GREENPLAN™
ROUTE PLANNING AND EXECUTION

EPG® Ehrhardt Partner Group
Smarter Connected Logistics™

WHITEPAPER

FUEL & CHARGE STOP OPTIMIZATION

SMARTER PLANNING

FOR LONG HAULS AND E-VEHICLES

EVERY STOP MATTERS.
SAVE TIME, MONEY AND ENERGY.

In traditional logistics, as the meter ticks closer to empty, drivers begin searching for the nearest station to refill. But the nearest station is not necessarily the most cost-effective or convenient. For e-trucks, the nearest station might be too far or overcrowded, stranding drivers between charging points. In a tightly planned route with strict time windows, accurate charge time calculation is vital. Prior planning with fuel & charge stop optimization helps drivers avoid long detours and high price zones, saving significant time and money.

Fleet managers face rising fuel costs, tightening environmental regulations, and the constant pressure to improve efficiency while reducing expenses – no easy feat. But fuel stop optimization solves a lot of these challenges. It squeezes significantly more km out of every Euro spent on fuel and, if desired, supports an easy transition to an electric or hybrid fleet for operations looking to lighten their ecological impact.

THE BENEFITS
OF FUEL & CHARGE STOP OPTIMIZATION

The implementation of fuel stop optimization has immediate and long-lasting benefits for fleet operations including…

1. ECONOMIC RESILIENCE

By identifying smart stops with low fuel prices on optimized routes, trucks can go farther for less. Most drivers know it's best to top up before e.g., crossing the Swiss border or entering Atlanta's metropolis, but even the most experienced trucker lacks refined knowledge about price points for every station along a route. Fuel stop optimization leverages a vast database to set cost-effective stops for predictably affordable refills. For companies that have contracts with certain providers, like Aral or Shell, the software lets dispatchers set preferred gas stations, optimizing based on brand as well as price. With this advantage, companies can better withstand market fluctuations, fuel price volatility, and supply chain disruptions – a crucial capability for long-term planning and growth.

2. HIGHER ETA COMPLIANCE

Fuel stop optimization enhances the precision of delivery schedules by integrating previously variable elements, like refueling or charging stops, into route calculations. By factoring in station locations, stop durations, fuel types, and traffic conditions, the system generates a more accurate and data-driven Estimated Time of Arrival (ETA). It accounts for the exact duration and location of refueling or recharging, reducing the uncertainty caused by unplanned stops. As a result, fleets are better positioned to meet their delivery time windows with higher consistency, improving ETA compliance to over 95%. This boosts overall service reliability, leading to higher customer satisfaction and increased repeat business.

3. ELECTRIC VEHICLE INTEGRATION

One of the biggest barriers to electric vehicle (EV) adoption is limited charging infrastructure. The thought of drivers and deliveries trapped between charging stations scares off most managers when it's time to replace or expand their fleet. Businesses don't want to risk harming the quality of their service. But fuel stop optimization considers factors such as provider brand, charging price, charging speed, and battery capacity to create stress-free route plans for e-trucks. E-charging takes time, so it's important to consider strategic points in the stop sequence. If the third delivery on a route has a critical time window with only a ten-minute buffer, it's smarter to plug in after execution of the third stop is complete, keeping delivery quality high. This comprehensive intelligence supports the shift towards environmentally friendly fleets, reducing harmful emissions while lowering fuel expenses and raising customer satisfaction.

4. GREENER LOGISTICS

Fleets that operate efficiently, cost-effectively, and sustainably are better positioned to attract and retain clients. Fuel stop optimization provides a competitive advantage in a crowded market with low margins, driving business growth and success. Customers are increasingly eco-conscious, assessing the ethical impact of their providers. Fuel stop optimization empowers organizations to reduce fuel consumption and support the transition to electric and mixed fleets – all while minimizing operational costs and meeting time windows to ensure sustainable success.

THE ELEMENTS
OF THE EQUATION

Fuel stop optimization isn't simple. When routes take days and cross international borders, the challenge intensifies. The number of potential fuel stops is enormous and prices at each of those stops fluctuate on an hourly basis. Every truck gets different gas mileage and not all stations are open 24/7, further complicating the challenge. To effectively plan, Greenplan computes dynamic variables across large data sets and identifies the few stations among thousands which will best benefit your budget and timeline. The critical elements of this calculation include…

1. CORE ROUTE EFFICIENCY

An advanced routing algorithm sets the foundation for fuel stop optimization. Predictive analytics output tailored tours which minimize operational costs, labor hours, and fuel consumption while ensuring on-time delivery. Overlapping districts, time dependent traffic patterns, and time windows all contribute to the equation. The system leverages data to mathematically derive optimized routes – which are then further refined by fuel stop optimization

2. FUEL PRICES AND LOCATIONS

Intercity and international routes pass through differing gas price zones which can have a big impact on accumulated costs. A few cents per liter may not seem like a big difference, but when a typical semi-truck tank can hold between 400 and 600 liters, those cents add up fast, creating price differences in the high double digits to top-up one vehicle. Greenplan compiles dynamic data on the cost of fuel across different locations and cross references these statistics with the detour distance of each location, identifying the option of lowest impact for route times and expenses. The algorithm works with a cost function, developed in conjunction with each individual customer, to always provide the route with the lowest overall (real and virtual) cost. If a detour is too lengthy and the savings too small, it's sometimes smarter to visit an ostensibly more expensive station that lowers cost-time penalties.

