ARQLUS / FLEET INTELLIGENCE

From Fleet Data to Defensible Decisions

An enterprise decision-intelligence platform for fleet electrification, charging infrastructure, and transition execution

WHITE PAPER

A practical framework for fleet operators, municipalities, engineering partners, investors, pilot customers, and Ontario's mobility innovation ecosystem.

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Prepared by Arqlus Corporation

Executive summary

Fleet electrification is not a single procurement decision. It is a coordinated transformation across vehicles, duty cycles, energy, charging, facilities, finance, operations, and organizational readiness. The cost of a weak sequence is measured not only in capital, but in stranded chargers, disrupted service, unsuitable vehicles, missed funding windows, and plans that cannot survive scrutiny.

Arqlus Fleet Intelligence is designed as the decision layer between fragmented fleet data and investment action. It converts operational evidence into a defensible transition plan: which vehicles to electrify, when to replace them, what charging capacity is required, how depot constraints change the answer, and which scenario best balances cost, emissions, resilience, and service.

CORE PROPOSITION

Arqlus does not begin with a charger count or an EV target. It begins with the work the fleet must perform, then builds an explainable pathway from evidence to implementation.

What the platform delivers

- Vehicle-level suitability analysis based on real duty cycles and operational constraints.
- Transition sequencing that coordinates replacement windows, vehicle availability, infrastructure lead times, and policy objectives.
- Charging and depot plans that connect energy demand, dwell time, operational resilience, and site constraints.
- Total-cost and scenario models that make assumptions visible and comparable.
- Executive and technical reporting that supports approvals, procurement, pilot design, and funding applications.
- A durable infrastructure memory that preserves assumptions, decisions, evidence, and asset history over time.

Intended result

A fleet operator can move from broad electrification intent to an auditable, staged investment program—without losing the operational context behind the recommendation.

1. The market problem

Public and private fleets face rising pressure to reduce emissions, manage operating costs, modernize assets, and prepare facilities for electric vehicles. Yet the information required to act is distributed across telematics systems, maintenance records, fuel transactions, route schedules, procurement plans, utility data, building systems, spreadsheets, and institutional knowledge.

Fragmented input	Decision risk	Business consequence
Vehicle and route data	Averages hide peak-day and seasonal requirements	Unsuitable vehicle selection or conservative oversizing
Replacement plans	Vehicle timing is disconnected from site readiness	Early purchases, delayed deployment, or stranded capital
Utility and depot data	Power, civil, and operational constraints emerge late	Redesign, schedule slippage, and cost escalation
Financial assumptions	Fuel, energy, incentives, residuals, and maintenance vary	Business cases appear precise but are not comparable
Organizational knowledge	Critical constraints remain in emails or with individuals	Plans degrade when staff, vendors, or priorities change

Why current approaches fall short

- Point tools optimize one part of the problem but do not reconcile fleet, energy, site, and financial decisions.
- Static studies become outdated as asset plans, rates, routes, incentives, and technology change.
- Vendor-led assessments may inherit equipment or product assumptions before operational needs are understood.
- Opaque recommendations make it difficult for executives, councils, finance teams, and operators to approve or defend investments.

2. Why fleet electrification decisions are difficult

The central challenge is interaction. Vehicle range affects charging. Charging affects dwell time. Dwell time affects operations. Operations affect redundancy. Redundancy affects capital cost. Capital cost affects timing. Timing affects eligibility for incentives and the feasibility of site upgrades.

Decision dimension	Typical question
Operational fit	Can the vehicle complete normal, peak, winter, and exception-day work?
Technology fit	Which available platforms meet payload, range, duty, upfit, and service needs?
Infrastructure	Where, when, and at what power level should charging be installed?
Energy	What are the peak demand, tariff, managed-charging, and resilience implications?
Financial	Which scenario has the strongest whole-life value under credible assumptions?

Decision dimension	Typical question
Program delivery	What dependencies, approvals, procurement steps, and lead times control the schedule?

