QUESTIONS TO THE PUBLIC MINISTRY, POWER UTILITIES, ABNT, ANEEL & CITY HALL ABOUT PLACING A HV TRANSFORMER + FUSES THAT COULD EXPLODE - IN FRONT OF A WINDOW WHERE CHILDREN LIVE?

ABNT NBR 15688 standard needs to change and increase distances from 1.5m to 7+ meters.

YouTube video with TV reports about dangerous accidents https://youtu.be/dra1zBg9OuE

- ARTICLE in English: https://www.cognitor.com.br/FusesInTheWindows.pdf
- ARTGO em Portugues: https://www.cognitor.com.br/FusiveisPerigososNasJanelas.pdf

1. ABOUT PROXIMITY RISKS, POWER UTILITIES' VISION AND HOW ANEEL, the regulatory agency, COULD HELP BY GIVING MORE ATTENTION VIA R&D PROGRAM (Law No. 9,991)

It is very dangerous to have a 13.8 kV cable in front of the window, 2 or 3 meters away from your children. Unfortunately, overhead networks with bare conductors are common in developing countries like Brazil. The video in the YouTube link above clearly shows the risks of transformer explosions. The complete videos from which I took the scenes are in the links to the reports at the end. I edited the video myself.

The objective of the article is to alert the general public and authorities about the risks of placing transformers, fuses and high voltage cables from distribution networks close to building facades and windows. They are extremely dangerous and deadly in the event of an explosion or close contact.

I worked 25 years doing tests in CEPEL's testing laboratories and was the general manager of the labs. I've seen a lot of equipment explode under short circuits. In my understanding, if an electric utility company places a distribution transformer in front of a window, as in the photo and video above, it is taking the risk of killing someone, even if ABNT Standard NBR15688 does not cover the subject, as it should. I asked ABNT to review this standard and the matter is being analysed by the power utilities (who prepare the standard). From everyday experience, they know the consequences of a transformer explosion. I witnessed, around 2002, in the context of a court case requesting the relocation of a transformer, a test causing an explosion to see the extent of the burning oil. The oil was more than 5 meters away. The testing laboratory possibly has a full report. More details in Section 3. I initially consulted the Public Ministry of Rio de Janeiro (MPRJ) and am awaiting a response.

My initial goal was just to resolve my case and I sent a request to the power company. I started investigating more details after receiving a response from the energy company that it follows the requirements of Standard ABNT NBR15688. I soon realized that that standard does not apply to distances from transformers to facades and windows. It should be applied so as not to induce to risky situations. The standard was created only by electricity companies and does not have the perspective of the lay citizen subjected to risks.

After this first analysis, I concluded that I would be remiss as a citizen if I did not draw public attention to the issue, which affects many families in Brazil. Many Brazilian energy distributors cause risky situations like these because in urban areas they use the ABNT NBR 15688 standard.

These aerial networks, with their transformers and expulsion-type fuses, appeared about 100 years ago, for use in sparsely populated areas and at a great distance from people. However, cities grew, many in a disorderly manner. The buildings were getting closer to the networks. The city of Rio de Janeiro is a clear example. City Hall lost control of the situation and the aesthetics of favelas became the rule rather than the exception. Since the end of the 1980s, instead of seeking the intelligent reduction of favelas, politicians in Rio de Janeiro have chosen to let them grow. It gives more votes and time has already shown the size of the error.

In Rio, the much better and safer underground networks are only used in parts of rich areas in the South Zone and Barra da Tijuca. The other payers of high and misused taxes live with abandoned cables hanging in the streets, left by telephone, cable TV, internet, etc. companies. It's a shame. See photo above right. It is an area with high IPTU taxes Rio, with so many problems such as violence, corruption, cable theft and lack of planning, problems such as transformers close to windows remain in the background.

Another example, Ilha do Governador, where I live, has been experiencing almost daily blackouts lasting hours since the beginning of January 2024. Typical case of lack of maintenance planning on the part of the electricity company. I never saw ANEEL, the electricity regulation agency, come forward to comment. After the wave passes, the financial losses of commerce, industries and consumers in general will remain, as always, with consumers. Possibly the high fines applied to the power utility will end up not being paid.

