SRBE KBVE

Société Royale Belge des Electriciens

Koninklijke Belgische Vereniging der Elektrotechnici

October 2020

Newsletter

Editorial by Daniel Ladang

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Medium and High Voltage Substations – State of art and progress
Power Network digitalization – Protection, Automation and Control
Power to Molecule – P2M: Power to H2 to e-Chemicals and Fuels
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EDITORIAL by Daniel Ladang

The newsletter of July was the first edition of KBVE-SRBE to stay in touch with all members during the COVID period. The main subject was to share information about the European green deal introducing a WEBINAR which took place on September 24th.

This second edition aims to inform all members about the life of the scientific and technical Committee of KBVE-SRBE who had to adapt his method of working during 2020 in response to COVID restriction.

Due to personal convenience, Jean-Pierre Becret required the Bureau to accept his resignation as President of the Committee. Hence, I have accepted the nomination on June 5th by the Bureau to succeed to Jean-Pierre. This is a great challenge as Jean-Pierre very efficiently led the Committee for a long period and his competence and experience were deeply appreciated by all KBVE-SRBE members. Each of us know his great dedication in organizing many study days followed by all of you about any subjects in relation with electricity and energy. In 2019, almost hundred people from our expert community followed each of the 4 study days managed by him. For all the work that has been accomplished by Jean-Pierre let KBVE-SRBE and myself once again cordially thank him. For the coming study days in 2020 and 2021, KBVE-SRBE will appreciate his advice and availability to support our next actions.

Taking over Jean-Pierre's job was also disturbed by the COVID disease as the program initiated by him and the Committee end of 2019 continuously needs to shift and to adapt each time at unforeseen circumstances.

Four study days would have to be organized in 2020 and beginning this year four task forces were in place to set up attractive programs balancing strategy and technical aspects:

1. Medium and High Voltage substations: (21/04/2020, delayed and cancelled for 2020).
2. Power Network digitalization: (1/10/2020, delayed and cancelled for 2020).
3. Power to Molecule – P2M (ready to be set in place)
4. New concepts for electricity pricing

Expecting the resolution to COVID for S2 2020, the Committee was intended to organize the 2 first study days in October and November while studying other means of communication if not possible for unexpected reasons. Today, WEBINARS seem the best solution to continue the program of the Committee. As the webinar of September 24th was plainly a success with more than hundred registered attendees, we are confident to organize sessions about Power to Molecule using a similar method in 2020: Other study days remain to be organized in 2021 either by on line sessions or traditional ways. To set up this plan B your advice and support will also be greatly appreciated: info@kbve-srbe.be

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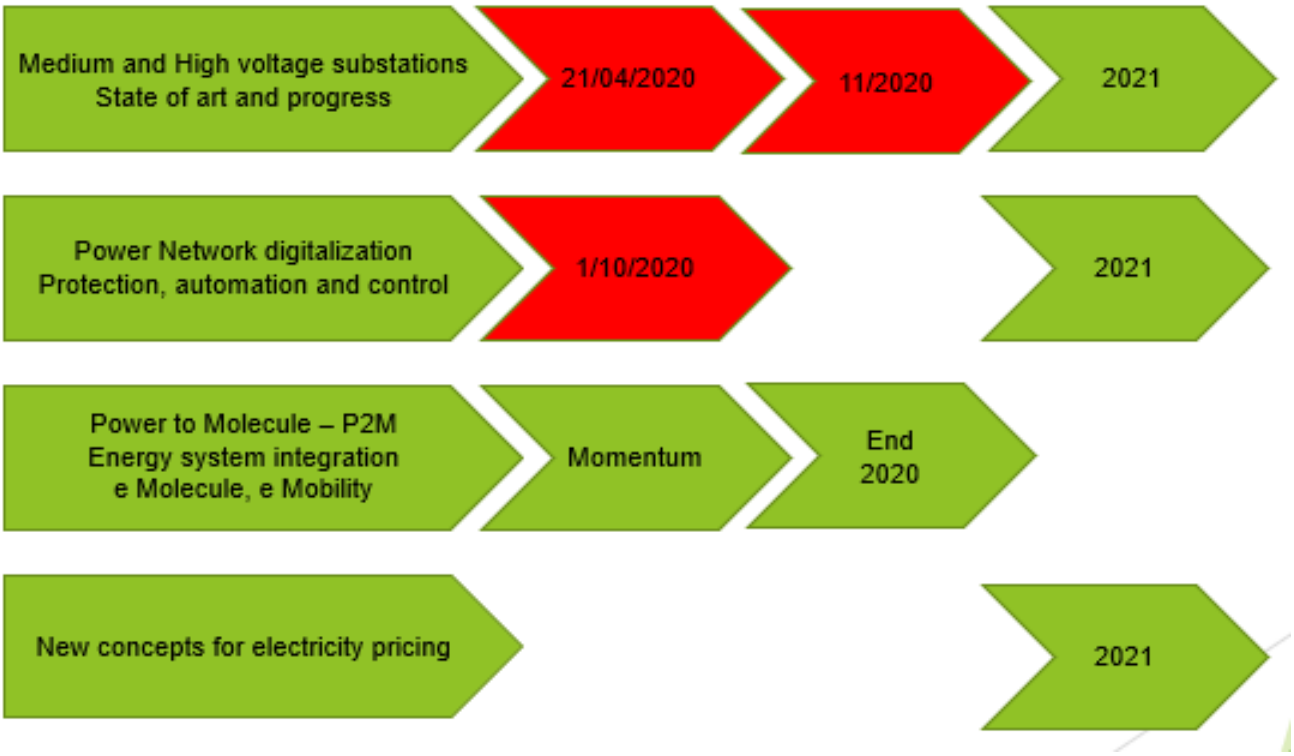

