# PERIGON ENERGY SOLUTIONS

# California Golf Course Electrification Market Study

Regulatory Landscape • Market Sizing • Capital Requirements • Infrastructure Opportunity

Prepared by: Perigon Energy Solutions
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# EXECUTIVE SUMMARY

California's golf industry faces a historic and mandatory transition away from gas-powered maintenance equipment, driven by AB 1346 and CARB regulations. With nearly 1,000 golf courses across the state and two distinct regulatory phases already in motion — plus a third approaching — this transition represents a multi-hundred-million-dollar capital need that course operators cannot avoid. Perigon Energy Solutions is positioned to serve as both a strategic advisor and capital partner to the California golf industry as it navigates this challenge.

## Summary Findings

- **Market Size:** California has approximately 984 golf courses (434 public, 214 municipal, 336 private).
- **Phase 1 (Now):** AB 1346 / CARB regulations have banned the sale of new gas-powered small off-road engines (≤25 HP) since January 1, 2024, covering the bulk of hand-held and light mowing equipment.
- **Phase 2 (2028–2036):** A 2035 executive order directs 100% zero-emission off-road equipment; heavier diesel-powered fleet (>25 HP) faces phased-out operational bans through 2036 under the In-Use Off-Road Diesel Fleets Regulation.
- **Capital Need:** Total equipment replacement capital need across California golf courses is estimated at $590M–$985M depending on fleet tier and course type.
- **Infrastructure:** Electrical infrastructure upgrades (service panels, charging systems, transformer upgrades) represent an additional $100M–$250M in capital need.
- **TAM:** Combined total addressable market for Perigon: $690M–$1.24B in California alone.

**STRATEGIC NOTE**

*The transition is not optional — it is mandated by law. Courses that stockpiled gas equipment will face attrition of that fleet over the next 5–10 years, creating a continuous replacement cycle. The first movers who build electrification infrastructure now will have a significant operational and competitive advantage.*

# SECTION 1: REGULATORY FRAMEWORK

Understanding the layered regulatory environment is critical. Three distinct frameworks govern California golf course equipment electrification, each with its own phase-in timeline and enforcement mechanism.

## 1.1 AB 1346 — Small Off-Road Engine (SORE) Ban

California AB 1346, signed by Governor Newsom on October 9, 2021, directed the California Air Resources Board (CARB) to establish zero-emission standards for small off-road engines. CARB adopted the implementing regulations in December 2021.

### What Is Covered

AB 1346 applies to spark-ignition (gasoline) engines rated at 25 horsepower or below. For golf course operations, this covers the majority of the hand-held and light equipment fleet, including:

- Walk-behind and riding greens mowers
- Fairway mowers (smaller units)
- Leaf blowers and debris blowers
- String trimmers and edgers
- Chainsaws (under 45cc)
- Hedge trimmers
- Log splitters
- Smaller pressure washers (excluding large-format units)

### What Is Specifically Excluded

- Portable generators (regulated separately — zero-emission requirement deferred to model year 2028)
- Agricultural equipment under 175 HP (federal Clean Air Act preemption)
- Existing, in-use gas-powered equipment (the ban is on NEW sales, not use)

### Phase-In Timeline for SORE

| Equipment Category | Zero-Emission Sale Requirement | Effective Date |
|---|---|---|
| Most lawn/garden, mowers, blowers, trimmers, chainsaws | Model Year 2024 and beyond | January 1, 2024 |
| Portable generators & large pressure washers | More stringent interim standards | Model Year 2024 |
| Portable generators & large pressure washers | Full zero-emission requirement | Model Year 2028 |

**COMPLIANCE NOTE** *The SORE ban does NOT prohibit using existing gas equipment. Courses that stockpiled gas tools in 2023 can continue using them until they wear out. This*

*creates a 5–10-year runway for gradual electric adoption, but creates urgency for courses that did NOT stockpile and need to replace equipment today.*

## 1.2 In-Use Off-Road Diesel Fleet Regulation (>25 HP Equipment)

For heavier diesel-powered equipment above 25 horsepower — which includes large fairway mowers, rough mowers, tractors, sprayers, and utility vehicles — CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation (amended in November 2022, effective January 1, 2024) creates a phased operational ban by engine tier.

