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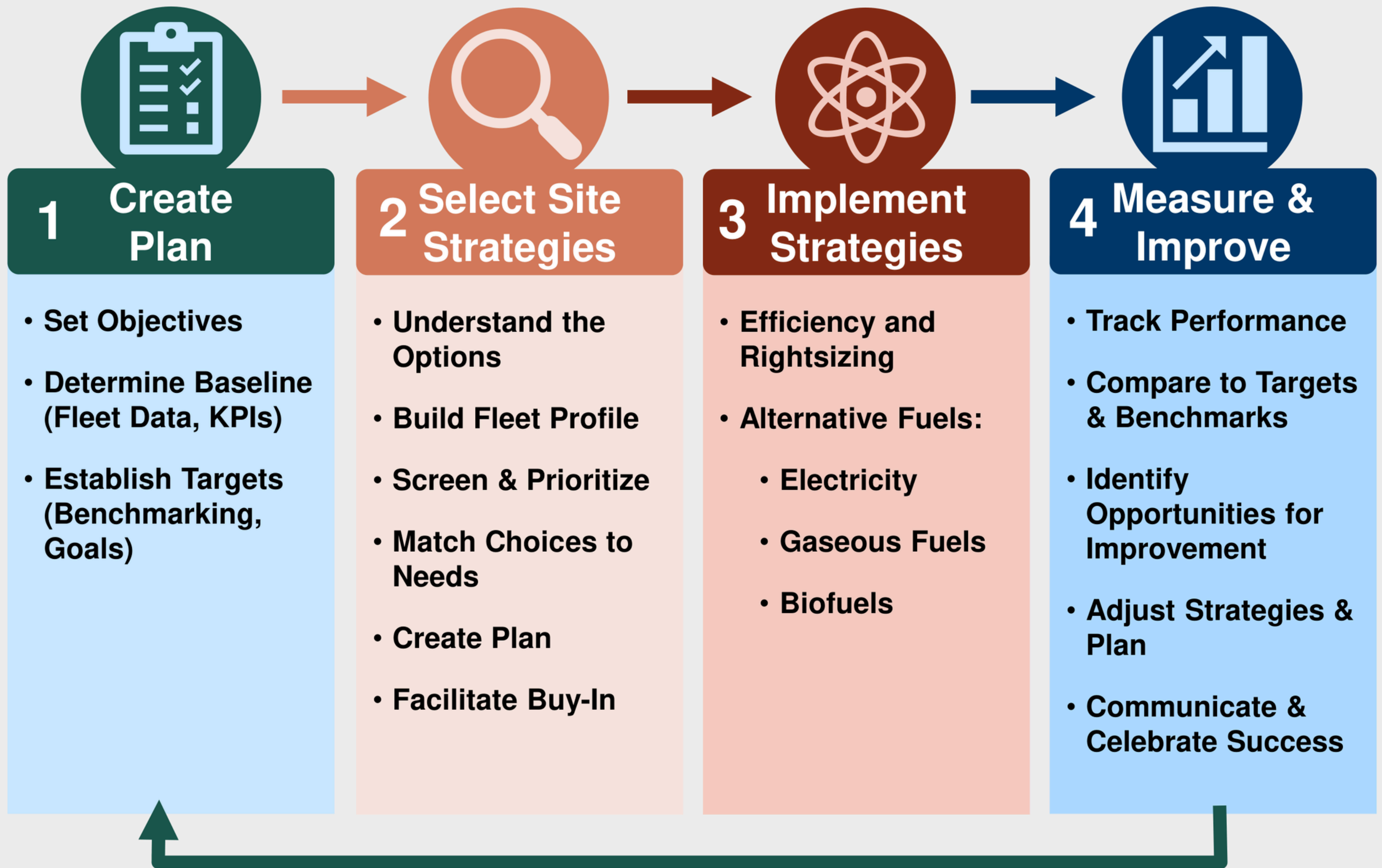
Right Fuels for the Right Job

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Green Drives Conference and Expo

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Fleet Planning Framework



Alternative Fuel—Ideal Vehicle Use Cases

Biofuels



Ethanol (E85)

Flexible fuel vehicles operating in areas with reliable E85 availability; easy drop-in option for light-duty fleets.

Biodiesel

Ideal for fleets with existing diesel infrastructure, B100 may require engine modifications, biodiesel blends require no vehicle modifications.

Renewable Diesel

Direct replacement for diesel with no vehicle modifications.

Electricity



Battery Electric Vehicle (EV)

Predictable daily routes that return to base for parking. Range considerations and charging access are key.

Plug-In Hybrid EV (PHEV)

Return to base for parking and vehicles with variable or longer routes where full electrification is not yet feasible.

Gaseous Fuels



Compressed Natural Gas (CNG/RNG)

High-mileage, centrally fueled fleets (e.g., transit, refuse, delivery) with access to dedicated fueling infrastructure.

Propane (LPG)

Medium-duty or vocational fleets with consistent routes and access to on-site or nearby fueling (e.g., school buses and delivery).

