

# CIGRE Study Committee A2

## Annual report 2021 for CIGRE Canada

November 12, 2021



**cigre**

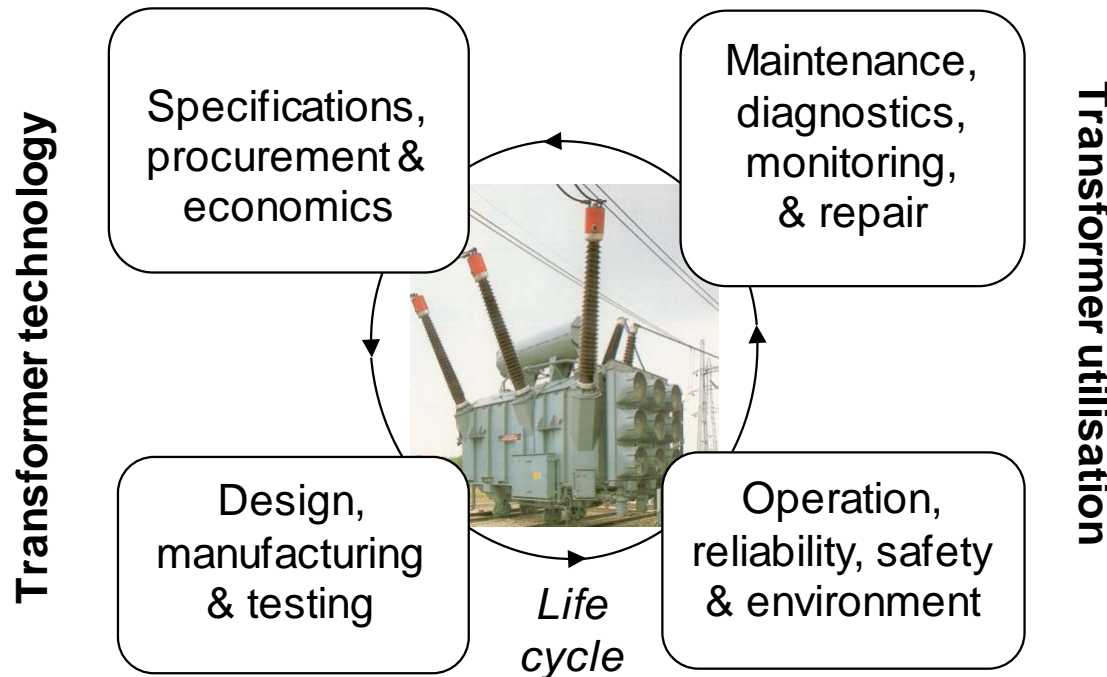
For power system expertise

Canadian Representative: Patrick Picher  
Presented by: Patrick Picher

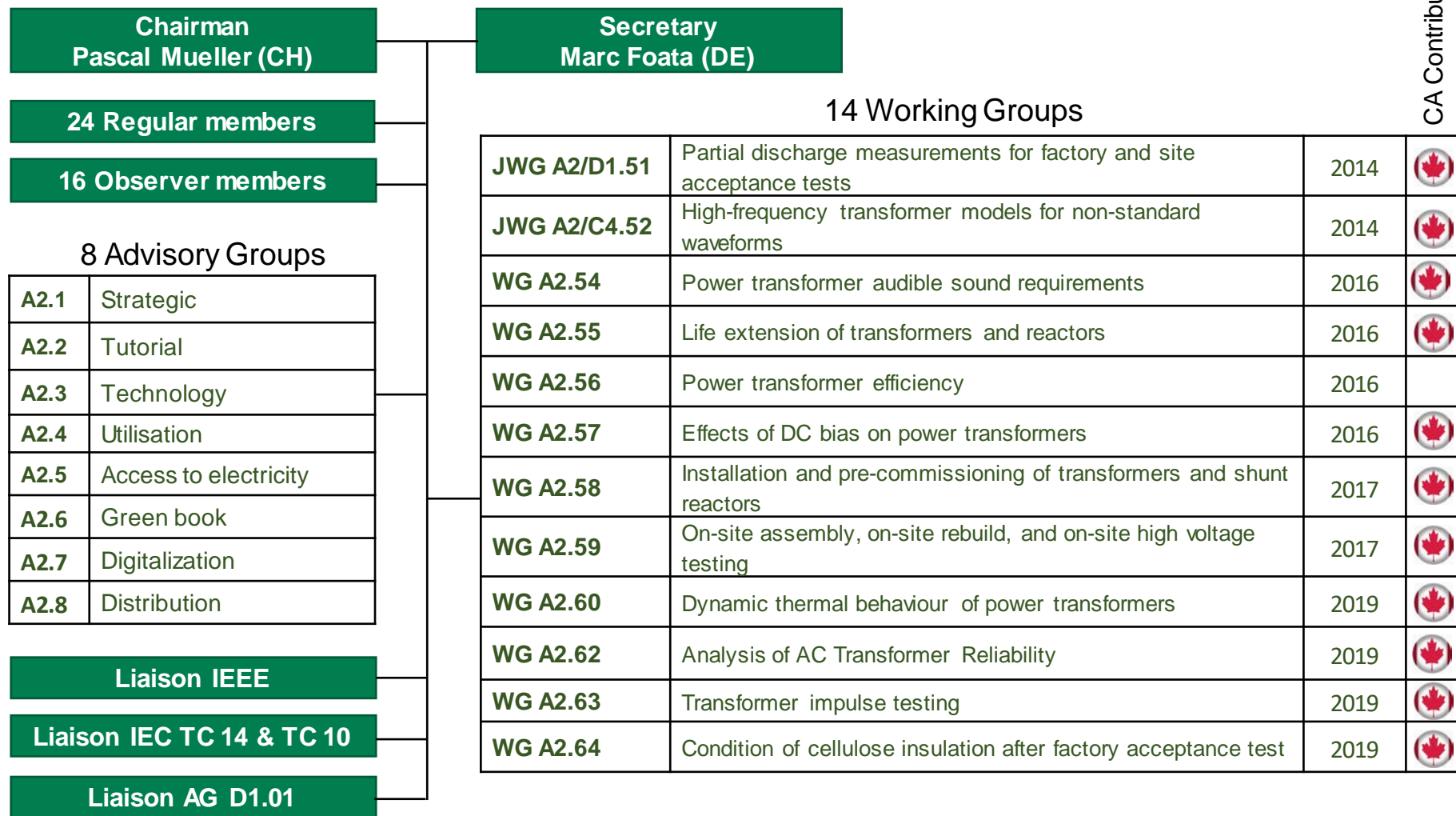
# Study Committee A2 – Transformers

## Scope

Design, construction, manufacture and operation for all kinds of power transformers, including industrial, DC converters and phase-shift transformers and for all types of reactors and transformer components (bushing, tap-changer...).



# Organization of SC A2



CA Contribution

# CIGRE A2 Canadian panel (mirror committee)

## Annual meeting report

- The panel is composed of 34 experts in all CA provinces, all the meetings of the past years were made by phone or virtual conferences (no in-person meeting yet)
- The 2021 annual meeting was held on October 29 with 15 participants attending
- Discussion points of the 2-hours meeting:
  - Presentation of the annual report and WG activities and progress: the canadian participants in the WGs are invited to speak about the the WG activities and possible issues and challenges.
  - We noted the interest to share more information within CA utilities regarding the NERC TPL-007 requirements for transformer thermal assessment during GIC.
  - Information and technical papers shared regarding new optical methods to assess transformer paper insulation degradation.

Virtual meeting 2021





# 2021 CIGRE Canada Conference (Oct. 25-28) Toronto

## A2-related papers

1. K. Kaineder, et al., “Innovative Resilient Transformers for Maximum Operating Flexibility” (Siemens Energy Austria, Con Edison NY USA, DuPont Poland)
2. Z.H. Draper, J.J. Dukarm, “Forecasting near-term failure of transformers using reliability statistics on dissolved gas analysis” (Delta-X Canada)