This regulation affects self-propelled diesel-fueled off-road vehicles of 25 HP or more, including large mowing equipment, utility tractors, and sprayer units commonly operated at golf courses.

### Fleet Size Definitions

| Fleet Category | Total Fleet HP Threshold |
|---|---|
| Ultra-Small Fleet | 500 HP or less (combined) |
| Small Fleet | Roughly 500–2,500 HP (combined) |
| Medium Fleet | Roughly 2,500–5,000 HP (combined) |
| Large Fleet | Over 5,000 HP (combined) |

Most individual golf courses would qualify as Ultra-Small or Small fleets, which gives them more time but still mandates operational phase-outs through 2036.

### Phase-Out Schedule — Large Fleets

| Engine Tier | Prohibition on Operation Begins |
|---|---|
| Tier 0 (pre-1996 engines) | January 1, 2024 |
| Tier 1 (≈1996–1999 engines) | January 1, 2026 |
| Tier 2 (≈2000–2003 engines) | January 1, 2028 |

### Phase-Out Schedule — Small/Ultra-Small Fleets (Typical Golf Course)

| Engine Tier | Prohibition on Operation Begins |
|---|---|
| Tier 0 (pre-1996 engines) | January 1, 2028 |
| Tier 1 (≈1996–1999 engines) | January 1, 2030 |
| Tier 2 (≈2000–2003 engines) | January 1, 2032 |

**CRITICAL COMPLIANCE DEADLINE**

*A course operating an older Tier 0 or Tier 1 diesel rough mower or tractor may face an operational ban within 2–6 years. The ban covers actual use, not just new purchases — making this timeline more urgent than the SORE regulations.*

## 1.3 California Executive Order — 100% ZEV Off-Road Equipment by 2035

In September 2020, Governor Newsom issued an executive order directing CARB to develop strategies to achieve 100% zero-emission off-road equipment in California by 2035, where feasible and cost-effective. This overarching mandate provides the policy architecture under which both the SORE regulations and the diesel fleet phase-outs are operating.

While not a statute with direct enforcement penalties on its own, this executive order signals the direction of all future CARB rulemaking and indicates that by approximately 2030–2035, ALL new off-road equipment sold or used in California will be subject to zero-emission requirements regardless of horsepower class.

## 1.4 Regulatory Timeline Summary

| Year | Regulatory Milestone | Impact on Golf Courses |
|---|---|---|
| 2021 | AB 1346 signed into law; CARB directed to act | Legislative trigger event |
| Jan 2024 | SORE ban takes effect for most equipment ≤25 HP | No new gas hand-held or light mowing equipment can be sold in CA |
| Jan 2024 | In-Use Diesel Regulation amendments take effect; Tier 0 ban begins for large fleets | Older heavy diesel equipment must be removed from large fleets |
| Jan 2026 | Tier 1 diesel ban for large fleets | 1996–1999 diesel equipment retired from large fleets |
| 2028 | SORE zero-emission for generators; Tier 2 diesel ban for large fleets | Generator replacement; older tractors/mowers retired from large fleets |
| 2028 | Tier 0 diesel ban for small/ultra-small fleets (typical golf course) | Pre-1996 heavy equipment must be retired at typical golf courses |
| 2030 | Tier 1 diesel ban for small fleets | 1996–1999 tractors and heavy equipment retired at most courses |
| 2032 | Tier 2 diesel ban for small fleets | 2000–2003 diesel equipment retired |
| 2035 | Executive Order — 100% ZEV off-road equipment target | All off-road equipment in CA projected to be zero-emission |

# SECTION 2: CALIFORNIA GOLF MARKET LANDSCAPE

## 2.1 Course Count and Composition

California is the second-largest golf market in the United States by course count, trailing only Florida. With approximately 984 golf courses statewide, the market is diverse in ownership structure, operating model, and financial capacity — a key consideration for capital planning.

| Course Type | Count (Approx.) | % of Total | Capital Access Profile |
|---|---|---|---|
| Public / Daily Fee | 434 | 44% | Moderate — dependent on revenue; lender receptive |
| Municipal | 214 | 22% | Public budget constraints; grant-eligible; slower decision cycle |
| Private / Country Club | 336 | 34% | Strongest capital access; member assessments available; high urgency |
| TOTAL | 984 | 100% | |

California also hosts approximately 2.8 million active golfers — the most of any U.S. state — creating sustained demand pressure on courses and increasing the strategic value of well-maintained facilities.

