Project Milestone 13
Meetings, Training Events, and Workshop KSA

Contents

1- **KSA Visits and Workshop (31st December – 3rd January)**

1.1 Visit Program
1.2 Site visit & Meetings: The Holly Mosque Electric Vehicles Stations (31st December 2022)
1.3 Workshop (1st, 2nd January 2023)
1.4 . Project Meeting (3rd January 2023)

2- **Visit and Meeting, CEER Motors, Riyadh, KSA (10th May 2023)**
2.1 Meeting Minutes

3- **Workshop and Visit: Sustainable Energy Technologies Center (SET), King Saud University, Riyadh, KSA (11th May 2023)**
3.1 Meeting Notes and Decisions
3.2 Activities at SET

4- **Visit and Meeting, Future Mobility Institute, KACST, KSA (11th May 2023)**
4.1 Meeting Minutes and Recommendations

5- **Conclusion and Recommendations**

1- KSA Visits, Meetings, and Workshop (31st December – 3rd January)

1.1. Visit Program

Saturday 31 December 2022:

Site visit & Meetings: The Holly Mosque Electric Vehicles Stations

Sunday 1 January 2023:

Workshop Day #1:

9:00 – 9:30	Registration and coffee
9:30 – 9:40	Welcome to delegates (Prof. E. Almatrafi, HOD, Mech Eng. Dept., FER, KAU)
9:40 – 10:00	Brief introduction about Brunel (Professor Mohamed Darwish, Brunel)
10:00 – 10:15	Brief introduction about KAU (Prof. A. Mekki, Vice Dean PG FER, KAU)
10:15 – 10:30	Project progress (Prof. M. Darwish, Brunel, Prof. M. Rady, Prof. A. Amin)
10:30 – 11:30	Artificial Intelligence & Future of Electric Vehicle Systems (Prof. Maysam Abbod,Brunel)
11:30 – 12:30	Electric Vehicle Systems M. Sc.: Feasibility and Framework (Dr Chun Sing Lai, Brunel)
12:30 - 13:30	Coffee Break
13:30 – 14:30	Project Mentoring (Prof. Amr Amin)
18:00 - 20:00	Project Welcome Dinner

Monday 2 January 2023:

Workshop Day #2:

10:00 – 10:30	Brunel Racing a Model for Collaborative Learning (Prof. M. Darwish)
10:30 – 11:30	Thermal Management of Electric Vehicles (Prof. Moahmed Rady, KAU)
11:30 – 12:30	Thermoelectric Technology & Electric Vehicles (Dr. A. Attar, KAU)
12:30 - 13:30	Coffee Break
13:30 – 14:30	Laboratory visits and meetings with staff.
16:00 – 20:00	Social Activities and Site Visits

Tuesday 3 January 2023:

10:30 – 12:30	Project Meeting

1. 2. Site visit & Meetings: The Holly Mosque Electric Vehicles Stations Saturday 31 December 2022

https://gph.gov.sa/index.php/ar/component/k2/item/10212-2023-01-05-07-06-13

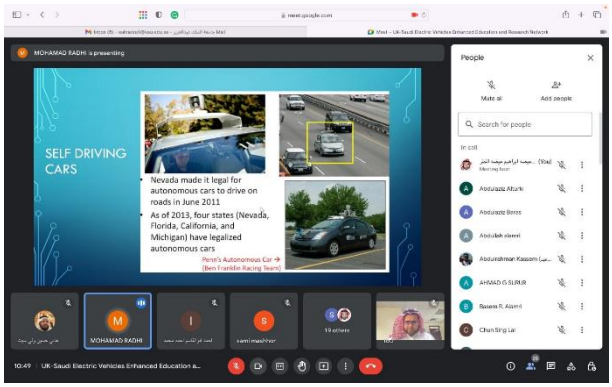
The General Presidency for the General Affairs of the Grand Mosque and the Prophets Mosque, represented by the Agency for Services and Environmental Protection Achievement, received a number of researchers from King Abdulaziz University and Brunel University at the Grand Mosque, to review electric vehicles and make proposals and scientific development studies for vehicles.

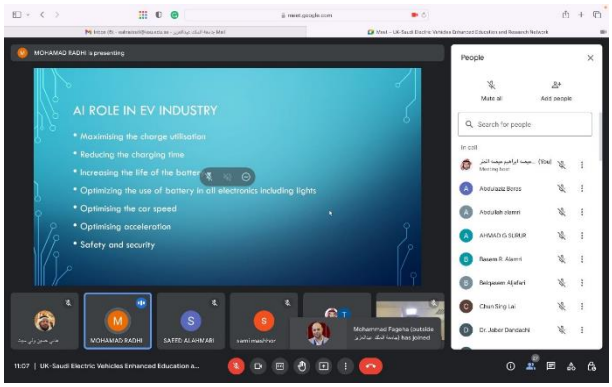
This visit aims to study reducing waiting hours for obtaining service, exploiting the full capacity of electric vehicles, reducing expected vehicles, ensuring electric vehicles work and non-stop, extending the life span of batteries, improving the charging mechanism, in addition to experimenting with the rapid charging mechanism and its impact on batteries.

