

create business  
value  
competitive  
advantage  
raise  
operating  
margins  
increased  
efficiency  
build  
market share  
solutions  
fast time-to-  
benefit



**aspentech**

*Utilities Management with  
Aspen Utilities*



# Agenda

- ▶ **• Introductions**
- Business process analysis approach**
- Overview of Aspen Utilities**
- References**
- Aspen Utilities Demo**
- Discussion**



## Why Focus on Utilities / Energy?

- Energy is the single largest operating expense after raw materials for oil refiners, petrochemical and chemical companies
- “The best spend less than 50% on total energy cost compared to the worst.” (Solomon)
- Deregulation has opened up new opportunities / threats
- Linked to  $\text{NO}_x/\text{SO}_x$
- Energy is one of the few remaining areas for significant cost reduction
- Energy costs are rising dramatically!



# How can AspenTech help customers meet these demands?






**Aspen Utilities™**  
Aspen Engineering Suite

Version **10.2**

**Aspen Enterprise Optimization**

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and International copyrighted laws as described in the Help About.





## The Evolution of Aspen Utilities

- Developed from within AspenTech Services
- Started in 1998 with MCC project
- Response to client need
- Originally derived from customization & integration of existing AspenTech products
- Now a fully developed stand-alone product





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- **Introductions**



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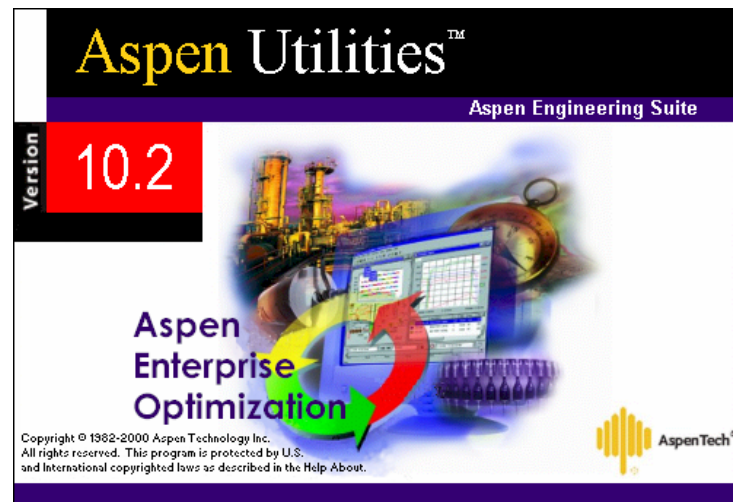
- **Aspen Utilities Demo**

