هيئة تنظيم الخدمات العامة
Authority for Public Services Regulation

Regulatory Update on Electricity Sector

IEEE PowerTalks – September 2024

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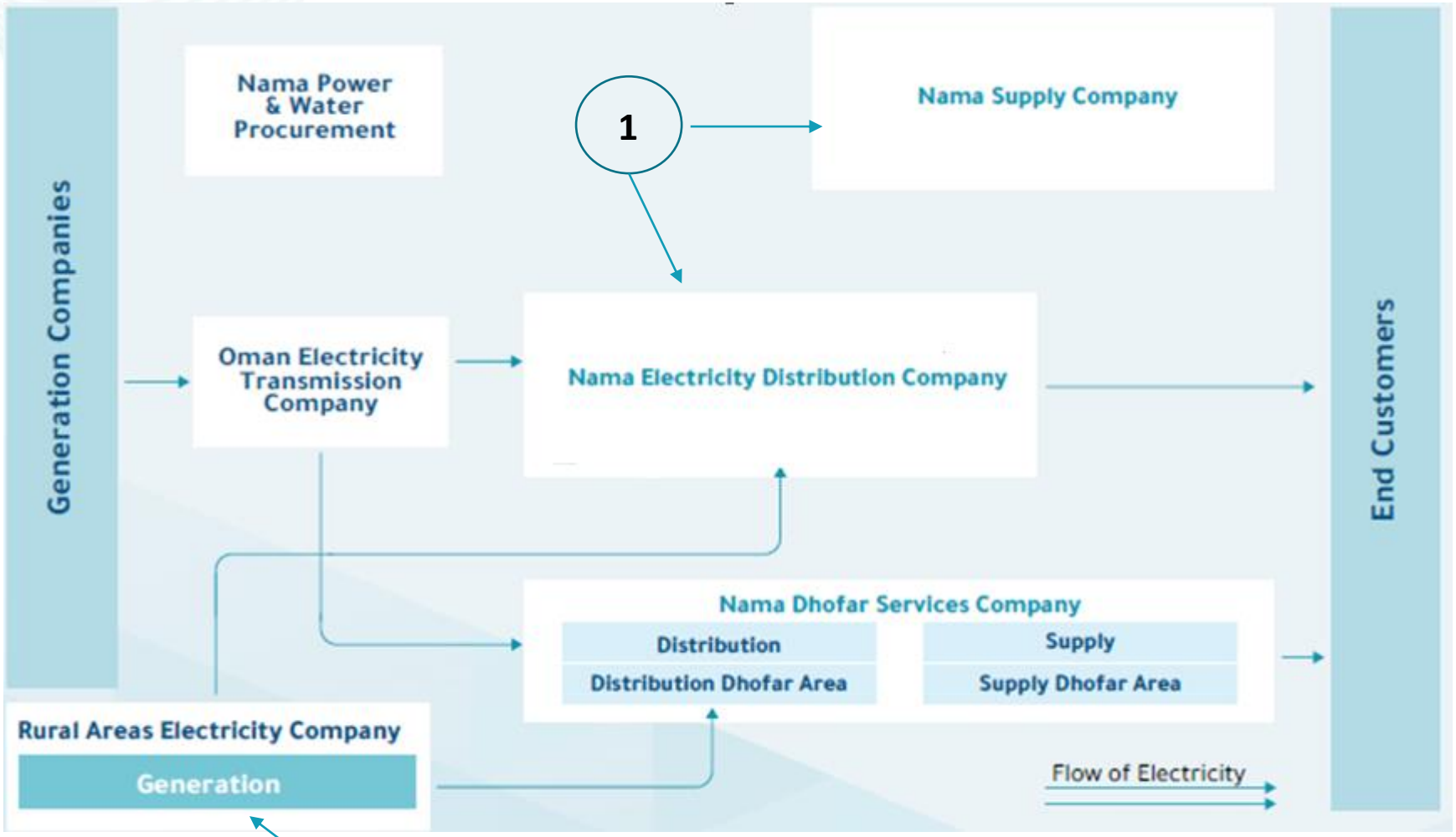
Contents