As underground networks will not be built outside of rich areas in the next ten years, we need, in addition to increasing the minimum distances allowed in the technical standard, to encourage innovations to reduce the risks of proximity to transformers and fuse switches (IEC 60282-2 + ABNT NBR 7282).

Creators of innovations for the electrical sector have a huge global market in countries such as Brazil, Latin America, Africa, and Asia and even in parts of the developed USA. Examples of welcome innovations are:
• SELF-PROTECTED TRANSFORMERS with quick fuse replacement;
• LOW-COST NON-EXPLOSIVE FUSES for use in existing fuse switch bases.

Taking care of the risks associated with electrical networks is one of ANEEL's responsibilities. This subject could easily be included by the regulatory body in its list of desirable projects under the R&D program (Law No. 9,991) for power utilities. Electricity companies should not be expected to take this initiative. They defend the idea that existing aerial systems are much cheaper than underground systems.

The second objective of this article is to list evidence that can be used in legal cases, in the case of unfulfilled requests similar to the one I made to Light Serviços de Eletricidade and ANEEL. What I write here can be easily proven in forensic tests. I think that the catalyst for the emergence of these innovations will be the increase in the number of legal actions for the relocation of transformers, when the concessionaire does not respond to requests spontaneously, like in my case.

This will happen even if the technical standard ABNT NBR15688 takes time to be changed. One idea would be to change the standard to specify, in new installations , greater distances and give a period of, say, 10 years to replace existing parts that do not meet the distances.

I learned that when we send a transformer relocation request to the power utility there is an inversion of values. The company responds as if it were doing the customer a favour and makes a series of demands. It appears to be a tactic to discourage customers and make them give up their demand. The request to remove the transformers cannot be confused with a request for a new connection in the consumer's interest. It is something that, unfortunately, the consumer is forced to do, to avoid dangers caused by the electricity company.

What initially motivated me to write this article is that my relatives went to live in the apartment in the photos above, which show the transformer and the fuse about 2,2 m from the window of a room with children. As I describe in the video, even when operating correctly, expulsion fuses emit dangerous sparks and hot gases. Australian standards have requirements about this but the Brazilian ones not. When they fail, it is common for the transformer to explode, and this can kill people nearby. Watch the video again, imagining if it was someone in your family.

If you have a situation like this close to your family, take it seriously and complain immediately. It's more or less like a stray bullet in the routine shootings in Rio de Janeiro. We think it will never happen to us until it does .

I made requests on the Light and Aneel websites (protocol numbers below) The power utility response shows a mistaken assessment. It informs that the distance of 2.20 m is sufficient and based on ABNT NBR 15688 and internal regulations. The mistake is that the standard does not deal with distances from transformers to facades. It only deals (and poorly) with distances from cables to facades.

In any case, the answer was useful to understand that the ABNT NBR 15688 standard leads to risk situations and therefore must be improved immediately. ANEEL, as has become common in regulatory agencies, after the artificial intelligence robots, limited itself to passing on the electricity company response without getting involved. Disappointing not being able to even talk to a human. At the water company and its regulatory agency is the same.

2. ABOUT ABNT AND IEC TECHNICAL STANDARDS THAT DEAL WITH DISTANCES TO BUILDINGS

I have experience in the drastic consequences of equipment explosions, after 45+ years of testing transformers and many other substations equipment in addition to designing many types of products. I have in-depth knowledge of ABNT and IEC technical standards and helped in the preparation of several of them, such as NBR 7282, IEC62271-307 and IEC 60282-2, when I chaired Technical Committee 32 (FUSES) of the IEC – International Electrotechnical Commission.

When the power utility Light informed that the distance of 2.20 m is sufficient and based on ABNT NBR 15688 and an internal regulation, I understood the root of the problem. It is an error of interpretation because the standard does not deal with distances from transformers to facades. It only deals (and poorly) with distances from cables to facades.

