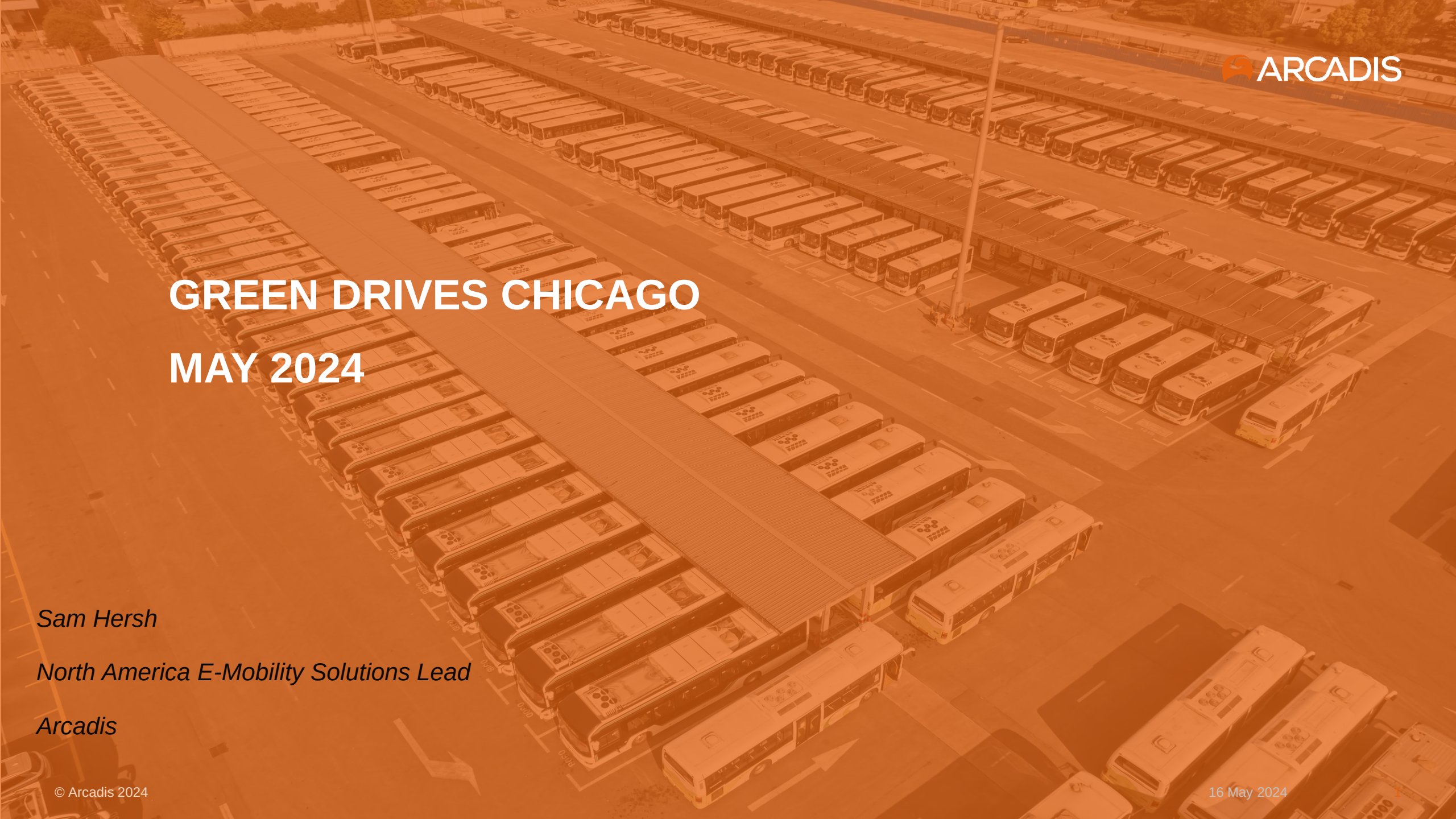


GREEN DRIVES CHICAGO

MAY 2024

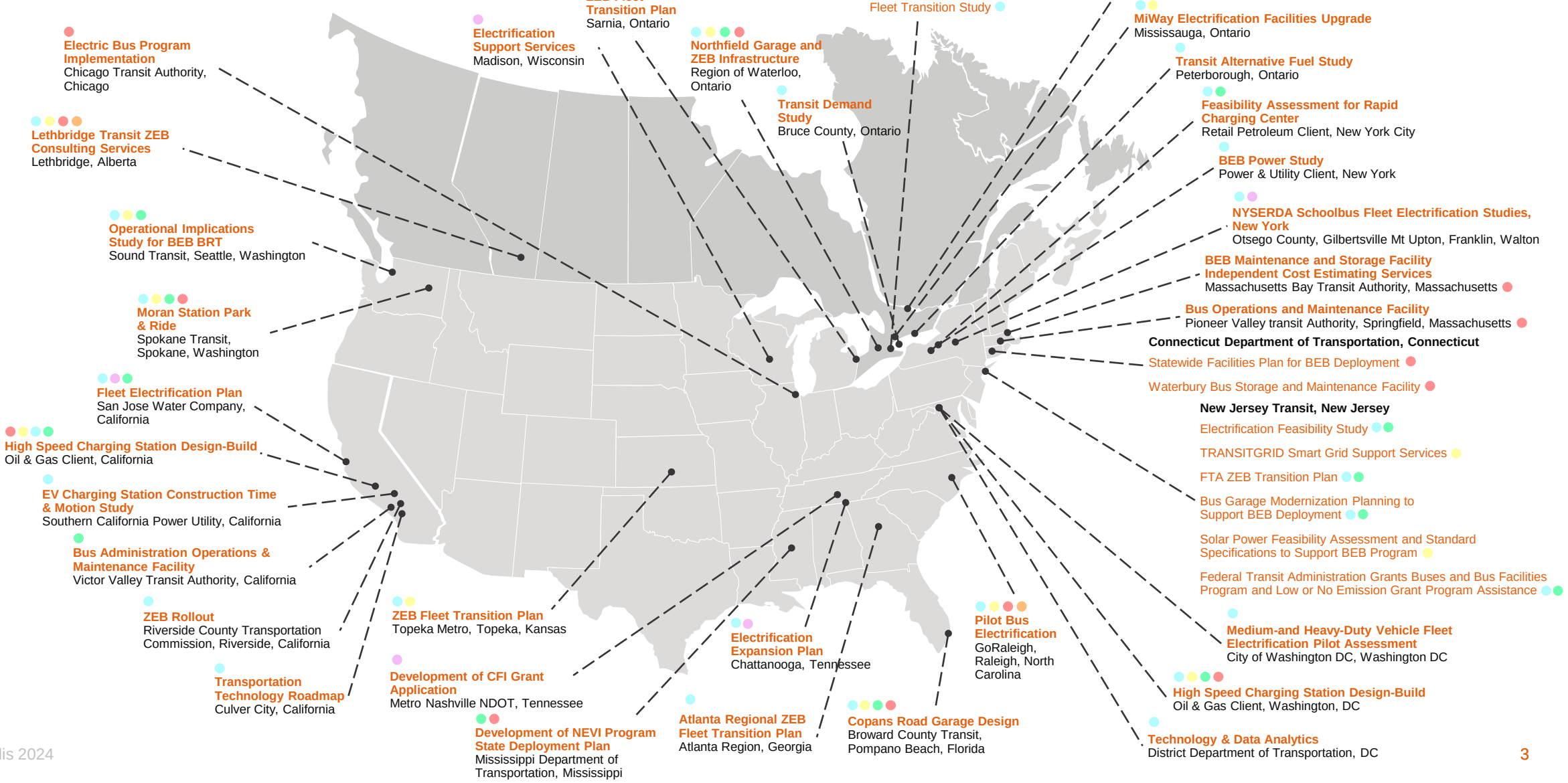
Sam Hersh

North America E-Mobility Solutions Lead

Arcadis

Global Reach and Experience

North American Fleet Transition



Brantford, Ontario
Municipal Fleets EV Charging Strategy
Transit Fleet Transition Plan

Hamilton Street Railway
Hamilton, Ontario
Fleet Transition Study

ZEB Modeling Analysis Study
OC Transpo, Ontario

MiWay Electrification Facilities Upgrade
Mississauga, Ontario

Transit Alternative Fuel Study
Peterborough, Ontario

Feasibility Assessment for Rapid Charging Center
Retail Petroleum Client, New York City

BEB Power Study
Power & Utility Client, New York

NYSERDA Schoolbus Fleet Electrification Studies, New York
Otsego County, Gilbertsville Mt Upton, Franklin, Walton

BEB Maintenance and Storage Facility Independent Cost Estimating Services
Massachusetts Bay Transit Authority, Massachusetts

Bus Operations and Maintenance Facility
Pioneer Valley transit Authority, Springfield, Massachusetts

Connecticut Department of Transportation, Connecticut
Statewide Facilities Plan for BEB Deployment
Waterbury Bus Storage and Maintenance Facility

New Jersey Transit, New Jersey
Electrification Feasibility Study
TRANSITGRID Smart Grid Support Services
FTA ZEB Transition Plan
Bus Garage Modernization Planning to Support BEB Deployment
Solar Power Feasibility Assessment and Standard Specifications to Support BEB Program