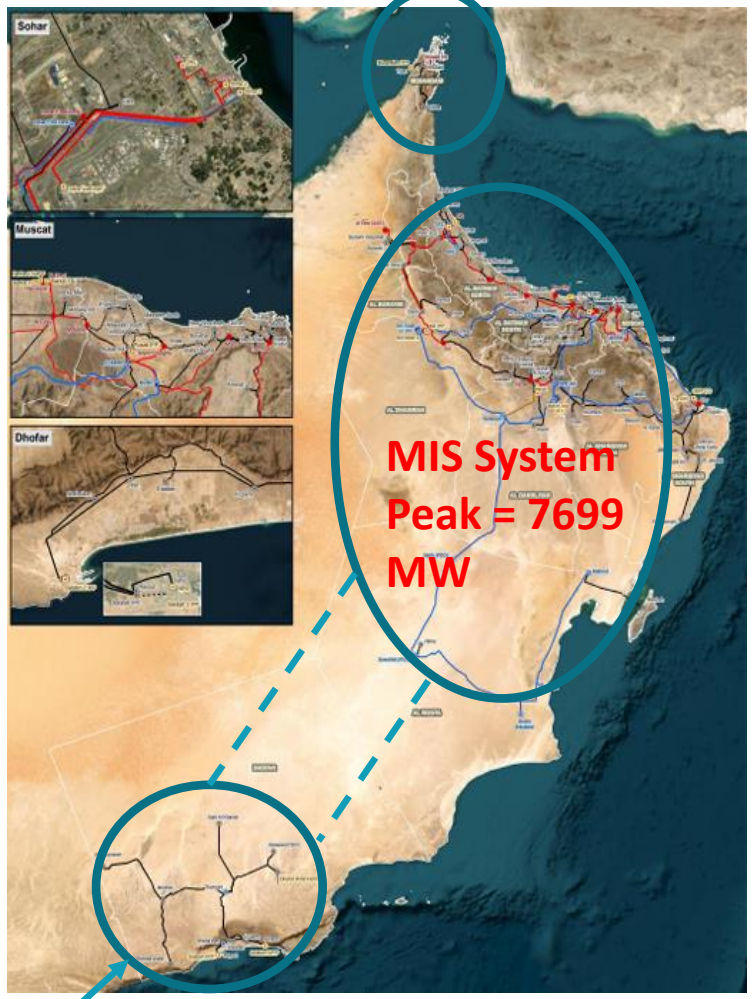
This presentation will cover the following items:

- Updates on Electricity Market Structure
- Regulatory study on Auto-generation / Self Supply
- Possible Grid Implications (System) due to self supply
- EV Technical Standards Guidelines

Electricity Market Structure

Musandam System Peak = 93 MW





Dhofar System Peak = 842 MW

Vision 2040 Directions

De-carbonization and Net Zero Targets	Affordability and reduction of Electricity Prices	Ensuring Security of Supply
Review of Generation Mix	Review of System Cost Reflectiveness	Review of System Balancing Requirements

Do the Market Structure and Regulations Needs a Review? Yes

Ongoing Market Review Study

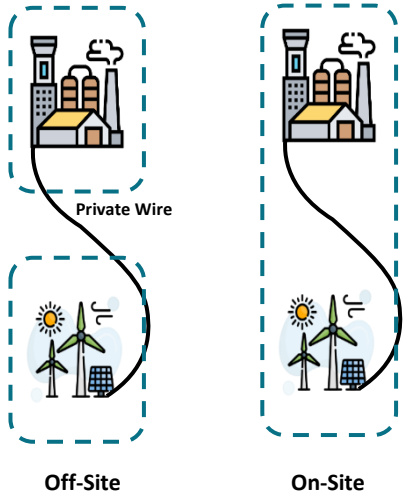
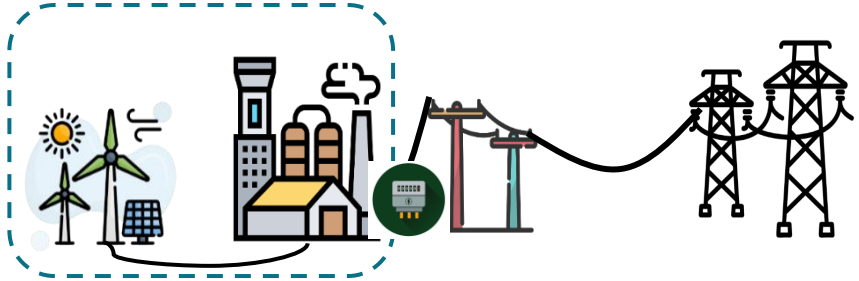
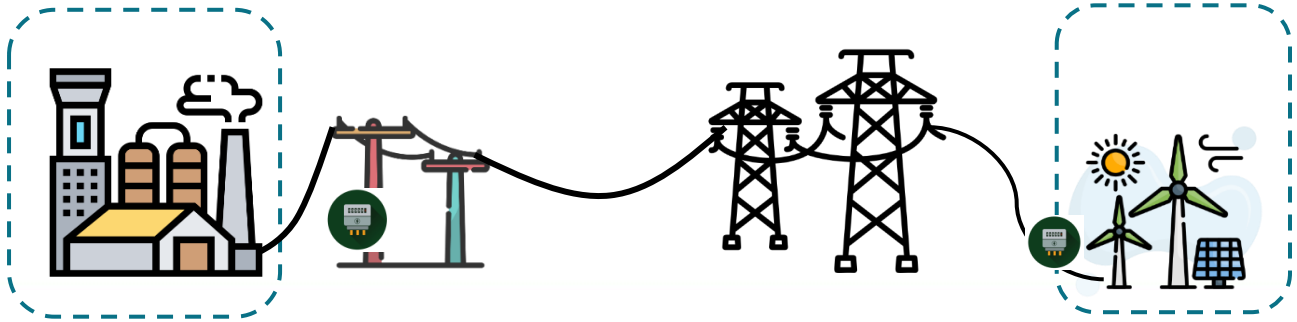
Objective

- Review of the Market Design to capture the overall changes within the sector an to make it more competitive in line with the international best practices.

