

## Summary

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## FISUEL General information

### For consistent newsletters

Thank you to everyone who contributed to the richness of this newsletter.

As them, if you have topics that you would like to share with the recipients of the FISUEL newsletter, send us a page with photos to the e-mail address [fisuel@fisuel.com](mailto:fisuel@fisuel.com)

### Known dates today for Fisuel meetings in 2018

Africa, Asia / Pacific and Europe Working Groups (in progress)

The Board meeting in October / November (in progress)

The Newsletter is available on website [www.fisuel.org](http://www.fisuel.org)

### Reminder

- The address for any letter to Fisuel : Fisuel chez Promotelec, Tour Chantecoq, 5 rue Chantecoq, 92808 Puteaux Cedex, France
- The e-mail address to Mrs Annie Besançon: [fisuel@fisuel.org](mailto:fisuel@fisuel.org),
- Phone number : + 33 (0) 9 52 19 68 75
- Head office are 21 rue Ampère, Paris, 75017, France.



## Introduction by the President Mr Dominique DESMOULINS

Dear Directors, dear members and partners,

Our Federation organizes every year a one-week meeting (called GAM 2018 for this year) which took place in Abidjan, Cote d'Ivoire from April 30th to May 4th, 2018.

On May 2nd and 3rd, the meeting took place on Symposium focused on all topics that contribute to affordable, safe and sustainable access to electricity for all in complete safety, followed the next day May 4<sup>th</sup> by the inauguration of a security setting of twenty boxes in the market of Divo with the presence of the Minister of Economic Infrastructures and Mayor of Divo, Mr Amede Kouakou (former Vice-President of FISUEL).



On behalf of the Board of Fisuel and personally, I would like to thank:

- The Minister of Economic Infrastructures and Mayor of Divo for the excellent reception that was reserved, among others, as part of the inauguration of the project to secure part of the Divo market and the magnificent reception at the town hall we were the object of this memorable day.
- The organizing committee of the event, its President Mr Jean Claude Kouassi, his assistant Mr Mamadou Sylla, as well as the entire LBTP team, who contributed greatly to this success and unforgettable week.
- All the speakers at the symposium, for kindly agreeing to intervene
- Finally all the sponsors who gave their support for this week to succeed.

We were impressed by the quality and the seriousness of this event which showed us the value and the relevance of the actions carried out by Fisuel. We can only congratulate you all for this great initiative and look forward to seeing the efforts of each other to contribute to the promotion of electrical safety in this beautiful country of Cote d'Ivoire.

This great success, (as was the case in other countries in previous years), which we are proud to share with you, reinforces the pursuit of the goals set by our Federation. It reinforces also our determination to intensify ongoing and future actions to enable to ensure the safety of electricity users, in more countries. Concrete actions, such as securing the markets in Divo, which ended the week of Fisuel GAM in Abidjan, must be renewed. They give credibility to our approach.

In renewing our thanks, please accept each one of you, our kind regards and with the pleasure of seeing you again at GAM 2019 (information will be given later).

*Dominique Desmoulin. Président de FISUEL*

## Africa's Energy Surge – 20 December 2016

### Affordable and sustainable energy for all

The UN's plan for universal access to energy :

<https://www.seforall.org/content/africas-energy-surge>

Today 1.2 billion people around the world have no access to electricity, but a UN plan aims to fix that -- with clean and affordable energy -- by 2030 :

<https://edition.cnn.com/videos/world/2016/12/19/africas-energy-surge-kyte-int.cnn>

Source: CNN



# Mandatory control of conformity for indoor electrical installations before power on in Senegal since June 2017

In the face of the countless damage caused by electricity in Senegal (electrification, electrocution, fire and deterioration of domestic and industrial equipment), a draft decree requiring mandatory compliance control of electrical installations before powering was initiated by Ministries of Energy, Interior, Urbanism, Labor, Environment, Justice, Finance, ASN (Senegalese Association of Standardization) and PROQUELEC.