These visits come towards the continuous development of business outputs and services in the Two Holy Mosques to provide distinguished services that meet the aspirations of visitors from all over the world.

1. 3. Workshop


BRITISH COUNCIL
Brunel University London
Invitation
"UK-Saudi Electric Vehicles Enhanced Education and Research Network"
1- 2 January 2023
9 AM – 14 PM
Center of Excellence In Desalination Technology
Seminar Room, KAU Main Campus, Jeddah
Online Meeting Link Available for Registeration


MOHAMAD RADHI is presenting
SELF DRIVING CARS
Nevada made it legal for autonomous cars to drive on roads in June 2011
As of 2013, four states (Nevada, Florida, California, and Michigan) have legalized autonomous cars
People


MOHAMAD RADHI is presenting
AI ROLE IN EV INDUSTRY
Maximising the charge utilisation
Reducing the charging time
Increasing the life of the batter
Optimizing the use of battery in all electronics including lights
Optimising the car speed
Optimising acceleration
Safety and security
People

List of Participants

Name	Affiliation	Email
Ahmed Aboalkasem	KAU	aaahmed2@kau.edu.sa
Abdullah Abuhabaya	KAU	aabuhabaya@kau.edu.sa
Abdelwahab Almorsi	KAU	aalmursi@kau.edu.sa
Faisal Albatati	KAU	alalbatati@kau.edu.sa
Mohammed Alshwaiter	Teknia	alshowaiter@tecniasteel.com
Ahmad Bamasag	KAU	ambamasek@kau.edu.sa
Abdelkarim Hegab	KAU	amhegab@kau.edu.sa
Amr Amin	USA	amrmaamin@yahoo.com
Basil Rabghi	KAU	balrabghi@kau.edu.sa
Chun Sing Lai	BU	chunsing.lai@brunel.ac.uk
Faiz Abukhadra	KAU	fabukhadra@kau.edu.sa
Fahd Alharbi	KAU	falharbi@kau.edu.sa
Hani Sait	KAU	hhsait@kau.edu.sa
Ibrahim Zibalai	KAU	ialzebali@kau.edu.sa
Jaber Dandash	Energya	jdandachi@cables.energya.com
Alaa Attar	KAU	loattar@kau.edu.sa
Mohamed Algarni	KAU	malgarni1@kau.edu.sa
Mohamed Rady	KAU	maradhi@kau.edu.sa
Maysam Abbod	BU	maysam.abbod@brunel.ac.uk
Mohamed Darwish	Bu	mohamed.darwish@brunel.ac.uk
Mohamed Zwawi	KAU	mzwawi@kau.edu.sa
Anas Ahmad Makki	KAU	nhmakki@kau.edu.sa
Omar Bamaga	KAU	obamaga@kau.edu.sa
Salman Qahtani	Petro Rabigh	qahtsa0a@petrorabigh.com

1.3.1 Project progress (Prof. M. Darwish, Brunel)

Professor Darwish highlighted the project progress and the fruitful academic and industrial support from universities and industrial companies in UK.

Industrial Support

Brill Power

HVSS Ltd

GRIDSERVE

Sondrel

Academic Support

Glasgow Caledonian University *(Prof. Farrag)*

University of Derby *(Prof. Shafik)*

Cardiff University *(Prof. Liana Cipcigan)*

Cranfield University *(Prof. Patrick Luk)*

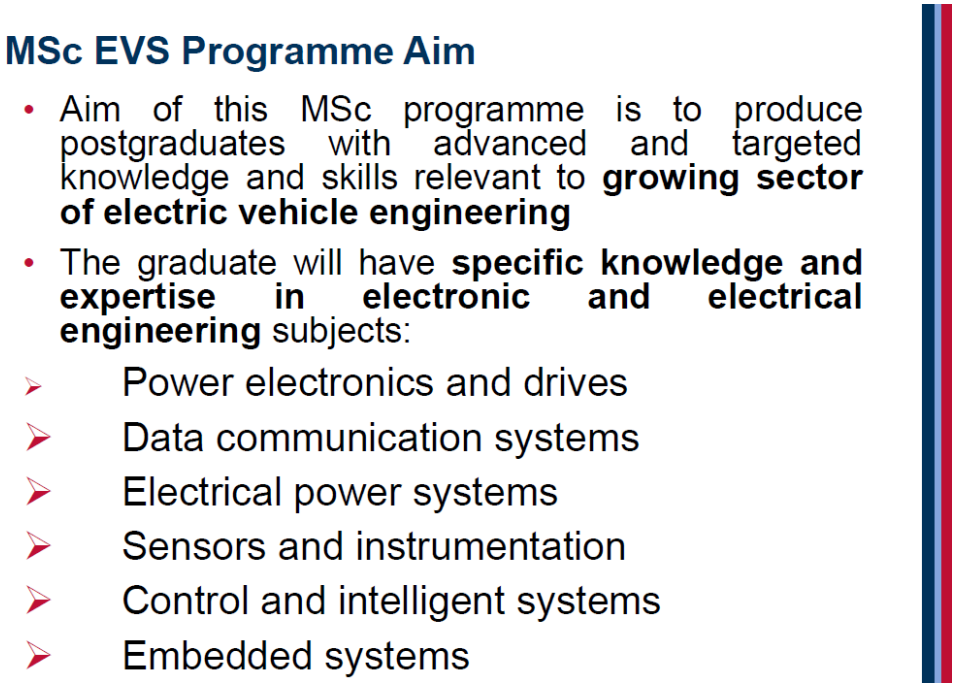
Birmingham University *(Dr Pietro Tricoli)*