SIMPLE CALCULATION

0,04 € difference per litre of fuel

x

400 litre tank

=

16 Euros

16 Euros

x

Fleet of 100 trucks

=

1,600 Euros

EUR 1,600 price difference for each full refuelling of the fleet!

3. PARTIAL REFILLING AND ADVANCED STRATEGIES

If time allows, refueling can be split into multiple stops, directing drivers to buy a few liters in the city center before filling the tank at a cheaper station down the road. In other situations, the time-cost penalty works in the opposite direction and it's better to preserve quality of service by minimizing stops and prioritizing speed. The algorithm's decision is guided by priorities set by the customer, adapting to the needs of each industry and organization. By considering all possible strategies, fuel stop optimization achieves significant savings in any scenario while fulfilling ETAs.

4. VEHICLE SPECIFICATIONS AND ENERGY CONSUMPTION RATES

Each vehicle in a fleet has unique characteristics that influence its energy consumption rate. While one truck might cover 1,300 kilometers on 400 liters of fuel, another could struggle to reach 1,000 kilometers on the same amount. Factors such as load weight, engine type, and aerodynamics impact gas mileage. Factors such as battery health and age additionally affect the range of electric vehicles. By considering each vehicle‘s average km per liter, an algorithm can tailor the fuel stop strategies to match vehicle performance metrics. This precision ensures effective optimization, maximizing efficiency for a seamless drive.

THE ROADMAP AHEAD

Fuel stop optimization is a recent development that already delivers impressive insights. Nonetheless, projects are ongoing to further strengthen its computational capabilities. Upcoming developments will add more depth and accuracy to route planning for boosted benefits. Here's what's on the horizon:

1. SPEED, TERRAIN, AND WEATHER FACTORS

Fuel consumption is heavily influenced by external variables like speed, terrain, and weather. Steep inclines and high-elevation routes demand more fuel, as do winter temperatures and higher speeds. In the near future, the optimization tool will incorporate these factors, using predictive modeling to adjust routes based on anticipated conditions. This ensures a smooth and efficient journey from the mountains to the valleys, rain or shine.

2. EXTENDED CHARGING DATA

The accuracy of electric vehicle (EV) route planning will continue to improve as databases on public charging sites expand. While the tool already optimizes stops based on charging speed, future enhancements will introduce more nuanced data, such as the availability of charging ports throughout the day and searches for specific providers. This will include predictive waiting times at charging stations, allowing for more seamless integration of EVs into your fleet with minimal delays and cost-analysis of EV fleets before purchase decisions.

3. DRIVER SCHEDULES AND LEGAL REQUIREMENTS

Smart fuel stop planning isn't just about fuel; it's about people, too. When smartly planned, fuel stops double as driver breaks, conveniently aligning two goals in one. Compliance with hours of service is critical to driver well-being and regulatory health. The optimization tool will soon integrate driver schedules into fuel stop calculations, giving drivers the opportunity to simultaneously recharge themselves with a well-deserved break for food, stretching, and rest. By adhering to maximum hour regulations, you ensure legal compliance while promoting driver safety and satisfaction.

THE MANAGER PERSPECTIVE

Fuel stop optimization, as a feature of route planning and execution solutions, can increase the efficiency of static master routes or dynamic routes. Either way, operations optimize performance without changing their existing infrastructure. The tool quickly connects via REST APIs to minimize disruption and maximize ease of use. This compatibility allows for a smooth transition, leveraging existing data and workflows to enhance route planning and resource management.

READY… SET… GO!

CONFIGURE

Import fleet data, including vehicle types, fuel consumption rates, and maximum tour times for comprehensive data analysis.

CUSTOMIZE

Tailor the tool to the unique needs of different fleets, setting preferences and parameters that align with operational goals, such as cost efficiency or speed priorities, without extra coding or costs.

INTEGRATE

Choose whether to optimize static routes, connect the tool to your TMS via REST APIs for dynamic routing, or execute through a comprehensive frontend.

ADAPT

Monitor and adjust routes to adapt to unplanned events, adjust routes in response to real-time tracking intelligence.

For users who need daily, dynamic route planning, a comprehensive frontend equipped with fuel stop optimization can continuously monitor and optimize routes. This dynamic dashboard provides a view of all vehicle stats, giving real-time updates and insights. Alerts notify dispatchers of unplanned route deviations taken by the driver or unexpected delays, empowering proactive management and swift adjustment. Managers can access key performance metrics such as fuel savings, route efficiency, and ETA compliance rates to identify further opportunities for optimization and create strategies for sustainable success. Scenario analytics test possible business decisions and inform managerial action. This holistic approach ensures fleet operations remain responsive to dynamic conditions.

WHY NOW
AND WHAT'S NEXT

As the pace of logistics accelerates, companies must adopt strategies which meet the demands of tomorrow. Designed to minimize the time and money spent on refilling for traditional, electric, and hybrid fleets, fuel stop optimization helps operations strategically top up. In the coming months, Greenplan's R&D team will continue to strengthen and extend capabilities of the tool, ensuring lasting value for years to come.

If you're curious about Greenplan's fuel stop optimization feature or any of its other transportation superpowers, feel free to reach out for a chat with one of the experts and equip your operations with smarter tools for better dispatch.

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