関西電力送配電

論点１

→ 日本のFlexibilityの現状は？

→ 再エネ大量導入に向けて、どのような展開を見据えるべきか？

再エネ大量導入を見据えた現状　～想定される課題と現在の解～

TSO視点

基幹系・全系レベルで再エネ特性への対応が必要

- 間欠性：スケール（線路単位、地域単位、ノード単位等）によって異なる課題
  周波数維持や電圧、系統安定性なども課題
- 時限性：いわゆる“ダックカーブ”の課題
  周波数維持や電圧、系統安定性なども課題
- 偏在性：特定の系統にのみ生じる系統混雑の課題

・基本は調整力による対応
・Flexibilityの概念に近いのはノンファーム接続くらいか

➔ *現在の解：調整力電源による調整、ノンファーム接続、N-1電制、出力抑制…*

DSO視点

6kVクラスの再エネへの対応・メッシュ状系統を前提とした検討が必要

- 間欠性：電圧変動（過昇）、系統の混雑管理が課題
- 時限性：　（　同上　）
- 偏在性：　（　同上　）

Flexibility的要素は、ほぼ存在しない

➔ *現在の解；*

電圧変動：電圧監視と電圧調整器による制御
系統混雑：系統切り替え、系統増強、出力抑制

カーボンニュートラル実現レベルの再エネ大量導入で想定される課題

TSOが採る対策・行動（想定）

- 周波数：　全系レベルで再エネの間欠性に追随、対応
- 電圧・安定度：　線路や地域単位でFlexibilityを活用
- 系統混雑：　（　同上　）

DSOが採る対策・行動（想定）

- 電圧：　街区レベルや配電線区間単位でFlexibilityを活用
- 系統混雑：　（　同上　）

Flexibility Resourceの必要量が確保できない恐れ

TSOとDSOの視点で、求めるFlexibilityが若干異なる
- ・Flexibilityが必要な地域の違い
- ・必要なFlexibilityの方向（上げ／下げ）と大きさの違い
- ・Flexibilityが必要な時間の違い

TSO／DSO間でのFlexibilityのバッティングが生じる恐れ

課題①

TSO/DSO間で、Flexibilityをどのように調整して活用するか？

課題②

再エネ“大量”導入に対して十分なFlexibility Resourceをどう確保するか？

課題③

必要な地域・locationで必要な量のFlexibility Resourceをどう確保するか？

諸課題に対する方向性

課題①：TSO/DSO間の調整

- TSO/DSO間の連携強化
- Flexibilityの“見える化”、統合プラットフォームなどの環境整備

➔ *データ利活用や“プラットフォーム”の議論など、関連する動きはある*

課題②：十分なFlexibility Resourceの確保

- 現時点からFlexibility Resource活用の意識づけと利活用促進

➔ *調整力市場へのDRの参画や、アグリゲーターの活性化など動きはある*

課題③：必要な地点での必要な量のFlexibility Resourceの確保

- 再エネ適地や系統の脆弱箇所の見極め（Flexibilityが必要な箇所の見極め）
- Flexibility Resourceの対象資源の拡大と必要な地域への設置誘導

➔ *現時点で具体的な解や動きが見当たらない…*

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Theme 1

→ What about the current status of Flexibility in Japan?

→ What kind of evolution should we consider
in terms of mass deployment of RES in Japan?

KANSAI Transmission and Distribution

Current Status –Prospected Challenges and Current Solutions-

TSO point of view

Required to cope with RES as bulk system/whole system

- Intermittency
  challenges varies in terms of scale, location, area, nodes
  maintain frequency, voltage problem and system stability are also challenges
- Time domain matter
  "Duck Curb" problem
  maintain frequency, voltage problem and system stability are also challenges
- Localization
  congestion problems on specific lines/areas only

- Basically frequency adjustment only
- similar to Flexibility is only Non-firm.

➔ *Current Solution;*
adjustment power, non-firm connection, N-1 restriction, generation suppression…

DSO point of view

Taking 6kV class RES and mesh-like grid into consideration

- Intermittency: Voltage and congestion problems
- Time domain matter: (the same as above)
- Localization: (the same as above)

There is nothing about "Flexibility".

➔ *Current Solution;*
Voltage fluctuation: SCADA and voltage control
Congestion: grid switching, reinforcement, generation suppression

Prospected Challenges –Mass RES deployment for Carbon Neutral-

Action on TSO side

- For frequency: Cope with intermittency as whole system level
- For voltage/stability: Utilize Flexibility on lines/areas
- For Congestion: (the same as above)

Action on DSO side

- For Voltage: Utilize Flexibility on city block/feeder
- For Congestion: (the same as above)

Concern;
Lack of volume

Required Flexibility is different from TSO & DSO.
- Required location/area
- Required direction (up/down) and volume
- Required time of the day/week

Concern;
Conflict about Flexibility between TSO & DSO

Challenge-1

How to manage/utilize Flexibility between TSO & DSO?

Challenge-2

How to ensure enough volume of Flexibility Resources?

Challenge-3

How to ensure Flexibility Resources on the required location/area?

Actions for Challenges

Challenge-1: Harmonization between TSO & DSO

- Strengthen relationship between TSO & DSO
- Ensure visibility of Flexibility, set up Integrated Platform

➔ *Related/similar movement, such as Data Utilization, "Platform", etc.*

Challenge-2: Ensure enough volume of Flexibility Resource

- Enlightenment/Enhancement of Flexibility Resource utilization

➔ *Related movement, such as DR participation to Adjustment Market, growing Aggregators*

Challenge-3: Ensure Flexibility Resource on required location/area

- Find out required location/area, such as RES favorable are, vulnerable point of grid, etc.
- Expand Flexibility Resource, Induction resources to required location/area

➔ *There is no comprehensive solution and actual movement…*