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TECHNICAL & COMMERCIAL PROPOSAL

Grid-Informed EVCS Planning & Infrastructure Advisory

The purpose of writing this proposal is to draw attention to a significant problem which **OMC Companies**, is currently facing one that will become increasingly severe in the upcoming years. Allow me to share a critical finding from our recent assessments. During an independent grid infrastructure audit of existing EV charging deployments along the Motorway M2 corridor, our engineering team uncovered a multi-million-rupee blind spot in Pakistan's current EV rollout strategy. We analyzed a recently commissioned EVCS site featuring an electricity connection with a sanctioned load of $180kW$ utilizing a standard $400kVA$ transformer. However, under standard utility distribution rules, this transformer can safely support up to $272kW$ of maximum demand. By reactively securing a $180kW$ sanction without verifying grid headroom, the operators left exactly $92kW$ of paid-for capacity completely stranded unutilized headroom that could immediately power an additional DC Fast Charger without spending a single rupee on new grid infrastructure.

Beyond stranded capacity, installing chargers based solely on physical space rather than time-series traffic behaviors creates a regulatory time-bomb. By anchoring international EV adoption trajectories to local fleet realities and simulating M2 corridor traffic, we project that natural multi-vehicle peak demand at this specific site will organically breach the $180kW$ legal limit by 2029. Without dynamic stochastic modeling and integration planning, this natural growth will trigger automated DISCO penalties, localized voltage drops, and severe thermal degradation of the transformer, rendering a flagship station an operational bottleneck during peak travel hours.

EVCS networks cannot be built on commercial instinct alone; they require rigorous grid intelligence. Chief Consultant Pakistan offers a comprehensive advisory framework that bridges this technical gap through two core pillars: EV demand forecasting and BESS financial feasibility using OpenDSS, combined with end-to-end DISCO connection execution utilizing WAPDA-approved FDRANA impact studies. This approach ensures that prior to any capital expendi-

ture, fuel retailers have a mathematically validated, high-IRR execution pathway that optimizes utility tariffs, prevents stranded assets, and guarantees regulatory compliance.

To know further how we will tailor the solution specifically for **OMC Companies**, please find the attached detailed technical and financial proposal. **Meanwhile we assure our best and professional services.**

For and on behalf of Chief Consultant Pakistan:



Signature

Name: Engr. Ikram Ullah

Designation: Chief Executive Officer /
Lead Planning Expert

Date: June 16, 2026

1. Executive Summary of Solution

Oil Marketing Companies (OMCs) are the undisputed backbone of the nation's transportation energy. With the largest and most strategic retail network stretching from the coast to the northern borders, They are naturally positioned to lead and dominate the impending electric vehicle (EV) revolution. However, adding an Electric Vehicle Charging Station (EVCS) to an existing retail outlet is fundamentally different from adding a new petrol dispenser.

A fuel pump dispenses stored liquid; a DC Fast Charger acts as a massive, instantaneous drain on the local power grid. Imagine throwing a switch that suddenly demands as much electricity as a small residential neighborhood, directly at your retail site. If the underlying infrastructure the site's transformers, internal cabling, and the DISCO's supply lines is not rigorously prepared for that sudden, unpredictable surge, the system will choke. Equipment overheats, breakers trip, and customers are left stranded. Furthermore, drawing massive power blindly during peak utility tariff hours can completely wipe out the profit margin of a charging session, turning a premium service into a financial liability.

We have closely analyzed OMC's unique operational footprint. Your network is diverse, encompassing high-speed, high-demand motorway corridors (like the M2) and high-turnover, dense urban centers. The traffic flow, customer dwell times, and charging behaviors at these locations are entirely different. This means a "one-size-fits-all" electrical design will inevitably lead to either wasted capital on oversized, expensive equipment or lost revenue from undersized, bottlenecked connections.

Chief Consultant Pakistan provides a common-sense, financially driven solution to this engineering challenge. Before a single physical cable is laid, we build a dynamic virtual model of your specific OMC retail site. We simulate daily vehicle traffic patterns, charging probabilities, and local grid constraints. By doing this, we answer the critical business questions: *How many chargers can this specific location handle before the utility grid fails?* and *Will integrating a Battery Energy Storage System (BESS) save money by storing cheap off-peak electricity to sell during peak hours?*

By pairing our predictive analysis with our deep institutional knowledge of DISCO connection protocols, we handle all regulatory approvals natively. Our approach ensures that OMC's transition to EV charging is seamless, highly profitable, and technically flawless.