3. The Arqlus Fleet Intelligence solution

Arqlus is conceived as an intelligence platform rather than a dashboard of disconnected metrics. The platform creates a traceable chain from source data to normalized evidence, analytical methods, recommendations, and implementation records.

DECISION CHAIN

DATA → VALIDATION → METHODOLOGY → SCENARIOS → RECOMMENDATIONS → IMPLEMENTATION MEMORY

Product modules

Module	Primary output	Decision enabled
Fleet Baseline	Validated asset, duty-cycle, utilization, cost, and emissions profile	Where is the fleet today?
Vehicle Suitability	Vehicle-level electrification confidence and constraint profile	Which assets are candidates?
Transition Sequencer	Prioritized waves aligned to replacement and readiness	What moves first, and when?
Charging Intelligence	Energy, connector, power, dwell-time, and resiliency requirements	What charging is actually needed?
Depot Planner	Site constraints, capacity pathways, phasing, and dependency register	Can the depot support the plan?
TCO & Scenarios	Comparable financial, operational, and emissions cases	Which pathway is most defensible?
Executive Reports	Decision-ready evidence, assumptions, risks, and approvals	How is the investment governed?
Asset Passport	Persistent history of assets, decisions, documents, and changes	How is institutional memory retained?

4. Data and intelligence methodology

The methodology is designed around explainability. Recommendations should be reproducible from the evidence available at the time, and every material assumption should have an owner, source, date, and confidence level.

1. Ingest and inventory: assemble vehicle, operational, cost, energy, site, and policy inputs.
2. Normalize and validate: reconcile identifiers, units, gaps, outliers, and conflicting sources.
3. Establish constraints: define minimum operational, technical, financial, and policy thresholds.
4. Model scenarios: test alternative vehicles, timelines, charging strategies, and infrastructure pathways.

5. Score and explain: present suitability, readiness, economics, risk, and confidence with supporting reasons.
6. Review and approve: capture operator, engineering, finance, utility, and executive decisions.
7. Monitor and learn: update assumptions and outcomes as pilots and deployments generate evidence.

METHODOLOGICAL SAFEGUARD

AI can accelerate analysis and explanation, but it does not silently override source data, approved assumptions, engineering constraints, or accountable human decisions.

5. Charging and depot infrastructure planning

Charging planning must begin with operational demand, not a fixed charger-to-vehicle ratio. Arqlus connects vehicle energy needs with arrival and departure patterns, parking assignments, dwell windows, redundancy requirements, utility constraints, and site-development realities.

Planning outputs

- Daily and coincident energy demand by vehicle group, depot, and operating window.
- Recommended charging power bands and managed-charging logic.
- Connector, redundancy, and spare-capacity assumptions.
- Preliminary electrical, civil, communications, safety, and accessibility dependencies.
- Utility engagement requirements, service-upgrade pathways, and lead-time risks.
- Phased infrastructure plan that avoids overbuilding before vehicle deployment.
- Resilience options, including operational fallback, load curtailment, and future storage or generation interfaces.

Depot intelligence model

Layer	Examples of evidence	Planning use
Operational	Pull-out times, return windows, parking, dispatch, exceptions	Defines available charging windows
Electrical	Service capacity, peak demand, one-lines, transformers, panels	Frames capacity and upgrade options
Physical	Parking geometry, trenching, drainage, traffic flow, snow, accessibility	Identifies constructability and safety constraints
Digital	Networks, charger protocols, access control, telematics, cybersecurity	Defines integration and control requirements
Delivery	Permits, utility milestones, procurement, construction staging	Creates an executable schedule

6. Vehicle suitability and transition sequencing

A technically possible conversion is not necessarily an operationally responsible one. Arqlus evaluates both suitability and sequence, recognizing that the right vehicle at the wrong time can still create a failed deployment.

