



AMCS - FUEL PLANNER

INTELLIGENT OPTIMISATION FOR THE FUEL DISTRIBUTION INDUSTRY

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AMCS Fuel Planner is a revolutionary standardised system developed specifically to optimise the distribution of liquid fuel through efficient automatic planning and optimisation facilities. The system enables major cost savings and CO2 emission reductions in your oil and petrol distribution. Moreover, it decreases planning time drastically and assists you in improving your customer service and route quality.

Improving Efficiency Within Oil, Gas and Petrol Distribution

Distribution within the petroleum industry involves many different forms of transport, including areas like domestic heating oil as well as diesel and petrol for service stations and industrial customers. All these types of distribution, along with internal transport, pose great challenges to the route planning abilities of the distributor.

In general, the petroleum industry faces certain difficulties. It gains increased public attention and is confronted by a demand for corporate responsibility and protection of the environment. One way for petroleum companies to meet these demands is to make distribution more efficient and environmentally safe by introducing modern route optimisation tools.

Moreover, the industry experiences tight supplies of oil, and when costs increase, companies tend to consolidate. Consolidation forces the involved companies to optimise their operations to prepare for the new and fiercer competitive situation.

Since there are little options for product differentiation in the petroleum industry, companies must distinguish themselves by, for example, competing on price or providing better customer service, including delivery accuracy and order flexibility. An efficient, high-quality planning system enables petroleum companies to deliver better customer service at lower costs.

Activities related to transport are major cost burdens, and the potential for improving the efficiency of oil and petrol distribution is great. Savings in this area have a direct impact on company margins. Therefore, it is essential to find the right tools for optimising the planning and execution of the distribution.

AMCS Fuel Planner is a sophisticated, automatic and easy-to-use IT system which covers the entire process of planning and executing distribution for oil and petrol companies. The system has a high level of industry-specific functionality and configuration options, making it highly capable of handling planning and distribution for both private and industrial customers as well as service stations.

Thus, AMCS Fuel Planner contributes to significant improvements in areas such as compartment planning, volume deviations, delivery forecasting, product substitution and order prioritisation (degree day versus urgent orders). The system also optimises distribution based on vehicle and driver qualifications, product pricing, lowest mileage, and product availability at various terminals.

Moreover, the system represents a state-of-the-art enterprise solution, which features key elements of SOA technology and distributed architecture, as well as multi-user access, scalability, advanced security and much more.

AMCS Fuel Planner can even be set up to communicate in real time with a range of complementary IT systems in the company's IT infrastructure. This enables more dynamic planning and precise monitoring and follow-up.

Benefits and Savings

Benefits

By using AMCS Fuel Planner, petroleum companies can streamline internal work flows considerably and achieve significant savings on transport costs.

Companies normally experience the following benefits:

- ▶ A reduction in operational costs (km, time, trucks) by 5–15%, and a major reduction in CO₂ emissions
- ▶ An increase of 5–15% in delivered oil and petrol per driven km
- ▶ A striking improvement in customer service levels
- ▶ 25–50 % less time spent on planning and resource scheduling
- ▶ 30–60 % less time spent on registration and follow-up
- ▶ Significantly increased employee satisfaction due to a stress-free planning and order entry environment

AMCS constantly strives to raise the bar and is continuously inspired by our customers and business partners to further develop the algorithms, functionality and overall performance of the system. A long-lasting partnership between AMCS and our customer ensures that the profitability and business value of our customers will continue to grow.



AMCS has 35 years of experience in developing and implementing advanced, automated planning systems. The company is the leading provider of planning systems in Scandinavia, and this position is now increasing internationally through the promotion of superior industry-specific planning systems.

AMCS Fuel Planner is based on AMCS's standardised system platform, which has been expanded with a petroleum-specific functionality.

Founded on extensive knowledge of oil and petrol distribution, AMCS keeps improving AMCS Fuel Planner to consolidate its position as the most advanced planning and optimisation system within the petroleum industry.

AMCS Fuel Planner is a comprehensive enterprise solution which integrates seamlessly with ERP/order-receiving, fuel depot, VMI, gauging, and on-board computer systems. This ensures effective and easy communication between all process constituents and a smooth operational flow throughout. On top of this, the functionalities and user interfaces of the system are widely configurable, resulting in a high degree of customisation and user-friendliness.

As an enterprise solution, the system also constitutes an advanced client-server platform, which allows multiple planners to access and process the same data simultaneously. Other client-server features of AMCS Fuel Planner include Citrix compatibility and role-based access control.





The system can be integrated with AMCS's own built-in mobile application as well as other mobile devices. This offers the possibility of sharing decision-making with the drivers, which enables quicker, better and more hands-on decisions during operations. The drivers are able to receive orders, trips and loading suggestions, print out notifications and take new orders, as well as send back status messages, registrations, positions, reports of delivered quantities, etc. to the office clients.