For the coming year, the program of the committee will focus on the 2 complementary axis strategy and technology such as to develop any subjects in relation with the "European green deal" and energy transition strategy while technology remains the second pillar of our study days.

Additionally, a dedicated event about cybersecurity of electrical systems will be organized in 2021. The Committee will also start in 2021 a task force to initiate a study day about all subjects relying with the local energy communities.

The following newsletter intends to present the 4 subjects that are in the pipe and about which we would like to share with you in the coming months. May I also inform you that even the traditional study day could not be organized soon, the Committee will always be pleased to exchange with our experts questions in relation with these subjects.

Best regards,

Daniel Ladang

Bureau's member & Chairman of the
Scientific and Technical Committee

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Study Days of the Scientific and Technical Committee

Medium and High Voltage Substations – State of art and progress

11 kV substation for a 800 kVA cogeneration unit.

How a substation is built depends on several factors. Every power grid manager, including large industrial companies has developed its own concept. An important point in choosing the configuration of an HV/MV substation is the reliability of the power supply. The choice of topology and equipment will depend on the necessary redundancy depending on the criticality of the process and maintenance needs. If there is a problem with the installation, a part may be off for a period of time depending on the configuration chosen.

Safety in case of flash or fire should guide the design of electrical rooms, their technical voids, floors, ventilation, ... to control the flow of burning gases, to resist shock waves and overpressures, to allow the evacuation of personnel, ... Faced with the risk of electrical defects, the principles of grounding and equipotential and mechanical attachments of cables are also critical for safety.

Thus, for customers connected to the distribution network, Synergrid prescribes the technical requirements that a functional unit must meet, as well as how the premises and MV equipment must be coordinated.

During this study day, several speakers will present their philosophy for building a reliable and safe operating system. Personal safety is the most important factor in the development of MV equipment.
Manufacturers are therefore required to have their equipment tested according to the latest version of applicable international/local standards.

Their switchboards must comply in many challenges such as obtaining the redundancy

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required by the customer, holding the internal flash, replacing the SF6, the operating safety, the use of unconventional sensors of currents and voltages, ...

KBVE-SRBE will invite you soon to a study day where all these topics will be discussed. With presentations from network managers, manufacturers and experts, this study day will address these topics in a comprehensive and exciting way.

