



**International conference co-organized by ANSALB and RAOS
8 - 11 November 2021, Cotonou, Benin (<http://www.se4a.africa/>)**

Sustainable Energy for Africa (SE4A 2021)

Draft programme V7 (6/11/21)

Preliminary notes:

- Posters are presented during the break times (except day 1). A short (3 min) plenary presentation of the posters (Poster Session) is scheduled Tuesday 9 November, after session 8.
- Most plenary papers are 15 minutes, questions are sent via zoom or in written form to a moderator. At the end of each session, all authors are called on stage and 15 minutes are devoted to answering the questions, presented by the moderator.
- There are four sessions of typically 1h30 per day, two in the morning and two in the afternoon, except Tuesday 9 November: 3 in the afternoon, including the short poster presentations. Sessions are 6 x 15 minutes.
- “V” means that the speaker will give his talk via zoom; “P” means that the speaker will be present in Cotonou.

Supporting institutions (listed by alphabetic order)

- *European Society for Engineers and Industrialists (SEII)*
- *Gnansounou-Group – GR-GN of EPFL*
- *Institut de Recherche pour le développement (IRD): représentation au Bénin*
- *Institute of Research in Solar Energy and New Energies*
- *International Atomic Energy Agency (IAEA)*
- *Laboratoire d'Anthropologie Appliquée et d'Education au Développement Durable, University of Abomey-Calavi*
- *Louvain School of Engineering of UCLouvain*
- *Unesco Chair in Mathematical Physics and Applications, University of Abomey-Calavi*
- *Unesco Chair in Renewable Energy and Environment, University of Zambia*
- *Université Mohamed V, Rabat*

Monday 8 November 2021
Palais des Congrès de Cotonou, avenue de la Marina
Blue hall (left wing)

Energy is crucial for achieving the Sustainable Development in Africa

9:00 – 10:00 **SESSION 1 : OPENING SESSION**

Chair: Hippolyte Agboton (Benin)/Philippe Goyens (Belgium)

Keynote speakers:

- Nazaire Padonou, President of ANSALB (P)
- Philippe De Maeyer, Permanent Secretary of RAOS (V)
- Atef Marzouk, Acting Director Infrastructure and Energy of the African Union ()
- Fadila Boughanemi, UE (V)
- Xavier Leblanc, Ambassador of Belgium to Benin and Togo (P)
- Norbert Hounkonnou, President of NASAC (P)
- Minister of Energy of Benin (P)
- Minister of Higher Education and Scientific Research of Benin (P)

10:00 - 10:30 **COFFEE BREAK**

10:30 – 12:15 **SESSION 2**

Chair: Thierry d'Almeida (Benin)/ Jean Snoeck (Belgium), **questions moderator:**
TBD

THEME 1 - Energy access and socioeconomic development as primary drivers, part 1

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|----------------|--|
| 10:30 - 10h45 | Rajaâ Cherkaoui El Moursli (Morocco), <i>Moroccan National Energy Strategy</i> (P) |
| 10:45 – 11:00: | Fadila Boughanemi (France), <i>International cooperation in research and innovation is a strategic priority for the EU</i> (V) |
| 11:00 – 11:15: | Nopenyo Dabla (Togo), <i>Renewable Energy as an enabler for socioeconomic development in Africa</i> (V) |
| 11:15 – 11:30: | Faustin Dahito (Benin), <i>Les « business models » de la transition énergétique en Afrique de l'Ouest (CEDEAO)</i> (P) |
| 11:30 – 11:45: | Badr Ikken (Morocco), <i>Three new research and innovation platforms in Morocco</i> (V) |
| 11:45 – 12:00: | Appolinaire Ki (Burkina-Faso), <i>Improving Electric Supply in West Africa: the potential of cross border trading</i> (P) |
| 12:00 – 12:15: | Q&A |

12:15-13:15 **LUNCH**

13:30-15:00 **SESSION 3**

Chair: Rajaâ Cherkaoui El Moursli (Morocco)/Mansourou Moudachirou (Benin),
questions moderator: TBD