1.3.2 Artificial Intelligence & Future of Electric Vehicle Systems (Prof. Maysam Abbod, Brunel)

Prof. Maysam envisaged that EV is developing fast and new technologies are introduced every year. AI can help refining these technologies and improve the performance of EV Integration of EV with the electric grid is the future direction.

1.3.3 Electric Vehicle Systems M. Sc.: Feasibility and Framework (Dr Chun Sing Lai, Brunel)

Dr. Chun emphasized that Teaching of Electric Vehicle Systems is challenging in terms of teaching content since it is and emerging multi-disciplinary area. MSc dissertation projects can be based on real-life scenarios/challenges.

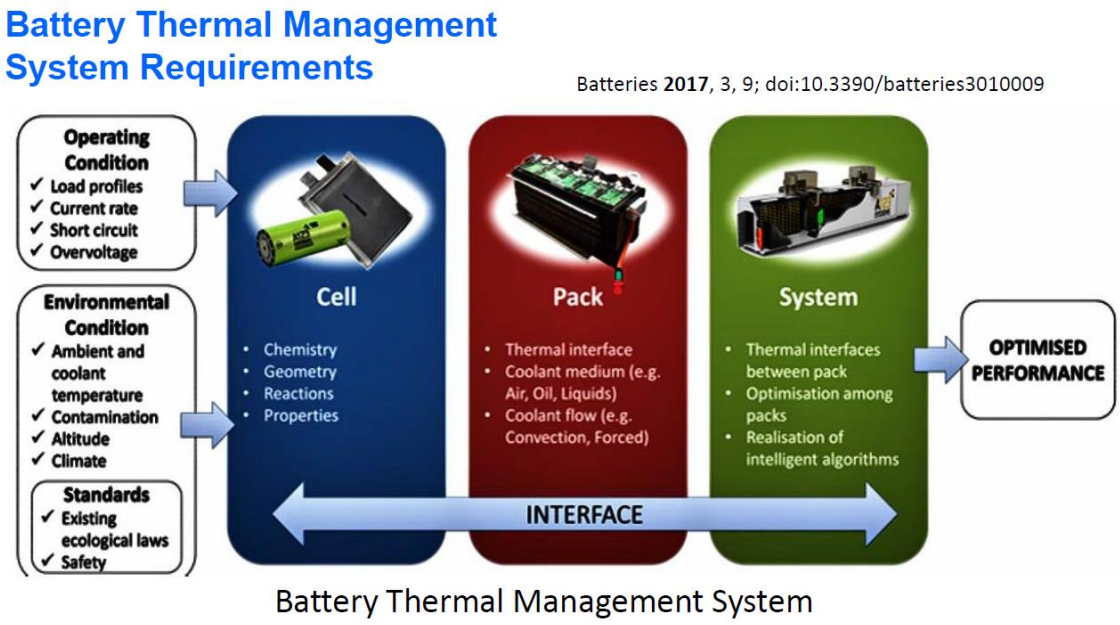


1.3.4 Brunel Racing a Model for Collaborative Learning (Prof. M. Darwish)

Formula student is a competition event which provides students with the opportunity to demonstrate their engineering capabilities in the form of a prototype single-seat race car for autocross or sprint racing. 30 undergraduate students make up Brunel Racing - Brunel's team. Some have their individual or group projects based on parts of the car, whilst others are volunteers. This allows students from a variety of disciplines to be involved in different parts of the project.

1.3.5 Thermal Management of Electric Vehicles (Prof. Mohamed Rady, KAU)

Prof. Rady introduced a background on the topic of thermal management of EVs batteries, why battery thermal management important? , Battery thermal management system requirements, thermal control using air, thermal control using liquid, and tools for designing BTMS.



Battery Thermal Management System

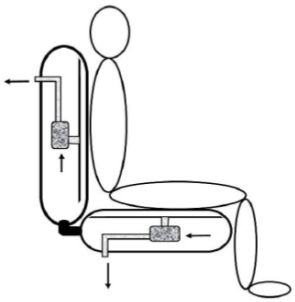
1.3.6 Thermoelectric Technology & Electric Vehicles (Dr. A. Attar, KAU)

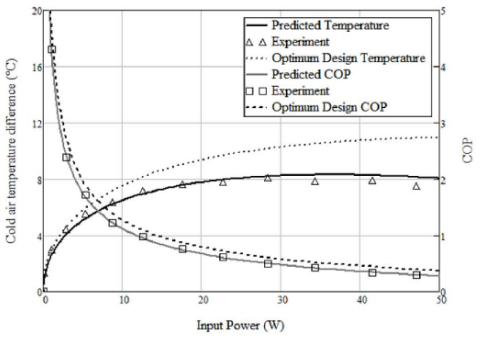
Dr. Alaa Attar gave a lecture on Thermoelectrics: History and Applications, Formulation of Basic Equations, Materials and Figure of Merit, Commercial Modules, Thermoelectric Systems and Modelling, Thermoelectric Generator: Waste Heat Recovery, Thermoelectric Coolers: Automotive Air Conditioner.