The development of this new text was made necessary by the fact that the interior electrical installations did not comply with the standards in force and were not subject to any regulation. There was a dangerous void. In addition, access to the profession of electrician is free and very permissive, and that it was not well organized.

Therefore, in order to give this control action all the weight and interest it deserves, it was considered useful to involve a decree making this conformity check compulsory.

To accept such an idea, benchmarks near the member structures of the FISUEL (International Federation for the Safety of Electricity Users) and a vast public awareness campaign in the direction of opinion has been conducted since 2015 to the present day.

There was general agreement that the opinion favorably received the idea that it was timely. This led the President of the Republic to sign on June 8, 2017 the decree under the number N ° 2017-1333, which now makes it mandatory in Senegal the conformity check of indoor electrical installations before being turned on by the distributor and the dealers energy.

## **20 years to obtain the signature of the decree**

The draft decree mandating the conformity check of indoor electrical installations before powering up by the distributor and energy concessionnaires dates back to the creation of the COSSUEL (Senegalese Committee for the Safety of Electricity Users) on 16 November 1996 by the founding members of PROQUELEC (Promotion of the Quality of Electrical Installations).

From 1996 to 2003 the draft decree was led by the late Doro SY general director of Proquelec under the regime of President Abdou DIOUF. Several actions have been taken with the competent authorities of the state but without significant progress from the institutional point of view.

From 2003 to 2013 the draft decree was led by the late Adiouma DIONE, General Manager of Proquelec and Vice President of FISUEL under the regime of President Abdoulaye WADE. Several actions were carried out with the competent authorities of the state with the signature of the report of presentation by the Minister of the Energy which made it possible to obtain the first observations of the Prime Minister. Unfortunately, before these observations are taken into account, the latter is no longer head of government and his Minister of Energy has been replaced as well. This has led to the resumption of the procedure with the new authorities.

Finally, from 2013 to 2017 the draft decree was led by Mr.El Hadji Malick DIALLO General Manager of Proquelec under President Macky SALL. Positive achievements were consolidated and reinforced by other benchmarking and awareness-raising activities of the various stakeholders until the decree was signed on 8 June 2017 by the Prime Minister and the President of the Republic of Senegal.

## **The different steps**

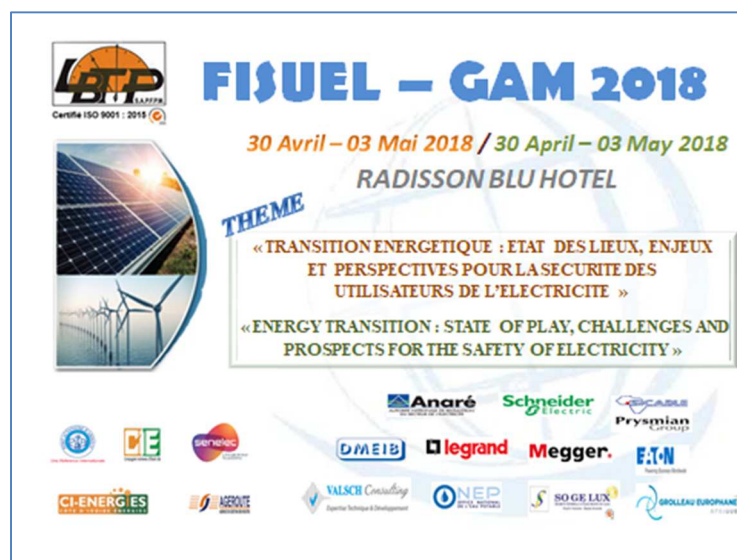
- Development of a draft decree based on existing decrees in other countries and taking into account our own realities
- Submit the draft decree to the Minister of Energy
- Organization of benchmark missions to structures that exist in other countries
- Sensitization of the different actors concerned by the safety of the users
- Sharing the draft decree by the Minister of Energy, consumer associations, control offices, ....
- Sharing the draft decree by the Minister of Energy with the CRSE (Electricity Sector Regulatory Commission)
- Transmission of the draft decree to the Secretary General of the Government
- Sharing of the draft decree by the secretary of the government with all relevant ministries and government advisers
- Passage in internal commission at the level of the prime minister
- Change to technical commission at the level of the prime minister
- Signature by the Prime Minister and the President of the Republic

