MRC Industry Linkage Fund
Industry-University Interaction Session 2021

29 June 2021

By Mr. Steven Ng Ching Eng
MRPMA Committee

Our History

Established

1952

Malaysian Rubber Goods Manufacturers' Association (MRGMA)

Renamed

1977

Malaysian Rubber Products Manufacturers' Association (MRPMA)

2022

70 Years

Our Mission

- To facilitate cooperation and protect the interest of rubber products manufacturers
- To assist and advice the government in creating relevant policies
- To facilitate the development of a technologically advanced and competitive rubber industrial sector
- To encourage new and sophisticated manufacturing processes in order to improve quality and productivity
- To collaborate with other similar associations in achieving a common objective

Our Membership

Representing Dry Rubber & Latex Manufacturing Industry

Ordinary Members

Membership of MRPMA is open primarily to manufacturers of rubber products in the rubber industry. This category will be considered as

Associate Members

The participation of other companies related to the rubber industry are classified as

MRPMA

Our Leadership

(Term 2020 – 2022)

Honorary Life President
YABhg Tun Dr. Arshad Ayub
Karex Berhad

President
Yeaw Kok Kwey
Associated First Rubber

Vice-President
Phang Kwai Keong
Bright Polymer

Vice-President
Loh Yoon Hon
Saiko Rubber

Honorary Secretary
Patsy Kuan Ling Pei
Kossan Rubber Industries

Honorary Treasurer
Steven Ng Yong Beng
Hebe Rubber

Elected Committee
Mabel Lee Mei Hui
Dippro

Elected Committee
Apple Lau Wan Peng
Top Glove

Elected Committee
Stephen Soo Sui Liong
Asian Resinated Felt

Co-opted Committee
Melissa Tan
Getha

Co-opted Committee
Oon Choo Hin
First Win

Co-opted Committee
Steven Ng Ching Eng
Fung Keong Rubber

Co-opted Committee
Dr Fatimah Rubaizah MR
MRB

Co-opted Committee
Dr Shamsul Kamaruddin
MRB
(Alternate)

Observer
Dato' Serajudin Mohd Ismail
MHM Consortium

Observer
Phuah Lee Ping
First Win

Observer
Chin Hon Meng
MALCORP

Observer
Ng Wee Chong
Independent

TYPES OF RUBBER

Natural Rubber

Unique Properties of Natural Rubber

- Natural rubber combines high strength (tensile and tear) with outstanding resistance to fatigue.
- Excellent green strength and tack which means that it has the ability to stick to itself and to other materials which makes it easier to fabricate.
- Moderate resistance to environmental damage by heat, light and ozone which is one of its drawback.
- Excellent adhesion to brass-plated steel cord, which is ideal in rubber tyres.
- It has low hysteresis which leads to low heat generation, and this in turn maintains new tyre service integrity and extends retread-ability.
- Low rolling resistance with enhanced fuel economy.
- High resistance to cutting, chipping and tearing.

Uses of Natural rubber

- Natural rubber forms an excellent barrier to water.
- This is possibly the best barrier against pathogens such as the AIDS virus (HIV). That is the reason why latex is used in in condoms and surgical and medical examination gloves.
- Natural rubber is an excellent spring material.

Synthetic Rubber

- Synthetic rubbers were produced artificially from petrol chemicals.
- It was first produced during the WWII, then more and more types were produced to enhanced rubber applications where Natural rubber was weak, i.e., oil resistance, ozone, extreme high temperature.

TYPES OF RUBBER PRODUCTS

Latex Products

- Medical devices
  - Medical gloves, condoms, catheters, breathing bags, tubing
- Household products
  - Household gloves, pacifiers, rubber bands
- Sporting Goods
  - Toys
  - Exercise bands

Dry Rubber Products

- Automotive products & parts
  - Tyres, mats, seals, bumper, dust cover

- Anti Vibration Mountings
  - Isolate vibrations from work surfaces, reduce noise levels, absorb shock
  - Cylindrical mounts, technical mounts, leveling mounts, anti vibration plates

- Rubber Seals & O-rings
  - Without seal and O-rings, as a mechanical part. There will be no movable vehicles on the road.