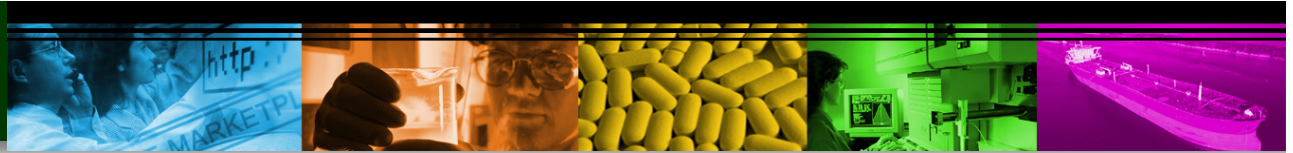
- **Discussion**



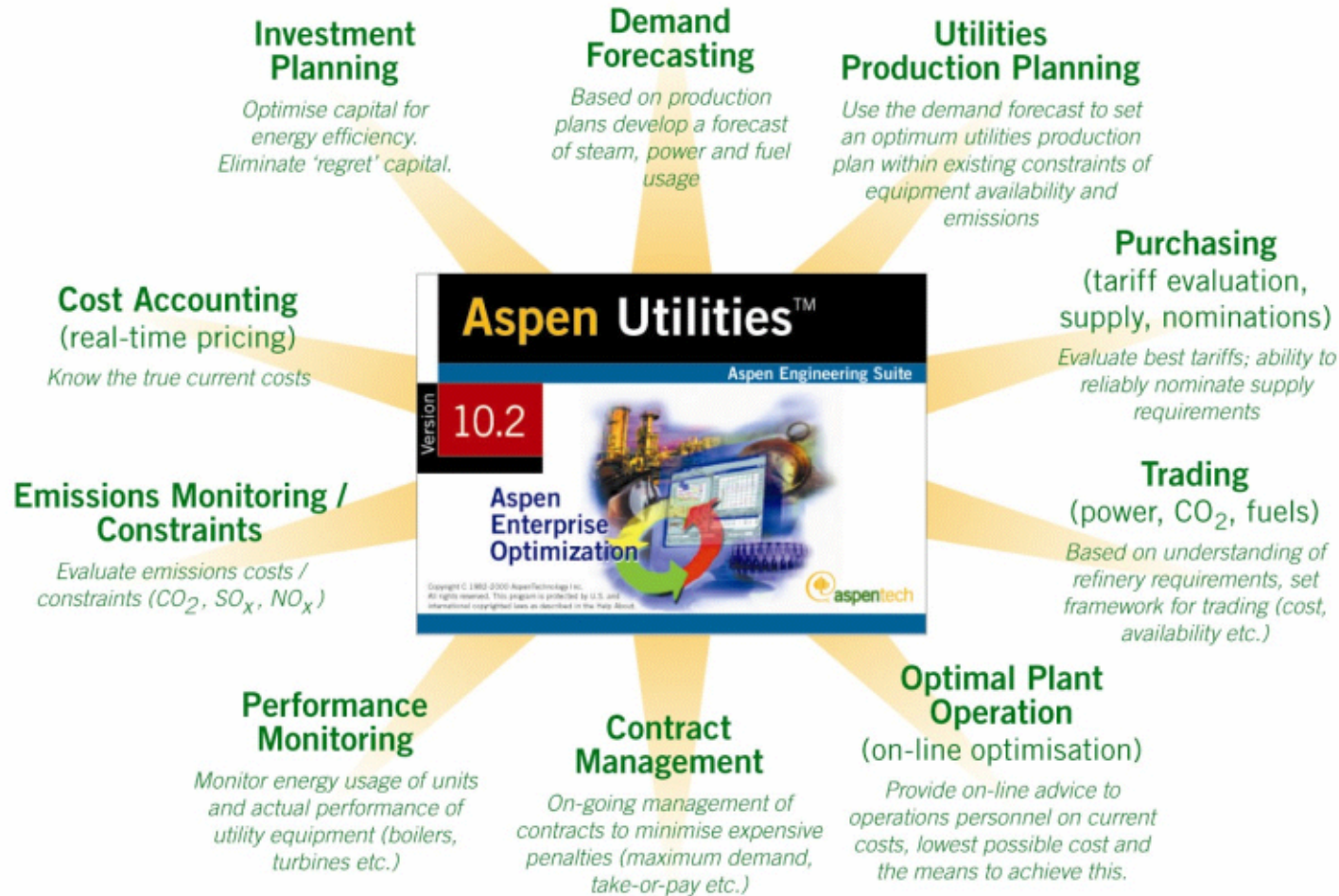
# Business Processes for Energy Optimization and Management

*Economic optimization of the energy and utility systems requires that the many business processes associated with the purchase, sale, generation, distribution and use across the entire enterprise are considered.*





# Business Processes





## Benefits from each business process

- Demand Forecasting / Production Planning

- Fuel savings due to optimum loading of boilers to exploit differences in efficiency
- Reduced off gas flaring/steam venting
- Optimal planned maintenance schedules

- Utilities Contract Evaluation

- Maximize benefits from negotiating ‘special conditions’ for utility contracts
- Further benefits if future deregulation offers wider choice of suppliers and tariffs

- Project Investment Evaluation

- Maximize ROI for energy saving projects
- Minimize “regret” capital





## Benefits (continued)

- Performance Reporting, Monitoring and Trending
  - Time savings for preparation of energy and CO<sub>2</sub> reports
  - Energy savings through more efficient operation and effective equipment maintenance due to improved performance monitoring
  - Quickly identify and target problem areas
  - Optimum scheduling for maintenance
- Operations Optimization
  - Energy savings due to ability to re-establish optimum operation faster after changes in utility loads or plant upsets
  - Optimum equipment on/off decisions
  - Optimum equipment load allocation
- Utilities Contract Management
  - Manage electricity load to reduce demand charges through peak shaving and shifting load from Normal hours into Off Peak hours