2. Introduction to the Problem

A Tale of Two Realities

During a recent independent infrastructure audit of EV charging deployments along the M2 Motorway corridor, our engineering team analyzed the power parameters of a newly commissioned EVCS site. The facility had recently secured a sanctioned load of 180 kW from the local DISCO, utilizing an existing 400 kVA transformer. We modeled this scenario to answer a straightforward engineering question: *How much additional load can this site safely accommodate to expand its charger network before grid failure or utility penalties occur?*

The answer to this question exposes a critical, multi-million rupee blind spot in how EV infrastructure is currently being deployed across Pakistan.

When we analyzed the site infrastructure, two distinct realities emerged:

Reality 1: The Immediate Stranded Revenue (Today's Opportunity)

Under standard utility distribution rules in Pakistan, a transformer can be safely loaded up to 80% of its nameplate capacity at a baseline conservative power factor of 0.85. The mathematical limit for a standard 400 kVA transformer is calculated as follows:

$$\text{MaximumSanctionableLoad} = 400kVA \times 0.85PF \times 0.80 = 272kW$$

Because the OMC reactively secured a sanction of only 180 kW without verifying grid headroom, they have left exactly 92 kW of paid-for capacity completely stranded. That is unutilized headroom that could immediately power an additional DC Fast Charger or a cluster of AC commercial chargers without spending a single rupee on new infrastructure.

Reality 2: The Regulatory Time-Bomb (Tomorrow's Risk)

The second reality is more alarming. OMCs are currently installing chargers based on static physical space, completely detached from time-series traffic behaviors. By anchoring international EV adoption trajectories to local fleet realities (such as import frameworks and fuel parity indices), we modeled the P50 (median) peak power demand curve for this specific M2 motorway corridor over a 10-year horizon:

Year	EV Fleet Share	Peak Demand	Operational & Regulatory Status
2026	0.8%	45 kW	Safe operational zone; high stranded capacity.
2027	1.6%	82 kW	Safe operational zone; infrastructure under-utilized.
2028	3.1%	135 kW	Approaching sanctioned limit during peak long-weekend traffic.
2029	5.4%	198 kW	BREACH YEAR: Demand violates 180 kW sanction. FESCO/DISCO penalties active.
2031	9.2%	265 kW	Approaching absolute physical limit of the 400 kVA transformer (272 kW).
2034	15.0%	380 kW	Severe thermal overload; localized grid failure without BESS/Solar.

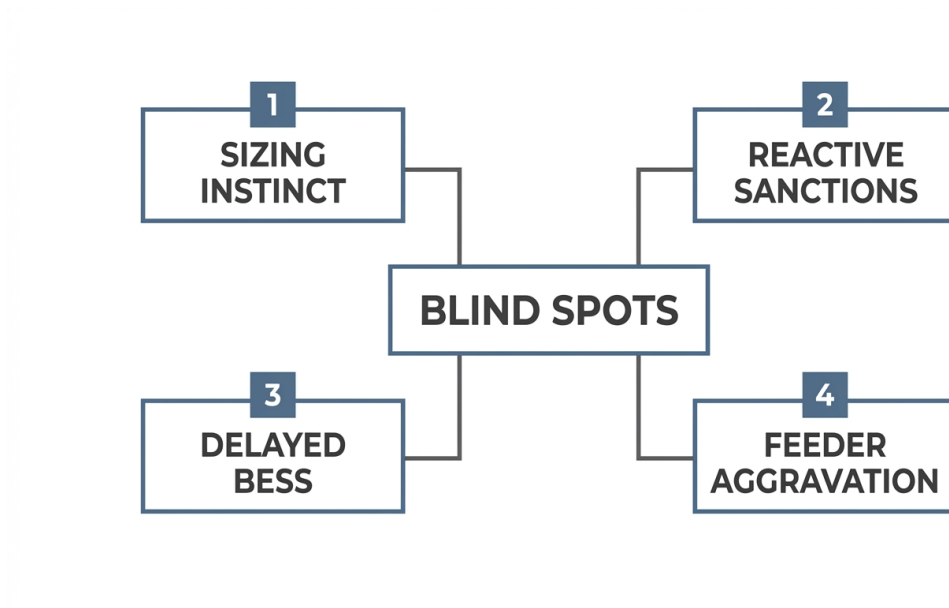
By 2029, normal vehicle arrivals at this site will naturally draw peak power that breaches the 180 kW legal limit. The OMC will face immediate automated DISCO penalties, localized voltage drops, or equipment tripping, rendering their flagship station an operational bottleneck during peak travel hours.