THEME 1 - Energy access and socioeconomic development as primary drivers, part 2

- 13:15-13:30 Bart Biebuyck (Belgium) - *Exploring the first large-scale hydrogen, ammonia and fuel cell related activities and projects underway in Africa* (V)
- 13:30-14:30 Prem Jain (Zambia) - *Growth of solar energy industry and opportunities* (V)
- 14:30-14:45 Arnaud Zannou (Benin) - *Les enjeux de la transition vers un mix énergétique responsable au Bénin* (P)
- 14:45-15:00 Q & A

15:00-15h30 **COFFEE BREAK**

15:30-17:00 **SESSION 4**

Chair: Norbert Hounkonnou (Benin)/Philippe De Maeyer (Belgium), **questions moderator:** TBD

THEME 1 - Energy access and socioeconomic development as primary drivers, part 3

- 15:30-15:45 Atef Marzouk (Egypt) - *Role of Geothermal in Renewable Energy Mix* ()
- 15:45-16:00 Michel Boko (Benin) - *Energy and Sustainable Development: how to change the paradigm?* (P)
- 16:00-16:15 Fabrice Lusinde (DRC) - *Acteurs, enjeux et perspectives de l'industrie de l'électricité en République démocratique du Congo... En attendant Inga 3 et Grand Inga* ()
- 16:15-16:30 Christian Rakos (Austria) - *Pelletized agricultural residues as alternative cooking fuel for Africa* (V)
- 16:30-16:45 Claude Fischer-Herzog (France) - *Vers un pacte de solidarité énergétique en Afrique de l'Ouest pour l'industrialisation de la sous-région. Quelles coopérations avec l'Europe ?* (V)
- 16:45-17:00 Q & A

Tuesday 9 November 2021
Palais des Congrès de Cotonou, avenue de la Marina
Blue hall (left wing)
9:00-10:30 **SESSION 5**

Chair: Bernard Mairy/Hippolyte Agboton, **questions moderator:** TBD

THEME 2 - Appropriation of renewable energy technologies, dispatchable (hydroelectric, biomass) as well as non-dispatchable (sun, wind) energies

Keynote speaker: Yezouma Coulibaly (Burkina-Faso)

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| 9:00-9:15 | Yezouma Coulibaly (Burkina Faso) - <i>Renewable Energy (RE) penetration rate: Reliable energy, Energy accounting and Energy Indicators for African countries</i> () |
| 9:15-9:30 | Joris Proost (Belgium) – <i>Hydrogen: a Sustainable Facilitator for Decentralised Electricity Production (and Consumption)</i> (V) |
| 9:30-9:45 | Laurent Albert & Francisco Francisco (France & Mozambique) – <i>General opportunities & advantages of wave power for Africa, including the advantage of wave power’s ability to mitigate intermittency (Ghana project)</i> (V) |
| 9:45-10:00 | Jean Bosco Niyonzima (Burundi) – <i>Flow measurements conducted on the Mwogere River in Burundi with an hydrometric current meter using the reduced points-method in order to use a small Banki-Michell hydraulic turbine</i> (P) |
| 10:00-10:15 | Patrick Hendrick (Belgium) - <i>Mini hydro as an off-grid electricity solution for communities in villages in Africa, South America and Asia</i> (V) |
| 10:15-10:30 | Q & A |

10:30 -11:00 **COFFEE BREAK**

11:00 – 12:30 **SESSION 6**

Chair: Monique Ouassa-Kouaro (Benin)/Bernard Mairy (Belgium), **questions moderator:** TBD

THEME 3 - Energy systems that are secure, competitive and compatible with a sustainable and inclusive development of the continent (part 1)

Keynote speaker: Wisdom Ahiataku-Togobo (Ghana)