Thermoelectric Air Conditioner (TEAC) Zonal Concept

- Current ACs: 3,500 Watts to cool the entire cabin
- Zonal Concept: cool/heat each occupant independently
- **630 W to cool a single occupant**
  - Target **COP of 1.6** for cooling and $\mathbf{P_{in}}$ **of 400W)**

CAR SEAT CLIMATE CONTROL (CSCC)





Parameter	$ZT_{\infty h,in} = 0.79$ (PRESENT)	$ZT_{\infty h,in} = 1$	$ZT_{\infty h,in} = 1.5$	$ZT_{\infty h,in} = 2$
$P_{in}(W)$	40.95	39.126	40.126	40.153
$G_{e,opt}\ (mm)$	1.59	1.513	1.353	1.237
$I_{opt}\ (A)$	4.3	4.5	5	5.2
$Q_c\ (W)$	18.61	21.452	26.78	30.494
$\Delta T_{cooling}$	11.064	12.751	15.919	18.126
COP	0.454	0.548	0.666	0.759
$DMU(\%)$	14.9	17.2	21.4	24.4
PD (W/cm^2)	1.163	1.341	1.674	1.906

1.3.7 KAU Laboratory Visits and Staff Meetings

1. 4. Project Meeting
Tuesday 3 January 2023:

Meeting Agenda

UK-Saudi Electric Vehicles Enhanced Education and Research Network

Project Meeting – 3rd January 2023

AGENDA

1)	Welcome and project progress status	EM/MD
2)	Budget management	EM/MD
3)	Academic visit and workshop activities in UK Report	MR/MD
4)	Curriculum Development Report – Article Submission	MR/CL/MA
5)	Industrial Consultancy Report	MD
6)	Future Visits and Meetings in UK and KSA	EM/MD
7)	Monitoring and evaluation	AM
8)	Date for next meeting	

List of participants

1	Dr. Mohamed Darwish	Brunel University
2	Dr. Maysam Abbod	Brunel University
3	Dr. Chun Sing Lai	Brunel University
4	Dr. Amr Metwally	Grand Canyon University
5	Dr. E. Almatrafi	King Abdulaziz University
6	Dr. Mohamed Rady	King Abdulaziz University

2. Visit and Meeting, CEER Motors, Riyadh, KSA (10th May 2023)

CEER is the first Saudi automotive brand to produce electric vehicles in Saudi Arabia. The company will design, manufacture, and sell a range of electric cars including sedans and sports utility vehicles (SUVs) for the GCC region. CEER Motors' distribution plan will focus on Middle Eastern markets. The brand name CEER, translates to the Arabic word for "drive forward". CEER Motors vehicles are scheduled to be available in 2025. CEER will attract over US$150 million of foreign direct investment and create up to 30,000 direct and indirect jobs; the company is projected to directly contribute US$8 billion to Saudi Arabia's GDP by 2034.

The project team and visit to CEER has the objective to establish a good networking and cooperation in training, curriculum development, and research with industrial partners in the field of electric vehicles.

Meeting, CEER, KSA (10th May 2023)

2.1 Meeting Minutes and Action Details

CEER & King Abdulaziz University Meeting Minutes					
Meeting Objective	Colaboration on Developing Curriculums for Automotive related majors for Bachelor Engineering Degree and Master Degree				
Date	May 10th, 2023	Time	12:30 pm – 2:20 pm	Location	Diom- Riyadh

Attendees	
Name	Company
Abrar Al Qarshi	CEER
Mogren Aldalilah	CEER
Markus Leitner	CEER
Christopher Goodey	CEER
Carl Timmer	CEER
Fahad Al Dulaijan	CEER
Dr. Fahad Al Harbi	KAU
Dr. Mohammad Radi	KAU
Dr. Alaa Attar	KAU
Dr. Abdullah Bo Habbaiyah	KAU
Dr. Edhah Al Matrafi	KAU

Discussion Points

The meeting was held between CEER Company and King Abdulaziz University (KAU) to discuss the collaboration on developing curriculums related to automotive majors for Bachelor Engineering degrees and Master degrees.

The meeting started with an overview presentation given by CEER, which covered the company's background, its current operations, and the

educational requirements for its employees. CEER's Leadership discussed some analysis of the current educational system in Saudi Arabia and the challenges faced by the local automotive industry in terms of hiring skilled and competent graduates.