This standard ABNT NBR 15688 - Aerial electrical energy distribution networks with bare conductors" is used to define small distances that do not consider oil transformers and expulsion fuses that may explode. In the oil case, the distances need to be much greater, as in the ABNT NBR 13231 standard - Fire protection in electrical substations. Check with the Fire Department.

ABNT NBR 15688 only deals with distances from cables to facades. Use short distances as if the consumer were an expert on the dangers of electrical substations	**ABNT NBR 13231 - Fire protection in electrical substations.** This standard deals with the distances to buildings from equipment that contains oil, such as transformers
This standard, contrary to what happens in the vast majority of ABNT standards on electrical networks and substations, does not reference or mention a relevant international IEC standard. So, the question is, where did the distances in this table come from, which were clearly made with cables in mind? What is the basis? Why don't the standard mention distances to transformers?	This table is originated in IEC 61936 – "Power Installations exceeding 1 kV AC and 1.5 kV DC - Part 1: AC". ..... Clearly recognizes the dangers and defines distances from oil transformers to the building depending on the volume. As was done for substations, the distances to homes and buildings should be greater as they are lay users of electricity.

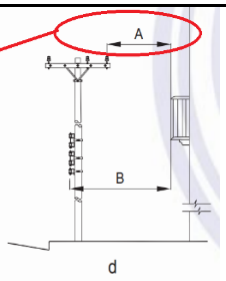
ABNT NBR 15688:2012

Afastamentos mínimos

mm

Figura	Primário				Somente secundário	
	15 kV		36,2 kV			
	A	C	A	C	B	D
a	1 000	3 000	1 200	3 200	500	2 500
b	-	1 000	-	1 200	-	500
c	-	3 000	-	3 200	-	2 500
d	1 500	-	1 700	-	1 200	-
e	1 000	-	1 200	-	1 000	-
f	1 000	-	1 200	-	1 000	-
g	1 500	-	1 700	-	1 200	-

A norma é falha quando não cobre as distancia entre transformadores e fachadas ou janelas. Cobre apenas (e mal) a distancia de cabos a fachadas.



d

Afastamento horizontal entre os condutores e o piso da sacada, terraço e janela das edificações

TABELA 2 – DISTÂNCIAS MÍNIMAS DE SEPARAÇÃO ENTRE TRANSFORMADORES E REATORES A EDIFICAÇÕES

Tipo do líquido isolante do transformador	Volume de líquido isolante	Distância horizontal			Distância vertical
		Edificações resistentes ao fogo por 2 h	Edificações não combustíveis	Edificações combustíveis	
	L	m	m	m	m
Óleo mineral	< 2.000	1,5	4,6	7,6	7,6
	> 2.000 e < 20.000	4,6	7,6	15,2	15,2
	> 20.000	7,6	15,2	30,5	30,5
Fluido resistente ao fogo – Transformador sem proteção aprimorada	< 38.000	1,5	1,5	7,6	7,6
	> 38.000	4,6	4,6	15,2	15,2
Fluido resistente ao fogo – Transformador com proteção aprimorada	não se aplica	0,9	0,9	0,9	1,5

In December 2023, I sent a proposal to ABNT to review NBR 15688 in order to increase the distances. ABNT is analysing the problem. There were two meetings of that Commission in January 2024.

THE OBJECT OF MY REQUEST TO ABNT, THE BRAZILIAN STANDARDIZATION BODY INCLUDES:

a) Standard ABNT NBR 15688 needs to be immediately revised: because it specifies minimum distances from cables to facades and windows that are much lower than necessary to avoid dangers. The minimum distances for 13.8kV cables do not consider that those who will be close to the cable will be laypeople, including children, who could, for example, extend a fishing rod towards the cable. The small distances were made for qualified people in high voltage substations and not for children and laypeople. They possibly only considered aspects of dielectric discharges and, perhaps, the legislation that limits the intensity of electric and magnetic fields (ANEEL and international regulations).

b) NBR 15688 disregards the minimum distance to transformers that can explode and kill. These distances must be greater than 7 meters. NBR 15688 uses distances as small as 1.5 m. Check out the photos and text in the article and the ABNT NBR 13231 standard - Fire protection in electrical substations. This standard deals with the distances to buildings from equipment that contains oil, such as transformers.

