

## CIGRE Study committee C5

### PROPOSAL FOR THE CREATION OF A NEW WORKING GROUP

#### WG C5.39

##### NAME OF THE CONVENOR

Nath Shaw Rabindra (AUSTRALIA)

##### TITLE

Regulatory frameworks and market integration for assets under non-firm grid connection

#### THE WG APPLIES TO DISTRIBUTION NETWORKS: YES

##### ENERGY TRANSITION

- 1 / Storage
- 5 / Grids and Flexibility
- 6 / Solar PV and Wind
- 7 / Consumers, Prosumers and Electrical Vehicles
- 8 / Sector Integration

##### POTENTIAL BENEFIT OF WG WORK

- 1 / commercial, business, social, economic benefits
- 3 / likely to contribute to new or revised industry standards
- 5 / Guide or survey on techniques, or updates on past work or brochures

##### STRATEGIC DIRECTION

- 2 / Making the best use of the existing systems

##### SUSTAINABLE DEVELOPMENT GOAL

- 0 / Other SDGs or not applied
- 7 / Affordable and clean energy
- 9 / Industry, innovation and infrastructure

#### BACKGROUND :

As part of the energy sector's evolution towards decarbonization, there has been an increased focus on integrating new energy resources, including renewable generation and storage, into existing power grids. However, traditional firm grid connections are expensive and may create bottlenecks. Non-firm connections offer a more flexible and cost-effective alternative, allowing assets to connect without the guarantee of full-time access but still participate in electricity markets.

Given the increasing adoption of distributed energy resources and the transition to net-zero energy systems, it is crucial to design regulatory frameworks that allow non-firm connected assets to operate efficiently. Existing Working Groups, such as CIGRE WG C5.22 (Mitigating systemic market risk in electricity markets), have highlighted the need for more flexible integration strategies. This proposal seeks to build on previous work and focus specifically on regulatory frameworks and market structures for non-firm grid connections.

## PURPOSE / OBJECTIVE / BENEFIT OF THIS WORK :

This Working Group (WG) aims to address the following objectives:

- Enhance regulatory understanding: provide a clear framework for how non-firm connected assets can be integrated into energy markets, reducing uncertainty for investors, operators, and regulators.
- Optimize market signals: propose mechanisms to use market signals, including market and grid data, effectively, ensuring that non-firm assets are dispatched in a way that maximizes grid stability and market efficiency.
- Support Net Zero goals: facilitate the large-scale adoption of Distributed Energy Resource (DER) technologies to meet decarbonization targets while ensuring the stability of the grid.

By addressing these challenges, this Working Group will provide regulatory and market solutions that ensure an orderly and efficient transition to a decarbonized energy system.

## SCOPE :

This Working Group will investigate regulatory practices and market integration strategies for assets operating under non-firm grid connections. Non-firm grid connections allow for a better integration of energy resources, including renewable energy assets, battery storage, industrial loads and generation systems, to the grid. Non-firm grid connection may be associated with conditional curtailment in real-time or limited access during pre-determined periods of grid congestion or instability. This concept aligns with the growing flexibility demands in modern grid operations, where intermittent renewable generation must coexist with traditional grid infrastructure. It also facilitates the utilisation of existing transmission and distribution grid infrastructure, given the significant infrastructure requirements and investment required.

The WG will focus on the following key areas:

### 1. Review and Assessment of Non-Firm Grid Connections practices:

- Gather case studies from regions that have implemented non-firm grid connections, including the UK, Australia, Ireland and other jurisdictions that have adopted similar practices identified with an international survey.
- Investigate the different operational strategies and regulatory mechanisms that permit such assets to participate in energy markets.

### 2. Regulatory Framework Development:

- Examine how existing market structures and regulations impact non-firm connected assets, especially in deregulated markets.
- Highlight best practices in terms of regulatory reforms that ensure fairness, economic efficiency, and flexibility for all grid participants, while ensuring reliability and security of supply.

### 3. Market Mechanisms for Integration:

- Explore the role of market signals and pricing mechanisms, including the availability of data, in optimizing the use of non-firm connected assets.
- Assess how non-firm connections interact with balancing services, ancillary markets, and congestion management strategies.

### 4. Challenges in Curtailment/limitations and Compensation Mechanisms:

- Investigate mechanisms for compensating assets curtailed due to non-firm status and propose solutions to maintain investor confidence and operational viability.
- Address the financial, legal, and technical challenges faced by assets operating under these conditions.

### 5. Future-Proofing for Net Zero:

- Assess the role of non-firm grid connections in supporting the transition to a net-zero energy system.
- Identify how non-firm connection models can be scaled to support large-scale DER integration, particularly as part of distributed and decentralized energy systems.

### Originality and Relation to Existing Initiatives:

While several CIGRE working groups have addressed aspects of distributed generation (C6) and the integration of renewables (B4), this WG will focus specifically on the **intersection of market structures and regulatory frameworks** with non-firm grid connections.

Relevant Technical Brochures and other materials include:

[Provision of Ancillary Services by Renewable Energy Sources \(C6-116\)](#)

[Modelling of Inverter-Based Generation for Power System Dynamic Studies \(TB 727\)](#)

[Risk Evaluation for Ancillary Service \(C5-11011\)](#)

This WG will extend these initiatives by focusing on the emerging market and regulatory models that need to evolve as non-firm connections become more prevalent.

## DELIVERABLES AND EVENTS

### Deliverables Types

Annual progress and activity report to Study Committee

Electra report  
Meeting  
Technical Brochure and Executive Summary in Electra  
Tutorial  
Webinar

### Deliverables schedule

Technical Brochure Q2 2026 Technical Brochure

Webinar Q3 2026 Tutorial or Webinar

### Time schedule

Q4 2024 Recruit members (National Committees, WiE, NGN)

Q1 2025 Kick-Off Meeting

Q1 2025 Develop final work plan, setting milestones and member responsibilities

Q2 2025 Survey of practical approaches of non-firm grid connection

Q3 2025 Draft the Technical Brochure for Study Committee review

Q4 2025 First Panel Discussion with industry experts to gather feedbacks and refine WG's focus

Q2 2026 Finalize Technical Brochure

Q3 2026 Tutorial

Q2 2027 Webinar/Workshop to present the final report and recommendations

### APPROVAL BY TECHNICAL COUNCIL CHAIRMAN:

Rannveig S. J. Løken  
November 12th, 2024