3. Y. Monteiro Rossini, “Transformers dynamic overload guide” (Siemens Energy, US)
4. C. Nybeck, M. Soller, “On-site partial discharge testing of transformers” (Megger US, Power diagnostix Systems)
5. S. Geoffroy-Gagon et al, “Inrush current analysis for transformers in isolated microgrids” (Yukon University Canada)
6. A.A. Devadiga, S.H. Jayaram. “The influence of transient parameters on the ageing of transformer turn-to-turn paper-oil insulation” (University of Waterloo, Canada)
7. V. Balvet, “Combining controlled switching and flux conditioning to eliminate voltage dips when energizing the step-up transformer of renewables and distributed energy resources” (Vizimax Canada)

Design

Operation  
Diagnostics

Interactions  
with network



# 2021 Colloquium

Bucharest, Romania – October 11-13

- Joint Colloquium with SC B3 in conjunction with CMDM conference 6th edition:

Challenges for digital T&D substations and reliable equipment of the future

- Transformers related papers (topics and keywords):
  - UHF PD measurements
  - Diagnostic techniques for GIS transformer
  - OLTC vibro-acoustic diagnostic
  - Mitigation of moisture using oil filtration technique with high temp. diffusion process
  - Transformer digital twin (Norway)
  - Combining DGA and PD for transformer monitoring
  - FRA on shunt reactor
  - Data-based solutions for transformers asset management
  - Top-oil temperature models for overload capability estimation
  - Moisture in transformer insulation (the silent killer)
  - Health assessment of 765 kV power transformer
  - Life assessment and extension strategies for aging transformers and reactors
  - Power transformers oil diagnostic using AI neural networks