# Criteria for Evaluation

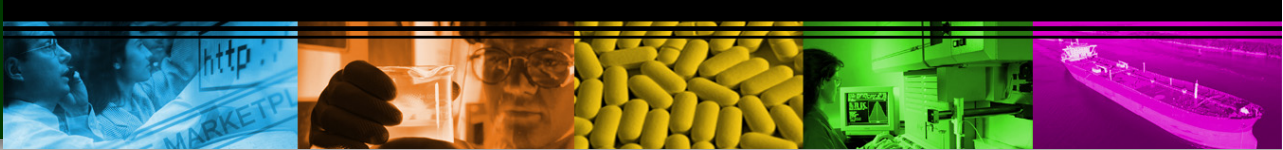
Size of benefits depends upon:

- Number of business processes to be covered
- Degrees of freedom / flexibility
- Complexity of contracts / state of utilities market
- Rate of change on the site
- Scope of existing management tools
- Likelihood on investment in energy efficiency
- Variability in process operations
- Operations liable to upsets / shutdowns

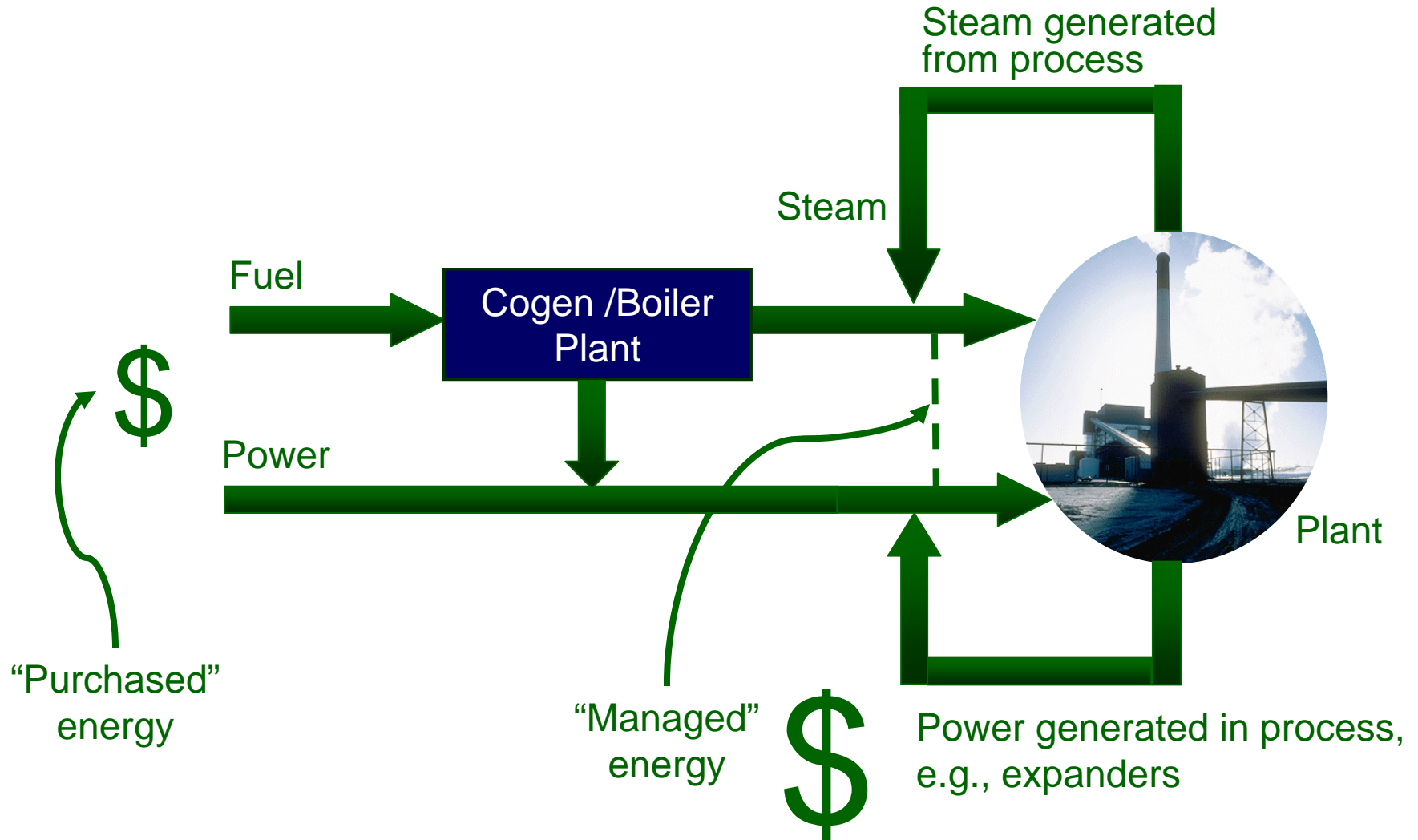




Typical benefit of an Energy Optimization and Management System is **2 to 6%** of the “*managed*” energy cost.



# Comparison of Purchased vs Managed Energy





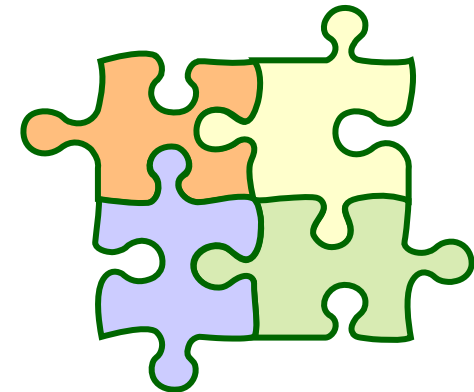
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## What is Aspen Utilities™?

An *equation oriented tool* for  
*Utilities System Simulation and Optimization*,  
specially designed to address *all* the business  
processes related to the operation and management  
of industrial energy and utility systems, making all the  
pieces fit together.

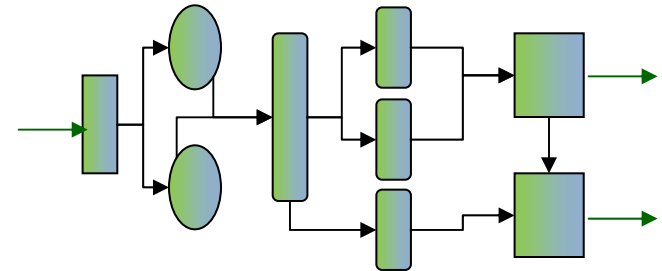




# Key Features of Aspen Utilities™

- **Modeling and flowsheeting**

- Drag and drop flowsheet build
- Expandable model library
- Steady-state simulation and data reconciliation
- Inferential measurement