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| 11:00 – 11:15 | Wisdom Ahiataku-Togobo (Ghana) - <i>Energy systems that are secured, competitive and affordable, and compatible with a sustainable and inclusive development of the continent</i> (V) |
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11:15 – 11:30	Youssouf Ali Mbodou (Tchad) - <i>Système de paiement échelonné «Pay As You Go » : rendre l'énergie solaire accessible pour les ménages et les petites entreprises</i> (P)
11:30 – 11:45	Douglas Baguma (Uganda) - <i>Remot, an IoT digital tool made in Africa for offgrid energy systems</i> (P)
11:45 – 12:00	Edi Assoumou (Benin) - <i>Challenges of long term power system transition in West Africa: the case of the Ivory Coast</i> ()
12:00 – 12:15	Luc Van Den Durpel (Belgium)- <i>Nuclear Energy Tomorrow as Critical Enabler towards a Sustainable Future</i> (V)
12:15 – 12:30	Q&A

12:30 -13:30 **LUNCH**

13:30-15:00 **SESSION 7**

Chair: Michel Boko (Benin)/Jean Snoeck (Belgium), **questions moderator:** TBD

THEME 3 - Energy systems that are secure, competitive and compatible with a sustainable and inclusive development of the continent (part 2)

13:30-13:45	Joseph Thokozani-Mwale (Zambia) - <i>The Conundrum of Sustainability of Hydro-Electric Energy as a Renewable Energy Source under Climate Change: Implications for the Resilience of the Water-Energy-Food Nexus of Southern Africa</i> ()
13:45-14:00	Mawuéna Medewou (Benin) - <i>Calcul de l'écoulement de puissance dans les réseaux de transport électrique par la méthode de Newton-Raphson : application au réseau de transport électrique de la Communauté Electrique du Bénin</i> ()

Energy value chain in Africa (including conversion technology and energy services)

THEME 4 - Management of energy based services in an inclusive and sustainable way (in rural and urban regions) (part 1)

14:00-14:15	Mark Tjebbe Hoekstra (Mozambique) - <i>Renewable energy and productive water for irrigation purposes in Mozambique</i> (V)
14:15-14:30	Carrasco Pedro (Spain) – <i>Chaos, Fractals and energy from the oceans</i> (V)
14:30-14:45	Sandiswa Qayi - <i>Energy Challenge in Africa using case study of AET innovations in energy efficiency</i> ()
14:45-15:00	Q&A

15:00-15:30 **COFFEE BREAK**

15:30-17:30 **SESSION 8**

Chair: Rajaâ Cherkaoui El Moursli (Morocco)/Brice Sinsin (Benin), **questions moderator:** TBD

THEME 4 - Management of energy based services in an inclusive and sustainable way (in rural and urban regions) (part 2)

Keynote Speakers: Edgard Gnansounou (Benin), Shaukat Abdulrazak (Kenya)

- 15:30-15:45 Edgard Gnansounou (Benin) - *Sustainable Strategy for Transportation Fuels in West-Africa: A 2050 Prospective Assessment* (V)
- 15:45-16:00 Shaukat Abdulrazak (Kenya) - *IAEA's contribution to capacity building in Africa for sustainable nuclear energy solutions* (V)
- 16:00-16:15 Samuel Igbatayo (Nigeria) - *Harnessing waste-to-energy value chain to achieve sustainable development goals : lessons for Sub-Saharan Africa* (V)
- 16:15-16:30 Susan Pendame (Malawi) - *Electricity Access and Economic Development: The Case for Productive Use of Off-Grid Renewable Energy in Rural Africa* (V)
- 16:30-16:45 Christopher Kost (USA) - *Sustainable and Equitable Mobility for African Cities* (V)

THEME 6 - Energy supply chain for all types of consumers

- 16:45-17:00 Eddie Bilitu (DRC) - *Electrification des milieux ruraux par les microcentrales hydroélectriques en RD Congo* (P)
- 17:00-17:15 Yannick Useni-Sikuzani (DRC) - *Le Projet CHARLU, vers une gestion durable de la ressource bois-énergie pour une offre sécurisée en charbon de bois et une réduction de la déforestation du miombo* (V)
- 17:15-17:30 Q&A