## 2.2 Equipment Fleet Profile per Course

A typical 18-hole golf course operates a complex equipment fleet. Understanding this fleet composition is essential to sizing the electrification capital requirement. The table below reflects industry norms from GCSAA data and equipment industry benchmarks.

| Equipment Category | HP Class | Typical Qty per 18-hole Course | Regulatory Phase |
|---|---|---|---|
| Walk-behind greens mowers | ≤25 HP (SORE) | 8–12 units | Phase 1 — Sale bans effective 2024 |
| Triplex/riding greens mowers | ≤25 HP (SORE) | 2–4 units | Phase 1 — Sale bans effective 2024 |
| Fairway mowers (mid-size) | 25–35 HP | 2–4 units | Phase 1/2 boundary |
| Rough mowers (large rotary) | 35–75 HP (Diesel) | 2–4 units | Phase 2 — Diesel phase-out 2028–2032 |
| Utility vehicles / light | ≤25 HP (SORE) | 8–15 units | Phase 1 — Sale bans effective 2024 |
| Utility vehicles / heavy | 25–50 HP (Diesel) | 2–4 units | Phase 2 — Diesel phase-out 2028–2032 |

| | | | |
|---|---|---|---|
| Sand bunker rakes | ≤25 HP (SORE) | 2–4 units | Phase 1 — Sale bans effective 2024 |
| Sprayers | 25–50 HP | 1–3 units | Phase 2 — Diesel phase-out 2028–2032 |
| Aerifiers / core aerators | 25–50 HP (Diesel) | 1–3 units | Phase 2 — Diesel phase-out 2028–2032 |
| Tractors (for aeration, etc.) | 50–100+ HP (Diesel) | 1–2 units | Phase 2 — Diesel phase-out 2028–2036 |
| Hand-held tools (blowers, trimmers, etc.) | ≤5 HP (SORE) | 15–30 units | Phase 1 — Sale bans effective 2024 |
| Portable generators | ≤25 HP (SORE) | 1–3 units | Phase 1/2 — Full ban 2028 |

A fully equipped new private club spends $2M or more on its initial equipment fleet. Industry data suggests replacement of the operating equipment fleet ranges from $500,000 to $1.5M for a typical 18-hole course, with private clubs trending toward the top of that range.

**MARKET DYNAMICS**

*The electric premium is real but narrowing. Electric versions of most golf course equipment carry a 15–30% price premium over gas equivalents today. As supply chains mature and regulation accelerates demand, this premium is expected to compress. Early movers benefit from a wider range of available products; late movers will face supply constraints.*

# SECTION 3: EQUIPMENT REPLACEMENT CAPITAL NEEDS

## 3.1 Per-Course Equipment Cost Assumptions

We model three tiers of course based on type and operating profile. Capital replacement costs are estimated based on industry benchmarks, OEM price data (Toro, John Deere, Club Car), and the 15–25% electric premium that currently applies to most equipment categories.

| Course Tier | Course Types | Current Fleet Value (Gas) | Electric Fleet Replacement Cost | Electric Premium |
|---|---|---|---|---|
| Tier 1: Municipal / Budget Public | Municipal, executive courses | $300K–$500K | $375K–$650K | ~25% |
| Tier 2: Daily Fee / Mid-Market | Public daily fee, semi-private | $500K–$800K | $625K–$1.0M | ~20% |
| Tier 3: Private / Premium | Private clubs, resort courses | $800K–$1.5M | $960K–$1.8M | ~15–20% |

The phased regulatory timeline means courses do not need to replace their entire fleet simultaneously. The practical capital need per course over each regulatory phase is outlined below:

### Phase 1 Capital Need (2024–2028): SORE Equipment ≤25 HP

This phase covers hand-held tools, light utility vehicles, greens mowers, and bunker rakes. For most courses, this represents 40–55% of total fleet value.

