incubator Infrastructure Milestones

Table 1. Milestones associated with the program.

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
2	Completion of contracting with the consultant to implement the incubator building works.	2022-12-31	1	1.7	1.8	2023-03-20	Completed	Signed contract certificate by both parties
4	Completion of preparation of the incubator building to receive the research equipment.	2022-12-31	1	6.7	8.8	2023-07-10	Completed	Work-completion certificate
5	Completion of the incubator’s infrastructure, devices, and research equipment.	2022-12-31	1	23.6	32.4	2023-03-27	Completed	Invoices and work-completion certificate

Media Program

The incubator conducted two annual meetings that brought together stakeholders from the university, the NIDLP program, and industry. The first meeting was held on 6 June 2024 and the second on 12 May 2025. The events introduced the incubator ecosystem, presented the results of its projects, and featured presentations by Dr. Ali Al-Sheikhi, Vice President for Research and Development; Dr. Atif Al-Zahrani, Director of the Sustainable Energy Systems Research Center, representing the university; Eng. Faisal Al-Rabeh, Vice President for Energy and Planning; and Eng. Nayef Al-Osaimi, Executive Vice President, representing NIDLP.

The meetings strengthened communication, supported discussion of progress, and promoted integration among partners in the renewable-energy ecosystem. The university also participated in the annual NIDLP program ceremony held in Riyadh on 29 December 2024, where it was recognized in the Human Capital Development and Entrepreneurship Award category.

Media documentation: First meeting promotional video | Second meeting promotional video












Figure 3. Selected scenes from the incubator's stakeholder meetings and outreach activities.



Figure 4. Media coverage and program outreach.

2. Proof of Concept Program

The program was launched in three stages and attracted 20 researchers. Nine research projects focusing on renewable energy, energy efficiency, and Fourth Industrial Revolution technologies were accepted. The projects achieved their objectives successfully, including the following activities:

- Screening and announcement of winning projects in three rounds.
- Development of five application-ready prototypes.
- Registration of five patents.
- Delivery of detailed presentations of achievements at a joint university–NIDLP exhibition attended by NIDLP representatives.

Table 2. Milestones associated with the program

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
1	Completion of the mechanism for defining the criteria used to select winners for the Prototype Development Program.	2022-10-31	2	0.1	0.1	2022-10-31	Completed	Winner-selection criteria mechanism
3	Completion of application screening and announcement of the winning projects for the Prototype Development Program (first announcement).	2022-12-31	2	0.3	2.1	2022-12-31	Completed	Detailed report on announcement and screening results
11	Completion of application screening and announcement of the winning projects for the Prototype Development Program (second announcement).	2023-06-30	2	0.3	35.09	2023-09-27	Completed	Detailed report on announcement and screening results
15	Completion of the Prototype Development Program and presentation of one prototype (first announcement).	2023-12-31	2	4	40.71	2023-12-25	Completed	Detailed achievement report
23	Completion of the Prototype Development Program and presentation of one prototype (second announcement).	2024-06-30	2	4	53.45	2024-06-29	Completed	Detailed achievement report
24	Completion of application screening and announcement of the winning projects for the Prototype Development Program (third announcement).	2024-09-30	2	0.4	53.85	2023-09-27	Completed	Detailed report on announcement and screening results
33	Completion of the third stage of the Prototype Development Program and presentation of three prototypes (third announcement).	2025-09-30	2	8	73.26	2025-06-22	Completed	Detailed achievement report
34	Completion of the development of five prototypes from RDI projects with application feasibility in renewable-energy technology.	2025-09-30	2	1.9	75.16	2025-06-22	Completed	Detailed report on completion of five prototypes
37	Completion of the registration of five patents through the Prototype Development Program.	2025-12-31	3	12	90.8	2025-06-22	Completed	Detailed achievement report

Table 3: POC associated outputs

Item	Number
No. Calls	3
Projects	9
Patents	7
Prototypes	8
Awards	1

PI Name	Patent Information				
	Number of patents	KFUPM Ref. No.	Oblon Ref. No.	Filing No.	Issuance No.
S. Rehman	1	2024-099-SD	553171US	19/028,138	10,323,091
Md. Abdul Aziz	1	2024-125-SNS	554019US	U.S. Serial No. 63/767,885	Filed
KASHIF IRSHAD	2	2024-043-01SNS	553643US	19/005,908	Filed
		2024-043-02 SNS		1020247370	Filed
Mohamed Zaery	2	2024-113-01	556626US	19/181,482	Filed
		2024-113-02		19/181,482	Filed
Muhammad Khalid	1	2024-118			
Uthman Baroudi	1	2021-031-01			US Patent App. 17/878,127

Award: Gold medal at the 50th International Exhibition of Inventions Geneva.