Federal Transit Administration Grants Buses and Bus Facilities Program and Low or No Emission Grant Program Assistance

Medium-and Heavy-Duty Vehicle Fleet Electrification Pilot Assessment
City of Washington DC, Washington DC

High Speed Charging Station Design-Build
Oil & Gas Client, Washington, DC

Technology & Data Analytics
District Department of Transportation, DC

ZEB Fleet Transition Plan
Sarnia, Ontario

Electrification Support Services
Madison, Wisconsin

Northfield Garage and ZEB Infrastructure
Region of Waterloo, Ontario

Transit Demand Study
Bruce County, Ontario

Electric Bus Program Implementation
Chicago Transit Authority, Chicago

Lethbridge Transit ZEB Consulting Services
Lethbridge, Alberta

Operational Implications Study for BEB BRT
Sound Transit, Seattle, Washington

Moran Station Park & Ride
Spokane Transit, Spokane, Washington

Fleet Electrification Plan
San Jose Water Company, California

High Speed Charging Station Design-Build
Oil & Gas Client, California

EV Charging Station Construction Time & Motion Study
Southern California Power Utility, California

Bus Administration Operations & Maintenance Facility
Victor Valley Transit Authority, California

ZEB Rollout
Riverside County Transportation Commission, Riverside, California

Transportation Technology Roadmap
Culver City, California

ZEB Fleet Transition Plan
Topeka Metro, Topeka, Kansas

Development of CFI Grant Application
Metro Nashville NDOT, Tennessee

Development of NEVI Program State Deployment Plan
Mississippi Department of Transportation, Mississippi