| Course Tier | Phase 1 Electric Replacement Cost | Estimated Replacement Urgency |
|---|---|---|
| Municipal | $150K–$325K | High — as existing gas units fail/wear out |
| Daily Fee / Mid-Market | $250K–$500K | High — immediate for new equipment needs |
| Private / Premium | $400K–$900K | Moderate-High — many stockpiled; 5-yr horizon |

### Phase 2 Capital Need (2028–2032): Diesel Equipment >25 HP

This phase covers rough mowers, sprayers, aerators, tractors, and heavy utility vehicles. For most courses, this is 45–60% of total fleet value by dollar amount given the higher unit costs of large diesel equipment.

| Course Tier | Phase 2 Electric/ZEV Replacement Cost | Key Constraint |
|---|---|---|

| | | |
|---|---|---|
| Municipal | $175K–$325K | Electric alternatives for large equipment still emerging |
| Daily Fee / Mid-Market | $300K–$550K | Supply chain and product availability risk |
| Private / Premium | $500K–$950K | Highest absolute cost; most financial flexibility |

## 3.2 Statewide Equipment Replacement Market Sizing

Applying per-course estimates to the 984-course California market, we arrive at the following statewide capital requirement. Note that not all courses will replace simultaneously — the figures represent the total capital need over the respective regulatory window.

| Phase | Timeline | Courses Affected | Per-Course Range | Statewide Total (Low) | Statewide Total (High) |
|---|---|---|---|---|---|
| Phase 1: SORE ≤25 HP | 2024–2028 | ~984 courses | $150K–$900K | $148M | $885M |
| Phase 2: Diesel >25 HP | 2028–2032 | ~984 courses | $175K–$950K | $172M | $935M |
| Phase 1 Practical Tranche* | 2024–2028 | ~984 courses | $150K–$500K avg | $148M | $492M |
| Phase 2 Practical Tranche* | 2028–2032 | ~984 courses | $175K–$550K avg | $172M | $541M |
| COMBINED TOTAL (Practical) | 2024–2032 | ~984 courses | — | $320M | $1.03B |

*Practical tranche estimates exclude the highest-end private clubs (top 10% by spend) which can self-fund and exclude ultra-budget municipal courses that may defer or seek grant funding. These figures represent the core addressable financing and advisory market.

**PERIGON TAM — EQUIPMENT**

*Conservative market sizing places the equipment electrification capital need at $590M–$985M over the full 2024–2032 window in California. Perigon's addressable segment — courses requiring capital advisory, financing solutions, or energy infrastructure planning — represents 60–70% of this figure, or approximately $354M–$690M.*

# SECTION 4: ELECTRICAL INFRASTRUCTURE UPGRADE OPPORTUNITY

## 4.1 The Infrastructure Challenge

Transitioning a golf course maintenance fleet to electric is not simply a matter of swapping equipment. The maintenance buildings, equipment sheds, and storage facilities at virtually every California golf course were designed around gas and diesel equipment — fuel storage, oil changes, and combustion engine maintenance. They were NOT designed to charge 30–60+ electric pieces of equipment simultaneously.

The electrical infrastructure requirement is substantial and represents a separate, parallel capital need that many course operators have not yet fully priced into their planning. Key infrastructure components include:

- Electrical service panel upgrades (100A–400A additions)
- Utility transformer upgrades (critical for simultaneous overnight charging loads)
- Level 2 commercial EV charging stations for turf equipment
- Dedicated circuit runs to charging bays in maintenance buildings
- Battery management and smart-charging software systems
- Trench and conduit work for new electrical runs
- Potentially solar-plus-storage systems to manage demand charges

## 4.2 Power Load Estimation

A fully electric maintenance fleet at an 18-hole course will require significant overnight charging capacity. The following estimates are based on typical equipment battery sizes and charging requirements.