Following the presentation by CEER, KAU presented its ongoing projects related to the EV sector studies, including its partnership with Brunel University London on the "UK-Saudi Electric Vehicles Enhanced Education and Research Network" project. KAU highlighted its strengths in the field of engineering education and research, and expressed its willingness to collaborate with CEER in developing relevant curriculums and programs to meet the demands of CEER qualified manpower.

CEER Leadership emphasized that for each function in the company, a different program is required, and on-job trainings are essential to allow students to gain on-job experience before they graduate. They also mentioned that a clear gap is found in the fresh graduates in their soft skills such as presentation skills and other communication skills that needs to be improved during studying in the universities.

In response, KAU mentioned that it has implemented different programs to solve this matter and improve student communication skills, such as implementing “Entrepreneur program” to improve the student’s communication and business skills. The university also showed flexibility in adapting to the company's requirements by developing some elective courses specialized in EV as per CEER requirement, or by developing new EV engineering programs to meet the demands of CEER.

In addition, KAU expressed its willingness to establish partnership agreements with CEER related to the graduates' coop program and other agreements to hire the best graduates.

Both parties expressed their commitment to achieve their common goal of providing Saudi students with the required knowledge and skills to prepare

them for this new Automotive sector, which will benefit not only the Saudi students but also the local industry and economy.

Overall, the meeting was productive and both parties agreed to continue their collaboration and coordination in developing the required curriculums and programs. The next steps include sharing the current curriculums and CEER's overview presentation, reviewing the current curriculums to identify any gaps, and agreeing on the next meeting date.

No.	Action Details	Responsible	Due Date
1	KAU to share the current curriculums of all related programs	KAU	May 18th, 2023
2	CEER to share the overview presentation	CEER	May 18th, 2023
3	CEER to review the current curriculums and identify the gaps	CEER	June 1st, 2023
4	Agree on the next meeting date, to discuss the changes required in the curriculums and to discuss the implementation plan	CEER & KAU	June 8th, 2023

3. Workshop and Visit, Sustainable Energy Technologies Center (SET), King Saud University, Riyadh, KSA (11th May 2023)

SET is envisaged to be a leading technology developer through its distinguished research in sustainable energy technologies to meet the future energy challenges of the Kingdom of Saudi Arabia. The visit and workshop with meet have the objective to enhance networking with national and international universities and research centers in the field of electric vehicles and sustainable energy. SET has a good network of national and international partners that allows extending cooperation and dissemination of project results. The feedback from such institution is very essential for the success of the project.

3.1 Meeting Notes and Decisions

Meeting Purpose:	Discussing Opportunities for Developing the Mechanical Engineering Curriculum to Keep Up with Changes in the Field, Particularly the Addition of Electric Vehicles (EVs).
Meeting Date:	Thursday, May 11, 2023
Meeting Time:	9:00 PM to 12:00 PM
Meeting Location:	Sustainable Energy Technologies Center, King Saud University
Meeting Facilitator:	Dr. Zeyad Ammar Almutairi, Director, SET Center
Attendees:	**King Saud University side:** ➢ Dr. Zeyad A. Almutairi (Director, SET Center) ➢ Dr. Ali Eltamaly (Faculty member) ➢ Dr. Kaleem Ahmed (Faculty member) ➢ Dr. Radwan A. Almuzaiqer (Postdoctoral fellow) **King Abdulaziz University:** ➢ Dr. Alaa Attar (Vice Dean of the College of Engineering) ➢ Dr. Eydhah Almatrafi (Chairman of the Mechanical Engineering Department) ➢ Dr. Dr. Abdullah Ali Abuhabaya (Faculty Member of the Mechanical Engineering Department) ➢ Dr. Mohamed Anwar Radi, Faculty Member of the Mechanical Engineering Department.

Minutes Issued By:	Dr. Zeyad A. Almutairi and Dr. Redhwan A. Almuzaiqer
Agenda	1 Introduction and presentation of Sustainable Energy Center activities by Dr. Zeyad Al-Mutairi 2 Presentation on energy storage systems and battery technologies by Dr. Ali Al- Eltamaly 3 Tour of Sustainable Energy Center facilities 4 Discussion of mechanical engineering curriculum development for Electric Vehicles

Meeting Notes and Decisions

1 Dr. Zeyad Al-Mutairi introduced the Sustainable Energy Center and its research activities, along with the center's graduate program. Key projects were highlighted, including a battery testing project focused on high-temperature performance to suit the climate conditions of Saudi Arabia. He also presented the work of master's students registered with the center, who are researching battery aging, cooling tests for lithium-ion batteries, and their efficiency.

2 Dr. Ali Al- Eltamaly presented various energy storage systems and battery types in use today. He provided detailed information on calculating battery efficiency and the main factors influencing it. He also reviewed the results of some research conducted at the center related to lithium-ion batteries and discussed international recommendations for battery conditions.

3 Both teams participated in a tour of the Sustainable Energy Center facilities and visited the center's laboratories.

4 In a follow-up meeting, the two teams discussed updating the mechanical engineering curriculum to align with recent technological advancements and the introduction of electric vehicles. Dr. Zeyad Almutairi has proposed the development of the mechanical engineering curriculum by adding several advanced courses. To be able for these advanced courses, students must complete prerequisite courses such as heat transfer, thermodynamics, fluid mechanics, and control.