17 :45-18 :45 **POSTER SESSION**

Chair: Antoine Vianou (Benin)/Philippe Goyens (Belgium)

- 17:45-17:48 Rotimi Muyima Adedayo (Nigeria) - *A Review of Global Perspective on Geothermal Energy* ()
- 17:49-17:52 Coffi Adihou (Benin) - *Etude de la performance d'un chauffe-eau solaire compact à absorbeur muni d'ailettes par le critère d'Entransy détruit* ()
- 17:53-17:56 Eddie Bilitu (DRC) - *Identification des modes d'exploitation des modules photovoltaïques dans la ville de Lubumbash* (V)
- 17:57-18:00 Rock Dake (Benin) - *Use of sorption materials in solar dryers for sustainable production* (V)
- 18:01-18:04 Pierre Kpantingnangan (Benin) - *Transformation des résidus agricoles, forestiers et déchets biodégradables en 'charbon vert'* (P)

18:05-18:08	Pierre Kpantingnangan (Benin) - <i>Transformation des résidus agricoles et déchets biodégradables en 'biogaz'</i> (P)
18:09-19:12	Guy Masudi (DRC) - <i>Réduction de la pollution harmonique du réseau de distribution électrique de la commune de Katuba (Lubumbashi, RDC) par un contrôle à base d'un filtre actif</i> (P)
18:13-18:16	Talata Soulemane Modibo Karim (Benin) - <i>Innovations énergétiques, activités génératrices de revenus des femmes et développement inclusif durable au Bénin</i> (P)
18:17-18:20	Timothée Nkodi (DRC) - <i>Optimization of biogas production from cassava peel by Response Surface Methodology</i> ()
18:21-18:24	Wirnkar Nsanyuy (Cameroon) - <i>Fault identification in Distribution transformers: Case of Fako Division, Cameroon</i> ()
18:25-18:28	Lorna Omuodo (Kenya) - <i>Evaluation of Napier Grass for Bioethanol Production for Africa through a Fermentation Process</i> ()
18:29-18:32	Victor Zogbochi (Benin) - <i>Étude de la dynamique de conversion thermo-électrique d'un groupe électrogène à base de moteur Stirling pour la production d'énergie électrique en milieu rural</i> (P)
18:33-18:36	Laetitia Zoungrana (Burkina Faso)- <i>Design study of a gasification reactor for manufacturing and experimentation in West Africa</i> (V)

Wednesday 10 November 2021

*Palais des Congrès de Cotonou, avenue de la Marina
Red hall (central wing)*

Research, innovation & education in connection with the energy-intensive sectors

9:00-10:30 **SESSION 9**

Chair: Marc Lobelle (Belgium, Benin)/ Jean Snoeck (Belgium), **questions moderator:** TBD

THEME 5 - Optimisation of energy based services for big consumers

Keynote speakers: Philippe Schild (France), Emmanuel Ackom (Ghana), Joseph Essandoh-Yeddu (Ghana) , Arthur Minsat (France), Bruce Sithole (South Africa)

9:00-9:15	Philippe Schild (France) - <i>Electrification des milieux ruraux par les microcentrales hydroélectriques en RD Congo</i> (V)
9:15-9:30	Emmanuel Ackom (Ghana) - <i>Close-by yet inaccessible: Urban poor communities and modern energy conundrum in Africa</i> (V)
9:30-9:45	Joseph Essandoh-Yeddu (Ghana) - <i>Natural Gas Use and Perspectives: Opportunities for Intra- and Inter- African Trade</i> (P)
9:45-10:00	Arthur Minsat (France) - <i>How sustainable energy in intermediary cities will strengthen Africa's food value chain</i> (V)
10:00-10:15	Bruce Sithole (South Africa)- <i>Extracting Maximum Value from trees</i> (V)
10:15-10:30	Q&A

10:30 -11:00 **COFFEE BREAK**

11:00 – 12:45 **SESSION 10**

Chair: Marcellin Amoussou-Guénou (Benin)/Bernard Mairy(Belgium), **questions moderator:** TBD

THEME 7 - Materials and sustainable development

Keynote speakers: Kenneth Ozoemena (South Africa), Hervé Jeanmart (Belgium), Thierry d'Almeida (Benin).