Blind Spot Capital Expenditure

The current expansion of EV charging stations across Pakistan’s primary highway networks and urban centers exhibits dangerous systemic patterns:

- **Sizing via Instinct:** Charger capacities are selected based on land footprint rather than time-resolved traffic probabilities.
- **Reactive Connection Sanctioning:** Load applications are filed arbitrarily, leading to either heavily oversized infrastructure or choked headroom.
- **Delayed BESS Evaluation:** Incorporating Battery Energy Storage Systems (BESS) as an afterthought doubles retrofit costs compared to integrated commissioning.
- **Feeder Aggravation:** Unmodeled multi-megawatt additions on aging 11 kV feeders trigger upstream protection mismatches and utility resistance.

Chief Consultant Pakistan bridges this technical gap, converting grid constraints into measurable competitive advantages.



The Solution: Grid-Informed Planning

EVCS networks cannot be built on commercial instinct alone; they require rigorous grid intelligence. Chief Consultant Pakistan has built a comprehensive, end-to-end framework that takes OMCs from existential risk to optimized return. This proposal transforms the EVCS deployment into an actionable execution pathway.

3. Scope of Services: The Two-Pillar Framework

Our advisory framework is split into two specialized services, ensuring technical validation precedes physical deployment.

[PHASE 0: RAPID NETWORK FILTER]



SERVICE 1	SERVICE 2
Demand Modeling & IRR Analysis	DISCO Connection & Implementation
• Traffic Stochastic Modeling • OpenDSS Quasi-Static Simulations • BESS Sizing (With/Without Scenarios) • Investment-Grade Sensitivity IRRs	• DISCO Legal Documentation • Infrastructure Sized Material BOQ • FDRANA Feeder Impact Approval • Solar vs. Hybrid Financial Matrix

SERVICE 1: EV Demand Modeling, Charger Sizing, BESS Feasibility & Financial Return Analysis

3.1 Site Classification & Traffic Stochastic Modeling

We categorize your site asset portfolio into distinct operating environments, knowing that a highway corridor behaves fundamentally differently than an urban fuel retail spot:

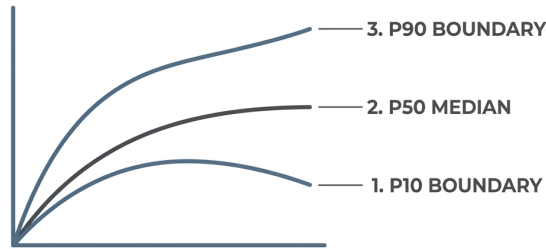
- **Corridor Typology:** Characterized by longer dwell times (30-90 min), range-anxiety behaviors, and high energy per session. We extract background metrics from National Highway Authority (NHA) loops and Motorway Police (NHMP) toll vectors.
- **Urban Typology:** Short dwell times (10-30 min), opportunity charging patterns, and distinct commuter dual-peaks. We leverage your on-site petrol transaction logs to build arrival arrays.

3.2 Probabilistic Demand Forecasting (Monte Carlo)

Instead of relying on rigid, linear growth lines, we run localized Monte Carlo simulations wrapped around international indexes (IEA/IRENA) and adjusted for Pakistani economic indicators (NEPRA tariffs, SRO EV customs data, and fuel pricing splits). This generates three distinct evaluation boundaries:

- **P50 (Median Case):** The baseline used to plan your multi-year charger deployments.
- **P10 / P90 (Confidence Margins):** Essential parameters to ensure your physical connection can handle maximum extreme load variance without failing.

DEMAND FORECASTING

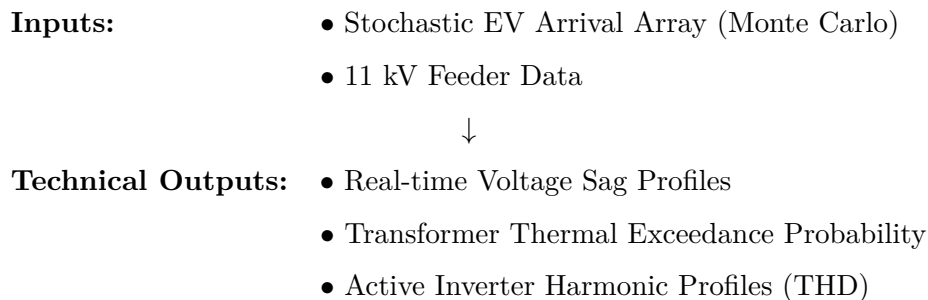


3.3 OpenDSS Quasi-Static Time-Series (QSTS) Simulation

Using the Electric Power Research Institute's (EPRI, USA) OpenDSS platform, we build a 24-hour time-resolved simulation of your site's electrical point of common coupling. This maps:

- True voltage profiles under multi-vehicle simultaneous fast-charging events.
- Real-time power factor variations and transformer thermal degradation curves.
- Total Harmonic Distortion (THD_V and THD_I) injected into the grid by high-power inverter switching circuits.