The proposed advanced courses aim to cover the following topics: Introduction to energy in batteries and their chemical components - The study of heat transfer from batteries and battery thermal management systems - Aerodynamic calculations - Fundamentals of electricity in electric and hybrid vehicles - Kinetic components in vehicles.

By incorporating these advanced courses into the mechanical engineering curriculum, students will gain a more comprehensive understanding of the latest developments in the field. This will enable them to apply their knowledge to real-world applications and contribute to the ongoing advancements in technology and engineering.

5 At the end of meeting, the Sustainable Energy Center at King Saud University and the Mechanical Engineering Department at Rabigh College of Engineering, King Abdulaziz University, agreed to continue their collaboration on research and academic initiatives.

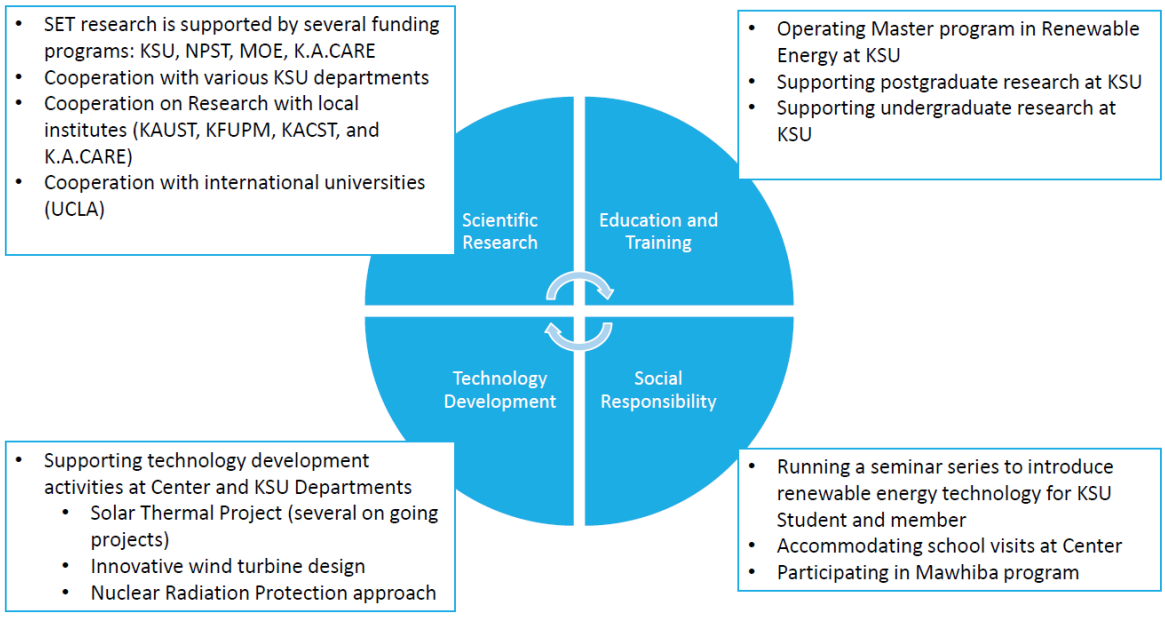
3.2 Activities at SET

Activities during the visit of SET, KSU

Sustainable Energy Technologies Center at King Saud University

By Zeyad Almutairi

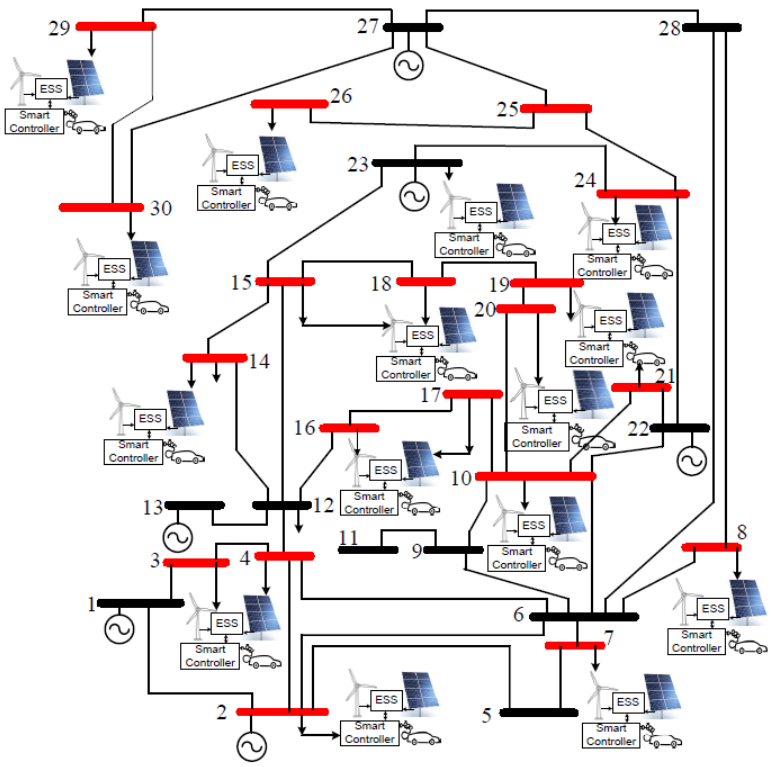
Director of the Sustainable Energy Technologies Center



Introduction of SEC, KSU

Future of Lithium-ion Batteries in Modern Smart Grid Systems

Prof. Ali Mohamed Eltamaly



The schematic diagram of the IEEE 30 bus system with SEVCS connected to each load bus.