Figure 5. Dr. Shafiqu Al-Rahman, Prototype Development Program, Round 1.

3. 50K Challenge Competition

The program was launched in two stages and attracted 50 students. Seventeen research projects were accepted. The program included the following activities:

- Screening applicants and announcing winners in two stages.
- Selecting three winners in each stage.
- Signing three cooperation agreements between companies emerging from the competition and the incubator to use the results of locally developed projects.

Table 4: Winners of the 50K Challenge Competition, Round 1

Ranking	Team leader	Project title
First prize	Fahad Khan	Development of a turbine system using a thermochemical fluid for clean and sustainable energy
Second prize	Israa Rajab	From carbon to butane: a revolutionary approach to sustainable energy production
Third prize	Taha Al-Hindas and Ibrahim Al-Shayeb	Centralized monitoring of photovoltaic cell systems using power-line communication

Table 5: Winners of the 50K Challenge Competition, Round 2

Ranking	Team leader	Project title
First prize	Omar Jaafar	Decomposition of ammonia into hydrogen for sustainable energy production
Second prize	Yudha Prima Hardianto	Composite cathode: carbon waste and biomass in semi-solid-state nickel–zinc batteries
Third prize	Nur Allif Fathurrahman	Enhancing prototype preparation for biofuel production using catalyst-based nanotechnology and microwave technology: a hybrid experimental–computational approach



Figure 6. Selected images from the two 50K Challenge rounds.

The projects achieved the targeted objectives and milestones, as shown in Table 6.

Table 6. Milestones associated with the program

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
10	Completion of applicant screening for the 50K Challenge (first announcement).	2023-06-30	4	0.75	34.79	2023-06-21	Completed	Detailed report on announcement and screening results
18	Completion of applicant screening for the 50K Challenge (second announcement).	2024-03-31	4	0.75	42.2	2024-03-31	Completed	Detailed report on announcement and screening results
19	Completion of the first 50K Challenge round, including the announcement of three winners (first winners announcement).	2024-06-30	4	5.15	47.35	2024-06-29	Completed	Detailed achievement report including the three winners
28	Completion of the second 50K Challenge stage, including the announcement of three winners (second winners announcement).	2025-03-31	4	5.15	61.06	2025-05-12	Completed	Detailed achievement report including the three winners
39	Completion of three cooperation agreements between companies emerging from the 50K Challenge and the incubator for the use of locally developed research and development results. This represents three agreements out of six winners from the first and second announcements.	2025-12-31	4	3.2	100	2025-06-30	Completed	Final partnerships and company registration certificates

Table 7: 50K associated outputs

Item	Number
No. Calls	2
Teams	21
Patents	3
Prototypes	14
Startups	2

Student Name	Patent Information				
	Number of patents	KFUPM Ref. No.	Oblon Ref. No.	Filing No.	Issuance No.
Esraa Ragab Kotob	3	2024-262-SNS	555139US		
		2024-324	557062US		
		2024-392	557063US		

The two startups were in solar-energy tools and biofuel extraction.



Figure 7. Startup outputs associated with the 50K Challenge.

4. Graduate Student Programs

Forty students participated in the program, and 18 research projects were accepted. The program included:

- At least three graduate theses in each stage.
- Documentation of achievements in detailed reports.

The projects achieved the targeted objectives and milestones, as shown in Table 8.

Table 8. Milestones associated with the program

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
6	Completion of applicant screening for the graduate and undergraduate student scholarship programs (first announcement).	2022-12-31	5	0.24	32.64	2023-06-22	Completed	Scholarship award document for beneficiary students
8	Completion of applicant screening for the graduate student scholarship programs (second announcement).	2023-03-31	5	0.16	33.4	2023-06-22	Completed	Scholarship award document for beneficiary students
14	Completion of applicant screening for the graduate student scholarship programs (third announcement).	2023-09-30	5	0.16	36.71	2023-12-27	Completed	Scholarship award document for beneficiary students
25	Completion of the graduate student scholarship programs and presentation of outputs, including three graduate theses (first announcement).	2024-12-31	5	1.32	55.17	2024-12-22	Completed	Detailed achievement report and graduation thesis
31	Completion of the graduate student scholarship programs and presentation of outputs, including three graduate theses (second announcement).	2025-03-31	5	1.32	64.62	2025-03-26	Completed	Detailed achievement report and graduation thesis
36	Completion of the graduate student scholarship programs and presentation of outputs, including four graduate theses (third announcement).	2025-09-30	5	3	78.8		Completed	Detailed achievement report and graduation thesis
38	Completion of training 200 students through graduation projects, ten graduate theses, and ten workshops and training programs.	2025-12-31	5	6	96.8	2025-03-26	Completed	Detailed report including lists of 200 trained students, ten graduate theses, and ten workshops