Cell phone. 55-21-9 88874600
E-mail: sergiofeitozacosta@gmail.com Site: http://www.cognitor.com.br

c) NBR1568 does not present any international normative reference on distances. Where did the values in the distance table come from? Brazilian standards are generally based on IEC standards.

d) ABNT – ANEEL: NEUTRALITY IN PREPARING THE REVIEW: Only specialists from the electricity companies, who are possibly not interested in changes, participated in the meetings. Therefore, who will look at the interest of the layman who is in the window? ANEEL is perhaps the only one with the neutrality and technical competence to coordinate the revision. IEC and ABNT rules have usually considered the issue of neutrality. It is for this reason that, at least in the past, it was mandatory to include at the beginning of the minutes the Stakeholders: (1) Provider; (2) Customer/Supplier; (3) Technical/scientific support; (4) Governing Body. The meetings mentioned above had the participation of 100% providers (power utilities). I ask: does IEC or ABNT consider a meeting with 100% of a single interested party to be valid?

e) Question to be answered in WG work: What are the national and international standards that deal with minimum distances? Do you consider that the minimum distances for lay people should be greater than for qualified substation operators? Is there a comparative table of minimum distances for some countries?

f) Does the use of insufficient distances mean that risks are being taken, including those of death? If the technical standard has omissions because the knowledge available in the previous version was less, it must be revised. If knowledge has advanced and is now public knowledge, in the case of accidents who is held responsible if it is legally considered a culpable crime?

3. FINAL COMMENTS

Summarizing the above, the ideal solution, used in developed countries, is to use underground systems in densely populated urban areas. In Brazil, this is unlikely to happen in the next 10 years.

Therefore, technological innovations that can alleviate the problem are welcome. The most likely are.
- SELF-PROTECTED TRANSFORMERS with quick fuse replacement;
- LOW-COST NON-EXPLOSIVE FUSES for use in existing fuse bases.

ANEEL can boost the emergence of these innovations through its R&D program (Law nº 9,991)

The catalyst for the emergence of these innovations will be the increase in the number of lawsuits for the relocation of transformers, when the electricity company does not attend requests spontaneously. The risks to life are being widely publicized. You won't be able to escape your responsibilities by saying that you didn't know what could happen. In the event of a serious accident, in a situation like those in the photo and video, it may be treated as a culpable crime.

The ABNT NBR 15688 standard must be revised in the short term to increase the distances preferably based on international standards. The issue of cables, fuses and oil transformers must be clearly differentiated.

I suggest to ABNT that, at least in cases that may have greater repercussions, someone formally representing consumers participates in the work of the Study Committee. The code (Ref. [1]) even signals this, but it does not actually occur. This also happens at IEC. It is easy to predict the result of the review of the technical standard if 100% of the participants are experts from the electricity utilities. Most likely nothing will change.

Evidence and studies already carried out must be considered. An example is a legal case, I believe from 2002, in which I gave a technical opinion in response to a consumer who complained about a situation similar to mine. He requested the removal of a transformer near his window. At 69 years old, I don't remember the

details, but I believe it was in Leblon, an upscale neighbourhood in Rio de Janeiro. In the process, I recommended that a short-circuit test be carried out on a transformer in which the fuse failed, as happens due to aging or some abnormality.

The objective was to check the reach of the hot oil in the event of a transformer explosion. The test was carried out and I watched it in the CEPEL laboratory and what I predicted happened. The burning oil reached around 5 meters. If it were close to an open window and the fuse operated correctly, the sparks would reach the curtains and start a fire. If the fuse failed and the transformer exploded it could be fatal. I don't remember the process number, but it was in 2002 or 2003 including the tests. I believe the law firm was called Mazzillo. In this JusBrasil link you can start a search with the keywords “explosion transformer fuses oil risks” or “transformer + proximity + explosion”.
https://www.jusbrasil.com.br/jurisprudencia/busca?q=transformador+proximidade+explos%C3%A3o

I sent to experts from Cigré International the suggestion to include in future work the topic “DANGEROUS DISTANCES BETWEEN 13.8KV CABLES and TRANSFORMERS TO FACADES and WINDOWS OF BUILDINGS IN URBAN AREAS”