Powerful Oil Features

In order to handle the special demands within oil and petrol distribution, the system is equipped with unique features such as:

- ▶ Compartment planning according to rules for e.g. gravity orders, cross-compartment contamination and sequencing
- ▶ Indication of actual vehicle stock level per compartment (volume and weight)
- ▶ Handling of volume deviations in connection with loading and unloading (planned versus needed)

- ▶ Ability to forecast stock level on tanks and automatically release orders for planning
- ▶ Planning with regional restrictions such as environmental zones and congestion charge areas
- ▶ Prioritisation of orders in terms of costs versus service demands

The many features and modelling opportunities make it possible to perform a highly valuable optimisation which covers the unique aspects of oil and petrol distribution.

Advanced Planning Algorithms

AMCS Fuel Planner uses powerful planning algorithms which are tailored for route planning within the petroleum industry. The algorithms are designed to carry out incremental planning and batch planning of an exceptionally high quality and are also ideal for real-time optimisation during execution. The route optimisation can either be performed on parts of the fleet or on the entire fleet.

AMCS Fuel Planner features a wide range of planning parameters and can be set up to perform automatic planning

based on either time, distance or a combination of cost profiles, thereby improving the deployment of resources. The algorithms also include a penalty functionality, which makes it possible to compare different situations and costs. For instance, the cost of a delayed arrival at a customer site can be balanced against the actual distribution costs.

Through comprehensive configuration facilities, the most popular planning restrictions and optimisation criteria can easily be accessed and changed by the planners, and the more advanced ones by the super-users.

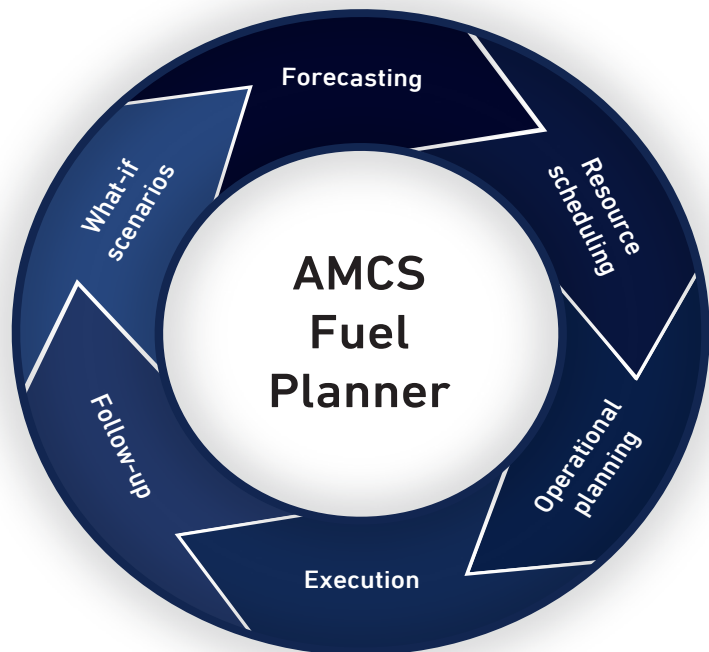
Easily Integrated Planning

AMCS Fuel planner is designed to cover the entire planning cycle of liquid fuel distribution, ranging from order time-slotting (interacting closely with the order-receiving system), through route planning and execution, to the delivery of post-operational data for follow-up.

AMCS Fuel Planner features strong planning facilities for the following:

- ▶ **Tank level forecasting:** Determining required next delivery based on forecasting individual tank level
- ▶ **Resource scheduling:** Providing overview of resources and facilitating the management of these according to need and availability
- ▶ **Operational planning:** Performing incremental planning and inserting new orders, both automatically and via manual drag-and-drop
- ▶ **Execution:** Real-time monitoring of the operation via status messages and GPS, facilitating real-time re-optimisation and data collection from trucks
- ▶ **Follow-up:** Supplying collected data for reporting, e.g. invoicing, self-billing and statistics
- ▶ **What-if scenarios:** Simulating consequences of using alternative terminals, different vehicle types, etc.

All planning levels are approached in an integrated way, which creates an all-embracing planning environment tailored directly for the planning processes within oil and petrol distribution.





Advanced Distribution Optimisation

Tank Level Forecasting

AMCS Fuel Planner is geared to handling all market segments within the petroleum industry: Orders may be generated through exact measurement (telemetry), forecasts, degree day figures and/or simple order placement, depending on whether the orders concern oil delivery for private customers or petrol and diesel delivery for service stations and industrial customers. For instance, when integrated with a tank level measuring system, the next required replenishment time can be calculated by the forecasting functionality, displayed in AMCS Fuel Planner's Gantt chart, enabling automatic generation of delivery orders.