11:00 – 11:15	Kenneth Ozoemena (South Africa) – <i>Energy storage landscape in South Africa and the rest of Africa</i> ()
11:15 – 11:30	Hervé Jeanmart (Belgium) – <i>The Energy Return on Investment (EROI) and the accessibility of renewable energy</i> (V)
11:30 – 11:45	Thierry d'Almeida (Benin) – <i>X-TechLab training sessions in Benin: towards borderless science education</i> (P)

11:45 – 12:00	Fouzia Cherkaoui El Moursli (Morocco) - <i>Polyanions phosphate and phosphite materials for Li-Ion Batteries: Moroccan resources valorization</i> (V)
12:00 – 12:15	Alina Iatan (Romania) - <i>EU CBRN Centres of Excellence-Strengthening preparedness on CBRN incidents in Africa.</i> (V)
12:15 – 12:30	Thierry Duvaut (France) - <i>Quels peuvent être les impacts d'une recherche et d'un enseignement scientifiques pluridisciplinaires sur la problématique générale liée à un système urbain durable (cas d'un campus universitaire par exemple), et sur le quotidien des citoyens ?</i> (V)
12:30 – 12:45	Q&A

12:45 -13:30 **LUNCH**

13:30-15:00 **SESSION 11**

Chair: Rajaâ Cherkaoui El Moursli (Morocco)/ Antoine Vianou (Benin), **questions moderator:** TBD

THEME 8 - Reinforcement of education and research capacities and valuation of scientific expertise in Africa

Keynote speakers: Léonard Lévêque (France), Hamid Aït Abderrahim (Algeria).

13:30-13:45	Léonard Lévêque (France) - <i>Long-Term Joint European Union - African Union Research and Innovation Partnership on Renewable Energy</i> (V)
13:45-14:00	Hamid Aït Abderrahim (Algeria/Belgium) - <i>Energie nucléaire pour l'Afrique et par l'Afrique : rêve ou réalité - The development of Small Modular Reactor (SMRs) for emerging nuclear countries in Africa</i> (V)
14:00-14:15	Glory Oguegbu (Nigeria) - <i>How Innovation and Capacity Building will Disrupt the Sustainable Energy Space and Aid Climate Action</i> (V)
14:15-14:30	Sandra Soares-Frazao (Belgium) - <i>Distance learning in hydraulics</i> (V)
14:30-14:45	Tsopgni Vadel Eneckdem (Cameroon) - <i>Contribution of mapping to wind power, solar photovoltaic and hydroelectric energies potential assessment from the highlands of Bitchoua (West Cameroon)</i> (P)
14:45-15:00	Q&A

15:00-15h30 **COFFEE BREAK**

15:30-17:15

SESSION 12

Chair: Phillippe De Maeyer (Belgium)/Michel Boko (Benin), **questions moderator:** TBD

THEME 9 - Multidisciplinary approach for a sustainable access to energy

Keynote speakers: Monique Ouassa-Kouaro (Benin), Bob van der Zwaan (The Netherlands).

- 15:30-15:45 Monique Ouassa-Kouaro (Benin) - *L'accès à l'énergie électrique et amélioration des conditions de vie des ménages : enjeu majeur et défi pour le développement durable au Bénin* (P)
- 15:45-16:00 Bob van der Zwaan (The Netherlands) - *An Integrated Assessment of Pathways for Low-Carbon Development in Africa* (V)
- 16:00-16:15 Satyanarayana Narra (Germany) - *Flexibilization of the sustainable energy supply in Ghana: a contribution by waste to electricity conversion* (P)
- 16:15-16:30 Dimitrios Mentis (USA) - *Energy Access Explorer, a dynamic geospatial information system to connect SDG 7 and sustainable development outcomes* (V)
- 16:30-16:45 Monica Gullberg – *African energy demand – the key to innovation* (V)
- 16:45-17:00 Léonard Kabeya (RDC) - *Modèle simple d'accès à l'énergie verte consommable par les femmes en milieu rural face à la résilience au changement climatique en Afrique* (I)
- 17:00-17:15 Bonaventure Banza Wa Banza (DRC) - *Electrification des quartiers périphériques de Lubumbashi (RD Congo) par le biais des miniréseaux hybrides PV-Diesel* (V)
- 17:15-17:30 Q&A

19:00 - ...

