Supporting Supply Chain Planning & Scheduling Decisions
In the Oil and Chemical Industry.
Outline

• Shell Global Solutions
• Supply Chain Management
• From History to Future
• Strategic and Global Planning
Shell Global Solutions

• Part of Royal Dutch/Shell
• An integrated research, technical services and consultancy group
• International skill pool of 2,700 + distributed teams
• Advising over 140 industrial sites in more than 30 countries through Technical Service Agreements & another 550 customers on consultancy work
• Operating out of 7 locations
Shell Global Solutions – centres of excellence
Our team

• From all over the world …
  • Many nationalities
  • 85% has hands-on operational experience

• Covering a broad range of expertise …
  • Ranging from chemical technology via all facets of hydrocarbon logistics management to business economics, distribution and marketing
  • Covering information and web-based technology
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• *Supply Chain Management*

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The world becomes greener, but it rains more often.

Operational environment - *decision support essential to survive*
- lower margins; over capacity, commoditization, reduced loyalty
- globalisation; consolidation, multiple assets, overlap

Planning environment - *business and technology have changed*
- world is now: always on, mobile, volatility at speed.
- the $$ are increasingly in managing the variability

Business imperatives - *what keeps VPs awake at night?*
- fine-tuning the investment portfolio
- decisions must be based on integrated margin rather than just cost
- improve ability to execute
Challenges in current Supply Chain

The enemy is variability!
The solution:
• shorter review cycle
• more frequent planning
• real-time decision support

Multiple hand offs
No Overall view of the Supply Chain
Disjointed information flows
No Overall planning framework
Economies of scale not realised
High Inventories
Multiple systems/interfaces
Operational inefficiency
Poor Product/Margin decision making
Systems management
Reactive Planning/Operations
Transaction Processing
Stock Administration/Management
Infrastructure and network support
Product and feedstock movement
costs and services
Terminal OPEX

Would it help in your case?
Transformation means information, people, processes and tools coming together ....

- **People** - getting the resources, skills and organisation right
- **Processes** - harmonisation around best practices
- **Tools** - a world-class APS based on a high quality data management environment.
- **Information** - accurate, reliable, consistent, transparent information
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Evolutionary Stages in Supply Chain Management

- **Data**
  - Ops/SCM

- **Efficiency**
  - MBO
  - Benchmarking
  - KPIs

- **Process**
  - BPT/BPR
  - ERP
  - MRP

- **Planning**
  - APS
  - Scheduling

- **Collaboration**
  - e-Commerce
  - VSS

- **Virtual Capabilities**
  - Outsourcing
  - Revenue-based services

- **Value**

Year:
- 1975
- 1985
- 1990
- 1995
- 2000
- 2005
From history, ...

- Feedstock sourcing
- Manufacturing investments
- GMOS/NetSim logistics investments
- Demand patterns

- Feedstock acquisition
- Production Planning
- Distribution Planning
- Demand forecasting

- Production scheduling
  - Packaging scheduling
  - Unit Optimisation
  - APC
  - DCS

- Distribution scheduling
  - Routing
  - Order commitments

Years
Quarters/Months
Weeks
Days
Hours

Supply Chain
Supply  Manufacturing  Distribution  Demand
From history, ...
Core Requirements

• Complete horizontal Supply Chain Integration
• Convergence of strategy, planning and scheduling
• Modularity
• Scalability
• Interactive
• User-interfacing
• Real-time optimization speed
• Direct links
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Strategic/Tactical/Planning tool: GMOS/NetSim

(Global Manufacturing & logistics Optimisation System; Network Analysis and Supply Chain Optimisation System)

- Overview GMOS/NetSim Functionality
- Application Areas
Shell Global Solutions

Structure

Model:
- Manufacturing Capabilities
- Logistics Network
- Interchangabilities
- Cash Cost / revenue Structure
- Environmental (Planet) data

Input
- Feed availabilities
- Product demand
- Prices
- Profit - *Planet* obj.

Output
- Manufacturing Plan
- Logistics Plan
- Supply cost curves
- P&L statements
- *Planet impact*
**Structure**

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**Options**
- Capacities (production, Modes of Transport)
- Flexibility (grades, modes of operation)
- Exchange/Swap Deals
- *Planet improvement possibilities*

**Output**
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Exchange Functionalities

- Can model on a “per contract” basis
- Can model on a “per grade/product” basis
- Can handle fix charges
- Can handle “settlements” – locational differences, handling charges
- Can handle exchanges of different products (e.g. grade1 with grade2)
- Can handle exchanges at different volume “mark-ups” (1 m³ for 1.1 m³)
Asset Rationalization/Investment analysis

• Fixed Costs can be modeled at different levels
  o Site Level, Process Unit Level, Filling/Dispatching Level
  o Allow for fixed cost / charges when site, process unit, FD line not used
• Examples
  o Site rationalization
  o Product rationalization
  o Manufacturing line rationalization
  o Debottlenecking
  o Evaluation of new options
Logistics Modeling

- Modes of Transport
  - $ per quantity
- Ship Scheduling
  - Pre-defined voyages
  - Load / Discharge parcel sizes
  - Travel time per voyage
  - Port / Ship restrictions
  - Costs per trip
- ’Exclusive Supplier’ constraints
Handling of Duties

• Export Duty
• Import Duty
• Calculations can be based on cost, selling price, transfer price
• Duties can be excluded in e.g same economic zone (CCA, Europe)
• Duties can be product specific, country of origin specific
Demand Modeling

- Fixed Demand
- Min/Max Demand
- Fixed or Variable pricing
- Tranched/Tiered Pricing
- Mk Margin
Other Functionality Features

• Full Spec blending capabilities
• Multi-period – Mixed Integer Non Linear
• Data can be entered in currency of the country/region
• Full Profit & Loss overview
• Graphics
• Drill – down possibility
• Extensive Data consistency checking
• Constraint Analyzer / Infeasibility Analyzer
• Built-in documentation
• Maintenance & Support (help-) desk
• Annual User Group Meeting
• R&D program – “Rapid Model Builder”
Main system features

- PC based: AIMMS – EXCEL / MS-Access front end / reporting
- 100% data driven
- Data intensive
- Enables transparent decision taking:
  - Data consistency
  - Robustness analysis (series of sensitivity analysis)
  - What-if’s using case management
Application Areas

Production Planning
- Feedstock selection, production & demand allocation
- Evaluation alternative feedstock suppliers
- Cost of product non-interchangability

Benchmarking
- Assess (competitive) position per demand area
- Identify key performance drivers (sensitivity analysis)

Investment Planning
- Asset re-structuring / Debottlenecking
- Feasibility alternative manufacturing technologies
- Master Plan Studies
- Valuation of potential acquisitions
- Sustainable Development studies
Thank you for your attention