Programme – Programma

Accueil par **Guy Van Heurck**,ENGIE-TRACTEBEL, Président de la journée
Introduction par **Guy Van Heurteck**, ENGIE-TRACTEBEL, Président de la journée d'étude
Concepts généraux
Nouvelles exigences de réseau impactant la conception de nouvelles installations, **Paul Leemans - Nicolas Bragard**,ELIA
Défis et exigences fonctionnelles pour les sous-stations de distribution numérique et les switchgears, **Wim De Maesschalck**, FLUVIUS
Evolution normative et législative des organisations nationales et internationales relative aux installations et équipements électriques (SF6), **Yvan Tits – Marc Arens**, ENGIE-LABORELEC
Conception – point de vue de l'utilisateur
Conception de sous-stations à vol moyen dans solvay Group, **Pablo Moll**,SOLVAY
Conception de sous stations de grands réseaux industriels : exigences spécifiques d'INFRABEL, **Bertrand Wiart**, INFRABEL
Présentation des configurations de busbar et de sous-station en relation avec la fiabilité et la mise à la terre secondaire, Guy **Van Heurteck**,ENGIE-TRACTEBEL
Équipements, fabrication
Zéro CO2e Gaz Isolé Switchgear, **Antoine Wotquenne,** SIEMENS
Technologie de commutateur MV sans SF6 alimentée par l'air et le numérique, **Julien Borenstein**, SCHNEIDER
Points de réflexion sur la sécurité et la continuité du service sur les tableaux de distribution électriques, **Mme Beatrice Irani** – Directrice technique d'ICET INDUSTRIE SpA
Nouveautés, design spécial
Monitoring avancé des équipements : prévention du vieillissement prématuré et limitation des arcs, **Julien Borenstein,** SCHNEIDER
Services numériques pour brownfield transmission et distribution avec une Bentley & Siemens Digital Twin, **Théo Van** de **Ven**, BENTLEY
Innovations et statut récent dans le domaine des transformateurs d'instruments, **Pieter De Bisschop**,SIEMENS

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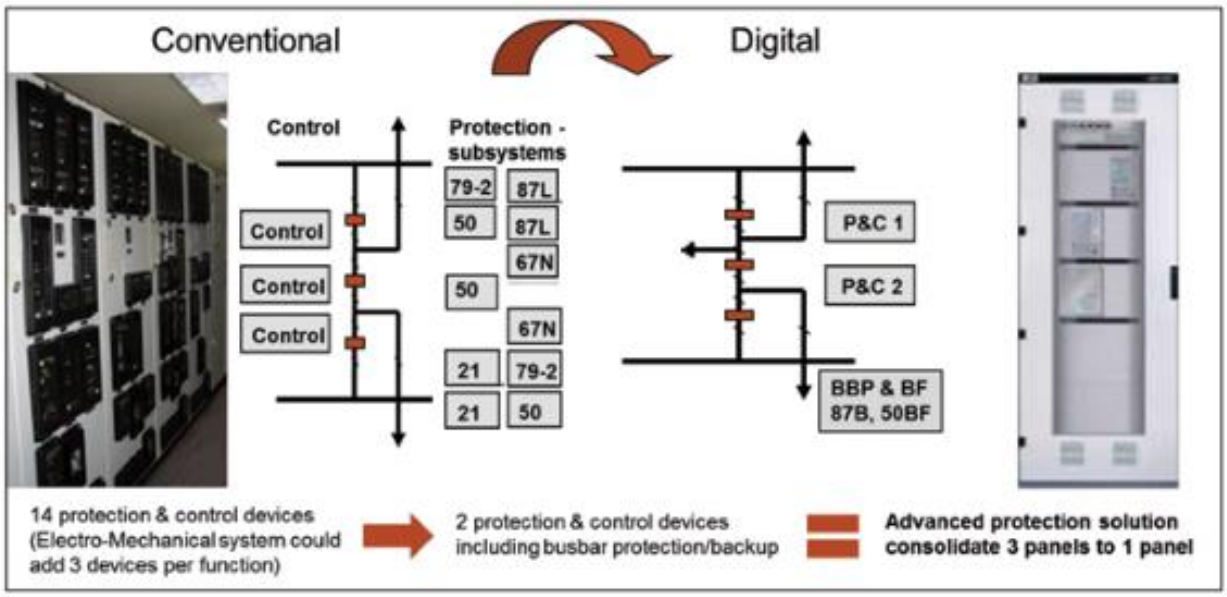
Power Network digitalization – Protection, Automation and Control



Protection, automation and control systems have always been important for the proper functioning of any electrical system, from transport and distribution networks to industrial facilities but also in production facilities (decentralized or not).

In fact, these equipment must not only minimize, in the event of a defect, the impact on the integrity of the network's constituent equipment (transformers, stations, cables and lines, etc.) but also ensure as much as possible the continuity of the power supply.

Currently, the electrical system is evolving, especially in terms of short-circuit power, inertia, ... but also new possibilities brought about by digitalization.

This study day will review the latest developments in principles and equipment used for protection, automation, and control. Thus, the increasing use of new algorithms and equipment, the evolution of sensors, artificial intelligence and Digital Twin features, communications, new testing and simulation tools, the problem of the obsolescence of digital solutions, etc. will be discussed. How different users integrate them into the design of their solutions will be presented.