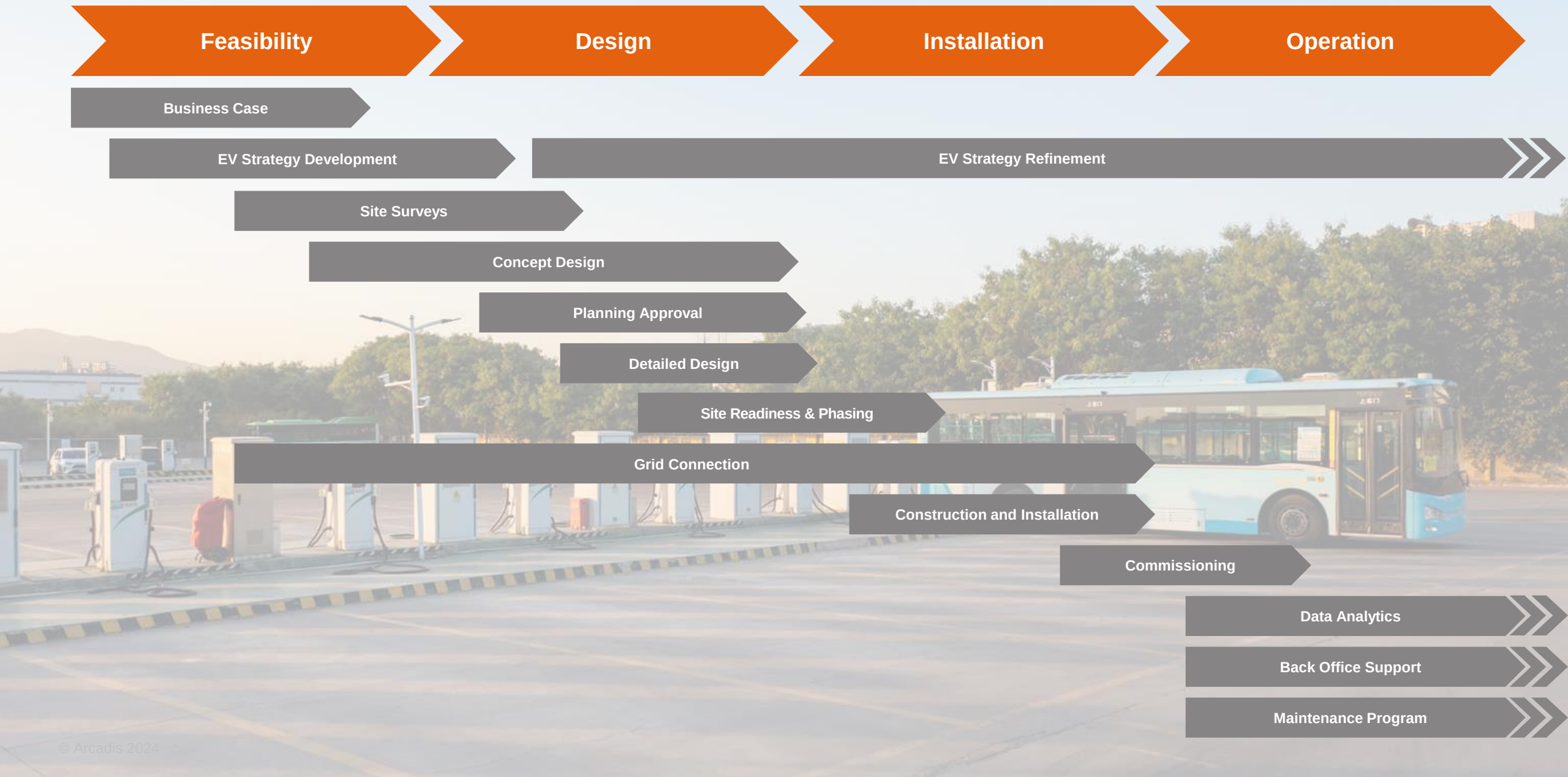
Electrification Expansion Plan
Chattanooga, Tennessee

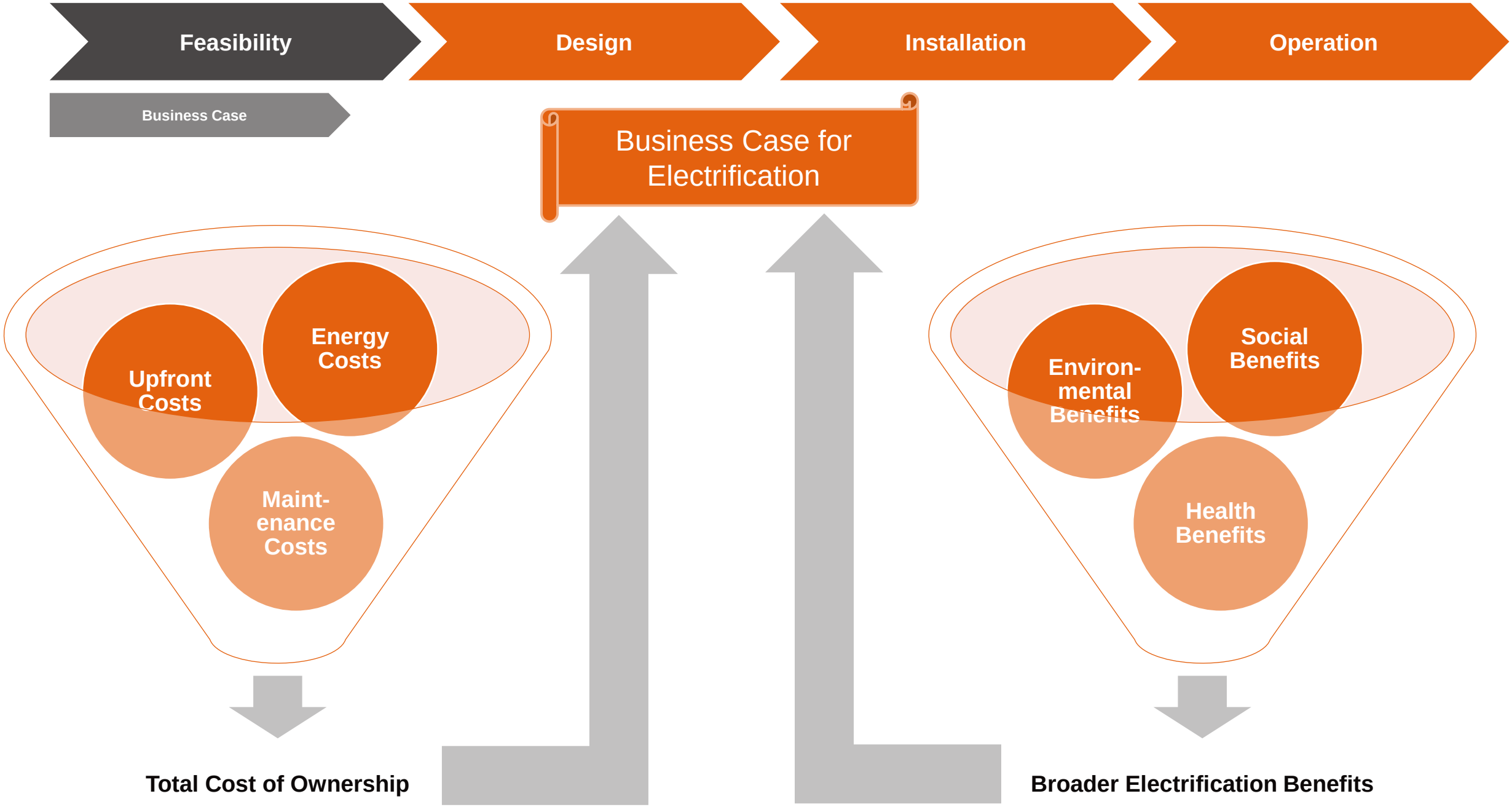
Atlanta Regional ZEB Fleet Transition Plan
Atlanta Region, Georgia

