

Street-level Carbon Tracking in Real-time (RT) using Power Grid Simulator



With nations pledging net-zero emissions by 2050, tracking the dynamics of anthropogenic carbon emissions is proving to be essential for global climate change governance and carbon neutrality achievement. Critical challenges remain in the timely, precise, and robust monitoring of carbon emissions given that the anthropogenic carbon emissions are estimated by the emission accounting inventories (e.g., emission datasets of IEA) that are based on energy statistics rather than measured directly. These “bottom-up” estimates in low voltage levels, which are often related to incompleteness of energy statistics, uncertainty in emission factors, and inconsistencies in data quality between regions, highlight the urgent need for technology and research paradigm innovation.

What are your tasks?

- Review the state-of-the-art operational control for low/medium power system
- Model the suitable MV/LV power grid, considering production, and consumption, and integrate them in the RT carbon tracking algorithm
- Deploy simulations to validate the developed methods and qualify their impact on the grid and GHG system.

In this thesis, you are expected to find:

- Optimal Power Flow theory and algorithm according to the CO₂ emission
- Modeling of power systems components using open-source simulators
- Steering green electricity mechanism

What should you bring?

- Master student in electrical engineering, computer science
- Background on power system monitoring, concepts on statistics, and machine learning are desirable
- Good programming skill in Python is mandatory
- Interest in inter-disciplinary research topics
- Critical thinking and enjoys working independently

What we offer?

- Highly motivated, young and output focused team
- Chance to bring your vision and ideas of a sustainable energy future to life
- Supervision in English language

Curious?

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