

Electrical Engineering Faculties Testing Labs (Temperature Rise and Short Circuit tests)

Teaching future professionals in real tasks while getting resources to improve the courses.

By Sergio Feitoza Costa

<https://www.cognitor.com.br/FacultLabENG.pdf>



1. WHY PROVIDING LABORATORY SERVICES IS GOOD FOR ELECTRICAL ENGINEERING FACULTIES THAT ALREADY HAVE SOME INSTALLATIONS

I live in Brazil and have studied at great public schools my whole life. From basic courses to college and later a M.Sc. in electrical engineering. I see in many Electrical Engineering departments old laboratories that were once very useful and are now abandoned and almost unused. In fact, if Brazil had a history of giving value to Education, it would have been in the G7 a long time ago. I recently wrote an article about the lack of testing laboratories in South America and how this is making us to go back more than 30 years. The link is here <https://www.cognitor.com.br/hplENG.pdf>

The current lack of laboratories in the country, caused by a series of misguided decisions and the Brazilian lack of talent to keep useful things running, is an open door for some universities that already have basic laboratories to expand them and start providing professional services to the electrical industry. There are two or three of them in Brazil that are already ready to take a positive leap in this area.

However, they need to leave their comfort zone and fight with a more business-oriented vision. It is not the role of a university to have a business focus on external service provision activities. However, for those who have been unable to overcome difficulties for decades, combining academic activity with professional services would allow students to better understand what will come after they graduate.

It is worth the deans and directors to visit the Electrical Engineering faculties of T.U. Delft (Holland) and RVTH Aachen (Germany). They would better understand why the electrical industry in those countries has become so strong and why Brazil is increasingly far from the G7, instead of getting closer.

For Brazilian universities, besides doing themselves a favour, they would do a favour to the electric power industry, which now, as 30 years ago, is once again going abroad to do tests because it cannot do them here.

What I write here about universities also applies to large technical schools.

2. HOW TO DO IT?

The steps to follow are the following:

- a) UNDERSTANDING WHAT IS DOING PROFESSIONAL TESTS IN A UNIVERSITY: invite an expert to apply a training or course or workshop on “Professional Tests, R&D and potential innovations for the electric power-industry”. The target audience is the dean, directors, professors and students of the faculty of electrical engineering.
- b) ANALYSIS OF THE EXISTING LABORATORY INSTALLATIONS and BUDGET: do a professional analysis and assess the potential to expand or improve the installation to do professional tests for the power-industry. Elaborate a budget and a basic plan of work including the reasonable size of teams.
- c) ADMISTRATIVE ASPECTS: To define the forms of remuneration for work in laboratories considering also the awarding of credits.
- d) WORKSHOP TO MOTIVATE FUNDING: who has to gain from the provision of services by the laboratory of the faculty of electrical engineering
- e) IMPLEMENTATION OF THE NEW LABORATORY

3. IS IT POSSIBLE TO OUTSOURCE THE LAB SPACE AND EQUIPMENT AND KEEP REVENUES FOR THE UNIVERSITY WITHOUT HAVING TO OPERATE THE LAB?

Often, when I talk about testing labs to universities people, I hear people say that academia does not have the skills or time to manage labs. I would agree if it were a 2500 MVA lab. Projects of this size are for private businesses. No university in the developed countries did this successfully.

However, labs of the size of the ones at FURB (SC), IEE-USP (SP) or the small 10 MVA lab that existed at CEPEL, which I helped design, construct and operate, can work well in universities as a sustainable side service.

There is also an interesting possibility that is to outsource the university lab space, equipment, tasks of expansion and operation. The University could have an additional source of revenue without having to operate the facility itself.

I and some professionals I know would be candidates in the case of outsourcing like this.

And we would transform it into one of the best laboratories in the country.

REFERENCES

[0] Article: **THE LACK OF A MEDIUM / HIGH-POWER TESTING LABORATORY IS PUSHING THE BRAZILIAN ELECTRIC INDUSTRY BACK 35 YEARS.** <https://www.cognitor.com.br/hplENG.pdf>

[1] **CIGRÈ BROCHURE 602 (2014)** Tools for Simulation of The Effects of the Internal Arc in T&D Switchgear,

[2] **CIGRÈ BROCHURE 740 (2018)** Contemporary design of **low-cost** substations in developing countries.

[3] **CIGRÈ BROCHURE 830 (2021)** – “SIMULATIONS FOR TEMPERATURE RISE CALCULATION”. (Sergio Feitoza Costa is co-author)

[4] **An article explaining IEC62271-307 (2015)** about extension of the validity of type tests in IEC62271-200 switchgear to avoid tests repetitions. <https://www.cognitor.com.br/IEC62271307ENG.pdf>

[5] **Free book by Sergio “SWITCHGEAR, BUSWAYS & ISOLATORS & SUBSTATIONS & LINES EQUIPMENT”**
https://www.cognitor.com.br/Book_SE_SW_2013_ENG.pdf

[6] **A SUCCESSFUL LPC POWERCENTER SWITCHGEAR DEVELOPMENT – 6300A – 100kArms -690V** (by IEC 61439-1&2 plus internal arc test 100kArms + seismic tests) <https://www.cognitor.com.br/ArticleIcel.pdf>

[5] **IEC TR 60943:1998** - Guidance concerning the permissible temperature rise for parts of electrical equipment, in particular for terminals. Issued by IEC Technical Committee TC 32.

