


Case Study

	Company	Industry	Application	Benefit
	Shell	Energy	Terminal and Planning Logistics	\$100 Million in LNG Output

## Shell's Revolutionary Terminal and Logistics Planning System

Shell Services International, Shell International Gas and Lanner have developed a new simulation tool, ADGENT, that models producer and receiving terminals, shipping logistics and shipping delivery programs for both liquid natural gas (LNG) and crude oil. The tool is the most advanced of its kind inside or outside of Shell. For the past 10 years, a predecessor to this tool has been used within Shell International Gas and associated operating companies for LNG terminal studies and logistics planning. The studies have shown impressive savings and increases in revenues. In the past year alone, the tool's use has benefited existing and new projects by nearly \$100 million.

Simulation gives organizations the much-needed ability to ask "what-if?" when making strategic and operational decisions. It also gives users a safe environment in which

current business activities within a simulation model. In addition, as in the case of Shell International Gas, the use of simulation can result in significant cost avoidance as the optimization reveals the true costs and benefits of proposed projects.

### ADGENT expands use of simulation

ADGENT uses the most up-to-date simulation technology, providing a user-friendly graphical interface and drag-and-drop functionality. It has the same look and feel as a standard Windows environment and will run on a PC with Windows or NT.



to experiment with different strategic scenarios. As a result, decision-makers can be sure that they have found the solution that is most fit for their organization. Benefits are numerous including improved throughput, reduced costs and lead-times and better utilization of resources. In many cases, organizations discover that they can improve efficiency without incurring any financial investment, by simply fine-tuning

### How Shell International uses simulation

To date, ADGENT has been used to:

- keep the volume of existing LNG storage tanks to a minimum
- optimize the LNG ship capacity and speed requirements
- optimize the level of storage capacity needed to guarantee reliable delivery of LNG and eliminate bottlenecks in existing LNG plants.

A recent study for one Shell-advised LNG plant demonstrated a potential increase of 15 LNG cargoes per year at very little additional cost—equivalent to \$75-150 million per year in extra revenues.

A basic model can be set up and running with just a few mouse clicks. The user simply drags element icons (such as tanks, jetties or well heads) onto the screen and builds up the system to be modeled. Each element has predefined properties such as capacity and pump rate. There is no need to do any programming.

ADGENT has both a Gantt and matrix style MYDP (Multi-Year Delivery Program) editor that allows users to edit the ship delivery program generated by ADGENT. Edits can be made to the ship arrival/departure dates at loading and receiving terminals, cargo sizes, the loading/receiving terminal the vessel should sail to

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next or any contingencies applied to voyages. If any edits break the model logic, such as trying to arrive at a port before it is feasible, users are automatically informed. This allows users to quickly and easily build complex delivery schedules.

The graphics and animation make models built in ADGENT very transparent. Users can observe the system as it runs, identifying any telltale signs of bottlenecks in the terminal or vessel queuing. Similarly, there are many pre-defined reports that enable users to diagnose any problems with the system. Reports can also be defined for any chosen element of the model; these can either be in the form of tables or dynamically updating graphs.

As with all complex systems, LNG systems have elements of uncertainty associated with them. Users can simulate this uncertainty in ADGENT by defining events such as breakdowns, maintenance, weather or tidal restrictions. Different speed strategies can also be defined for different ships.

ADGENT is a flexible and powerful tool that can be used for terminal studies, terminal operations, vessel logistics, supply and demand studies and even negotiations.

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