KBVE- SRBE will invite you to a study day in 2021 where all these topics will be presented by network managers, experts from the academic and industrial world, manufacturers of these equipment. This day will allow for exchanges between these speakers and the participants.

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Programme – Programma

Accueil par **Cédric Moors**, ELIA, Président de la journée Introduction par **Cédric Moors**, ELIA, Président du séminaire
Introduction générale et développements spécifiques de protection
Protection développements récents, **Cédric Moors** – ELIA
Principes et dispositifs de protection : Nouveautés : Algorithmes et équipements
Un système centralisé de protection et de contrôle utilisant un relais de protection de classe de transmission bien éprouvé, **Chee-Pinp Teoh**, GeneralElectric
Protection du réseau HVDC : comment atteindre la sélectivité sur une échelle de temps milliseconde?, **Willem Leterme**, Energyville
Evolution des Transformateurs de Mesure et Impact sur la Simulation des Réseaux électriques, **David Gueret**, DOBLE
Usages
Influence des nouvelles spécifications pour les utilisateurs, **Cédric Moors**, ELIA
Évolution de la distribution MV en Belgique et leur impact sur le plan de protection, **Pieter Vermeyen**, Fluvius
Evolution des normes européennes, **Didier Empain**, ENGIE-LABORELEC
Numérisation du contrôle et de l'automatisation : nouveautés
Contrôle de la tension dans les systèmes de distribution grâce à l'apprentissage en renforcement profond, **Jean-François Toubeau,** U.Mons
tbc, **Damien Ernst**, U.Liège
Communications numériques pour la protection et le contrôle : État d'art et de progrès
Evolution pour la communication numérique, – ABB
Numérisation : Nouveaux problèmes ...
Panel « Obsolescence des solutions digitales » : animé par **Serge Lamborelle** d'Engie/Laborelec. Avec deux exploitants de grands réseaux et des constructeurs.
Test et simulation des systèmes de protection et de contrôle :
Test basé sur la simulation de systèmes de protection **complets, Johan Beets**, Omicron
Test virtuel des relais de protection dans le cloud, **Claire Chevalier**, SIEMENS

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Power to Molecule – P2M: Power to H2 to e-Chemicals and Fuels

To limit the impact of global warming the world needs to decarbonise quickly and cost-efficiently. With the European Green Deal, Europe aims to play a leading role and be carbon-neutral by 2050. This is the first time the goal of 100% decarbonisation has been defined and the impact is such that no one can hide behind the last few percentage points anymore. Achieving this goal will lead to many benefits for all strata of society, but will inevitably also involve costs, significant investments and, for the government, the need to make the right choices and to create the right framework. In view of the limited RES capacity in Europe, especially in Belgium, it will be critically important to focus on the most cost-efficient and energy-efficient solutions for achieving decarbonisation at the lowest cost.

The COVID-19 crisis hit the world in early 2020, impacting the entire economy on a scale never seen. The crisis is not yet over, but governments are already analysing how to emerge from it and relaunch the economy. With that in mind, the European Green Deal and decarbonisation are perfect opportunities to encourage investment. In Belgium and Europe, developing the potential of renewable electricity generation, electrifying energy usage where it is efficient to do so and building the necessary electricity grids to decarbonise the power system are no-regrets. We must accelerate investment in those areas. Today the most efficient way to use renewable electricity is still to use it as electricity in the power system.

That being said, most scenarios (such as the IPCC 1.5° scenario) show that, even though significant electrification (up to 50%) of energy consumption is to be expected in the coming years, such as in transport (with e-mobility) and heating (with heat pumps), an important proportion of the energy system will still structurally rely on energy carriers other than electricity. In order to be carbon neutral, that part of the energy system that cannot be efficiently electrified (the 'hard-to-abate' sectors, such as chemicals, some heavy industry, long-haul heavy-duty road transport, aviation and shipping) also needs to be decarbonised.

Renewable hydrogen – produced from renewable energy, or any derivative thereof – could well play an important role in decarbonising these activities (depending also on the role played by other technologies, such CCS/CCU, pyrolysis, etc). It would then be appropriate to evaluate, on the one hand, how those industries that are already using hydrogen (e.g. certain major industrial players in the Port of Antwerp) could have recourse to green hydrogen, and, on the other hand, in which industries the conversion to (green) hydrogen as an energy carrier could be more appropriate than direct electrification. It is not yet known which molecule (hydrogen, methane, methanol, ammonia, liquid hydrogen, etc.) will be used in which field, but this should be carefully analysed.