Pilot Bus Electrification
GoRaleigh, Raleigh, North Carolina

Copans Road Garage Design
Broward County Transit, Pompano Beach, Florida

Fleet Transition is a PROCESS not a Project





Feasibility | Design | Installation | Operation

EV Strategy Development

“How do we operate today?”

Existing Conditions

Current Fleet Uses and Operations

Ownership of Fleet and Facilities

Makeup and Age of Fleet and Facilities

Future Electrified Conditions

Future Expansion and Future Proofing

Energy Management and Peak Load

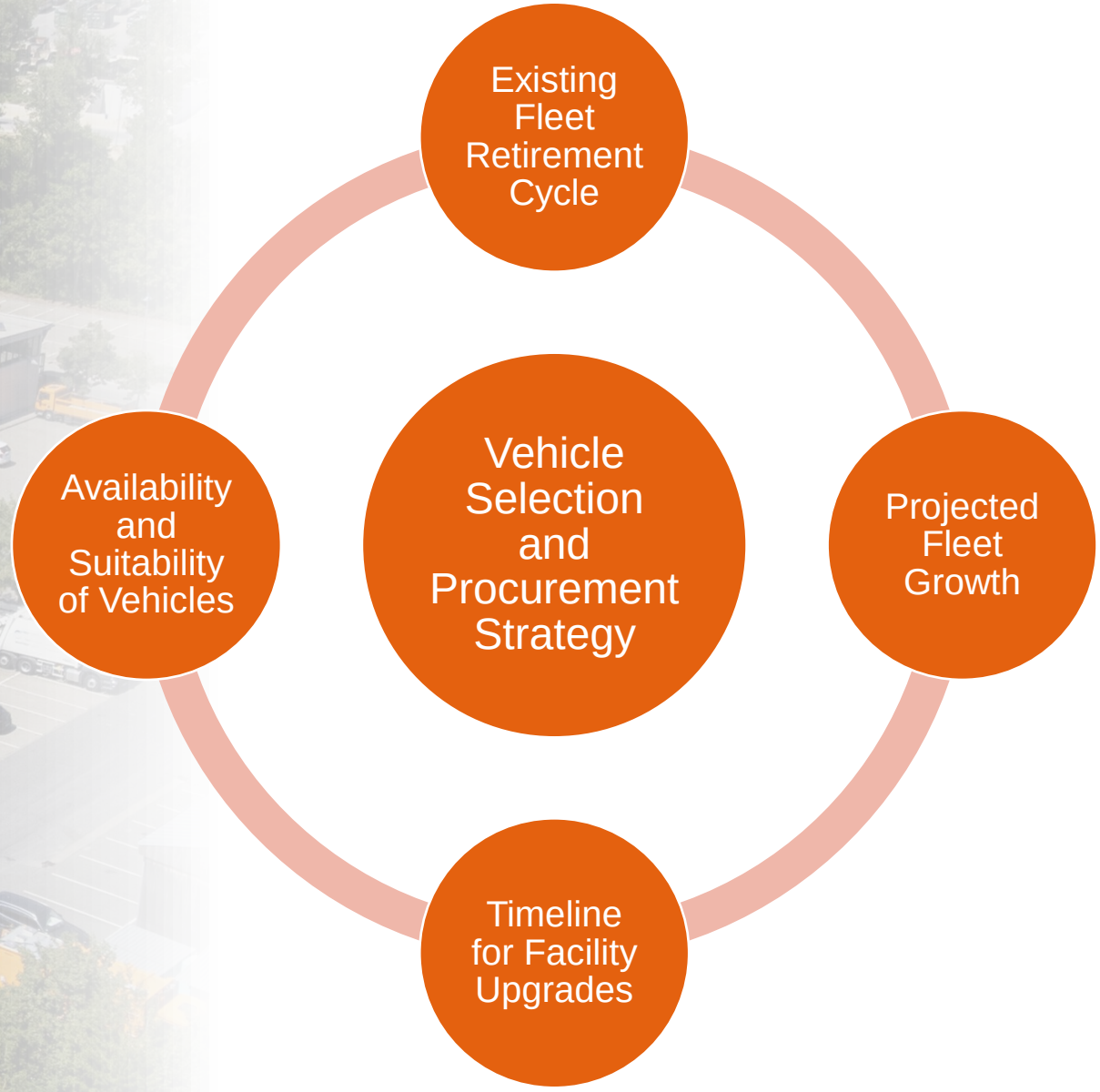
Site Operations with New EV Behaviors

“How will we operate once we go electric?”