Dry Rubber Products

- Extruded Rubber Products
  - applications. They are available in various compounds and styles to meet specific end-use requirements involving various factors like size, tolerance, configuration, cost and performance. Some extruded rubber
  - Rubber cord, rubber hose, rubber stripes and profiles, rubber tubings

- Metal Bonded Components
  - Rubber can be bonded to metal during moulding. This widen the usage of rubber in engineering applications.
  - Anti-vibration mount, bridge bearings, seismic bearings, expansion joints

Dry Rubber Products

- Calendered Rubber Products
  - Rubber Sheets, Rubberized Fabric
  - Elastomers that can be used include: Natural Rubber, Polychloroprene, SBR, Hypalon, Urethane, EPDM, Viton, Fluoroelastomer, Butyl, Nitrile, Silicone

- Rubber Adhesive & Sealants
  - An adhesive is used to bond or fasten materials together and its strength depends on:
    - The strength of attachment of the adhesive to the material surface called adhesion.
    - The internal strength of the adhesive called cohesion.
    - Another function of adhesive is Sealing

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TYPES OF SYNTHETIC RUBBER

Types of Synthetic Rubber

Acrylic Rubber (ACM)
Butyl Rubber (IIR)
Polyethylene(CSM)/ Hypalon
Monomer
Isoprene Rubber (IR)
Perfluoroelastomer(FFKM)
Polysulfide Rubber (PSR)
Styrene Butadiene Rubber
Butadiene Rubber (BR)
Chlorosulfonated
Ethylene Propylene Diene
Fluoroelastomers(FKM)/Viton
Nitrile Rubber (NBR)
Polychloroprene (CR)/Neoprene
Silicone Rubber (SiR)

AREAS OF RESEARCH IMPROVEMENTS

The MRPMA Proposed Areas

Smart Factory
- IR4.0
- IoT data collection & MES
- Automation

Impact of Electric Vehicles to the rubber automotive parts sector
- Specifications
- Raw materials
- OEM

The MRPMA Proposed Areas

Energy Management
- Energy efficiency
- Recover heat energy
- Utilities renewable energy for manufacturing process

Nanotechnology
- Especially in graphene and carbon materials

Use of Thermoplastic Elastomers (TPEs) for Products Substitutions

New Innovate Usage of Natural and Synthetic Rubber & Enhance Rubber Products Range
- Epoxidized Natural Rubber (NR) has not yet been explored

Contact Us

- Collaboration with MRPMA Members
- Event collaborations
- Surveys
- Student Internship, career talk, career advices etc
- And many more

Contact
MRPMA Secretariat Office

No. 1A, Jalan USJ 11/1J, USJ 11,
47620 Subang Jaya, Selangor.