Scope

- Full Review of the Market Design and Benchmark it with other Jurisdictions
- Conducting Gap Analysis
- Review of Planning Processes

Regulatory Study on Auto-Generation Arrangements

Definition	As per Sector Law (78/2004): - Auto-generator: a Person who generates electricity for the purposes of Self-Supply. - Self-Supply: the supply by a Person of electricity to himself, his employees or commercial business, other than via a Transmission System or a Distribution System of a Licensee.
Types of Self-Supply Scenarios	 **Off grid**  **Grid Connected, On-site Auto-Generation**
Non-Auto-Generation	 **Grid Connected, wheeling power through the grid (Treated as Direct Sale)**

Regulatory Study on Auto-Generation Arrangements

Problem Statement:

Large industrial customers who are currently connected/Not connected to the grid requested for exemptions to build large scale renewable generation plants for the purpose of Self-Supply/Auto-generation.

Drivers

- ❑ Decarbonize in line with Vision 2040;
- ❑ Production of Green Products
- ❑ Cost Avoidance during peak hours

What are the overall technical and economic consequences of approving self supply requests?

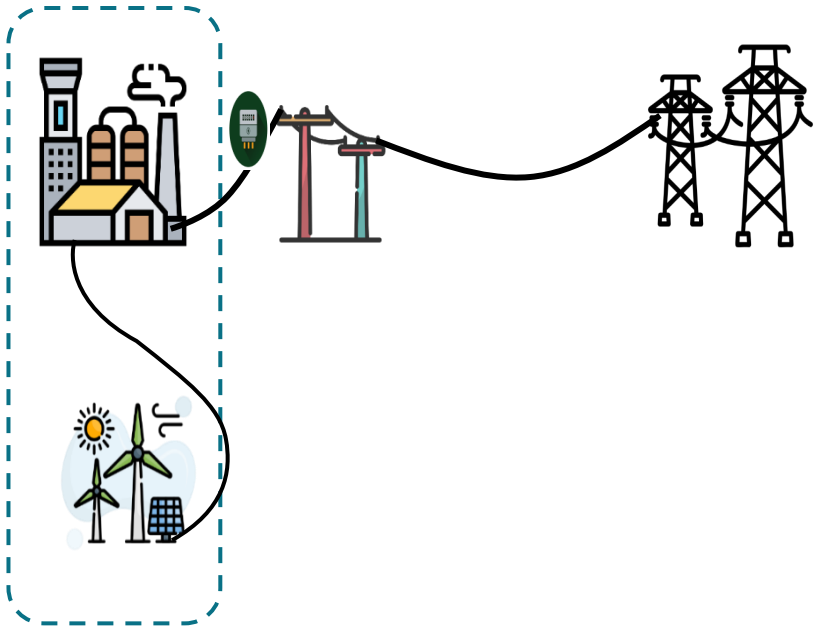
Potential Consequences

- Increased electricity costs leading to higher government subsidies;
- Non fairness of increased tariff to customers who don’t use self supply;
- Increased operational complexities to the system operator;
- Impact on fixed cost recovery plans for the single power procurer;
- Increased curtailment of renewable energy production to balance the system.

Potential Auto-generation Arrangements (Scenarios)

Auto-generation Matrix – Scenario 1

The current costing structure of BST doesn't have a breakdown.

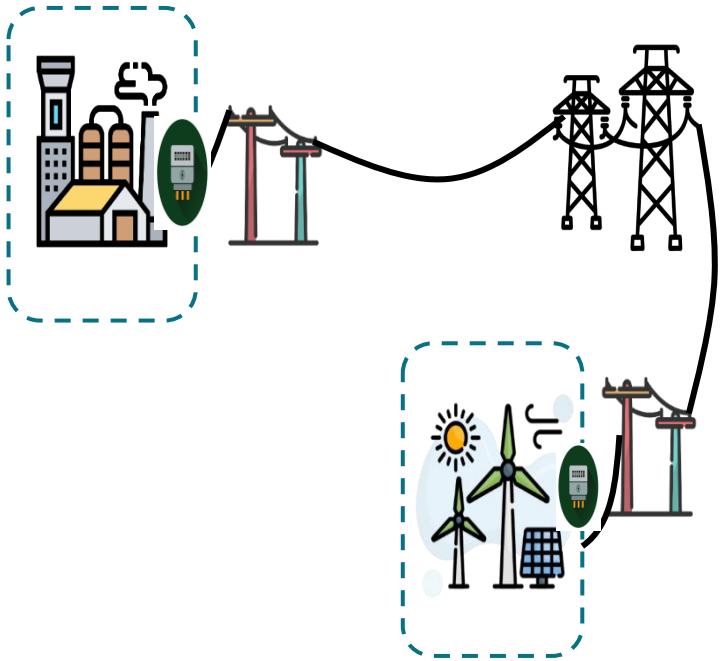


Grid Connected Self-Supply not importing or exporting from the grid

	BST-Components	
Non avoidable cost	Fixed Gen. Cost	✓
	Ancillary Services	✓
Avoidable cost	Average losses	✗
	Variable Gen. Cost	✗
Network charges	TUoS	✓
	DUoS *	✗