On 8 June 2020, the European Commission released its hydrogen strategy, which clearly sets ambitious targets for the development of the clean hydrogen sector: 6GW of electrolysis capacity installed by 2025 and 40GW by 2030. This is four to five times more than the investments currently planned in the national development strategies. We still do not know how and where this capacity will be developed or what kind of hydrogen network we might need.

With the development of hydrogen, interactions between the electricity and gas sectors (sector coupling) will become more important. For instance, energy storage will be one of the biggest challenges facing the energy world with the energy transition. In fact, fast-reacting fossil fuel-fired power plants will no longer be available, and battery technologies as we know them today will not be enough to cover storage needs. Today, the oil and gas industry provides seasonal storage for the entire energy system. Whether this storage capacity will still be needed in the future and

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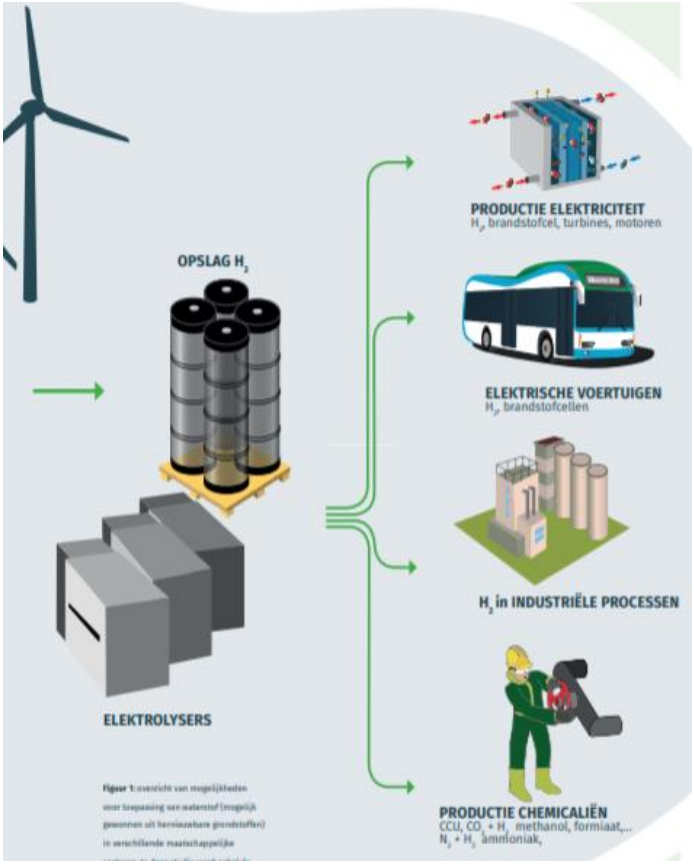
what role hydrogen might play are important questions that still need to be answered.

What we can say today is that electricity and hydrogen will be two fundamental components of the decarbonised world of tomorrow and should therefore not be rivals. They should be used in those sectors where they can each make a difference efficiently. The focus should be on making the most of mature and efficient technologies, for instance accelerating the electrification of the transport (EVs) and heating industries has no downside, while green hydrogen should be introduced into those industries that today rely on fossil fuels.

With the Power-To-Molecules study day, we plan to shed light on some of the above questions and issues.

Frédéric Dunon

Chairman of SRBE/KBVE



Source: Advanced energy technologies: study for the CCU hub strategy for the Ghent port area

The task force meeting all experts in the domain of electricity and gas sector as well integrators set up a program that will be presented with four WEBINARS by end 2020. The sessions are continuing the first WEBINAR about the European green deal and will be organized under the chairman Patrick Hendrick from ULB following the 4 themes':

- ❑ International and EU contexts
- ❑ Energy system integration: sector coupling
- ❑ Technologies and developments
- ❑ Applications : e Molecule, e Fuels, e Mobility