03-5631 6150
03-5631 6151

secretariat@mrpma.com.my

www.mrpma.com.my

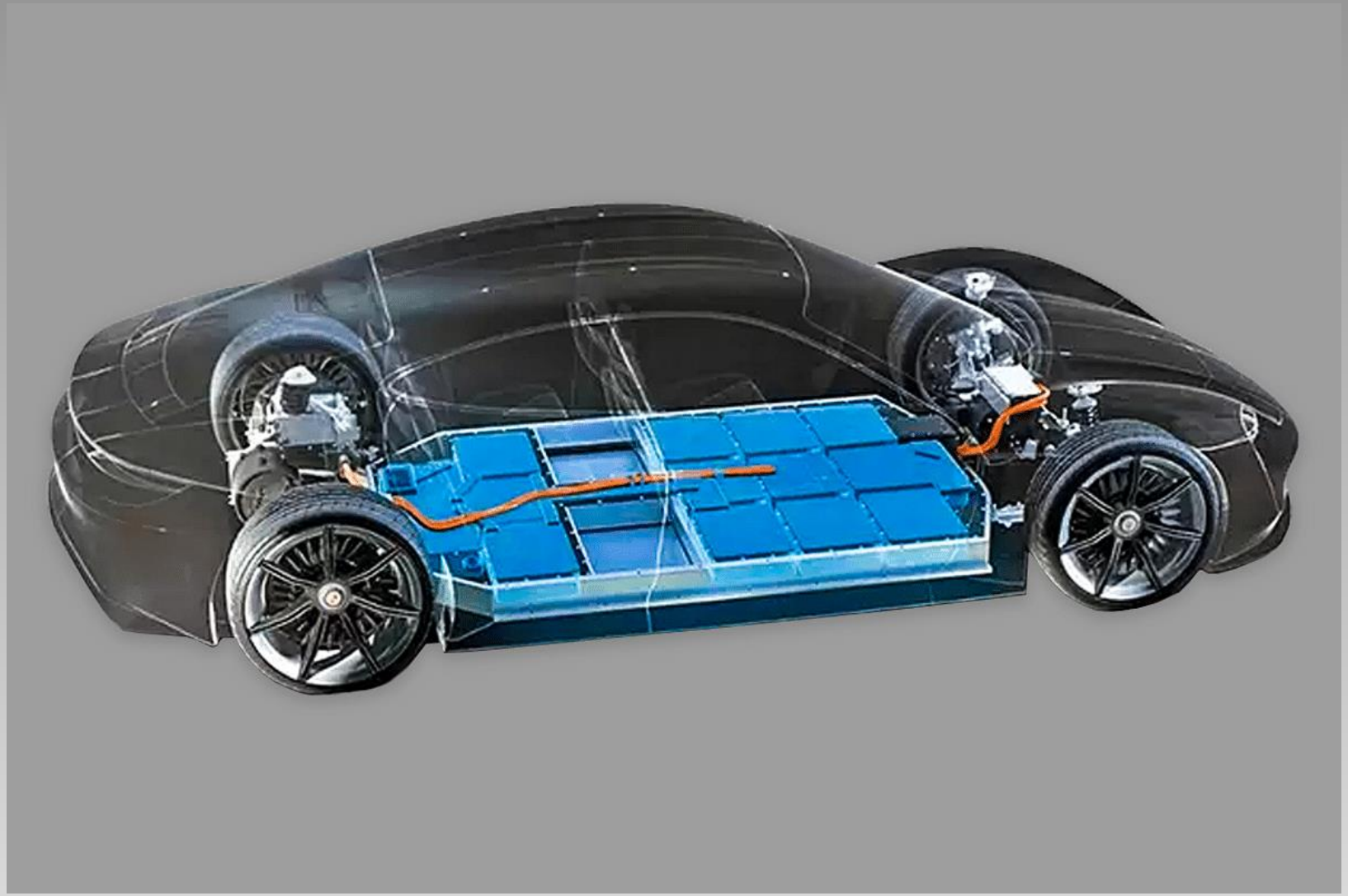
Potential Research Areas For Collaboration

Introduction

We see rubber being used almost everywhere. In our houses, cars, office equipment, electrical appliances, etc.

The potentials of rubber are huge and we continue to see companies churning new developments and advancements with better technology.

ELECTRIC VEHICLE BATTERY



Science News *from research organizations*

Rubber material holds key to long-lasting, safer EV batteries

Date: January 12, 2022

Source: Georgia Institute of Technology

Summary: For electric vehicles (EVs) to become mainstream, they need cost-effective, safer, longer-lasting batteries that won't explode during use or harm the environment. Researchers may have found a promising alternative to conventional lithium-ion batteries made from a common material: rubber.

- https://www.sciencedaily.com/releases/2022/01/220112121455.htm

Georgia Tech engineers have solved common problems (slow lithium-ion transport and poor mechanical properties) using the rubber electrolytes. The key breakthrough was allowing the material to form a three-dimensional (3D) interconnected plastic crystal phase within the robust rubber matrix. This unique structure has resulted in high ionic conductivity, superior mechanical properties and electrochemical stability.

This rubber electrolyte can be made using a simple polymerization process at low temperature conditions, generating robust and smooth interfaces on the surface of electrodes. These unique characteristics of the rubber electrolytes prevent lithium dendrite growth and allow for faster moving ions, enabling reliable operation of solid-state batteries even at room temperature.

"Rubber has been used everywhere because of its high mechanical properties, and it will allow us to make cheap, more reliable and safer batteries," said Lee.

- Rubber development can be in a very high tech industry as in the electric vehicle R&D.

- It would attract younger generations into rubber industry which could reverse the ‘brain drain’

- By having universities conducting research in this field, students will be able to see the potential of rubber industry.

- One way of future proofing the rubber industry.

Energy-Generating Rubber

Researchers from Empa have developed a flexible material that generates electricity when stressed. In future, it might be used as a sensor, integrated into clothing or even implanted in the human body, for instance, to power a pacemaker.

Flexible, organic, thin - properties that aren't usually associated with power plants or sensors. But a new material developed by Empa researchers is exactly that: a thin, organic, flexible film that generates electricity if stretched and compressed. This rubber film could be incorporated into control buttons, clothing, robots or even people, and monitor activities, record touches or generate electricity when stressed to power implanted devices such as pacemakers, for example.

Turning motion into electricity

Thanks to the piezoelectric effect, the specially designed rubber is able to convert mechanical movements into electrical charges. The trick behind the generated current is the internal polarization which changes when the rubber film is mechanically stressed.