Feasibility | Design | Installation | Operation

EV Strategy Development

Find the Right EV Fleet For Your Use-Case



Grant Program	Agency
National Electric Vehicle Infrastructure Formular Program (NEVI)	US DOT / DOE
Congestion Mitigation and Air Quality Improvement (CMAQ)	US DOT
Low or No Emission Bus Vehicle Program	US DOT
Charging and Fueling Infrastructure Discretionary Grant Program (CFI)	US DOT
National Infrastructure Project Assistance (MEGA)	US DOT
Strengthening Mobility and Revolutionizing Transportation Grant (SMART)	US DOT
Ride and Drive Electric	US DOE
Clean School Bus Program (CSB)	US EPA
Clean Heavy Vehicle Program	US EPA

Feasibility | Design | Installation | Operation

EV Strategy Development

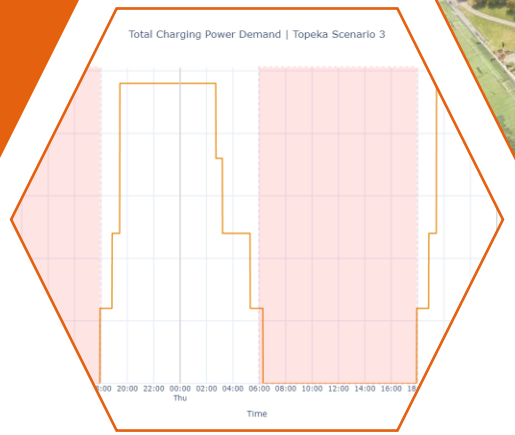
Identify Opportunities for Innovation and Co-Benefits

Battery Energy Storage and Renewable Energy

Community Benefits

Managed Charging and Energy Management

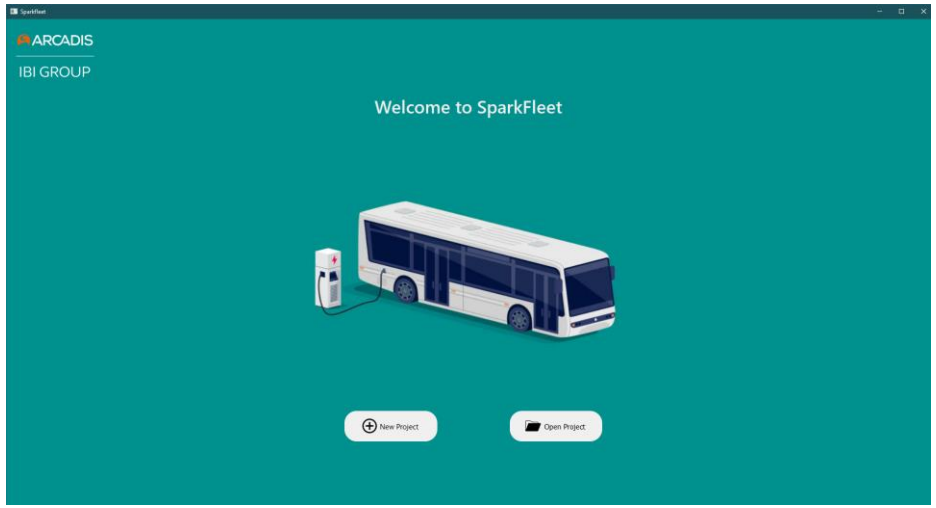
Vehicle-to-X (V2X) and Vehicle-to-Grid (V2G)