OpenDSS Simulation Engine Engine Workflow



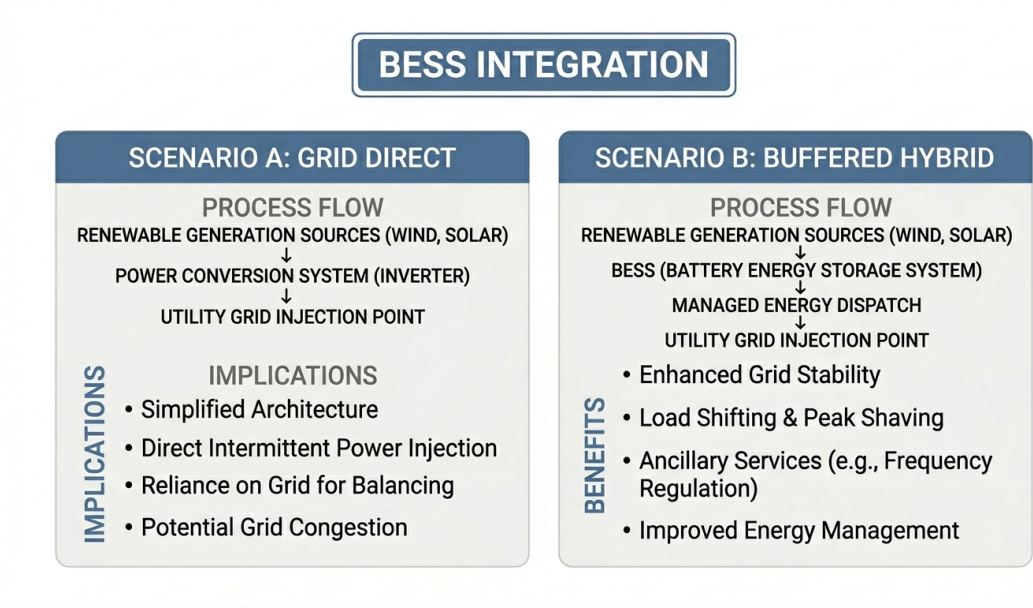
3.4 Integrated BESS Cost-Benefit Matrix

We present clear technical scenarios comparing an unbuffered grid connection against an optimized Battery Energy Storage System deployment:

Metric	Scenario A: Grid Direct (Without BESS)	Scenario B: Buffered Hybrid (With BESS)
Grid Draw Profile	Sharp, unmitigated peaks matching erratic vehicle arrivals.	Smooth, flattened demand profile.
Transformer Size	Forced to over-size to handle transient peak spikes.	Optimized for average continuous daily loading.
Tariff Exposure	High exposure to severe NEPRA peak commercial tariffs.	Off-peak grid storage charging; peak-shaving discharge.
Capex vs. Opex	Low initial capital layout; high, volatile monthly utility opex.	Higher initial equipment investment; optimized long-term opex.

3.5 Investment-Grade Financial Reporting

Our financial models yield definitive decision metrics: Net Present Value (NPV), Internal Rate of Return (IRR), and Levelized Cost of Charging (PKR/kWh). These metrics are tested against shifting NEPRA commercial tariff slabs ($\pm 20\%$) and volatile fleet adoption speeds, ensuring your finance team receives highly resilient investment files.



SERVICE 2: DISCO Connection, BOQ Preparation, Feeder Impact Analysis & Solar-Grid Comparative Study

3.6 DISCO Technical Navigation & Connection Filing

We will support the entire regulatory and bureaucratic process required to secure new or upgraded load sanctions across any DISCO jurisdiction (LESCO, FESCO, IESCO, GEPCO, MEPCO). This includes drafting the full package:

- helping to fill the official load application along with single-line diagrams drawn for utility standards.
- Grid tariff optimization mapping to lock in the lowest possible fixed demand rates.

3.7 Engineering Bill of Quantities (BOQ)

We draft detailed infrastructure itemized costing bills matching approved DISCO schedule rates. This prevents vendor overpricing during procurement by providing clear budgets for:

- Line-side materials (HT poles, conductors, line hardware, earthing arrays).
- Pad-mounted or pole-mounted step-down transformers sized precisely to your OpenDSS P50 peak profiles.
- Low-voltage protection panels, main air circuit breakers, and metering enclosures.