Table 9: Graduate Student associated outputs

Item	Number
No. Calls	3
Projects	11
Joint Ventures	1
Awards	3
Patents	13

Student Name	Patent Information				
	Number of patents	KFUPM Ref. No.	Oblon Ref. No.	Filing No.	Issuance No.
Muhamad Yudatama Perdana	1	2024-148	554293US	63/690,121	Filed
Rawan Al-Qahtani	1	2025-057			
Ariel Hazril Gursida	1	2024-359			
Abubakar Dahiru	4	2024-125	554019US	63/767,885	Filed
		2024-223			
		2023-029-01			12,243,686
		2023-029-02	556435US		
Mahbuba Aktary	3	2024-343			
		2024-130-01	554702SA	1020252502	Filed
		2024-130-02		19/189,081	
RUAA ABAKAR	1	2024-419			

Joint project: DEMA Energy.

Awards: Three awards for best scientific poster presentations at international conferences.

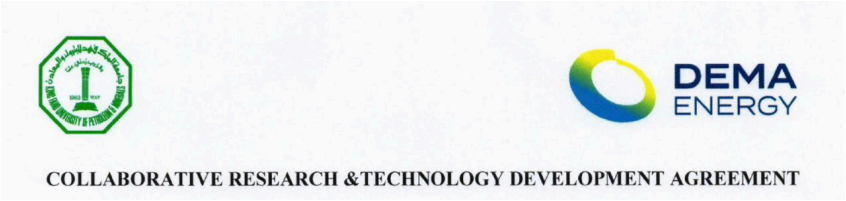


Figure 8. Collaborative Research and Technology Development Agreement with DEMA Energy.



Figure 9. Selected graduate-program achievements.

5. Undergraduate Student Grant Program

The program targeted 30 students, and 15 research projects were accepted. It was implemented in three stages and included:

- Screening applicants and awarding scholarships.
- Training students through graduation projects.
- Providing detailed achievement reports.

The projects achieved the targeted objectives and milestones, as shown in Table 10.

Table 10. Milestones associated with the program

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
6	Completion of applicant screening for the graduate and undergraduate student scholarship programs (first announcement).	2022-12-31	5	0.24	32.64	2023-06-22	Completed	Scholarship award document for beneficiary students
13	Completion of the undergraduate student grant programs, including training four students (first announcement).	2023-09-30	5	0.82	36.55	2023-09-15	Completed	Detailed achievement report (graduation-project research)
17	Completion of applicant screening for the undergraduate student grant programs (second announcement).	2024-03-31	5	0.1	41.45	2023-12-26	Completed	Scholarship award document for beneficiary students
21	Completion of the undergraduate student grant programs, including training four students (second announcement).	2024-06-30	5	0.82	48.81	2024-05-26	Completed	Detailed achievement report (graduation-project research)
26	Completion of applicant screening for the undergraduate student grant programs (third announcement).	2024-12-31	5	0.1	55.27	2024-09-30	Completed	Scholarship award document for beneficiary students
29	Completion of the undergraduate student grant programs, including training four students (third announcement).	2025-03-31	5	1.6	62.66	2025-03-26	Completed	Detailed achievement report (graduation-project research)

Table 11: Undergraduate Student associated outputs

Item	Number
No. Calls	3
Projects	21
Joint Ventures	1
Awards	2

Joint project: collaboration with the Canadian startup SwishSolar.

Awards: President's Badge 2024 and President's Badge 2025.



Figure 10. Collaborative Research and Technology Development Agreement with SwishSolar.



Figure 11. Selected undergraduate-program achievements and recognitions.

6. Training Workshop Program

Eleven training workshops were delivered, benefiting more than 470 trainees. Seventy percent of the trainees were undergraduate students from various Saudi universities, institutes, and companies. The workshops addressed renewable energy, energy efficiency, and Fourth Industrial Revolution technologies. Each workshop was documented through official certificates of completion.