Suitability domain	Illustrative factors
Duty cycle	Distance distribution, idle time, stops, speed, elevation, temperature, auxiliary loads
Mission criticality	Service consequence, backup availability, emergency or exception use
Vehicle configuration	Class, payload, towing, body, upfit, power take-off, accessibility
Market readiness	Available models, lead times, warranty, service, charging compatibility
Asset economics	Age, condition, remaining life, replacement window, maintenance burden
Organizational readiness	Operator acceptance, training, maintenance capability, policies

Transition waves

- Wave 1 — high-confidence vehicles with repeatable duty cycles and ready charging.
- Wave 2 — suitable vehicles dependent on planned site upgrades or procurement timing.
- Wave 3 — vehicles requiring technology maturation, route redesign, or specialized infrastructure.
- Hold / monitor — mission profiles where current options do not yet satisfy accountable constraints.

7. TCO and scenario analysis

Total cost of ownership is useful only when the boundary, time horizon, and assumptions are explicit. Arqlus compares scenarios using consistent logic while retaining the ability to show uncertainty and local policy choices.

Cost and value categories

Category	Included considerations
Capital	Vehicles, upfits, chargers, construction, electrical upgrades, design, contingency
Operating	Energy, fuel, demand charges, network fees, maintenance, tires, labour effects
Lifecycle	Useful life, residual value, battery assumptions, replacement timing, decommissioning
Program	Training, change management, permits, integration, project management, support
Benefits	Avoided fuel and maintenance, emissions reduction, noise, resilience, grant support

SCENARIO DISCIPLINE

The platform should present a base case, downside case, and upside case—plus the assumptions that cause the result to change. A single payback number is not a substitute for decision intelligence.

Decision outputs

- Net present cost and lifecycle cost by scenario.
- Annual and cumulative cash flow.
- Cost per vehicle, kilometre, tonne of emissions avoided, or service unit where appropriate.
- Sensitivity to utilization, energy price, fuel price, maintenance, incentives, capital escalation, and discount rate.
- Constraints and non-financial trade-offs that cannot be responsibly reduced to one number.

8. AI decision support

Arqlus can use AI to help users navigate complex evidence, identify inconsistencies, compare scenarios, draft explanations, and surface questions that require attention. The role of AI is to make rigorous analysis easier to use—not to obscure judgment behind a confident answer.

AI capability	Value	Control
Data quality assistant	Flags gaps, duplicates, anomalies, and conflicting assumptions	Source-linked; user resolution required
Scenario copilot	Helps construct and compare approved planning cases	Uses governed variables and methods
Evidence navigator	Answers questions across project documents and records	Cites accessible project evidence
Report assistant	Drafts audience-specific summaries and decision notes	Human review and approval
Change monitor	Highlights new data that may affect prior recommendations	No automatic approval or silent overwrite

9. Asset Passport and infrastructure memory

Fleet transformation unfolds over years, while teams, vendors, assets, and assumptions change. The Asset Passport concept gives each vehicle, charger, site, and major infrastructure component a persistent digital record linked to its decision and operating history.

What the record can preserve

- Identity, location, configuration, ownership, warranty, and commissioning details.
- Source documents, drawings, permits, inspections, certifications, and photographs.
- Maintenance, incidents, upgrades, firmware, connectivity, and operational performance.
- The assumptions and approvals behind the original investment decision.
- Relationships among vehicles, chargers, panels, transformers, sites, vendors, and projects.

INFRASTRUCTURE MEMORY

The value is not merely tracking an asset. It is retaining why the organization made a decision, what evidence supported it, what changed, and what should be learned before the next investment.