This effect is used in sound pick-ups on analogue record players, for instance: the needle is guided through the grooves in the record in such a way as to generate mechanical vibrations. In a piezoelectric crystal, these vibrations are converted into electrical impulses, which in turn can be amplified and transformed into sound waves.

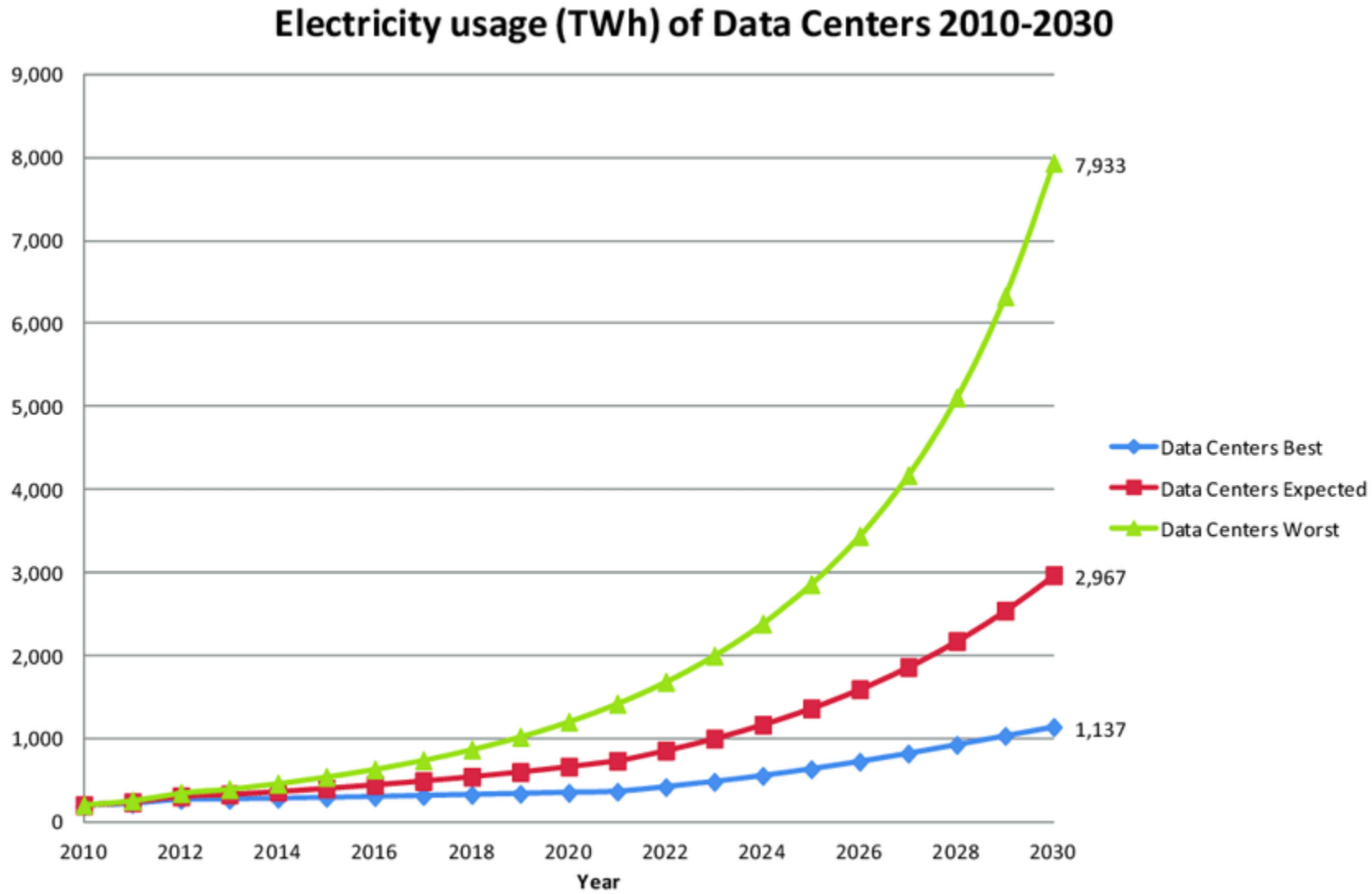
Wearable Technology Insights - A Rubber Power Plant

Energy remains a global issue as adoptation to technology surges that fuels the demand for more power plants to be built.