If you know of situations similar to the one in these photos, take a photo or video and send it to the email sergiofeitozacosta@gmail.com or comment on the post on my Linkedin linkedin.com/in/sergiofeitozacosta

---------- **END OF ARTICLE PREPARED BY SERGIO FEITOZA COSTA** ----------

AUTHOR ’s CURRICULUM:

- https://www.cognitor.com.br/Curriculum.html
- Things I helped to do: https://www.cognitor.com.br/HelpedToDo.pdf

BIBLIOGRAPHICAL REFERENCES AND COMPLETE VIDEOS USED TO ASSEMBLE THE COMPLETE VIDEO ABOVE

[1] Code of Conduct for Participation in Technical Standardization of the Brazilian Association of Technical Standards (ABNT)
https://www.abntonline.com.br/normalizacao/codigo_conduta.pdf

[2] Book TRANSMISSION AND DISTRIBUTION SUBSTATION EQUIPMENT (author Sergio Feitoza Costa)
Portuguese https://www.cognitor.com.br/Book_SE_SW_2013_POR.pdf
English https://www.cognitor.com.br/Book_SE_SW_2013_ENG.pdf

[3] Article in the Magazine “O Setor Eletrico” Edition 114 -2015. Page 46 “ASPECTS LINKED TO FIRE AND EXPLOSIONS IN TRANSFORMERS AND OTHER EQUIPMENT”.

[4] Article by Sergio feitoza Costa --- IEC 60282-2 - High-voltage fuses - Part 2: Expulsion Fuses *** Suggestions to SC32A for next revision . (Include a world comparison of prices & quality of distribution services)
https://www.cognitor.com.br/IEC602822sugestionstosc32afrombrazil.pdf

[5] Other Technical Articles by Sergio Feitoza Costa: https://www.cognitor.com.br/Downloads1.html

[6] Video prepared by Sergio based on the others below.

- English https://youtu.be/dra1zBg9OuE
- Portuguese: https://youtu.be/9fyUPAepuYM

[7] TV REPORT - Jornal do Almoço - SC- Celesc investiga causa de explosão de transformador em Blumenau - 21/03/2018 – GLOBOPLAY - https://globoplay.globo.com/v/6597978/

[8] TV REPORT Globo G1 – Santos e Região - Explosões em transformador que assusta moradores e os deixa sem luz no litoral de SP
https://g1.globo.com/sp/santos-regiao/noticia/2023/06/28/video-mostra-explosoes-em-transformador-assusta-moradores-e-os-deixa-sem-luz-no-litoral-de-sp.ghtml

[9] TV REPORT Globo G1 – Goiânia - Morador filma o momento em que proteção de transformador explode em rua de Goiânia;
https://g1.globo.com/go/goias/noticia/2022/01/28/morador-filma-o-momento-em-que-protecao-de-transformador-explode-em-rua-de-goiania-video.ghtml

[10] TV REPORT Campo Grande News - Transformador explode no Centro - CREDITO: CAMPO GRANDE NEWS
https://www.campograndenews.com.br/direto-das-ruas/video-mostra-momento-em-que-transformador-explode-no-centro

[11] TV REPORT – Santa Catarina - Programa SC no ar Transformador explode e deixa 6 mil casas sem luz em Coqueiros, na Capital
https://www.youtube.com/watch?v=OoDoNSRCVKQ

[12] TV REPORT – TV Record Goiás - SUSTO: VÍDEO MOSTRA EXPLOSÃO DE TRANSFORMADOR
https://www.youtube.com/watch?v=v250kXjAec0

[13] Outros - 50 TRANSFORMERS IN SEQUENCE
https://www.youtube.com/watch?v=ICL9gz1aYm8

[14] Livro “PROJETO SALVE O RIO EM 10 ANOS” : https://www.cognitor.com.br/projetosalveorio.html

[15] OS ENGENHEIROS CÓSMICOS NO PAÍS DA AMAZONIA:
https://www.cognitor.com.br/OsEngenheirosCosmicos.pdf