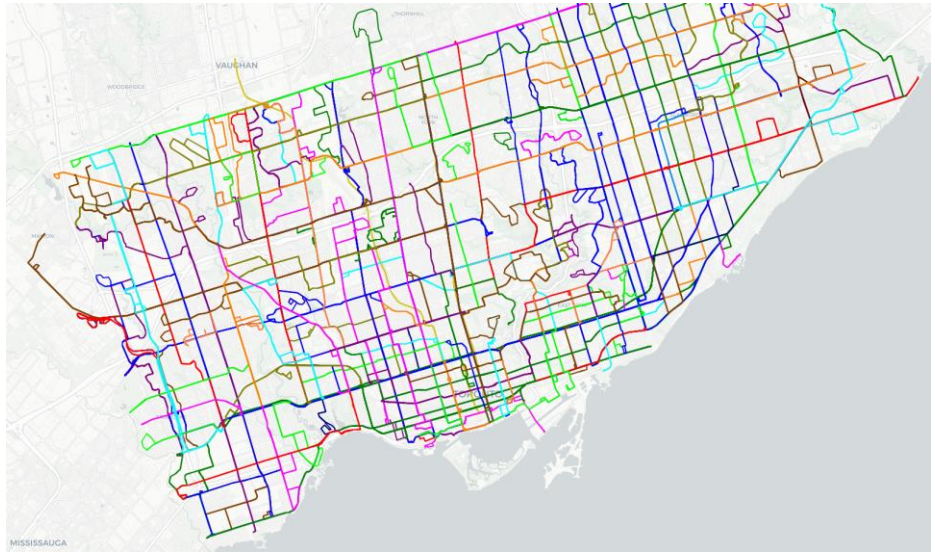


SparkFleet

Electrification Feasibility and Planning Tool

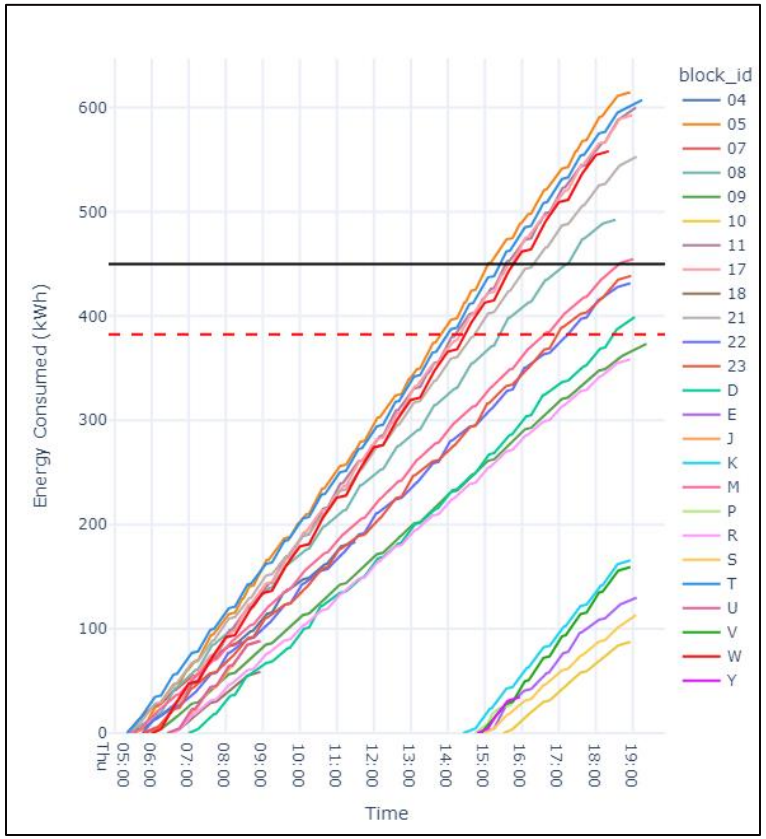
- **Energy Consumption**
  - Ingest GTFS file sets, passenger counts, and external public data
  - Project energy requirements for existing service blocks
  - Identify blocks exceeding ZEB range constraints
- **Re-Blocking and On-Route Charging**
  - Modify service blocking to achieve full compatibility with ZEB range constraints
  - Identify on-route charging opportunities for BEBs
- **Depot Simulation**
  - Assess workflow including ZEB charging/fueling, maintenance, and parking
  - Test charger placement and parking layout alternatives
  - Project power load profiles and flatten consumption to respect capacity limits
  - Investigate on-site storage and generation options to assist with offsetting charging power demand