10. Target customers and use cases

Customer	High-value use case
Municipalities and public agencies	Build council-ready transition plans; coordinate fleet, facilities, procurement, finance, and climate teams
Utilities and energy partners	Forecast fleet-driven demand; support customer planning and managed charging
Commercial and service fleets	Prioritize replacement waves while protecting productivity and cost control
Transit, shuttle, and institutional fleets	Coordinate service schedules, depot constraints, resilience, and capital programs
Engineering and advisory partners	Use a structured decision layer alongside detailed engineering and implementation
Investors, lenders, and insurers	Review assumptions, delivery risk, asset readiness, and evidence quality

11. Pilot approach

A pilot should prove decision value before broad platform scope. The recommended approach is a bounded fleet segment or depot with sufficient data to test the methodology and a real investment decision on the horizon.

Phase	Indicative activity	Output
1. Align	Confirm objectives, users, decision gates, scope, and data access	Pilot charter and success measures
2. Baseline	Ingest, validate, and reconcile fleet, operations, site, and financial inputs	Trusted baseline and data-quality register
3. Analyze	Assess vehicle suitability, charging needs, site readiness, TCO, and scenarios	Draft transition pathways
4. Validate	Workshops with operators, facilities, finance, engineering, and leadership	Approved assumptions and preferred scenario
5. Deliver	Issue decision package, roadmap, risks, and next-stage implementation plan	Pilot report and commercialization evidence
6. Learn	Measure deployment outcomes and update methodology	Validated case study and product backlog

Pilot success measures

- Reduction in time required to assemble and reconcile decision evidence.
- Agreement among operational, technical, and financial stakeholders on a preferred pathway.
- Clear identification of avoided capital, delivery risk, or unsuitable conversions.
- A repeatable workflow that can expand to additional depots, fleet classes, or customers.
- Documented customer willingness to pay and a credible conversion path beyond the pilot.

12. Business model

Arqlus is designed for recurring intelligence revenue, supported by implementation and partner services where they accelerate adoption.

Offer	Commercial form	Customer value
Fleet Intelligence Assessment	Fixed-scope engagement	Fast path from fragmented data to a defensible roadmap
Platform Subscription	Annual SaaS subscription	Ongoing scenario, portfolio, reporting, and decision memory
Professional / Partner Edition	Subscription plus enablement	Reusable workflows for engineering and advisory delivery
Enterprise Deployment	Multi-site or multi-business-unit agreement	Governance, integrations, security, and portfolio analytics
Data / API Services	Usage or licence based	Controlled access to validated models and outputs

Commercial principle

Professional services should accelerate learning, configuration, and adoption; the long-term product is the governed intelligence platform and the compounding evidence it enables.

13. Implementation roadmap

Stage	Focus	Exit evidence
0–3 months	Design partners, data model, core methodology, pilot workflow	Signed pilot scope; data readiness; prototype
3–6 months	Baseline, suitability, sequencing, charging, TCO, reporting MVP	Decision package produced from real customer data
6–12 months	Repeatable pilots, integrations, security controls, subscription packaging	Reference customers; repeatable delivery; paid conversions
12–24 months	Multi-site portfolio, partner edition, infrastructure memory, governed AI	Expansion revenue; validated product metrics; broader ecosystem adoption
24+ months	Scaled intelligence network, benchmarks, APIs, additional infrastructure domains	Defensible data asset and category leadership

14. Competitive differentiation

Arqlus distinction	Why it matters
Decision-first, not equipment-first	Recommendations begin with operational needs rather than a preferred vehicle, charger, or vendor

Arqlus distinction	Why it matters
Integrated fleet and depot logic	Vehicle, energy, facility, financial, and delivery decisions are reconciled in one chain
Explainable methodology	Users can inspect assumptions, evidence, confidence, and reasons
Persistent decision memory	Plans remain intelligible after staff, vendors, and market conditions change
Human-accountable AI	AI assists governed work without becoming an untraceable authority
Built for partners	Engineering and advisory firms can extend the platform into detailed design and implementation

15. Data governance, security, and IP ownership

Enterprise adoption requires clear boundaries around customer data, platform intellectual property, derived outputs, access, retention, and model use. These controls should be embedded from the pilot stage.