EM INGLES

[16] Book “Renewable Energy + Environmental Education to try to save the Planet. (About Energy Transition, H2 Green, Hydrogen and how to ride this wave)
https://www.cognitor.com.br/educationfortheplanet.pdf

[17] Book “Project Save Rio in 10 years “ https://www.cognitor.com.br/saverioENG.pdf
Book “The Cosmic Engineers in the Land of Amazonia”:
https://www.cognitor.com.br/TheCosmicEngineers.pdf

[18] Substations Equipment https://www.cognitor.com.br/Book_SE_SW_2013_ENG.pdf

[19] ABNT NBR 15688 - Aerial electrical energy distribution networks with bare conductors”

Protocolos Ouvidoria ANEEL

0104847132373 (02/11/2023) .....
0104826552306 (19/10/2023)
E-mail enviado ao gabinete do Diretor geral em 8/11/2023 gabinete.dg@aneel.gov.br

Protocolo Light Serviços de Eletricidade

1385537469 (resposta e-mail + PDF a Hugo em 27/10/2023

Light

HUGO CORDOVA COSTA
R CAMBAUBA 1581 AP 204
JARDIM GUANABARA
21940-001 RIO DE JANEIRO, RJ

Nossa Referência: 2335645867
Sua Referência:
Assunto: Resposta Ouvidoria

Data: 27.10.2023

Olá, Hugo!
Esperamos que esteja tudo bem com você.

Analisamos o seu pedido de nº1385537469 e esclarecemos que uma equipe técnica esteve no local indicado no dia 26.10.2023 e constatamos que a sua reclamação se refere a ZNA23108 que se encontra na Rua Monsenhor Magaldi, onde fizemos a medição da distância da chave-fusível do Trafo até a fachada do cliente. Ficou constatado que a rede, transformador e chave-fusível estão a mais de 2,20 mts (Dois metros e vinte centímetros) da fachada do cliente, estando de acordo com as normas previstas pela RECON MT e pela ABNT-15688 :2012.

Informamos que, e as informações levantadas foram passadas ao senhor Antônio que se apresentou como porteiro do edifício, e se comprometeu em repassar estas informações para você.

Agradecemos o seu contato com a nossa Ouvidoria. Estamos sempre dispostos a ouvir nossos clientes e a sua colaboração proporciona mais uma oportunidade de estreitar nosso relacionamento.

Se você ainda tiver dúvidas, entre em contato com os nossos canais de atendimento: Call Center 0800 284 0182 ou pela nossa Agência Virtual (agenciavirtual.light.com.br/portal/)

Caso discorde das medidas adotadas, você pode solicitar atendimento com a Aneel pelo telefone 167.

Abraços,

Equipe Ouvidoria
Light Serviços de Eletricidade S.A

EM PORTUGUES: ARTIGO:."PERGUNTA AO MINISTÉRIO PUBLICO, DISTRIBUIDORAS DE ENERGIA, ABNT, ANEEL E PREFEITURA --- .. COLOCAR TRANFORMADOR + FUSIVEIS QUE PODEM EXPLODIR, EM FRENTE A JANELA EM QUE HABITAM CRIANÇAS É CRIME CULPOSO ? ." Autor Sergio Feitoza Costa

Link: https://www.cognitor.com.br/FusiveisP...

Video :
https://www.youtube.com/watch?v=9fyUPAepuYM

IN ENGLISH: ARTICLE: " QUESTION TO THE PUBLIC MINISTRY, ENERGY DISTRIBUTORS, ABNT, ANEEL & CITY HALL--- IS IT A CRIME PLACING A TRANSFORMER + FUSES THAT COULD EXPLODE - IN FRONT OF A WINDOW WHERE CHILDREN LIVE? " Author Sergio Feitoza Costa

Link: https://www.cognitor.com.br/FusesInTh...