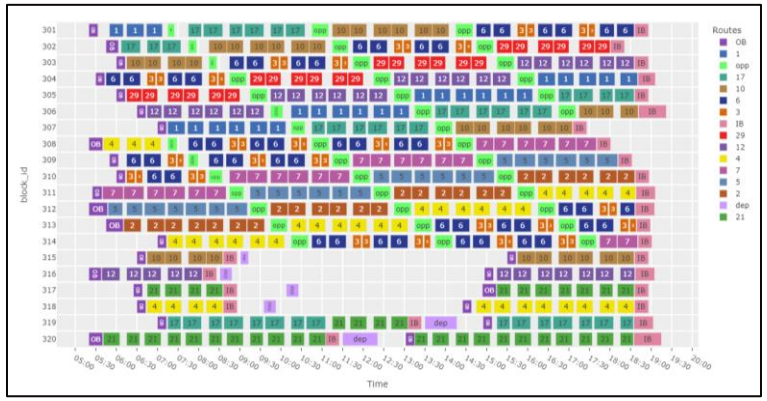


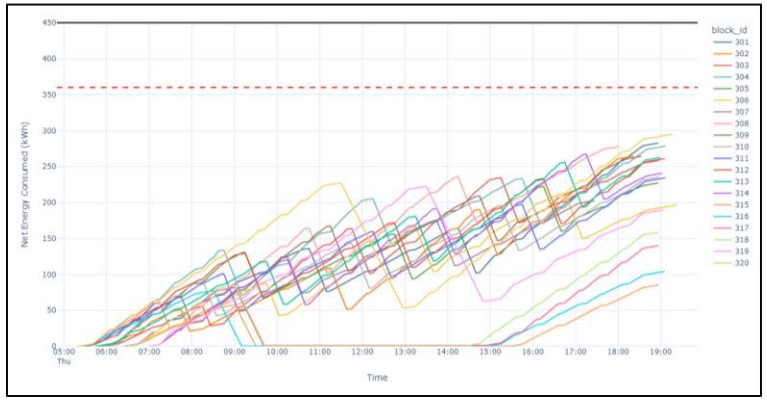
SparkFleet Output Samples

Energy Computation Output: Theoretical Energy Consumption

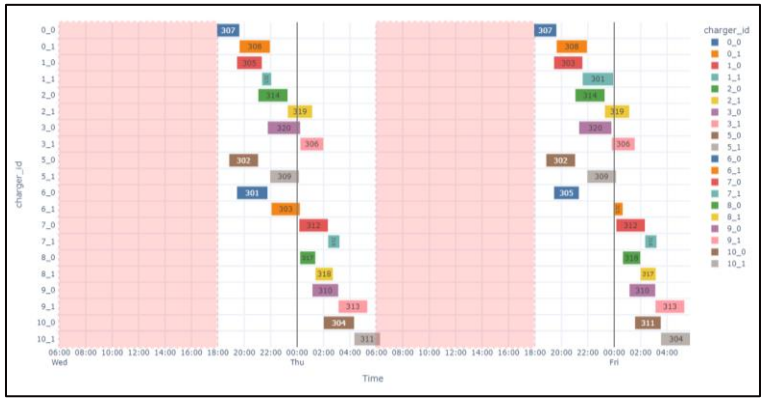


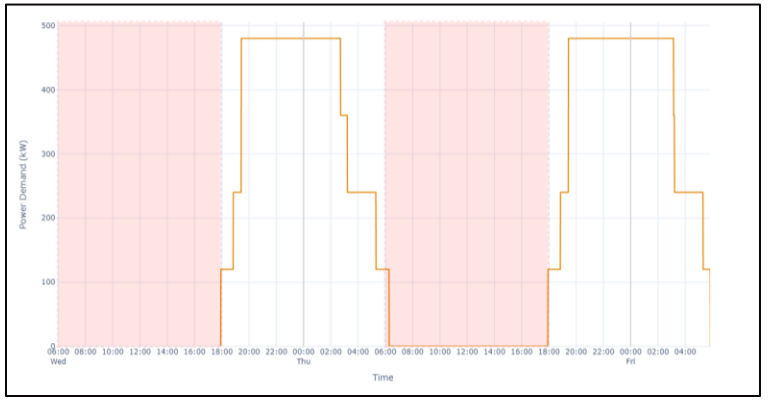
Re-Blocking Output: Revised, ZEB-Compatible Blocking Plan





Charging Simulation Output: Charging Schedule and load Profile





Feasibility | Design | Installation | Operation

- EV Strategy Development
- Site Surveys
- Concept Design

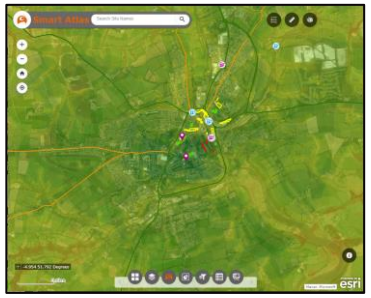
Smart Atlas

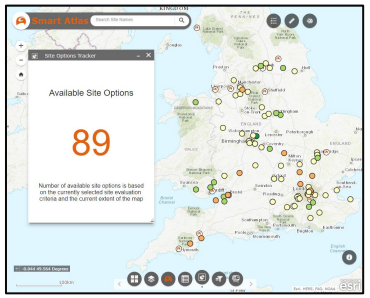
Arcadis' Proprietary EV Planning Tool

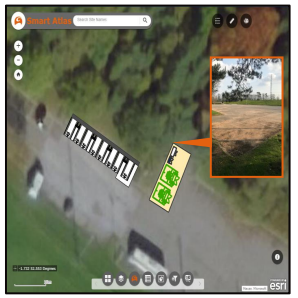
Proprietary tool to assess and locate EVCI - efficiently identify, evaluate and track site progress.

Uses a set of parameters and a scoring system for each layer to create a regional heatmap.

Locate → Assess → Design

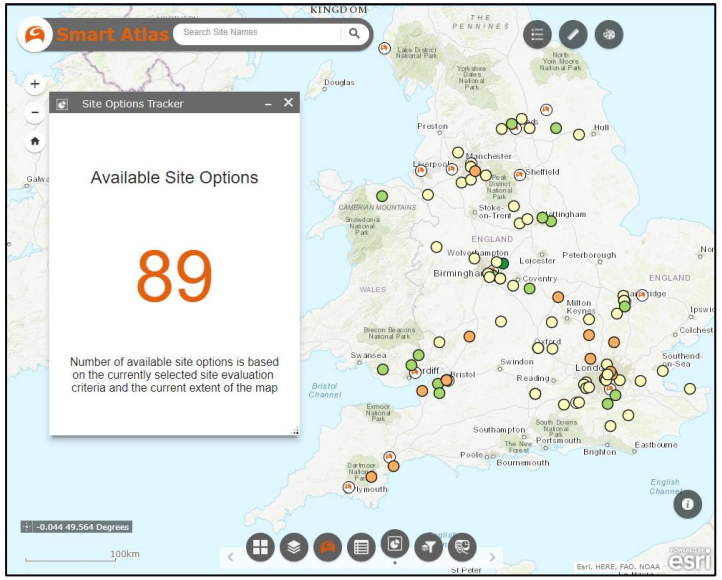






Smart Atlas
Arcadis' Proprietary EV Planning Tool

Assess using Smart Atlas

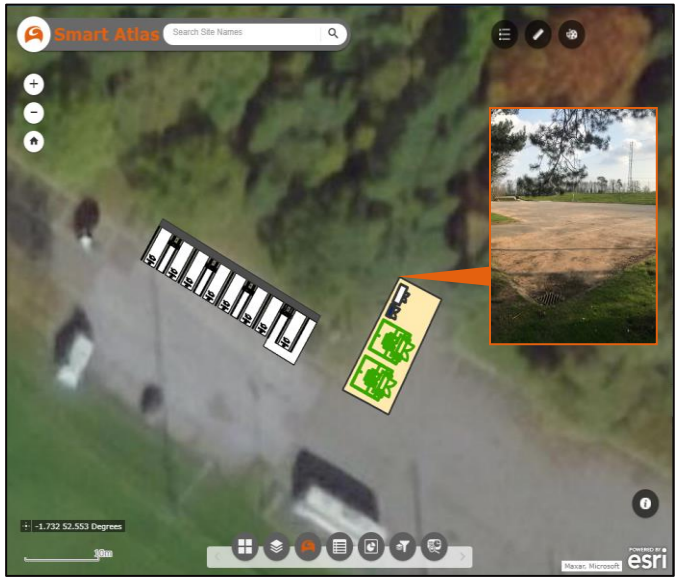


Provides access to key federal, state and local development constraints enabling rapid decision-making on preferred options including:

- Flood risk
- Ground condition
- Historic Districts
- Site accessibility
- Area demographics

Set criteria and adjust ranking and prioritisation run screening reports.