✓ Applicable ✗ Not Applicable * Applicable if connected to Distribution grid

Auto-generation Matrix – Scenario 2

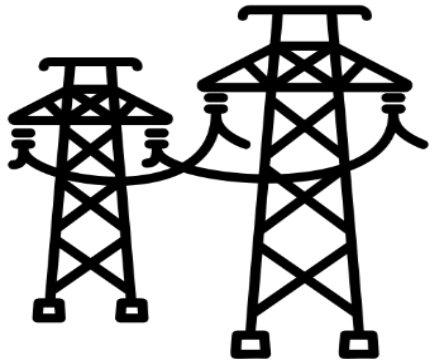


Off site grid connected - Wheeling

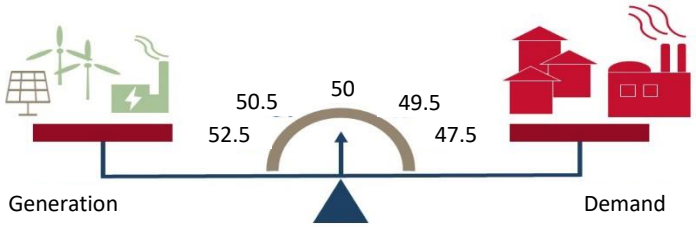
	BST-Components	
Non avoidable cost	Fixed Gen. Cost	✓
	Ancillary Services	✓
Avoidable cost	Average losses	✓
	Variable Gen. Cost	✗
Network charges	TUoS	✓
	DUoS *	✓