*Mr. El Hadji Malick DIALLO, General Director of Proquelec*

## The week of the Fisuel GAM 2018 in Abidjan in Cote d'Ivoire

GAM 2018 (General Annual Meeting) took place between April 30 and May 4, 2018 in Cote d'Ivoire. It is the first one to include an event specific to the host country, (proposal of the President when he was appointed in May 2017), securing markets in Africa. Many thanks to the whole organizing team, representatives of Fisuel members, sponsors, speakers, interpreters, who made this week a great success.

***Note: This part of the Newsletter will be the subject of a specific News this summer***



The official opening was made on Monday, April 30, in the presence of the Chief of Staff of the Minister of Economic Infrastructure Mr Amede Kouakou (former Vice President of our Federation Fisuel) and the Deputy Director of the Minister of Energy.

The 3 working groups, Europe / Middle East, Africa and Asia / Pacific met on Tuesday 1st May. Many non-Fisuel experts contributed greatly to the work of Africa WG (ACAVIE Mali, LNBTP Togo and DIAKELEC Guinée Conakry). They will certainly continue to participate and appreciate the added value.

The symposium on May 2nd and 3rd hosted a gathering of nearly 250 people every day.

We had 48 presentations with 38 speakers from 15 countries.

The aim of the symposium was to share all the initiatives within the chosen theme (see above) and Fisuel's vision (affordable, sustainable and safe access to electricity for all users in complete safety). All countries have their own history in terms of electrical safety, statistics, models and many other topics. This is the richness of these meetings. The synergy is strong. In Cote d'Ivoire, it was once again a strong momentum, through the diversification of speakers, the topics discussed, testimonies from different countries, methods, examples, etc.

In 2017, the Board decided to open the Fisuel website ([www.fisuel.org](http://www.fisuel.org)) to the public. What offers since the creation of Fisuel to 2018, a library of nearly 600 documents accessible to all, on any subject related to electrical safety, classified by events or themes and from 45 countries. They are supplemented by more than 60 newsletters such as this one.

The first day of this symposium was opened by a session devoted to a broad review of several statistics and the work that Fisuel is doing.

The statistics make it possible to make a good state of the situation, to show the axes of improvement and to measure the progress made

- The World Safety Barometer, a joint work by FISUEL and the European Copper Institute, provides an overview of safety in the world. Let us recall here that the collaboration of all the members of Fisuel is the key to realize a unique coverage of the situation of the countries.
- A new model and data for Africa was presented by Benoit Dome, recalling that this is the first attempt and that all the constructive remarks will be welcome to improve it

The second session was devoted to "electrical safety".

The key point focused on the interest of developing a "national electricity code" in all countries. This one has the following goals:

- Provide basic rules for all stakeholders to build a safe, efficient and reliable electricity network
- Reduce and control power consumption
- Improve the level of security
- Finance Renewable Energy and Energy Efficiency initiatives
- Mandate the use of recognized standards to assess the compliance of the network, installation and products.

In addition to having all the stakeholders involved in the construction of this Code, it is essential to also develop training, information and awareness actions around it.

The third session of the day, allowed presenting the project of "Safer Marketplace" in Cote d'Ivoire.

The main goal of this project is to secure the marketplaces, eliminating the risk of fire, reducing financial fraud and increasing the quality of energy supplied.

The key point to remember is that there is no ONE solution. Best practices should be harmonized by guidelines, but each market in each country has a specific configuration and use that must be assessed individually.

Again, user awareness and training of major electricians must be developed.

The fourth session of the day was an opportunity to highlight the threat of counterfeiting and non-compliant products. This issue is critical in some African countries.