| Equipment Category | Typical Battery Size | Charger Level | kW Draw per Unit |
|---|---|---|---|
| Walk-behind greens mowers (10 units) | 3–5 kWh each | Level 2 | 1.4–2.4 kW each |
| Riding/triplex greens mowers (3 units) | 8–15 kWh each | Level 2 | 3.3–7.2 kW each |
| Light utility vehicles (12 units) | 5–10 kWh each | Level 2 | 3.3–7.2 kW each |
| Heavy utility vehicles / large mowers (4 units) | 20–50 kWh each | Level 2 / DCFC | 7.2–25 kW each |
| Hand-held tools / chargers (20 units) | 0.5–2 kWh each | Level 1 | 0.2–0.5 kW each |
| Large diesel replacement equipment (3 units) | 50–150 kWh each | DCFC | 25–50 kW each |

Assuming staggered charging (not all units simultaneously), a typical 18-hole course maintaining a fully electric fleet could require a peak demand draw of 150–350 kW added to its existing load. Many existing maintenance facilities operate on 100–200A commercial service — wholly inadequate for this load.

**PLANNING URGENCY**

*A transformer upgrade alone — when required by the utility — can cost $50,000–$150,000 and take 12–24 months to procure and install given current utility backlogs. Golf courses must begin electrical infrastructure planning NOW to avoid operational disruptions when their equipment fleet goes electric.*

## 4.3 Infrastructure Cost Breakdown per Course

| Infrastructure Component | Low Estimate | High Estimate | Notes |
|---|---|---|---|
| Service panel upgrade (200A–600A) | $15,000 | $40,000 | Electrical contractor; permits |
| Utility transformer upgrade | $30,000 | $150,000 | If required by utility; long lead time |
| Level 2 commercial chargers (10–20 units) | $20,000 | $80,000 | $1,000–$5,000 per unit installed |
| DCFC fast chargers (2–4 units for large equip.) | $60,000 | $200,000 | $20,000–$80,000 per unit installed |
| Trenching / conduit / wiring | $15,000 | $60,000 | Depends on facility layout |
| Smart charging management system | $5,000 | $25,000 | Software + networking |
| Building modifications (charging bays, ventilation) | $10,000 | $50,000 | Structural modifications |
| SUBTOTAL — INFRASTRUCTURE PER COURSE | $155,000 | $605,000 | |
| Practical Mid-Range Estimate | $200,000 | $350,000 | Most 18-hole courses |

Municipal courses may benefit from public utility rebates and grant programs (e.g., CARB's Carl Moyer Program, IRA tax credits at 30% for EV infrastructure) that can reduce net infrastructure costs by 20–40%. Private clubs typically self-fund but may benefit from tax structures through ownership entities.

## 4.4 Statewide Infrastructure Market Sizing

Applying per-course infrastructure estimates to the 984-course California market:

| Scenario | Courses | Per-Course Avg | Statewide Total |
|---|---|---|---|
| All courses (full infrastructure need) | 984 | $275,000 | $271M |

| | | | |
|---|---|---|---|
| Municipal & Public (grant/rebate eligible) | 648 courses | $200,000 | $130M |
| Private / Premium (full-cost build-out) | 336 courses | $350,000 | $118M |
| Conservative (50% of courses need major upgrades) | 492 courses | $250,000 | $123M |
| Aggressive (80% of courses need upgrades) | 787 courses | $300,000 | $236M |

**INFRASTRUCTURE TAM**

*Statewide electrical infrastructure upgrade need is estimated at $100M–$250M, with a midpoint of approximately $165M. This is additive to the equipment replacement capital need. Total California golf course electrification capital requirement: $690M–$1.24B.*

# SECTION 5: PERIGON ENERGY SOLUTIONS OPPORTUNITY FRAMEWORK

## 5.1 Total Addressable Market Summary

| Opportunity Segment | Statewide Total (Low) | Statewide Total (High) | Perigon Addressable % | Perigon TAM |
|---|---|---|---|---|
| Phase 1 Equipment Replacement (SORE) | $148M | $492M | 60–70% | $89M–$344M |
| Phase 2 Equipment Replacement (Diesel) | $172M | $541M | 50–65% | $86M–$352M |
| Electrical Infrastructure Upgrades | $100M | $250M | 40–60% | $40M–$150M |
| TOTAL COMBINED TAM | $420M | $1.28B | 55–65% | $215M–$846M |

## 5.2 Service Model Options for Perigon

### Option A: Capital / Financing Facilitation

Structure equipment financing or leasing solutions for golf courses unable to fund full fleet replacement upfront. Courses already lease 3–5-year equipment cycles for daily-use items; Perigon can aggregate and structure financing across the California market.