✓ Applicable ✗ Not Applicable * Applicable if connected to Distribution grid

The System Implications

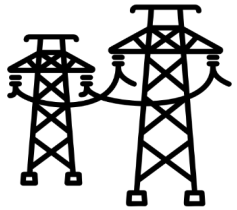


Ancillary Services and System Capacity Planning

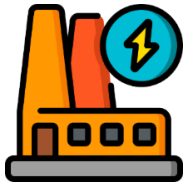


Frequency Control

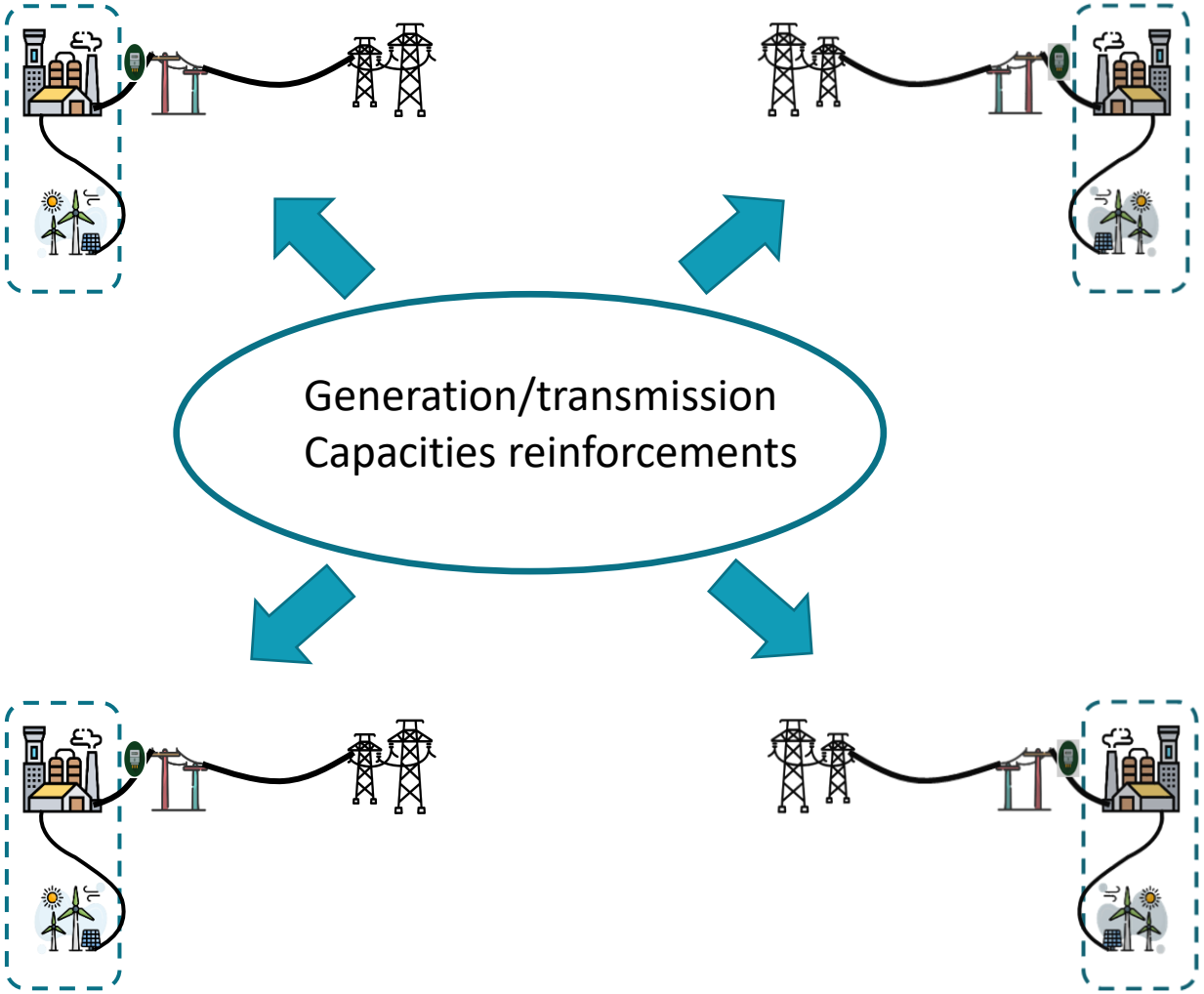
132kV ± 10%
220kV ± 10%
400kV ± 5%



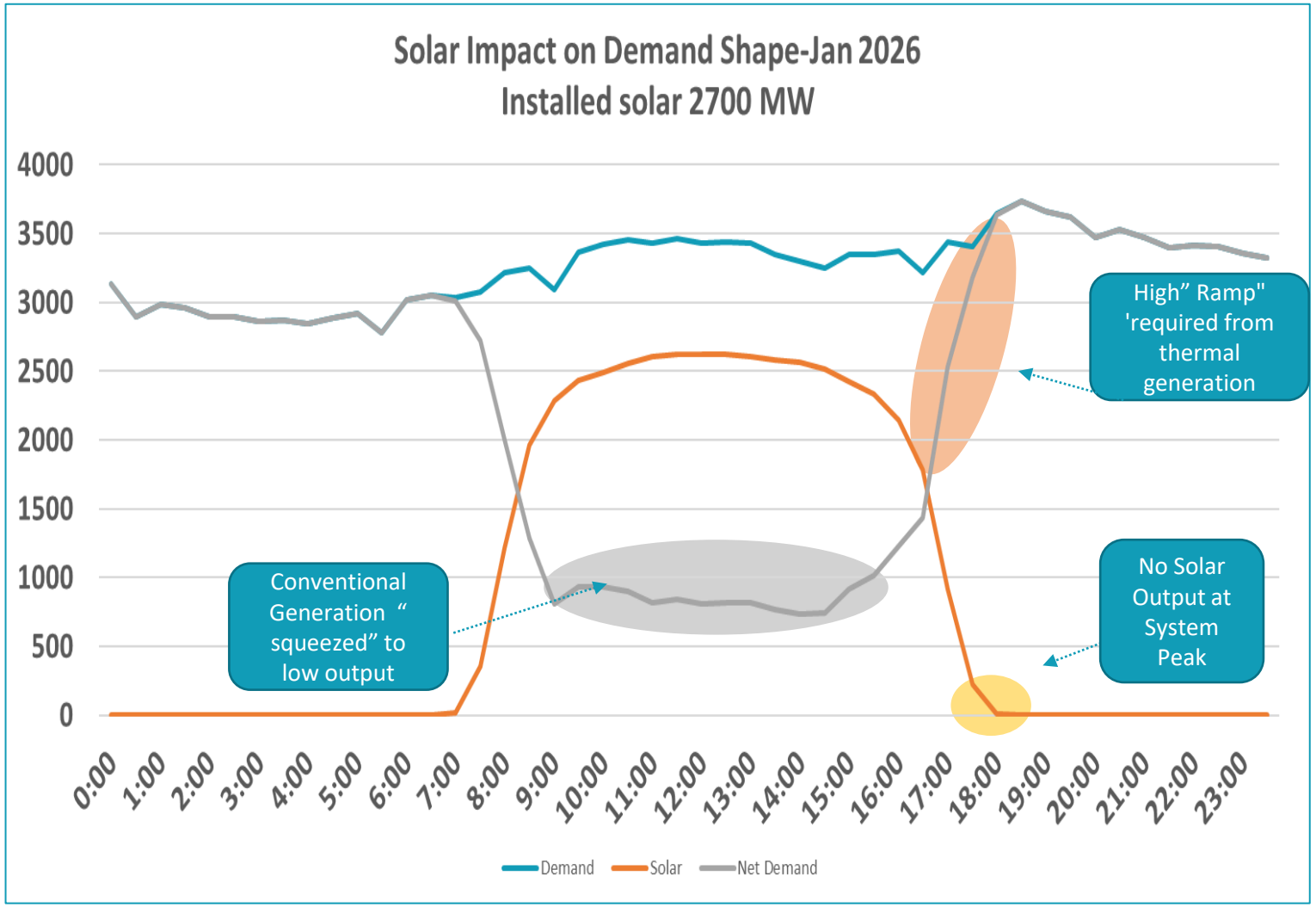
Reactive Power and Voltage Control



Black Start capability for System restoration

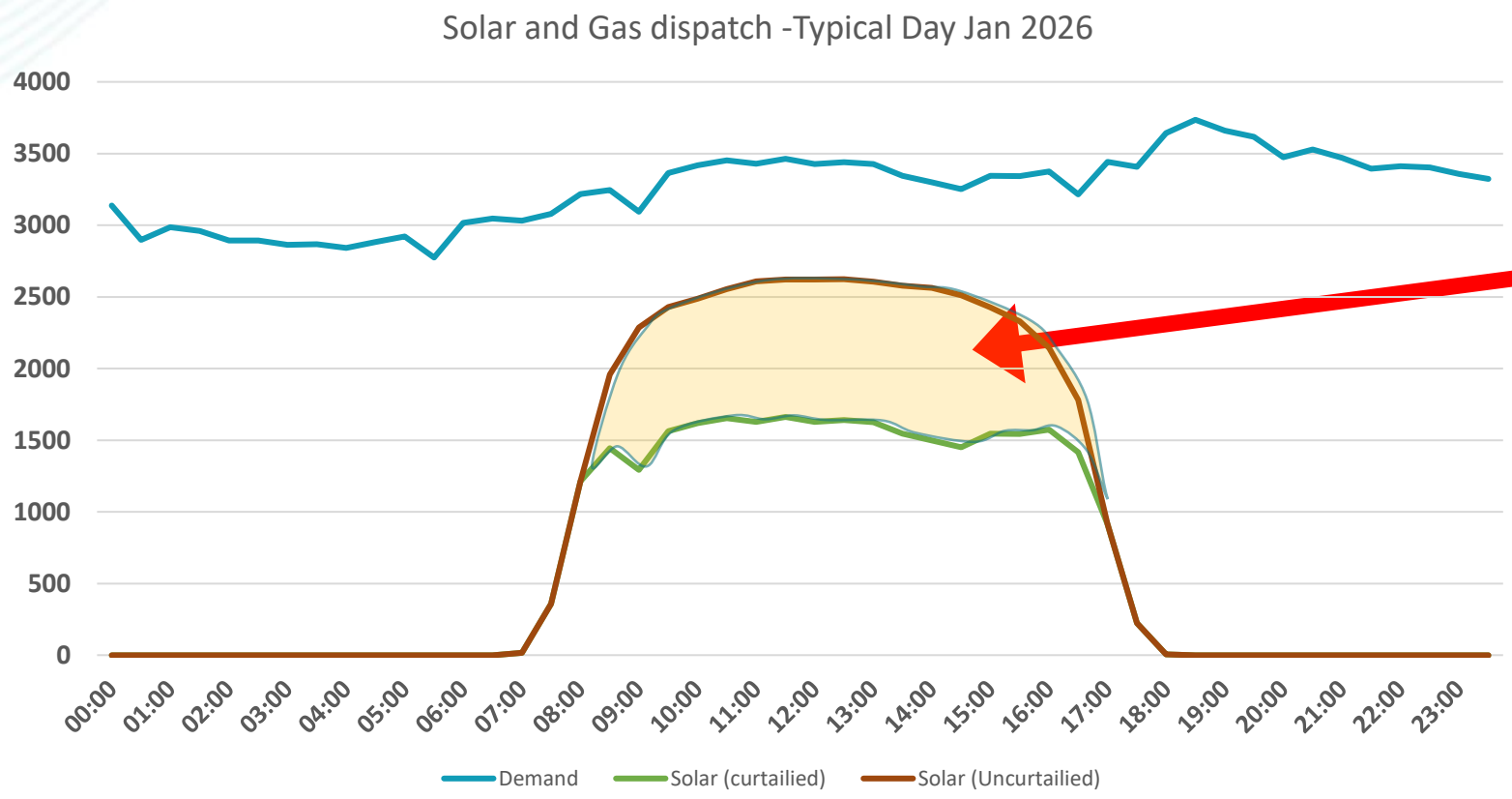


Example: Typical Day – 2026 Off-peak Season



Source: OETC Ancillary Services Study

Impact of Flexibility Limitations