Governance principles

- Customer control: customer data is used only for contracted purposes and according to defined retention and access rules.
- Data minimization: collect the information needed for the decision; avoid unnecessary personal or sensitive data.
- Traceability: material outputs retain source, version, timestamp, method, and approval context.
- Role-based access: users see only the projects, assets, and functions appropriate to their role.
- Secure-by-design delivery: encryption, environment separation, logging, backup, vulnerability management, and incident procedures scale with risk.
- AI boundaries: customer data is not used to train external models without explicit authorization and contractual clarity.

Indicative IP framework

IP category	Proposed ownership position
Customer source data	Remains the customer's property
Customer-specific deliverables	Licensed or owned as defined in the engagement agreement
Arqlus platform, methods, schemas, and software	Owned by Arqlus
Pre-existing partner IP	Retained by the contributing party; licensed as required
Project-created IP	Allocated expressly before work begins; no ambiguity at grant or pilot close
Aggregated insights and benchmarks	Used only where permitted, de-identified, and contractually defined

PARTNER REQUIREMENT

Engineering and software agreements should specify source-code delivery, documentation, environments, dependencies, security artefacts, and Arqlus ownership or licensing rights before development begins.

16. Commercialization strategy

Commercialization should move from proof of decision value to repeatable subscriptions. The first market objective is not maximum feature breadth; it is a small number of credible deployments that demonstrate avoided risk, faster planning, and stakeholder confidence.

- Recruit design partners with an active fleet or depot decision and executive sponsorship.
- Convert pilot evidence into quantified case studies, references, and a repeatable implementation package.
- Build channel relationships with engineering firms, utilities, fleet advisors, leasing providers, and sector associations.
- Package the platform around customer decisions and fleet scale rather than a long list of software features.
- Use Ontario deployments to establish commercialization evidence, local IP, skilled work, and export readiness.
- Expand by adjacent workflow: assessment → implementation memory → portfolio intelligence → partner and enterprise editions.

17. Expected outcomes

Outcome area	Expected result
Decision quality	Recommendations are evidence-linked, explainable, and easier to defend
Capital efficiency	Investments are phased to operational need, replacement timing, and site readiness
Operational continuity	Vehicle and charging choices reflect real service constraints and resilience needs
Delivery readiness	Dependencies, owners, risks, and lead times are visible before procurement
Organizational learning	Assumptions, approvals, and asset histories remain available over the program lifecycle
Commercial impact	A repeatable Ontario-developed intelligence product can scale through subscriptions and partners
Environmental impact	Electrification is directed toward credible, measurable, and operationally sustainable emissions reduction

Measurement framework

- Time from data access to approved decision package.
- Percentage of fleet records meeting defined data-quality thresholds.
- Number and value of avoided, deferred, or redesigned investments.
- Variance between modelled and observed vehicle energy, charging, cost, and availability outcomes.
- Pilot-to-paid conversion, recurring revenue, expansion, and partner-led deployments.

Conclusion

Fleet electrification will be won or lost in the quality of the decisions made before procurement and in the institutional memory preserved after implementation. Organizations need more than isolated studies, vendor calculators, and static

spreadsheets. They need an accountable intelligence layer that connects operations, vehicles, energy, facilities, finance, and execution.

Arqlus Fleet Intelligence is designed to provide that layer. Its purpose is straightforward: transform complexity into a staged, explainable, and investable plan—then preserve the evidence and learning required to improve the next decision.

CALL TO ACTION

Arqlus is seeking fleet operators, municipalities, engineering partners, utilities, and pilot customers with an active electrification or depot-planning decision. The next step is a focused discovery session to confirm the decision, available evidence, pilot boundary, success measures, and commercialization path.

About Arqlus

Arqlus is building intelligence platforms for complex, high-value decisions. Arqlus Fleet Intelligence applies that mission to fleet transition, charging infrastructure, depot readiness, and lifecycle investment planning.

Trusted intelligence for complex decisions.

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