CONFERENCE BANQUET
Infosec Convention Center, Rue 913
Central Terrace

Thursday 11 November 2021
Palais des Congrès de Cotonou, avenue de la Marina

2 parallel tracks of seminars;
each track = 4 sessions of 1h30 (2 before lunch and 2 after lunch)

Track 1: *Room Collines*

9:00 - session 1: Solar seminar

Coordinators: Léonide Sinsin (Benin), Bernard Mairy (Belgium)

11:00 session 2: Carnon Seminar

Coordinator: Joseph Essandoh-Yeddu

13:30 and 15:30 - sessions 3 and 4: financial seminars

Coordinator: Bernard Mairy (Belgium)

Moderator: Mireille Janssens (Belgium)

Each panelist is expected to attend the whole seminar and give a 10 min talk.

Axelle Bourreau (GDLuxembourg) - *EIB investing in Western & Central Africa for renewable energy* (V)

Natalia Svarinska (Belgium) - *Addressing the financing gap in access to renewable energy markets in Sud-Saharan Africa* (V)

Medjo Wafo (Côte d'Ivoire) - *PROPARCO : présentation et activités dans le domaine des énergies en Afrique de l'Ouest* (V)

Camille Fronville (Belgium) – *BIO Invest facts & figures* (V)

Mireille Janssens (Belgium) - *How can an Export Credit Agency provide financing for energy projects in Africa. The case of Credendo in Belgium* (V)

Alzouma Nouhou (Nigeria) - *L'initiative de l'Afrique sur les énergies renouvelables (AREI)* (V)

Glory Oguegbu (Nigeria) - *Investment that Works; A look at investing in the African Renewable Energy Industry; instruments and things to keep in Mind.* (V)

Track 2: *Room Atacora*

9:00 and 11:00 - sessions 1 and 2: nuclear seminar

Coordinators: Rajaâ Cherkaoui El Moursli (Morocco), Bernard Mairy (Belgium)

Moderator: Hamid Aït Abdelrahim

Each panelist is expected to attend the whole seminar and give a 10 min talk.

- Shaukat Abdulrazak (Kenya) - *IAEA's contribution to capacity building in Africa for sustainable nuclear energy solutions* (P)
- Marcellin Amoussou(Benin) - *Etat des lieux de la réglementation de l'utilisation des rayonnements ionisants au Bénin en 2021* (P)
- Khammar Mrabit (Morocco) - *The Moroccan experience* (V)
- Vincent Lukanda (RDC) – *A propos de l'Electronucléaire en Afrique* (V)
- Jan Bartak (France) - *Small Modular Reactors : Economics, Safety, Advantages and Challenges* (V)
- Anicet Toure (Mali) - *Small Modular Reactors : a tool to re-shape African energy ecosystems of tomorrow?* (V)
- Henri Zaccai (Belgium) - *Your road to nuclear: how to deploy your nuclear energy options?* (V)
- Pierre Kockerols (Belgium) - *Que faire des déchets du nucléaire. L'expérience et le savoir-faire européens en la matière* (V)
- Marc Deffrennes (Belgium) - *Africatom ? Lessons learned from Euratom to foster a successful African nuclear collaboration...* (V)

13:30 and 15:30 - sessions 3 and 4: experts 4 Africa seminar

Coordinators: Norbert Hounkonnou (Benin), Marc Lobelle (Belgium)

16:15 -17:00 **CLOSING SESSION**

Conclusions and future actions

Friday 12 November 2021

Visit of typical energy-related sites in the Cotonou area