Video : https://www.youtube.com/watch?v=dra1zBg9OuE

Contato / Contact E-mail sergiofeitozacosta@gmail.com

LinkedIn: linkedin.com/in/sergiofeitozacosta

Site: https://www.cognitor.com.br/

SUGGESTION OF NEW WORK FOR CIGRE Study Committee XXXXXX

Prepared by Sergio Feitoza Costa on February 8 - 2024

PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

JWG [1]N° _xx.	**Name of Convenor:** Preferably an expert from B2 + IEC work **E-mail address**:
Strategic Directions	**Sustainable Development Goal**
The WG applies to distribution networks: ☒ Yes / ☐ No	
Potential Benefit of WG work	
Title of the Group: "DANGEROUS DISTANCES BETWEEN 13,8KV CABLES / TRANSFORMERS TO BUILDING FACADES AND WINDOWS in URBAN CIRCUITS"	

Scope, deliverables, and proposed time schedule of the WG:

Background:

Having a 13.8 kV cable right in front of and close to the window where laypeople are present is very dangerous. In developing countries, urban overhead lines near buildings are typical rather than an exception. The dangers of transformer explosions and expulsion fuses are clearly demonstrated in the video and article below. The proximity of residences is not well considered by IEC and national standards on urban lines. The dangers of internal arc overpressures so well addressed by IEC62271-200 have simply not been considered for distribution transformers in the streets. The distances to buildings do not consider the possibility of lay people, especially children, being close to the cable and extending objects towards it. Minimum distances only consider dielectric aspects and perhaps prevent magnetic and electric fields from exceeding legal limits. The Brazilian standard ABNT NBR 15688, "Aerial electrical energy distribution networks with bare conductors", serves as an illustration. It stipulates that 13.8kV cables must be kept at least 1.5 meters away from facades, while IEC 61936-1 specifies a minimum of 7.5 meters within a substation. Using such a small distance is taking the risk of killing. Cigré has the neutrality to study the subject and propose the improvement of these standards. A barrier for changes is that the citizen at the window does not participate in the preparation of standards drawn up by almost 100% of experts from power utilities, not interested in changes. Today, in Brazil, if you want to remove the transformer next to the window, you need to file a lawsuit.

Scope:

The objective of the WG work is to assess the existing standards and to propose suggestions to IEC, considering that that most national standards follow the same rules. The steps would be:

- Raise the history that led to the minimum distances that are used today within IEC and IEEE (consultations to experts and documentation). Identify similarities between the IEC61936 guide for values of outdoor transformers clearances.
- Survey the practices adopted all over the World that can bring evidence to propose raising the minimum distances (questionnaire & consultation with experts of IEC, IEEE, etc...)
- Survey of the existence or not of systematic problems like accidents with an association to the minimum distances practiced.
- Make a proposal for IEC and IEEE of new values of minimum distances from the aerial cables, distribution transformers and fuses, to building facades.
- As far as possible, make an economic comparison between the resources necessary to change distances in new installations and the use of underground networks.

Cell phone. 55-21-9 88874600
E-mail: sergiofeitozacosta@gmail.com Site: http://www.cognitor.com.br

- Identify potential technological innovations that can alleviate the problem like (a) self-protected transformers with quick fuse replacement and (b) low-cost current limiting fuses for use in existing expulsion type fuse bases.
- To write a brochure including the conclusions of the work. In the results, to indicate the positive and negative impacts of increasing the minimum distances.

Relevant literature:

Article by Eng. Sergio Feitoza Costa "About Placing A Hv Transformer + Fuses That Could Explode - In Front Of A Window Where Children Live? " : https://lnkd.in/dFnMt3SP

Video with the same title of the article by Eng. Sergio Feitoza Costa: https://lnkd.in/dvrUPAXt

A3 - Brochure Cigrè 602 (2014) - Tools for simulation of the internal arc effects in HV and MV switchgear
B3 – Brochure Cigrè 740 - Contemporary design of low-cost substations in developing countries.

Deliverables:

☒ Technical Brochure and Executive Summary in Electra
☒ Electra Report
☒ Future Connections
☐ CSE
☒ Tutorial
☒ Webinar

Time Schedule: start: XXXXXXXX **Final Report**: XXXXXXXX

Cell phone. 55-21-9 88874600
E-mail: sergiofeitozacosta@gmail.com Site: http://www.cognitor.com.br