Design using Smart Atlas



Preliminary layouts for selected sites can be seamlessly visualised in Smart Atlas:

- Visualisation of CAD/BIM designs in 2D/3D
- Integration with document management systems
- Sharing with field teams for on-site data capture

Visualise and comment throughout design stages for direct collaboration.

Field surveys instantly available; rapid revisions adjusting to on the ground observations.

Can also be used as a Stakeholder Engagement Tool

Feasibility | Design | Installation | Operation

Site Surveys

- Present-Day Operations
- Electrical System and Power Constraints
- Available Space for Chargers, Circulation, and Pull-In/Pull-Out
- Structural Integrity and Capacity
- Ventilation and Fire Suppression
- Vehicle Lift Weight Capacity
- Fuel Storage Tanks

Feasibility | Design | Installation | Operation

Concept Design

Detailed Design

1. Develop Program and Conceptual Space Plan
2. Firm Up Electrical Design Early
3. Refine and Finalize Design Concurrent with Utility Upgrades
   - Mechanical and Structural Upgrades
   - Site Circulation
   - Equipment Locations and Details
   - Fuel Storage Remediation
4. Permits and Approvals

Feasibility | Design | **Installation** | Operation

- Site Readiness & Phasing
- Grid Connection
- Construction and Installation
- Commissioning

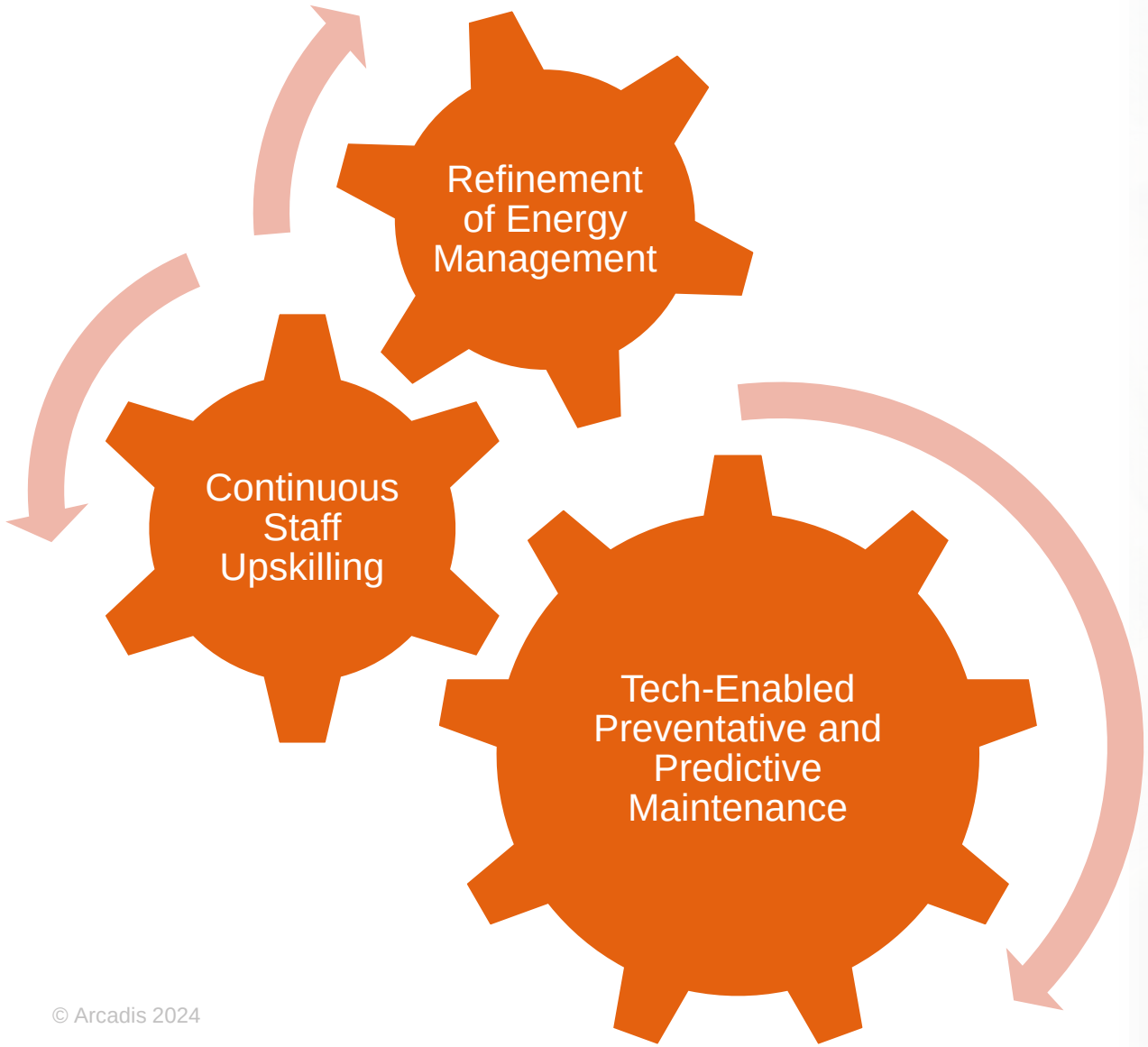
Tight Coordination
with Site Operations Team

Equipment and Construction
Alignment with Utility Upgrades

Installation and Commissioning

Feasibility → Design → Installation → Operation

- Data Analytics
- Back Office Support
- Maintenance Program



Thank you

Arcadis. **Improving quality of life.**