Note: for illustrative purposes only (not based on analysis)

Solar Curtailment due to minimum generation of thermal power to ensure system stability

Curtailment would have a system Cost !

Source: Ancillary Services Study

Options to Mitigate Curtailment

- ❑ Increase Demand
- ❑ Energy Storage
- ❑ International Export (GCCIA)
- ❑ Set a cap for renewable energy penetration

Recommendations of the self supply study

- Develop the auto-generation policy, considering the engagement with sector stakeholders.

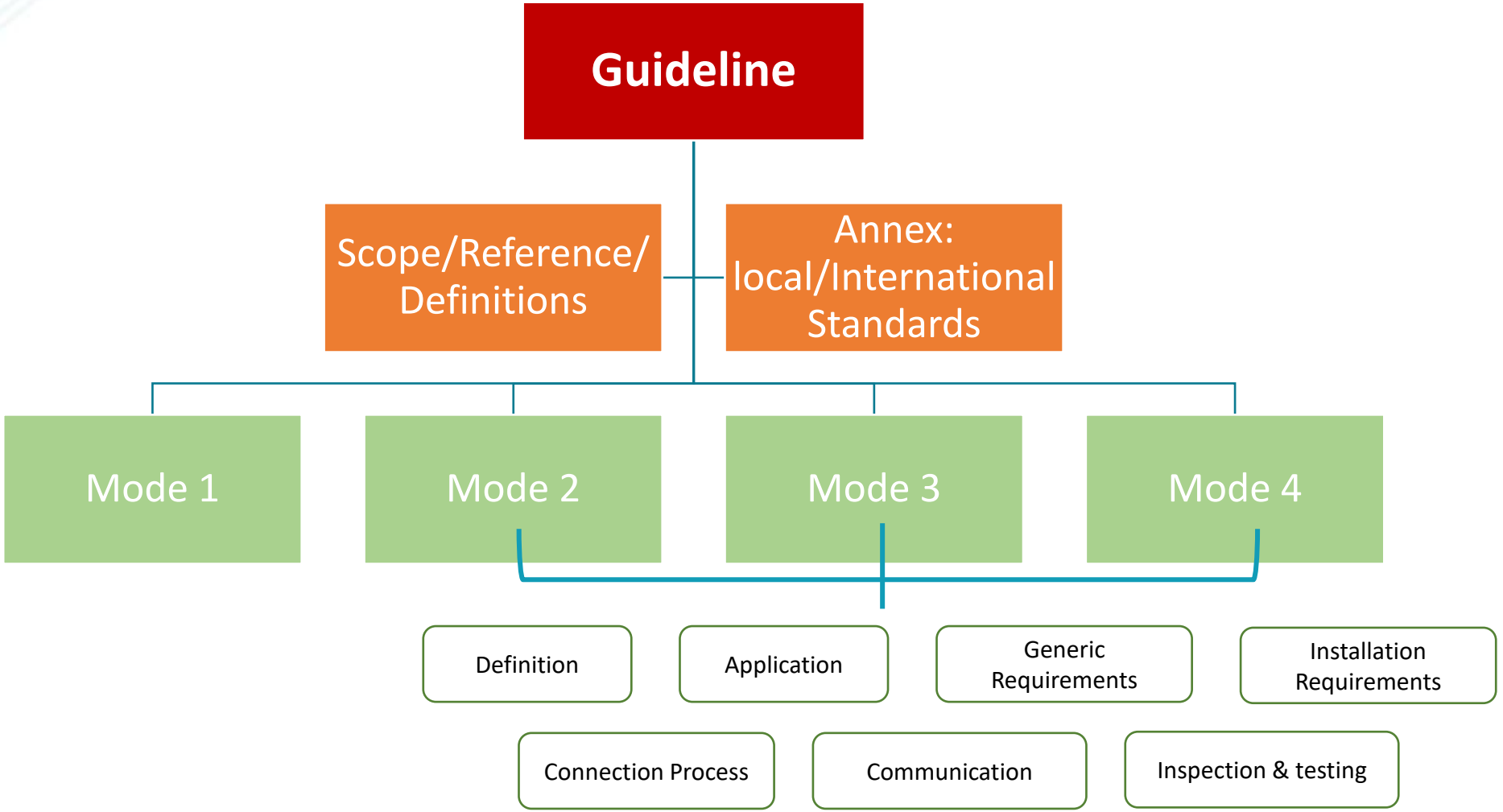
- An annual Renewable Energy Cap (%) for auto-generation projects to manage the transition.