Some solutions exist to increase the level of fight against these unscrupulous operators, but they need dedicated resources (human and financial), a strong relationship with the authorities and the body of legislation.

The end of this huge first day, offered the opportunity to some members to share their testimonies with all the public present.

On the 2nd day, the symposium is opened with the sixth session which is related to the access to electricity whose presentations were structured in 2 major points:

- From emergency to reconstruction, with the example of Haiti
- Access to clean, reliable and affordable energy developed as follows:
  - the 4-point approach for access to electricity in West Africa
  - for sustainable projects and the development of rural electrification

Session 7, directly related to the GAM theme, "Energy Transition / Renewable Energy", gave us mainly testimonies from Cote d'Ivoire, Senegal and Benin on:

- local development and the draft national energy transition policy
- renewable energy in the energy mix
- safety aspects, normative and regulatory requirements and equipment quality

The resolutions drawn from this symposium, consistent with those given in previous years, can be summarized as follows:

- Consolidate the coherent and shared statistics in order to allow the authorities to direct the regulations
- strengthen market surveillance for the safety of electricity users with compliant products
- for the electrical installations of the markets in Africa, to work in the direction of securing which several countries can serve as an example, to establish a mode of payment, to set up a local governance, and to ensure an electrical installation of sustainable security
- finally continue to share all local experiences including those related to energy transitions

The last day, May 4, is the inauguration of a safety bet of twenty boxes in the market of Divo in the presence of the Minister of Economic Infrastructure and Mayor of Divo, Mr Amede Kouakou (former Vice -President of the FISUEL). After a reception at the town hall, it was the official launch and secured light for these boxes in the center of the market very applauded and especially highly anticipated by the owners or not, present in the market.

**Note: All the presentations of Abidjan GAM are available and accessible by everyone, on the website [www.fisuel.org](http://www.fisuel.org)**

Many media were present during this week of May (FISUEL GAM 2018) in Abidjan to report this event. Please find with the link below the video of the official Youtube channel of the RTI Group of Cote d'Ivoire.

[https://www.youtube.com/watch?reload=9&v=3C6jCy2p\\_rl](https://www.youtube.com/watch?reload=9&v=3C6jCy2p_rl)

Here is also the video made by Konsuil during the GAM 2017 which took place in May 2017 in Indonesia.

<http://www.konsuil.or.id/id/category-blog/item/595-video-kegiatan-gala-dinner-sightseeing-tour-fisuel-gam-2017.html>

*Patrick Aubelis – DG of Fisuel*

# World Electrical Safety Barometer Non-Residential

World Safety Barometer ( <http://www.safetybarometer.org/> )

Continuation of the Newsletter of February 2018 which presented the "World Safety Barometer Residential" taken over by FISUEL in 2016 and integrated into its website (<http://www.fisuel.org/>), here is information on the "World Safety Project Non-Residential Barometer".

Remember that for the Residential, 13 criteria were defined to characterize the level of electrical safety.

After the success of the Residential Barometer, the Board of the FISUEL has decided to extend it to the Non-Residential sector.

This extension is based on the selection of the buildings types and on a new list of criteria.

The list of buildings is based on the destination. The experts have defined more than 30 types of building, some classical like school, hospital and some more recent corresponding to the evolution of the construction like EOP (establishment open to the public) and HRB (high rise building).

For the criteria, 4 main concepts were defined, design of installation (30%) control of the installation (30%), safety of the components in installation (30%) and risks prevention (10%). Each category is subdivided and weighed (with a total of 1000).



