



# SweGRIDS

## CP 14: Tunnel Cable Project - TUCAB

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**Project funded by:**



**ELLEVIO**



**NKT**

# Purpose and motivation

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Tunnel cables are sometimes affected by failures.  
These failures tend to be catastrophic to their nature.



<https://pbs.twimg.com/media/C54tWL-WYAEhDYw.jpg>



<http://oregonstate.edu/dept/ncs/lifeatosu/wp-content/uploads/2010/12/fire.jpg>

# Purpose and motivation

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Reliable methods to detect deterioration are available,  
but they are not easily applicable in field conditions



[http://www.kinectrics.com/SiteCollectionImages/Solution-Profile-Photos/solutions\\_HighVoltageCableComm.jpg](http://www.kinectrics.com/SiteCollectionImages/Solution-Profile-Photos/solutions_HighVoltageCableComm.jpg)

# Develop an alternative diagnostic method

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The purpose is to develop a method which is applicable in field conditions

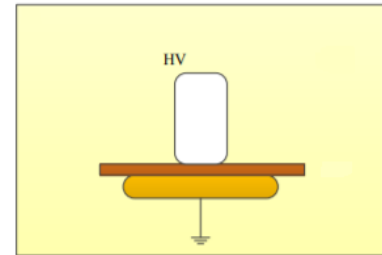
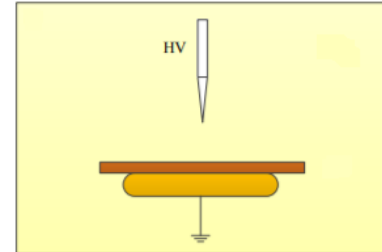
- on-line method
  - Simple
- Cost effective



**LET'S USE GAS ANALYSIS!**

# Creating a suitable model

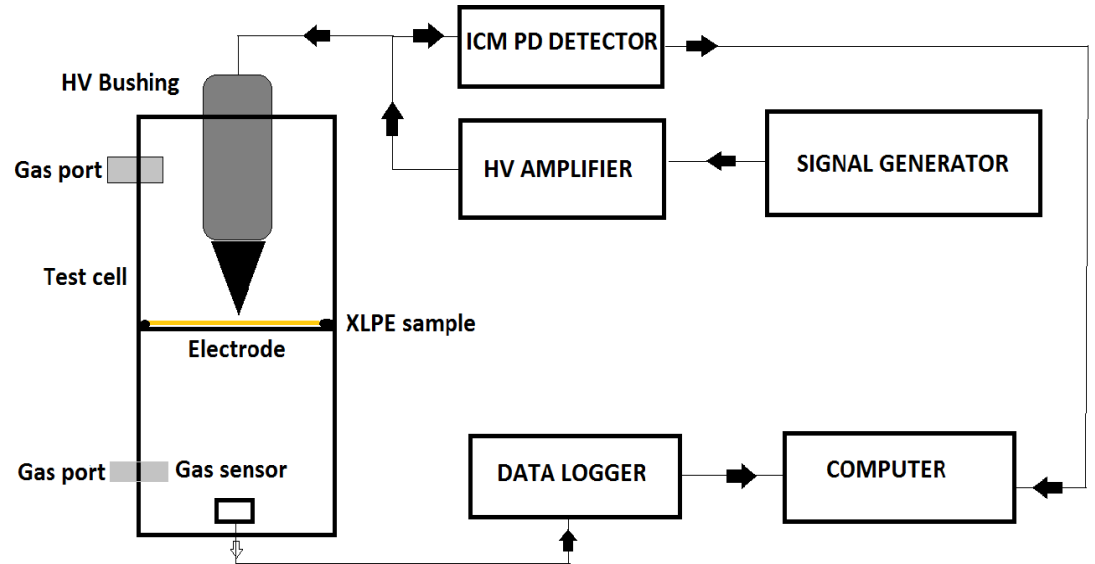
A suitable model where the desired properties of XLPE can be studied was developed



<https://lonheo.en.made-in-china.com/product/pqREsTWjHNAu/China-Hv-Power-Cable-High-Voltage-Power-Cable.html>

# Test setup for material properties testing

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# Latest results

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Long term measurements to evaluate system behaviour with XLPE samples

Questions requiring an answer:

- Is gas evolution caused by partial discharges in XLPE?
- What gases are emitted and in what quantities?
- How are the gases affected by voltage levels?
- Are the results reproducible?



# Latest results

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Long term measurements to evaluate system behaviour with XLPE samples

Conclusions so far from experiments:

- Gases are detectable and caused by discharge activity
- Amount of gas is proportional to discharge severity
- Gases are released when voltage is turned off. The reason for this needs to be investigated.



# What comes next

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Tests on real cable samples:

- Do they behave as the samples?
- Do they emit the same type of gases?
- Are the discharge types similar?





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Thank you for your  
attention!