4. Visit and Meeting, Future Mobility Institute, KACST, KSA (11th May 2023)

King Abdulaziz City for Science and Technology (KACST) is a scientific government institution that supports and enhances scientific applied research. It coordinates the activities of government institutions and scientific research centers in accordance with the requirements of the development of the Kingdom. It also cooperates with the relevant authorities in identifying national priorities and policies in technology and science so as to build a scientific and technological basis that serves development in agriculture, industry, mining, etc. It also aims at developing national competences and recruiting highly qualified specialists to help develop and control modern technology in order to serve development in the Kingdom. KACST comprises all the requirements of scientific research, such as laboratories, means of communications, information sources and all necessary facilities.

Meeting with Future Mobility Institute, KACST

4.1 Meeting Minutes and Recommendations

محضر الاجتماع			
الخميس	مقر الاجتماع: مدينة الملك عبدالعزيز للعلوم والتقنية مبنى 44 - القاعة الكبرى	الساعة 12:30 – 1:45ظهراً	11\ 5 \ 2023م

مدينة الملك عبدالعزيز للعلوم والتقنية معهد تقنيات النقل المستقبلية - قطاع اقتصاديات المستقبل	
الاسم	**المنصب**
د. علي الشهري	مدير العام لمعهد تقنيات النقل المستقبلية
د. صالح الغامدي	نائب المدير العام لمعهد تقنيات النقل المستقبلية
د. عمير ال حاتم	رئيس قسم تصميم الهياكل وقسم أنظمة الدفع النظيفة
د. خالد الحلوة	رئيس قسم المركبات المبتكرة
م. رامي الثبيتي	رئيس قسم التحول الكهربائي
أ. هيام الكشي	مساعد مدير عام - مكتب إدارة معهد تقنيات النقل المستقبلية
م. حسام الزهراني	باحث في قسم المركبات المبتكرة
م. سعيد القحطاني	قسم الدعم والمساندة

جامعة الملك عبدالعزيز كلية الهندسة في رابغ	
الاسم	**المنصب**
د. فهد الحربي	عميد كلية الهندسة
د. علاء عطار	وكيل كلية الهندسة
د. عيضة المطرفي	رئيس قسم الهندسة الميكانيكية
د. عبدالله علي أبو حبابة	عضو هيئة التدريس بكلية الهندسة الميكانيكية
د. محمد أنور راضي	عضو هيئة التدريس بكلية الهندسة الميكانيكية