CMDM 2021 - CIGRE Romania Conference on  
Condition Monitoring, Diagnosis and Maintenance (6th edition)

Modern Management Technology



Radisson Blu Hotel | Bucharest | Romania | 2021



# CIGRE 2022 session

- PS 1: Experience and new requirements for transformers for renewable generation
- PS 2: Beyond the mineral oil-immersed transformer and reactors
- PS 3: Best practices in transformers and reactors procurement



One paper from CA (PS1), abstract submitted

# Recently published reports

- Interim report on Transformer audible sound requirements, Electra, June 2020
- TB 812 (2020): Advances in the interpretation of transformer Frequency Response Analysis (FRA)
- TB 783 (2019): DGA monitoring systems
- TB 779 (2019): Field experience with transformer solid insulation ageing markers
- TB 771 (2019): Advances in DGA interpretation
- TB 761 (2019): Condition assessment of power transformers
- TB 755 (2019): Transformer bushing reliability



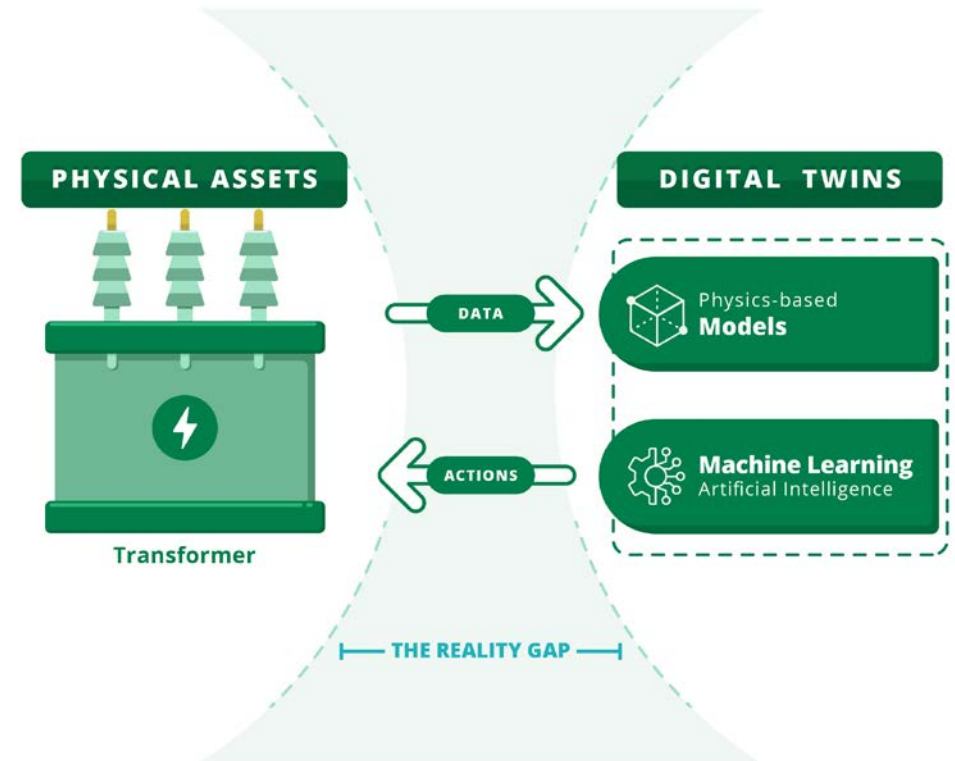
# To be published soon

- JWG A2/D1.51 Improvement to Partial Discharge Measurements for Factory and Site Acceptance Tests of Power Transformers - Convener Sebastian Coenen (Germany)
- WG A2.59 On-Site Assembly, On-Site Rebuild and On-Site High Voltage Testing of Power Transformer - Convener Yukiyasu Shirasaka (Japan)



# New WG to be initiated soon

- **Title:** Transformer digital twin – concept and future perspectives
- **Scope**
  - Propose a CIGRE definition, aspects which need to be encompassed in a complete digital twin
  - Survey and illustrate use cases and benefits
  - Propose methodologies to assess digital twin reliability (reality gap)
  - Make recommendations for possible standardisation
- **Kick-off:** Q1-2022
- **Progress:** ToR to be approved by technical committee, call for experts Q4-2021 or Q1-2022
- **Convenor:** Patrick Picher  
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# Canadian Representative

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