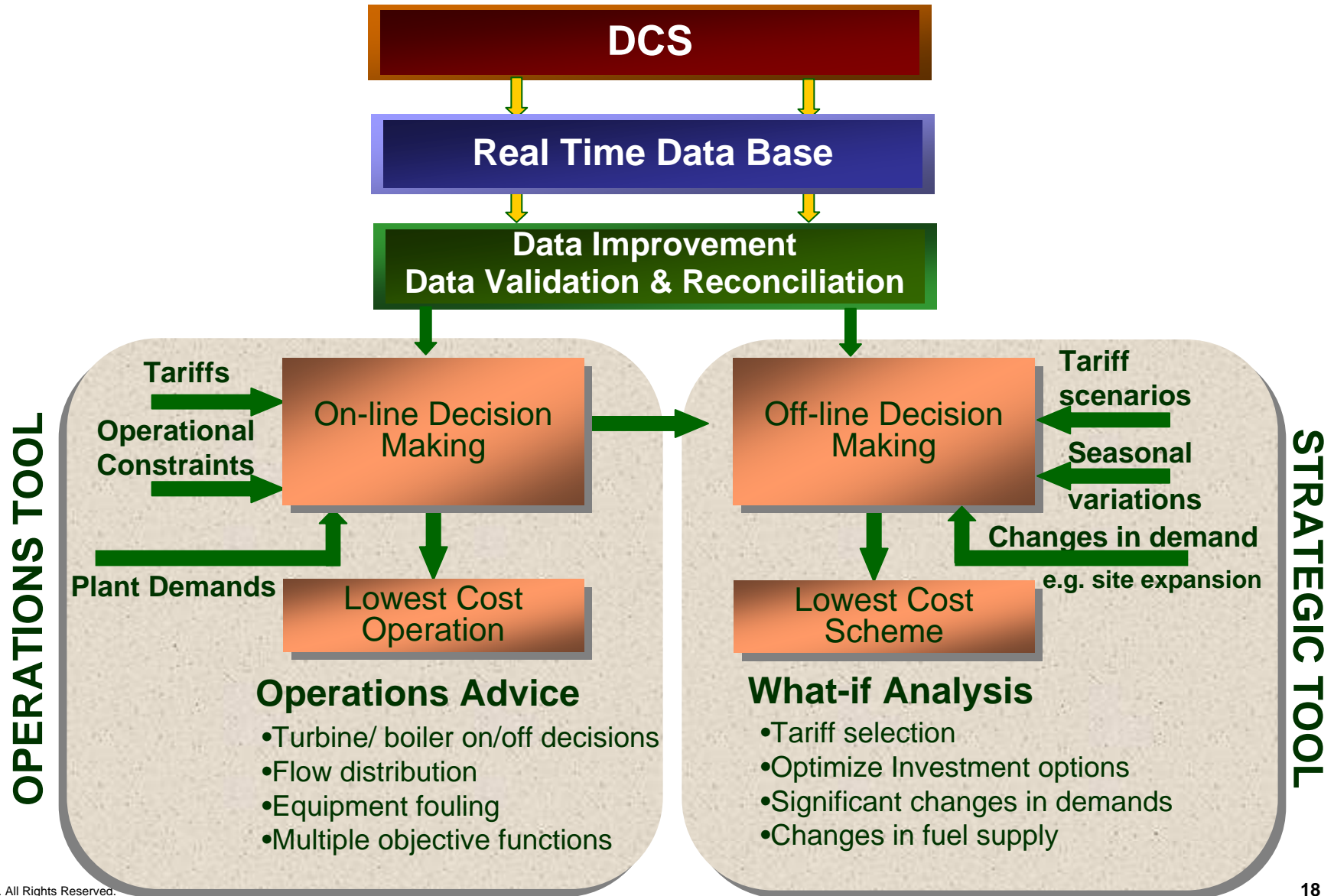


- **Optimization**

- MILP solver with multi-period optimization capability
- Off-line decision making
- On-line decision support



# System Overview





## “Life-cycle” Energy Management with Aspen Utilities

### Plan for the future

- Demand Forecasting
- Production Planning
- Contract Evaluation
- Investment Planning

### Operate today

- Performance Monitoring
- Utilities Debottlenecking / Load Management
- What-If Analysis
- Contract Management
- Trading

### Evaluate Past Performance

- Plan vs Actual
- Cost Accounting
- Reporting
- Auditing





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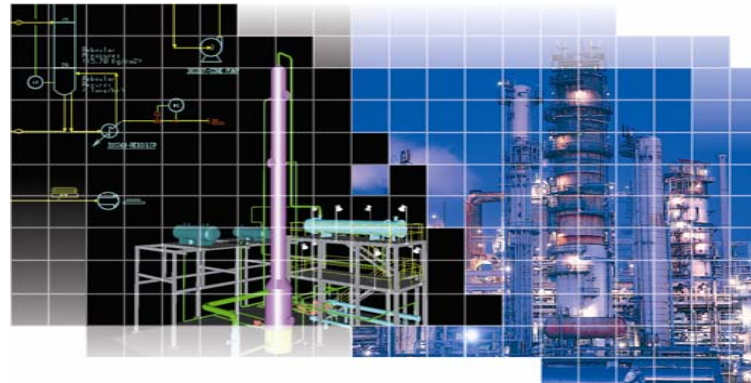


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## Experience

AspenTech has developed and implemented several Energy Optimization and Management Systems; including systems for BP Bulwer Island Refinery, Huntsman and DSM's petrochemicals site in Geleen.





# Experience

DSM reported first year benefits of €2.5 million in first year of operation from gas contract optimization.