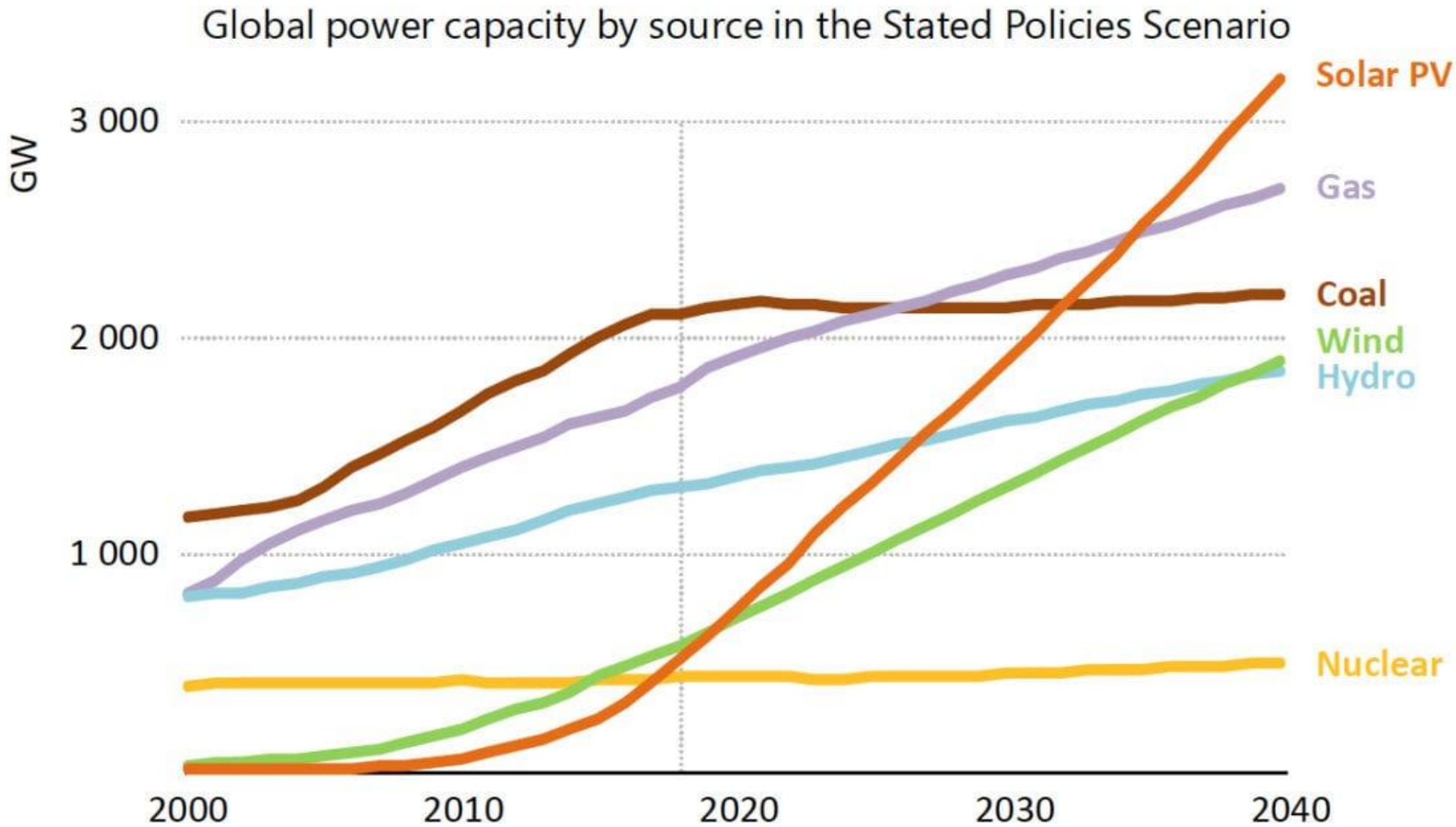
With the increasing demand in EV, the need to build more charging stations is on the sharp rise.

As countries try to avoid coal plant and nuclear energy, many are trying other methods to generate more electricity. Solar power is one of it.

Apart from this, there are a number of researches being done on rubber to generate electricity.



- Source : https://www.researchgate.net/figure/Global-electricity-demand-of-data-centers-2010-2030_fig2_275653947



- https://www.powermag.com/iea-world-energy-outlook-solar-capacity-surges-past-coal-and-gas-by-2040/

Thank you