### Option B: Turnkey Electrification Planning

Provide end-to-end electrification roadmaps including regulatory compliance timelines, equipment specification, utility coordination, infrastructure design, and capital planning. Position as the trusted advisor throughout the 10-year transition.

### Option C: Infrastructure Project Development

Own or co-develop the electrical infrastructure (charging systems, solar-plus-storage, transformer upgrades) at golf course facilities under a long-term service or PPA model, collecting recurring revenue while reducing upfront capital burden for the course operator.

## 5.3 Recommended Immediate Market Entry Strategy

- Target private clubs first: Highest financial capacity, most urgency due to member expectations for premium conditions, most receptive to advisory services.
- Municipal courses as a grant-enabled channel: Leverage CARB incentive programs and IRA tax credits to make the value proposition compelling for budget-constrained public courses.
- Build relationships with GCSAA California chapter and SCGA: These organizations are the primary communication channels to course superintendents and operators.

- Partner with OEMs (Toro, John Deere, Club Car): Equipment vendors need financing partners; Perigon can co-market with equipment dealers to reach courses at the point of purchase decision.
- Pilot 10–15 courses in Phase 1 to build case studies: Documented ROI and compliance outcomes are the most powerful sales tool in this market.

## 5.4 Key Risks and Mitigants

| Risk | Description | Mitigant |
|---|---|---|
| Supply availability | Electric versions of heavy equipment (large rough mowers, tractors) have limited market availability through ~2027 | Phase capital deployment to follow product availability; Phase 1 focus now |
| Course operator inertia | Many courses stockpiled gas equipment; short-term urgency is low for those operators | Focus on courses that did not stockpile and need replacements now; municipal courses facing budget cycles |
| Regulatory rollback | Change in California political environment could slow enforcement | Low probability; AB 1346 is statute, not executive order; enforcement infrastructure in place |
| Utility lead times | Transformer and service upgrades can take 12–24 months via utility approval | Early engagement essential; utility coordination service as a differentiator for Perigon |
| Capital access at smaller courses | Daily fee and municipal courses have thinner margins | Grant facilitation, IRA 30% tax credits, and structured financing products address this gap |

# SECTION 6: CONCLUSIONS & NEXT STEPS

California's golf industry faces a decade-long, mandatory equipment electrification transition with a combined capital need of $690M to over $1.2B across equipment and infrastructure. This transition is not a choice — it is mandated by AB 1346, CARB regulations, and an executive order directing 100% ZEV off-road equipment by 2035.

Perigon Energy Solutions is entering this market at an ideal inflection point. Phase 1 regulations are already in effect, creating immediate demand for electric equipment solutions. Phase 2 requirements are close enough on the horizon that forward-planning conversations are productive but sufficiently far away that comprehensive advisory and capital solutions have time to be structured.

## Recommended Next Steps

- Conduct 15–20 discovery calls with California golf course superintendents and GM/CFOs to validate capital need assumptions and identify the most acute pain points.
- Develop a Perigon Electrification Readiness Assessment tool — a rapid diagnostic (30-60 min) that quantifies a specific course's compliance timeline, equipment replacement cost, and infrastructure gap.
- Build a state incentive and grant tracker for golf course operators (CARB Carl Moyer, IRA 30% credit, utility rebates) — a tangible value-add that builds trust and opens advisory relationships.
- Identify 3–5 flagship clients for a pilot program in 2026 with documented outcomes to serve as case studies for broader market expansion.
- Evaluate OEM distribution partnerships with Toro and John Deere California dealer networks as a customer acquisition channel.

**BOTTOM LINE**

*The golf course electrification opportunity in California is large, non-discretionary, and time bound. The courses that act now — with the right partners — will be ahead of compliance deadlines, avoid supply constraints, and lock in the best economics. Perigon's opportunity is to be that partner.*