For the design of installation		Weight on 1000	Example: Yes / No
30%	National installation standard in line with the last edition of IEC/HD 60364 or NEMA	90	90
	Protection against electrical shocks (presence of PE conductor, use one of the safety measures for the electrical shocks, use 30mA RCDs for circuits supplying sockets-outlets)	45	45
	Protection against arcs and thermal effects (use of 300 mA RCDs, installation of arc fault detection devices, use of fire resistant cables for vital circuits, smoke extraction)	45	45
	Protection against overcurrent's by circuit-breakers or fuses in line with the characteristics of the conductors	45	0
	Protection against overvoltage's by surge protective devices	30	0
	Use of electrical components in compliance with their relevant standard and certified	45	0
For the control of installation			
30%	Initial inspection before commissioning and power	120	120
	Periodic inspection	120	0
	Infrared inspection	15	0
	Training and empowerment of the maintenance team	30	0
	Staff training	15	0
For the safety of components in installation			
30%	Counterfeiting/non-compliant products	30	0
	Association to fight against counterfeiting/non-compliant products	60	0
	Check compliance during inspections	45	0
	Access to technical records by inspectors	45	0
	Responsible for the import of non-compliant product	30	0
	Components with third party certification or comply to conformity mark	90	0
For the risks prevention			
10%	Role of insurance	25	25
	Fire data collection	25	25
	Inspection reports collection	25	0
	Risk management plan	25	0
Total		1000	350/1000

The criteria as well as the list of building were approved by the experts of the 3 FISUEL Working Groups.

The update of the Web site "WSB non-residential" is in progress for end of 2019.

Each country is invited to begin, to launch the reflexion on this subject.

Fisuel is ready to help you.

Benoit Dôme – Consultant of Fisuel



## India : Solar DC\* systems towards impacting Billion lives

*“Innovative Direct-Current Microgrids to Solve India’s Power Woes - Solar DC microgrids could do for electrification what mobile phones did for telephony.”*

In April 2018, the Prime Minister of India announced that each of the 650,000 villages in India has now been electrified. The program to provide electricity to the village-homes has been going on for more than a decade. It took time to take grid to majority of the villages. But some 5% of the villages were in so far remote and far-flung areas, that taking the power-grid to these villages in deserts, on mountains and in difficult terrains was not considered feasible. In fact putting a micro-grid was also very difficult. It was therefore decided to provide electricity to individual homes in these off-grid villages using roof-top solar. There were early attempts made to use conventional roof-top solar systems with a battery to provide AC power in homes for light, fans, cell-phone charging and televisions. If and when the grid (or microgrid) was to be available, the systems would be connected to it. However, these systems were expensive, large and difficult to be carried to each home (as most of these villages did not have a motorable road).

On careful examination, it was found that the energy demand in these rural households was low, with most of these homes consuming less than 1 kWh per day. But the conventional roof-top solar systems had about 50% losses, requiring the solar panel to be about 500W to 800W. Battery was similarly large. The problem was number of conversions involved at various stages in the system. Solar panel produces DC power. Battery takes in and gives out only DC power. But the load and the grid were AC\*. Solar power therefore had to be converted to AC and combined with grid-power, and then again converted to DC power to charge battery. The output of the battery was needed to be converted back to AC to power the load. This triple conversion gave rise to about 50% losses overall, especially when the power-level used was low, as discussed in the article, “Solar-DC Microgrid for Indian Homes, IEEE Electrification magazine, June 2016<sup>1</sup>.

It was further recognised that load itself in homes were increasingly becoming DC. LED lights, requiring DC power, consumed a fraction of power of that by conventional AC-powered CFL lights. Similarly, the conventional AC-motor based ceiling fans consumed 72 Watts, whereas new DC-powered BLDC fans consumed only 30 Watts. Cell-phones, TVs and all electronics need only DC power. So, when AC power-line was used at homes, each of these appliances would require an AC to DC converter, adding to the losses.