المواضيع التي تم مناقشتها
• بدأ الاجتماع بالتعريف بالحضور. • قدم الدكتور علي الشهري عرض تعريفي عن المعهد وتوجهاته الاستراتيجية والأقسام البحثية وأبرز المشاريع والبرامج الجديدة للقطاع والمعهد بشكل عام. • تحدث الدكتور فهد الحربي عن التعاون مع مركز الأمير سلطان للدراسات والبحوث الدفاعية في مجال الاستفادة من موقع الجامعة في رابغ لعمل الأبحاث في مجال الطائرات بدون طيار، التعاون مع شركة سير للمركبات الكهربائية، وتحدث كذلك عن تعاون كلية الهندسة برابغ مع جامعة برونيل في مجال المركبات الكهربائية والرغبة بعمل تعاون مماثل مع المعهد في مجال المركبات الكهربائية والطائرات بدون طيار. • تحدث الدكتور عيضة المطرفي عن أهداف ومخرجات التعاون مع جامعة برونيل بلندن في مجال السيارات الكهربية بدعم من جامعة الملك عبد العزيز والمجلس الثقافي البريطاني من أجل اعداد جيل من المهندسين قادر على التعامل مع التطور التكنولوجي المتسارع في مجال النقل الذكي. كما أشار الى مقترحات تطوير البرامج والمناهج الدراسية لمواجهة هذا التطور التي تم اعدادها كأحد مخرجات التعاون مع جامعة برونيل والرغبة بتضمين بعض المشاريع في الخطة الدراسية لطلبة الكلية كتصميم السيارات الكهربائية والدخول في المسابقات المحلية والعالمية، وكذلك الأبحاث الخاصة بالمركبات التي تستخدم أنظمة دفع بالهيدروجين، كما تم التطرق الى تعاون الجامعة مع مركز الأمير محمد بن سلمان لأبحاث تكنولوجيا المستقبل بجامعة طوكيو وكذلك الاستخدام المدني لمحطة رصد على الساحل الغربي لرصد ظاهرة المد الأحمر وتأثيرها على محطات التحلية باستخدام القوارب ذاتية القيادة أو طائرات الدرون. • تحدث الدكتور علي الشهري عن فرصة التعاون مع شركة لوسيد للسيارات الكهربائية وكذلك النقاش السابق مع المؤسسة العامة لتحلية المياه المالحة والمشاريع المقترحة لحل مشكلة ظاهرة المد الأحمر باستخدام القوارب والطائرات المسيرة. • تحدث الدكتور صالح الغامدي عن إمكانية اقتراح التركيز على تقنية السيارات الكهربائية في الكلية كتقنية مستقبلية تهتم الكلية بتطوير المهندسين الخريجين فيها. • أشاد الدكتور عمير ال حاتم بالتعاون الكلية مع جامعة برونيل وجامعة طوكيو واقترح تضمين الاهتمام بالتقنيات المستقبلية للنقل في مناهج التصميم والتصنيع في الكلية. • تحدث الدكتور خالد الحلوة عن موضوع المركبات المبتكرة وتعليمها والاهتمام بتطبيقاتها كالطائرات بدون طيار. • تحدث الدكتور علي الشهري عن البحث والتطوير والابتكار في مجالات تقنيات النقل المستقبلية وفرق البحث بالمعهد واهتماماتها وإمكانية التعاون مع الكلية. • تحدث الدكتور محمد أنور راضي عن أهمية ربط الدراسة الأكاديمية بالصناعة وتطوير القدرات البشرية وبناء قدرات وطنية في التقنيات المستقبلية بالتعاون ما بين المعهد والكلية مع الاستفادة من الشراكات مع المؤسسات الوطنية والدولية. • وعلق الدكتور علي الشهري بأن المدينة تعمل تحت مظلة هيئة تنمية البحث والتطوير والابتكار، والجميع سيعمل تحت نظام حوكمة يربط بين الجهات الفاعلة في المملكة مثل الجامعات والمدينة ومراكز الأبحاث والاذرع الصناعية والمستخدم النهائي. • تحدث الدكتور علاء عطار عن الأبحاث والتطوير في الجامعة والرغبة في تكامل الجهود بين الكلية والمعهد لتحقيق الاستفادة القصوى في مجال البحث والتطوير والابتكار. • بعد نهاية الاجتماع تم عمل زيارة ميدانية لمعمل الأقمار الصناعية وكذلك زيارة مركز الصناعة الرابعة ثم زيارة معهد تقنيات النقل المستقبلية والاطلاع على مشاريع المعهد والمعامل.

التوصيات خلال الاجتماع	
1	اقتراح التعاون في تطوير مناهج كلية الهندسة برابغ وتقديم المقترحات لتأهيل المهندسين الخريجين في مجال التقنيات الحديثة والمستقبلية وخاصة في مجال السيارات الكهربائية.
2	اقتراح تدريب تعاوني لطلاب كلية الهندسة برابغ في معهد تقنيات النقل المستقبلية بالمدينة.

3	اقتراح منسق بين المعهد والكلية للتنسيق في مجال التدريب وكذلك الأبحاث وغيرها.
4	اقتراح حضور أحد منسوبي المعهد لعمل محاضرات في كلية الهندسة برابغ للتعريف بتقنيات النقل المستقبلية.
5	اقتراح عمل مسابقة بين جامعات المملكة في مجال سيارات الفورمولا بتنظيم مدينة الملك عبد العزيز للعلوم والتقنية.

قام بإعداد المحضر
المهندس/ سعيد القحطاني

Recommendations:

1- Proposing cooperation in developing the curricula of the Faculty of Engineering in Rabigh and submitting proposals to qualify graduate engineers in the field of modern and future technologies, especially in the field of electric cars.
2- A cooperative training proposal for students of the Faculty of Engineering in Rabigh at the Institute of Future Transportation Technologies in the city.
3- A contact point proposal between the institute and the college for coordination in the field of training as well as research and others.
4- Suggesting that one of the Institute's employees attend lectures at the College of Engineering in Rabigh to introduce future transportation technologies.
5- A proposal to hold a competition between the universities of the Kingdom in the field of Formula cars, organized by King Abdulaziz City for Science and Technology.

5. Conclusion and Recommendations

The activities conducted within his project task has a good impact on the project outcomes as follows:

1- Establishing a network of cooperation among the project partners (KAU, Brunel) with national and international communities from the research and industry in this emerging field of electric vehicles and smart mobility.
2- Review and critical discussions on the required skills of future engineers for being well prepared for developing a successful career in electric vehicles industry.
3- Opening new training opportunities for students in electric vehicles manufacturing companies and research centers.
4- Identification of major barriers for the development of electric vehicles in KSA.
5- Continuous future cooperation among the project partners from both UK and KSA. CEER is engaged in the review of current and proposed enhanced curriculum for undergraduate and graduate degrees developed within the framework of the current project.
6- Future Mobility Institute, KACST, is in process of taking new initiatives for preparing new generations for this challenging filed.