When orders need to be inserted into a plan, the system can instantly provide a list of time-slotting suggestions for the planner or the order receiver in the call centre. AMCS Fuel Planner can even assess capacity and distribution costs automatically, which makes it easy for the order receiver and the customer to find a delivery time which is optimal from both a customer and a distribution cost perspective.

Resource Scheduling

In AMCS Fuel Planner, resource scheduling and route planning are carried out simultaneously. Each resource is assigned a standard resource calendar, which specifies the combined availability of driver and vehicle, based on working time, qualifications, capacity, district, etc. This makes it easy to assign resources to orders, either automatically or manually. As orders are received, planning and allocation of resources are performed roughly.

As the day of operation approaches, however, the actual resource needs have to be adjusted, for instance if the number of resources does not match the order volume. If the resource capacity exceeds the order volume, the system automatically adds service station orders to the plan, thereby optimising the utilisation of resources. AMCS Fuel Planner thus provides a strong platform for monitoring and dealing with deviations and for optimising accordingly.

Operational Planning

AMCS Fuel Planner can handle rolling planning across longer periods of time, making it possible to create rough plans ahead of delivery and then gradually fine-tune these into precise operational plans as execution approaches. The plan may even be optimised continuously during execution, thereby facilitating easy insertion of urgent orders.

Plans can either be formed automatically or by manually dragging-and-dropping orders between any of the four displays (Gantt chart, route list, digital map and order bank). Any changes to the plan prompt an instant overview of KPI consequences and possible restriction violations.

AMCS Fuel Planner is capable of planning with a wide range of parameters, taking both costs and restrictions into consideration. Furthermore, the system operates with flexible district borders for each vehicle, which means that orders can be transferred from one vehicle district to another, if the order volume exceeds the vehicle's capacity.

Optimising In Real Time

Real-Time Plan Execution

By integrating with AMCS's own mobile units in the trucks or with mobile applications delivered by external suppliers, both planners and drivers can update the distribution plan in real time during operation. This instant exchange of information regarding tour lists, order changes, GPS coordinates, etc. paves the way for instant re-optimisation of the plan.

As deviations between requested and required volumes occur very frequently within the petroleum industry, updating the plan along the way is often profitable and much preferable to locking the plan. Such status updates are relevant in connection with loading and unloading, but also in relation to for instance product substitution and new orders emerging en route.

After every update, AMCS Fuel Planner calculates which consequences the change may have, and if there are remainders, these are used in the distribution optimisation of present and subsequent trips. This way, the system offers full control of a complex operation.

Distribution Follow-Up

Through its real-time connectivity to the trucks, AMCS Fuel Planner will automatically collect all operational KPIs from the vehicles and merge these with the planning KPIs of the system, thereby creating an excellent platform for analysis and follow-up.

The collected KPIs can be analysed in the report facilities built in the system or exported to a data warehouse or an ERP system for further data analysis or creation of reports. These KPIs concern km driven, time spent on driving, pickup and deliveries, number of activities and volumes handled, number of violated service demands, empty mileage and much more. Such data is valuable for management purposes and as a basis for fine-tuning and calibrating AMCS Fuel Planner's planning model and parameters.

AMCS Fuel Planner is an excellent tool for ensuring quick data flow back to the ERP system. Here, the data may also be used for customer invoicing, proof of delivery, analysis of order handling time, evaluation of customer service fulfilment, haulier self-billing, and personnel salary payment. This quick handling of data thereby allows for immediate settlement of accounts.

What-If Simulations

AMCS Fuel Planner constitutes a solid basis for building and comparing different what-if scenarios which make it easy to test and evaluate the results of planning scenarios reflecting different strategies, policies and legislation.

Examples of different planning scenarios could be: Varying the type and number of vehicles, assessing the optimal use of external terminals, using different service levels, etc.

Moreover, new long-term investment scenarios reflecting strategic initiatives can be evaluated with detailed KPIs and customer service level indications.

AMCS Fuel Planner

Handling the distribution of oil and petrol is a challenging task, and the complexity of the industry constitutes a considerable potential for improving efficiency and achieving savings. To assist companies in obtaining this, AMCS has, based on years of experience, developed AMCS Fuel Planner – a cutting-edge planning system for the distribution of oil and petrol.

The system is highly capable of handling planning and distribution for service stations as well as private and industrial customers. Moreover, the system covers the entire planning process, including order time-slotting, resource scheduling, operational planning, real-time plan execution, follow-up, and what-if scenarios.

The powerful algorithms of the system can carry out highly efficient rolling planning, batch planning and optimisation in real time. AMCS Fuel Planner optimises plans based on time, mileage or a combination of cost profiles. It deals with issues such as volume deviation, tank level forecast, product substitution, and complex compartment planning, while securing an optimal utilisation of resources.

With AMCS Fuel Planner, petroleum companies will be able to improve their overall distribution efficiency. Specifically, they will be able to increase the amount of delivered oil and petrol per driven mile by approximately 5 - 15% and improve their competitiveness through better customer service.