Table 12: Training workshops delivered

Course	Dates
Geothermal Energy Fundamentals	23–25 January 2024
Energy Optimization for Sustainable Development	26–28 January 2025
Sustainable Hydrogen Technologies	26–28 January 2025
Fundamentals of Solar Energy Utilization	26–28 January 2025
Renewables for Decarbonization and Energy Sustainability	20–22 March 2023
Maximizing Energy Potential: Charting the Path to Sustainability and Efficiency	13–15 May 2024
Artificial Intelligence for Sustainability and Renewable Energy	13–15 June 2023

Course	Dates
Battery Technologies, Energy Storage Deep Dive and E-Mobility	10–12 September 2024
Energy Efficiency and Energy Management	12–14 September 2023
Smart Grid and Renewables	26–28 September 2023
Vision to Value: Design Thinking for Entrepreneurs and Startup Scalable Reality	7–9 October 2025

The training workshops achieved the targeted objectives and milestones, as shown in Table 13.

Table 13. Milestones associated with the program

No.	Milestone	Planned completion date	Linked output (No.)	Equivalent achievement weight (%)	Equivalent completion (%)	Actual completion date	Status	Supporting documents
7	Completion of the first training workshop (17 students).	2023-03-31	5	0.6	33.24	2023-03-23	Completed	Training-course completion certificates
9	Completion of the second training workshop (17 students).	2023-06-30	5	0.64	34.04	2023-06-15	Completed	Training-course completion certificates
12	Completion of the third training workshop (17 students).	2023-09-30	5	0.64	35.73	2023-09-14	Completed	Training-course completion certificates
16	Completion of the fourth training workshop (17 students).	2023-12-31	5	0.64	41.35	2023-11-28	Completed	Training-course completion certificates
20	Completion of the fifth training workshop (17 students).	2024-06-30	5	0.64	47.99	2024-01-25	Completed	Training-course completion certificates
22	Completion of the sixth training workshop (17 students).	2024-06-30	5	0.64	49.45	2024-05-14	Completed	Training-course completion certificates
27	Completion of the seventh training workshop (17 students).	2024-12-31	5	0.64	55.91	2024-09-12	Completed	Training-course completion certificates
30	Completion of the eighth training workshop (17 students).	2025-03-31	5	0.64	63.3	2025-01-28	Completed	Training-course completion certificates
32	Completion of the ninth training workshop (17 students).	2025-06-30	5	0.64	65.26	2025-01-28	Completed	Training-course completion certificates
35	Completion of the tenth training workshop (20 students).	2025-09-30	5	0.64	75.8	2025-01-28	Completed	Training-course completion certificates

Table 14: Training Workshop associated outputs

Item	Number
Training workshops	11
Trainees	+470

Conclusion

The preceding sections provide an overview of project progress and its current status. As shown, the milestones and objectives agreed between the Center and the NIDLP program under this project have been achieved. However, technical requirements remain for the continuation of some programs involving third parties, including patent activities, startups, and joint projects and partnerships.

Publication from all Programs [So far published and appeared online]

1. Baraean A., Al-Sakkaf S., Kassas M., Khalid M., Unlocking the Renewable Energy Potential: A Comprehensive Study of Saudi Arabia's Eastern Region, (2024) IECON Proceedings (Industrial Electronics Conference), Cited 0 times., DOI: 10.1109/IECON55916.2024.10905324
2. Perdana M.Y., Gondal M.A., Baig U., Elali B., Low-cost cement-polypyrrole composite electrodes for next-generation high performance supercapacitors, (2026) Journal of Physics and Chemistry of Solids, 215, art. no. 113717, Cited 1 times., DOI: 10.1016/j.jpcs.2026.113717
3. Maryana O., Aljalal A., Qari S., Al-Basheer W., Gasmi K., Wahyuni A., Tahir M., Study of the effects of confined water vapor in mesoporous silica on its mass transport analysis for thermal energy storage applications, (2025) Proceedings of SPIE - The International Society for Optical Engineering, 13704, art. no. 137040M, Cited 1 times., DOI: 10.1117/12.3074426
4. Kotob E., Awad M.M., Umar M., Abdulazeez I., Taialla O.A., Alhooshani K., Mohammed S., Waheed A., Hussain I., Al-Saadi A.A., Ganiyu S.A., Interplay of Particle Size and Facet Engineering in Cu Nanocatalysts for Enhanced CO₂ Reduction in Static System, (2025) Energy Technology, 13 (11), art. no. 2500466, Cited 3 times., DOI: 10.1002/ente.202500466
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Selected Participant Testimonials

The following testimonials are included in the source report as evidence of participant experience and program impact.