Online registration will open soon via our website : http://www.kbve-srbe.be

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Programme – Programma

4 Sessions – from 11h00 to 13h30

Chairman: Professor Patrick Hendrick, Head of Dpt ATM (ULB)
27/11/2020 - Session 1: Trends and Strategy
Introduction of the WEBINAR – **DANIEL LADANG** (KBVE-SRBE), **Pr. PATRICK HENDRICK** (ULB)
The Future of Hydrogen, some viewpoints, and perspectives from the International Energy Agency (IEA) – **Pr. JORIS PROOST** (UCL)
A hydrogen strategy for a climate neutral Europe Energy. **PIERRE LOAEC** (UE/DGE)
Strategische visie voor waterstof in Vlaanderen - **ISABEL FRANCOIS** (Waterstofnet)
4/12/2020 - Session 2: Energy system integration
Fuel for future – more molecules or deep electrification in Belgium's energy system by 2050 – **DANIELLE DEVOGELAER** (Bureau federal du plan)
Contribution of the electro- and bio- energy carriers to the Belgian security of supply in 2040 and beyond – **Pr. HERVE JEANMART** (UCL)
Benefits of long-term storage using power-to-gas – **YVES VERCAMMEN** (Fluxys)
Hydrogen – a power sector's perspective - **NICOLAS GIELIS** (Elia)
11/12 - Session 3 : Technologies
Towards a new Carbon-Neutral economy in the Ghent area of North Sea Port - **PATRICK LAFONTAINE** (CCU hub)
Driving the future of fuel cell and hydrogen technologies – **BAUDOUIN DE LANNOY** (Hydrogenics Europe)
Energy for Miles, Power for Comfort: Autonomous traction for public transport - **YVES CARELS** (Alstom)
Carbon neutral economy: Role of CCU méthane - **DANIEL MARENNE** (Engie)
Tbc, Fuel cells and Hydrogen joint undertaking – **BART BIEBUYCK** (EU-FCH)
18/12/2020 - Session 4 : Applications
A closer look at e-ammonia – **ZAC CESARO** (Siemens)
Why the zero-carbon energy transition will imply the use of lots of Carbon - **JAN MERTENS** (ENGIE)
Project van methanol als marine brandstof in de haven van Antwerpen – **SEBASTIAN VERHESLT** (UGent)
Fuel Cell Electric Bus: it works and it's ready! – **GEERT VAN HECKE** (Van Hool)
Conclusions – **PATRICK HENDRICK** (ULB)

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New concepts for electricity pricing

Calls to participate in the working group were made on June 5, 2020. We invite those interested to contribute to the program to make themselves known. The task force will start soon to set up the program for this study day in 2021.

This study day will raise the following questions:

Has the market price of electric power become too low to ensure the profitability of certain controllable and/or reserve generation units, controllable storages and demand side management assets needed to balance supply and demand?

Do we or will we experience a precarious nature of electricity or energy?

Therefore, do we need new pricing concepts for electricity: aside an energy only market, , a capacity market or capacity pricing mechanisms, other/new ancillary services (e.g. faster reserves, inertia products, …) ?

Should pricing be global or local ? Would local pricing solve internal congestions problems or favor investments in decentralized assets/systems ?

KBVE-SRBE Webinars in 2020/2021

1. The first WEBINAR KBVE-SRBE was organized on the 24th September about the "European green deal". It may be summarized as following: Towards a climate neutrality and CO2 neutral world by 2050 requires to upgrade the 3x20 strategy by increasing the 2030 targets and mobilizing "green" finance and investments. The "green deal" will be based on the following investigations and developments:
    a. Implement strategy on smart system integration
    b. Adapt the TEN-E regulation (Q4 2020)
    c. Increase offshore RES
    d. Implement Hydrogen strategy and Hydrogen Alliance
    e. Improve the energy system integration in a "circular" energy system
    f. Update the TEN-T regulation for sustainable and smart mobility
    g. Digitalization with data strategy and cybersecurity

    Link to this webinar : VIDEO
2. Continuing the European green deal WEBINAR, KBVE-SRBE would like to restructure the program of the Power to Molecule – P2M study day as 4 afternoon WEBINARS offered by end 2020.
3. A Web event will take place in Q1 2021 to introduce the cybersecurity aspects of the electrical systems.
4. With the collaboration of SIA Partners, KBVE-SRBE foresee to organize a seminar in 2021 about the "energy local communities". The program is not yet set up and we have the pleasure for calling your proposals about this subject. info@kbve-srbe.be

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Interesting third-party Webinars in 2020

Webinar about energy in Africa, 10/11/2020 (by Georges Van Goethem)

This webinar is an initiative of Mémoires du Congo in collaboration with CBL ACP and CRAOM.

For members of CRAOM participation is free; for non-members the participation fee is 30 €.

Please register until 5 November 2020 at CRAOM:

craom@hotmail.be or craom@skynet.be

Tel : 0472 50 86 61

NB :

* CBL-ACP = Chambre de Commerce d'Industrie et d'Agriculture Belgique-Luxembourg / Afrique-Caraïbes-Pacifique (située à Bruxelles)

* CRAOM = Cercle Royal Africain et de l'OutreMer

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