[6] **Article “TEMPERATURE RISE LIMITS OF IEC 61439-1** : unclear values distort the LV switchgear market. (May,12, 2023) - <http://www.cognitor.com.br/IEC614391Table6.pdf>

OTHER USEFUL REFERENCES

[6] **Article “METAL FOAM in SWITCHGEAR, switchboards & bus ducts**
<http://www.cognitor.com.br/switchgearmetalfoam.pdf>

[7] **ENVIRONMENTAL EFFICIENCY CERTIFICATE OF ELECTRICAL PRODUCTS (KG/MVA): TECHNICAL STANDARD & DEMO PROJECTS MANAGEMENT)**
<http://www.cognitor.com.br/demo1certificate.pdf>

[8] **SUBSTATIONS & LINES INNOVATIVE PRODUCTS. SMALL R&D CENTRES + TESTING LABORATORY**
<https://www.cognitor.com.br/demo2Lab.pdf>

[9] **ENVIRONMENTAL EFFICIENCY CERTIFICATE of electrical products (kg/MVA) . Draft of a technical standard**
<http://www.cognitor.com.br/EnvironmentalEfficiencyCertificate.pdf>

[11] **IMPROVEMENT OF QUALITY OF ELECTRIC SYSTEM INDEXES:**
<https://www.cognitor.com.br/IEC602822sugestionstosc32afrombrazil.pdf>

[12] **Free book by Sergio "RENEWABLE ENERGY + ENVIRONMENTAL EDUCATION TO TRY TO SAVE THE PLANET"**
<https://www.cognitor.com.br/educationfortheplanet.pdf>

[14] **Free book by Sergio” PROJECT SAVE RIO IN 10 YEARS:**
<https://www.cognitor.com.br/saverioENG.pdf>

[15] Visiting researcher training: <https://www.cognitor.com.br/trainingENG.pdf>

[16] Other reference articles free downloads <https://www.cognitor.com.br/Downloads1.html>

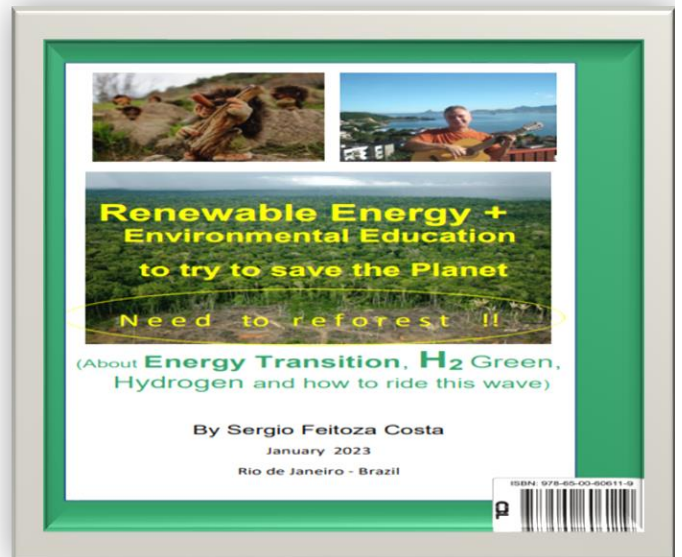
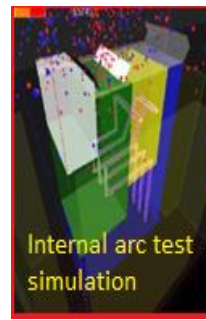
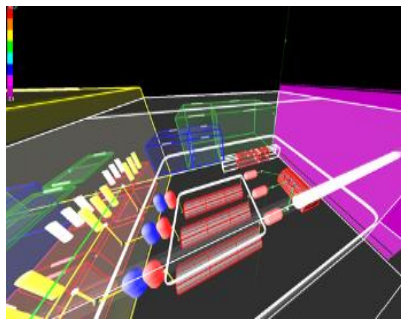
CV Sergio Feitoza Costa <https://www.cognitor.com.br/Curriculum.html>

Things Sergio helped to do <http://www.cognitor.com.br/HelpedToDo.pdf>

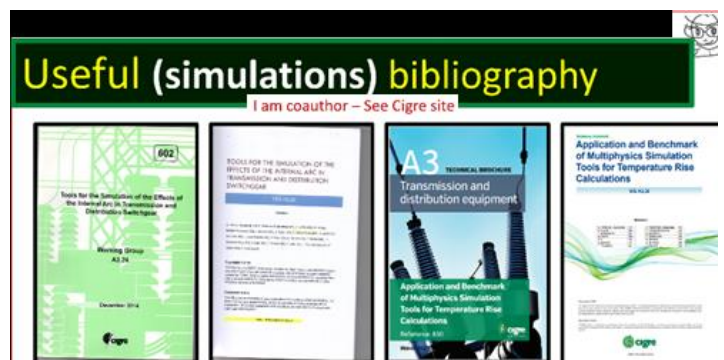
Site <https://www.cognitor.com.br>

Contact e-mail: write to sergiofeitozacosta@gmail.com


Linkedin profile (30K followers) : [linkedin.com/in/sergiofeitozacosta](https://www.linkedin.com/in/sergiofeitozacosta)



Será publicada em breve um livro ("Brochure City8) sobre o tema "Contemporary Solutions for Low-Cost Substations in Developing Countries". Sergio escreveu os textos INGLÊS dos capítulos "Equipment Selection" e "Training and Development"



SAVE RIO in 10 years (worldwide model PROJECT)
International monitoring *** 60% reforestation + 3 reference cities



Read it free

Please help to arrive to the leaders of G7.

Read in www.cognitor.com.br #sergiofeitozacosta



Reference text for the course

SWITCHGEAR, BUSWAYS & ISOLATORS
and
SUBSTATIONS AND LINES EQUIPMENT

Sergio Feitoza Costa



Sergio Feitoza, author of this article, helped to design, construct operate and to manage this set of 14 testing labs. including High-Power, High voltage, EMC, Ex, ...