3.8 Utility Feeder Engineering (FDRANA & OpenDSS)

To help you obtain immediate connection clearance without administrative friction, we run our upstream studies through FDRANA (Feeder Distribution Network Analysis), the software officially recognized and utilized by WAPDA and the DISCO planning directorates.

Because our engineering files speak the exact analytical language of the utility's review boards, we eliminate standard evaluation delays and prevent the utility from forcing unnecessary, expensive upstream network upgrades on your company.

[**Your Proposed EVCS Site**]

↓ (*OpenDSS QSTS Verifies Internal Integrity*)

[**11 kV Local Tapping Point**]

↓ (*FDRANA File Validates Feeder Capacity*)

[**DISCO Planning Approval**] → (*Fast-Tracked Load Sanction*)

3.9 Solar PV vs. Grid vs. Storage Trade-Off Assessment

Every potential location undergoes a rigorous three-way optimization check using local solar tracking profiles (NASA SSE / PVSyst databases calibrated to local coordinates):

- **Grid Exclusive:** Dependable operational simplicity but leaves the asset fully exposed to rising retail tariff risks.

- **Solar-Grid Hybrid:** Canopy/roof PV assets offset expensive daytime utility consumption, pushing down daytime operational expenses via net-metering structures.
- **Solar-BESS-Grid Tri-Brid:** Offers maximum long-term independence, captures cheap solar energy to buffer night peaks, and secures the highest calculated lifetime project IRR despite high initial capital.

4. Summary of Deliverables

Clients receive an integrated project file containing 10 technical and financial deliverables:

PROJECT STUDY DELIVERABLES	
1	Site Classification & Baseline Fleet Report
2	Monte Carlo 10-Year EV Demand Forecast Charts
3	Optimal Charger Sizing & Phased Deployment Schedules
4	OpenDSS QSTS Load Flow & Harmonics Profile Validation
5	Technical BESS Capacity Sizing & Battery Optimization Log
6	Investment-Grade Financial Models (NPV, IRR, Sensitivity)
7	DISCO Load Sanction Documentation Guidelines
8	Detailed Project Material BOQ & Independent Engineering Cost
9	FDRANA Feeder Impact Study for Utility Approval
10	Solar PV Integration Feasibility & Net-Metering Report

5. Unrivaled Credibility & Institutional Authority

Lead Planning Expert

Engr. Ikram Ullah

Retired Chief Engineer Planning, GEPCO

33+ Years of Sovereign Power Infrastructure Experience

There is no substitute for institutional authority when dealing with state-owned power utilities. As the former Chief Engineer of Planning for a major distribution utility, Engr. Ikram Ullah has directly commanded the infrastructure planning departments, connection sanction workflows, and grid reinforcement strategies that dictate current utility behaviors. He understands exactly how utility review boards evaluate load requests and where latent capacity hidden within grid assets can be legally unlocked.

Firm Track Record & Compliance

- **Pakistan Engineering Council Registration:** Registered Consultancy Firm under License Number Consult/2667.
- **Proven Utility Clearance:** Delivered over 30 major industrial and commercial grid-connection designs. Notably, our complete engineering design book for the Al-Rehman Garden Housing Society grid infrastructure was cleared and approved by utility planning divisions within just three working days of filing, a testament to our strict regulatory compliance and engineering precision.

6. Commercial Path Forward: The "Zero-Friction" Engagement

We recognize that reviewing a national network of fuel retail assets for EV deployment can cause corporate analysis paralysis. To eliminate procurement friction, we structure our engagements in two clear, logical stages:

Phase 0: The Rapid Headroom Filter (Low-Cost Assessment)

Before initiating extensive field studies or complex time-series modeling, you provide us with the transformer capacities and existing sanctioned load documents for a selection of your high-priority locations (e.g., 5 to 10 key highway stations).

- Within 7 business days, we deliver a Stranded Asset Matrix identifying immediate legal headroom anomalies (similar to the 92 kW unutilized gap found at the M2 Interchange location).
- This identifies immediate expansion opportunities on assets you have already paid for, providing immediate returns before significant capital is committed.

Phase 1: Full-Scale Site Optimization Study

For locations flagged during Phase 0 as high-risk or high-potential, we launch the full scope of Service 1 and Service 2, delivering complete investment-grade analytical and regulatory execution packages.

Contact & Coordination

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