Ethanol (E85)

Efficiency Impact:
Low

Implementation
Difficulty: Low to
Medium



Flex-fuel options are available for light-duty pickups, SUVs, vans, and sedans. Number of available options has been decreasing over time



Similar cost to a conventional gasoline-only car



No changes



Check for publicly available E85 stations, which are readily available in many areas



Installing a new E85 tank onsite can cost \$200,000 or more



Fast (same as gasoline)

Biodiesel
(B100)

Efficiency Impact:
Medium

Implementation
Difficulty: Medium



Niche; may require engine modifications or warranties



Higher cost due to limited availability and specialized use



Minimal training required for technicians to work on vehicles



Check for local availability and pricing



Needs temperature-controlled fuel tank. Small aboveground tanks can be rented or purchased for \$20,000 or more; large aboveground tanks can cost \$200,000 or more



Fast (same as diesel, if tank is heated)

Biodiesel
Blends
(B5 to B20)

Efficiency Impact:
Medium

Implementation
Difficulty: Low



Universal for diesel



No cost difference
compared to diesel
vehicles



No changes



Pricing similar to
conventional diesel.



Uses existing diesel
infrastructure. May require
minor upgrades (e.g., tank
filtering or filter
replacements)



Fast (same as diesel)

Renewable Diesel

Efficiency Impact:
Medium

Implementation
Difficulty: Low to
Medium



Universal for diesel



No cost difference
compared to diesel
vehicles



No changes



Check for availability.
Prices vary depending on
supply.



Uses existing diesel tanks.
Limited availability. Price
usually higher than diesel
and varies by location and
contract.



Fast (same as diesel)

Battery-Electric Vehicle

Efficiency Impact: High

Implementation Difficulty: Medium to High



Several light-duty options; some medium- and heavy-duty options (e.g., box trucks, school buses, cargo vans)



Higher upfront cost; lower total cost of ownership for many use cases (when utilizing private charging)



If maintenance is performed on site, confirm technicians have necessary training, including for high-voltages



Level 1 = limited daily mileage; Level 2 = moderate usage and evening dwell times; Direct-current fast charging (DCFC) = long daily driving distances, limited dwell times or medium-/heavy-duty vehicles



Costs vary depending on electrical services and/or utility upgrades needed. Level 1 is lowest costs, DCFC highest cost



Four to 12 or more hours for Level 1 and Level 2. Thirty to 90 minutes for DCFC

Plug-In
Electric
Vehicle

Efficiency Impact:
Medium

Implementation
Difficulty: Low to
Medium



Several light-duty
options



Higher upfront cost;
lower total cost of
ownership for many use
cases (when utilizing
private charging)



Requires maintenance
for both gas and electric
motor. If maintenance is
performed on site,
confirm technicians
have training



Level 1 = sufficient for
most PHEVs,
Level 2 = bigger, long-
range batteries, shorter
charge time



Costs vary depending
on electrical services
and/or utility upgrades
needed. Level 1 is
lowest costs



Two to 8 hours for Level
1 or Level 2 charging

Compressed Natural Gas

Efficiency Impact:
Low to Medium

Implementation
Difficulty: High



Some heavy-duty options (transit buses, refuse trucks, Class 7 and 8 trucks, delivery trucks)



Higher vehicle cost than diesel; lower fuel cost potential



Modifications to an existing facility may be required. CNG-trained technicians suggested. Some specialty tools required for service



Fast-fill, time-fill, and a combination of these two.

Check for publicly available CNG stations



Infrastructure is costly (approximately \$1 million or more) to install and maintain. Well-suited for large fleets with high-pressure gas lines.



Fast (10 or more minutes for fast-fill)
Overnight for time-fill

Propane
(LPG)

Efficiency Impact:
Low to Medium

Implementation
Difficulty: Low



Some school buses, medium-duty truck options. Renewable propane is chemically similar to conventional propane and used interchangeably.



Similar cost to diesel vehicles; renewable fuel is more expensive



Generally broad; check with local technicians or on-site maintenance staff to confirm technicians have training. Some specialty tools required for service.



Check for publicly available propane stations



Infrastructure is relatively simple and low cost (small tanks cost approximately \$50,000 or less)



Fast (approximately 5 minutes, similar to gasoline)

Technical Response Service

TechnicalResponse@icf.com
800-254-6735



- Reach out to receive a quick e-mail response from technical experts
- Anyone can submit a question
- Ask about alternative fuels, fuel economy improvements, advanced vehicles, and more



In-Depth Assistance

- Reach out to receive high-touch support (phone and in-person)
- Experienced subject matter experts are available for guidance, troubleshooting, research and analysis, and other problem-solving assistance in a wide variety of technologies
- Anyone can ask for help at any point in a project or product life cycle
- Examples include addressing vehicle performance issues, designing and siting fueling infrastructure, and navigating maintenance challenges

Thank You!

www.nlr.gov

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