Regulatory Update:- 2

Electric Vehicles –

Technical Requirements Guidelines

Contents of the Guideline



Charging Modes

Prohibited | Incidental | Default

Mode 1

Direct connection
of the vehicle to the grid

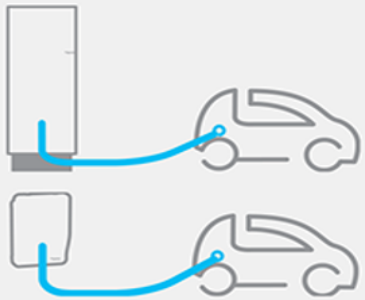
- **Non-dedicated** power socket (domestic)
- **Simple** cable
- Risk of overheating

Mode 2

Direct connection
of the vehicle to the grid

- **Non-dedicated** power socket
- incorporates an In-Cable Control and Protection Device

Mode 3



Direct connection
of the vehicle to the grid

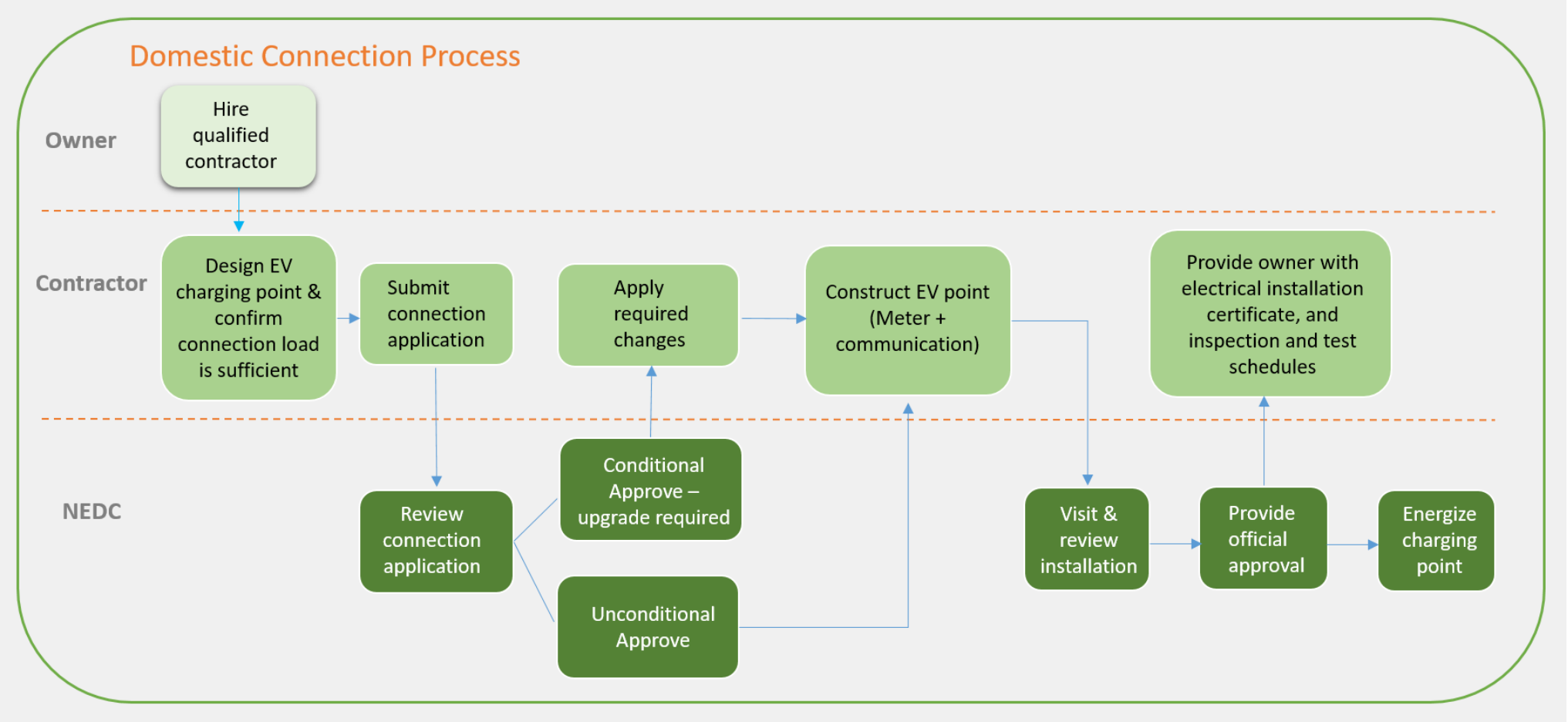
- **Dedicated power socket** incorporate charge monitoring
- Dedicated cable