“The RETI program played a pivotal role in developing and commissioning the Self-Cleaning Photo Thermoelectric Air Conditioner (SC-PTAC)—the world’s first net-zero, refrigerant-free thermoelectric cooling system. Through RETI, I gained hands-on experience in prototype design, PV optimization, field validation, and thermoelectric integration for sustainable cooling. This project enhanced my expertise in reliability engineering for extreme climates and inspired deeper research into advanced thermoelectric materials and IoT-based energy management. RETI demonstrated how interdisciplinary collaboration can transform innovative ideas into impactful technologies for a sustainable future.”

Dr. Kashif Irshad Ullah Khan | Research Engineer II, IRC-SES | Proof-of-Concept Program

“The RETI 50K Challenge reshaped how I view science and innovation—showing that impactful research is not just about answers, but about clear, creative communication that drives real solutions. Our solar-powered microwave system for converting waste cooking oil into biofuels started as a lab idea; RETI turned it into a working prototype and a vision beyond the lab. With mentorship and support, we built a multidisciplinary team, aligned with the Kingdom’s renewable-energy goals, and laid the foundation for The BioEnergy Arabia—a venture transforming waste oil into global-standard biodiesel. RETI 50K was more than a competition; it was a catalyst for confidence, collaboration, and clarity of purpose.”

Nur Allif Fathurrahman | PhD Candidate, KFUPM Chemistry | RETI 50K Challenge

“The RETI undergraduate research grant was a key part of my academic journey, helping me build essential research and life skills. Working on a Materials Science project allowed me to apply classroom knowledge in practice, strengthening my understanding and confidence. I learned experiment planning, time management, communication, and initiative—skills that will support my future contributions to the field. I’m grateful to the RETI team, especially Dr.

Atif Alzahrani, Dr. Amir Al-Ahmed, and Dr. Muhammed Haris, for their guidance and support. I strongly encourage students to seize such opportunities for hands-on research experience."

Ghadah Khalid Mobaireek | Materials Science and Engineering, KFUPM | Undergraduate Grant Program

"The RETI Undergraduate Grant played a major role in advancing both my research skills and my long-term academic vision. Through my project on sustainable hydrogen production from the co-conversion of plastic and heavy-oil waste via plasma-assisted gasification, I explored cutting-edge waste-to-hydrogen technologies, conducted detailed process simulations, and evaluated the feasibility of next-generation energy systems. This experience strengthened my ability to translate complex concepts into practical solutions and helped bridge the gap between academic learning and applied innovation. For future participants, stay curious, seek feedback often, and make the most of the resources available."

Fatimah Alhassan | Chemical Engineering Department, KFUPM | Undergraduate Grant Program

"RETI shifted my research from simulation-only to deployment-focused work. Through the KFUPM–DEMA collaboration, I gained hands-on experience with RTDS/dSPACE and MATLAB/Simulink, modeling cryptocurrency-mining loads, developing an AC microgrid, and creating an adaptive controller for system stability. This led to tangible outcomes: a KFUPM–DEMA joint-venture pathway, multiple publications, two patent filings, a Best Paper Award at SSD'25, and several posters. It also helped me complete my MSc and define my PhD goal—AI-enabled, optimization-driven control for renewable-rich power systems. I'm grateful for this opportunity and encourage future participants to pursue hardware-in-the-loop validation early for real-world impact."

Ghali Ahmad | Control and Instrumentation Engineering Department, KFUPM | Graduate Grant Program

"Participating in the RETI G Grant project was a transformative experience that deepened my understanding of sustainable materials and energy research. Through interdisciplinary collaboration and mentorship, I gained valuable skills in experimental design, data interpretation, and scientific communication. The program broadened my perspective on how research can address real-world environmental challenges, especially in CO_2 utilization and green catalyst development. RETI not only strengthened my technical expertise but also inspired confidence to pursue a PhD focused on clean-energy technologies. I highly recommend future participants to engage fully with the workshops and networking opportunities; they are an incredible platform for growth and collaboration."

Mahbuba Aktary | Graduate Student, Department of Materials Science and Engineering, KFUPM | Graduate Grant Program