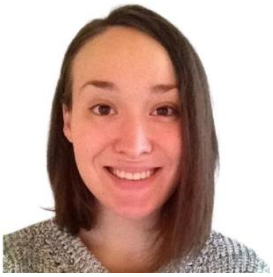
ISABELLE LÖFGREN



Isabelle Löfgren received her M.Sc. in Solar Energy Engineering at Dalarna University, Borlänge, in 2022. Her master thesis was conducted at Independent Insulation Group and dealt with the mitigation of sub-synchronous control interaction in a hybrid wind and PV farm using a PV-STATCOM. After graduating, Isabelle joined Independent Insulation Group working with power quality and EMT-type studies.

During her studies, Isabelle has worked part-time as a research assistant at Luleå University of Technology, working mainly with power quality and signal processing. In co-operation with Luleå University of Technology, Isabelle has written two conference papers presented at CIRED 2021 and ICHQP 2022, respectively.

MAIN FIELDS OF COMPETENCE

- Electromagnetic transient studies, including studies on sub-synchronous resonance and oscillations
- Impedance analysis and harmonic studies
- Power quality and signal processing

WORK EXPERIENCE

2022 – **Independent Insulation Group Sweden AB**, Ludvika, Sweden
Engineer

2020 – 2021 **Luleå University of Technology**, Skellefteå, Sweden
Research Assistant
Part-time employment working with power quality and signal processing, specifically interharmonics and rapid voltage changes.

EDUCATIONAL DEGREES

2022 **Master of Science in Solar Energy Engineering**
Dalarna University, Borlänge, Sweden
Thesis: Mitigating SSCI in a hybrid wind and PV farm utilizing PV-STATCOM – A Swedish case study
August 2020 – June 2022

2020 **Bachelor of Science in Energy Engineering**
Dalarna University, Borlänge, Sweden
Thesis: Interharmonic Analysis of Sustainable Energy Sources and Loads – Comparing two signal processing methods for estimation of interharmonics
August 2017 – June 2020

LANGUAGES

Swedish (native), English (professional level)

LIST OF PROJECTS

2025-	***Wind farm connection study*** Wind farm connection study performed in PowerFactory to evaluate for example reactive power capability and cable dimensioning.
2025-	***Frequency scans for subsynchronous and harmonic impedance of wind farms*** Studies in PSCAD including the creation of aggregated models of wind farms used for impedance scans to obtain both subsynchronous and harmonic impedances.
2025	***Assessing the need for surge arresters at 30 kV substation*** Lightning overvoltage (LOV) study to assess the need for surge arresters at a 30 kV substation. The study was conducted in PSCAD and included modelling of grounding system and associated earth wire.
2024-	***Harmonic studies for a new 150 kV regional network*** Studies in PowerFactory with the aim of investigating the propagation of harmonic content from the grid into the 150 kV network, as well as the harmonic emission from the 150 kV network into the grid. The study also included a basic filter design.
2023-2025	***Prerequisites and methods for studies in the frequency domain*** R&D project aiming to map prerequisites in both software and data for different types of studies in the frequency domain, including harmonic propagation studies, calculation of harmonic impedances, and screening for sub-synchronous interactions. Activities involved in the project include assessment of different software (e.g., PSSE and PowerFactory), development of supplementary functions in Python, harmonic modelling of various components, and assessment of methods to obtain impedance data or calculate harmonic propagation/harmonic load flow in power electronic systems. Voltage levels range from transmission to regional and distribution networks.
2023-2024	***Impact of corona attenuation on switching overvoltages when reclosing overhead lines*** Sensitivity analysis of how impact of corona attenuation on switching overvoltages is affected by e.g., line length, line configuration, and system voltage. The studies were conducted in PSCAD.
2023	***Damping of subsynchronous oscillations using BESS*** Development of SSO damping circuit in BESS control system, using impedance shaping.
2022-2023	***Transient overvoltages caused by intermittent earth faults in a regional network*** Model development (based on short-circuit and load flow calculations as well as detailed modelling of various components) and EMT studies in PSCAD with the aim of investigating possible overvoltages due to intermittent earth faults in a 220 kV system with isolated earth.
2022-2023	***Studies for a new 150 kV regional network*** Studies with the aim of investigating various phenomena in a new 150 kV regional network consisting of long HVAC cables. Studies included investigation of RVCs when energizing cables and transformers. The project involved short-circuit and load flow calculations, detailed modelling of different components, EMT simulations in PSCAD, as well as signal processing.
2022	***Model development for SSO studies*** Development of aggregated models of wind farms (including the connecting regional network) and provision of impedance characteristics for studies involving subsynchronous

	interactions. The model development includes short-circuit and load flow calculations as well as detailed modelling of various components.
2022	***Switching overvoltages when energizing 400 kV overhead lines*** The project involved model development (based on short-circuit and load flow calculations as well as detailed modelling of various components) and EMT studies in PSCAD with the aim of investigating switching overvoltages under various conditions considering different line configurations, etc.
2022-2024	***Allocation, assessment and validation of harmonic limits to solar and wind farms*** Industry project with the aim to give recommendations regarding the process for allocation, assessment, and validation of harmonic limits to solar and wind farms in Sweden. Simulations include short-circuit calculations (as part of model development) and harmonic load flow calculations.
2022	***Master Thesis*** Thesis title: "Mitigating SSCI in a hybrid wind and PV farm utilizing PV-STATCOM – A Swedish case study" This thesis dealt with mitigating sub-synchronous control interaction (SSCI) in a hybrid wind and PV farm by operating the PV farm as a STATCOM. The PV farm was implemented from scratch, including the control system, in PSCAD.
2021	***Detection of RVCs in a medium voltage network*** Project with Luleå University of Technology dealing with detecting RVCs in medium voltage data. The definition of an RVC given in IEC 61000-4-30 was altered in various ways to analyse the impact on the detected RVCs.
2020	***Analysis of interharmonics under fundamental frequency variations*** Project with Luleå University of Technology dealing with signal processing of interharmonics when the fundamental frequency is not constant. Both DFT based (e.g., FFT) and model based (e.g., ESPRIT) signal processing methods were used.

LIST OF PUBLICATIONS

J. Lundquist, O. Lennerhag, **I. Löfgren**
Simplified Methods and Models for Calculation of Switching Overvoltages on Transmission Lines including Effects of Corona Discharges
CIGRE 2024 Paris Session

O. Lennerhag, **I. Löfgren**
Tilldelning, uppföljning, och verifiering av övertonsgränser – Rapport 2024:1010
Energiforsk 2024

I. Löfgren, O. Lennerhag
Analysis and Mitigation of SSCI when Integrating Wind Power to Series Compensated Lines
International Conference on Power System Transients (IPST), Thessaloniki, Greece, 2023

I. Löfgren, E. Gutiérrez Ballesteros, S. Rönnberg
Modified Method of Detecting Rapid Voltage Changes in a Medium Voltage Network
International Conference on Harmonics and Quality of Power (ICHQP), Naples, Italy, 2022

I. Löfgren
Mitigating SSCI in a hybrid wind and PV farm utilizing PV-STATCOM – A Swedish case study
Master's Thesis, Dalarna University, Borlänge, Sweden, 2022

I. Löfgren, V. Ravindran, S. Rönnberg
Interharmonics under fundamental frequency variations

26th International Conference & Exhibition on Electricity Distribution (CIRED), 2021

I. Löfgren
Interharmonic Analysis of Sustainable Energy Sources and Loads – Comparing two signal processing methods for estimation of interharmonics
Bachelor's Thesis, Dalarna University, Borlänge, Sweden, 2020