Mode 4

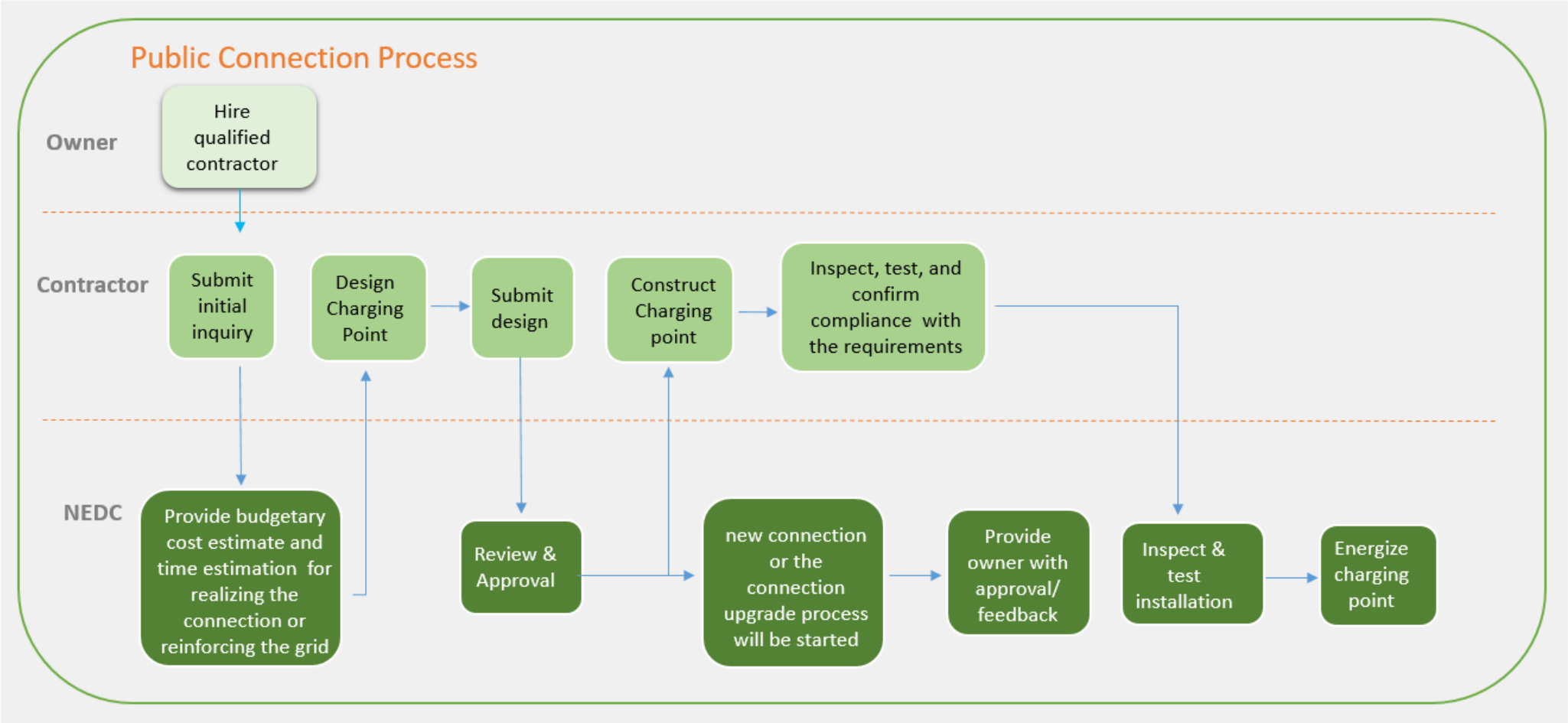
Indirect connection
of the vehicle to the grid,
via an external charger

- Direct current external charger incorporating charge monitoring
- Dedicated cable

Connection Process - Private



Connection Process - Public



EV Publications

Technical Requirements Guidelines;

EV Regulations

GSO Technical Requirements for EVs

EV Incentives

EV application for Charging Stations

Contractor Requirements for EVs

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Thank you