IIT Madras, India therefore came up with a concept of solar-DC system, a DC-based distributed solar power solution which could be scaled to even the most remote corners of the country. Here, not only do solar-panel and battery use DC power, but the power-line at home is also DC and each appliance uses DC power. The only conversion required is for the AC-grid, when available. This had two major impacts. Firstly, the energy requirement in each home due to use of more energy-efficient DC-appliances, came down to 500 Wh. Secondly, the losses in the system were now about 7%. It was found that 125 Wp\* to 200 Wp solar-panel (depending upon the number of sun-hours) was now adequate for a home. One kWh Li-Ion battery back-up was adequate in most conditions. As a result, the solar systems became relatively inexpensive, costing about \$400, including solar panels, the system controller unit (called Inverterless-500), battery, fans, lights and cell-phone charger. Additionally, the size and weight of the overall system has reduced considerably. Consequently, the systems became amenable to be carried even in the most difficult terrains and have been used to provide power in around 25000 homes of Assam, Manipur, Jammu & Kashmir, Meghalaya, Rajasthan and Madhya Pradesh in India.

Yet, transportation and deployment was not easy. Deserts of Rajasthan had scattered homes and material had to be carried on camel’s back. North-eastern states like Assam, Meghalaya and Manipur have Himalayan mountain terrain and large rivers. Roads in almost all these places were untarred mud roads unfit to travel, especially during rains. Some of villages were even fluvial in the rivers only accessible via boats. Most material, therefore, had to be carried on foot, bullock-carts, 4X4 off-road vehicles and boats as captured in figures 1, 2 and 3. In fact, in Jammu & Kashmir, one also needed to cross mountain-passes which are closed for some eight months a year mainly due to snow cover. Very often, the material had to be lifted by helicopters as shown in figure-4.



<sup>1</sup> A. Jhunjhunwala, A. Lolla and P. Kaur, "Solar-dc Microgrid for Indian Homes," *IEEE Electrification Magazine*, vol. 4, no. 2, pp. 10-19, 2016

*Figure 1: Non-motorable roads have been typical in rural Manipur, Meghalaya and Assam*

*Figure 2: The last-mile transportation in Manipur in challenging mountainous terrain*

*Figure 3: Boat being loaded to transport material to the village of Kaladia in Assam*

*Figure 4: Material being loaded and carried in helicopters to remote Jammu & Kashmir villages*

Moreover, the terrains also make it difficult to maintain the systems. While the solar-DC systems have a built-in GPRS<sup>2</sup>, so that they can be monitored remotely, many of the villages do not have mobile-connectivity. So the system is also designed for monitoring using blue-tooth. Even when village does not have mobile-connectivity, some people have mobiles as they travel. Blue-tooth in mobiles can be used to upload data from the solar-DC system and relayed to the server when the mobile is in the region with connectivity.

Figure-5 shows Photographs of solar-DC systems deployed in different regions of India which were previously off-grid.



*Figure 5: Solar-DC technology is conquering the terrain challenges and powering off-grid homes in the most remote areas of India*

The reward for the innovative technology and overcoming the difficulty of transportation in tough terrains is, however, enormous as the people in these homes are using lights and fans for the first time in their lives. The joy due to increased access to simple electricity services is quite profound as electricity becomes a step towards changing their lives.

*\*DC : Direct Current – AC : Alternative Current – Wp : Watt peak*

*Source: Ashok Jhunjunwala, Prabhjot Kaur and Aditya Lolla, IIT Madras - India*



## Visit of Kesco in Consuel (France)

On October 26, 2017, under the auspices of Fisuel, Consuel hosted two officials from KESCO (Korean Electrical Safety Corporation). Founded in 1974, KESCO is in charge of South Korea, promoting electrical safety, plant verification, accident prevention and technological development and innovation. This meeting allowed the two member organizations of FISUEL to get to know each other better. The exchanges made it possible to identify the roles and responsibilities of each in their respective countries and environment, and an effective sharing of experiences. For Consuel, beyond the electrical installations in new residential buildings and the various types of certificates of conformity, it was an opportunity to discuss the provisions recently entered into force in France in case of sale or lease of 'housing for the diagnosis of domestic electrical installations over 15 years old.

Consuel also responded to a detailed technical questionnaire submitted by KESCO on the administrative authorities in charge of electrical safety in France, and on the regulatory and normative provisions governing the implementation and verification of the different types of installations.

*Bruno Gendron - Consuel*



<sup>2</sup> GPRS = General Packet Radio Service