(Reference; DSM presentation at AspenWorld 2000)

DSM





## Partial Reference List of Aspen Utilities Clients

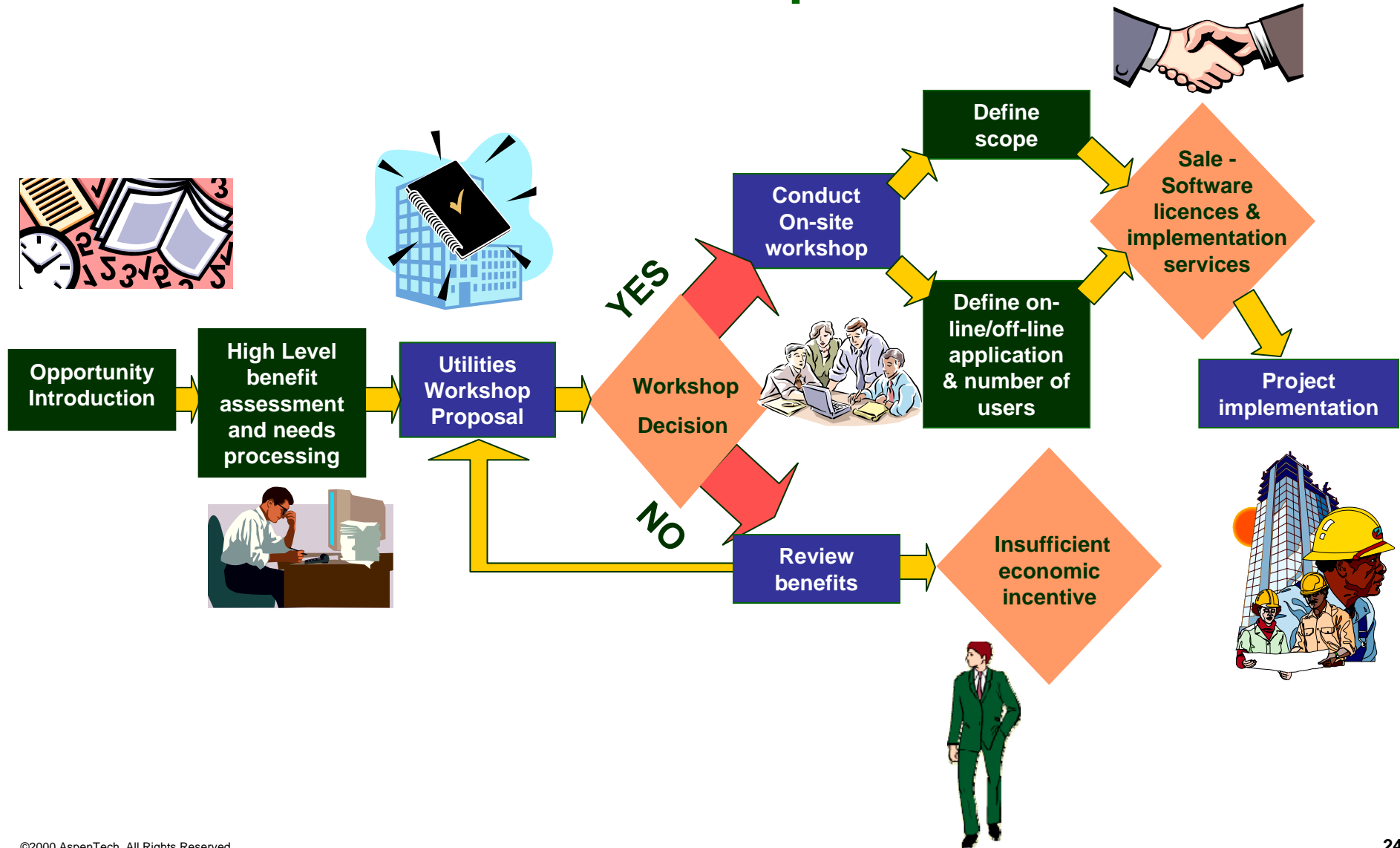


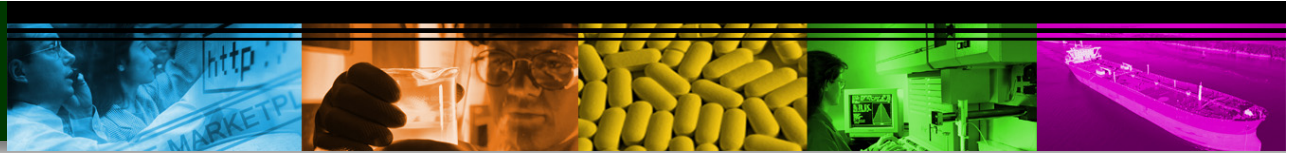
HUNTSMAN





# Evaluation Process for Aspen Utilities





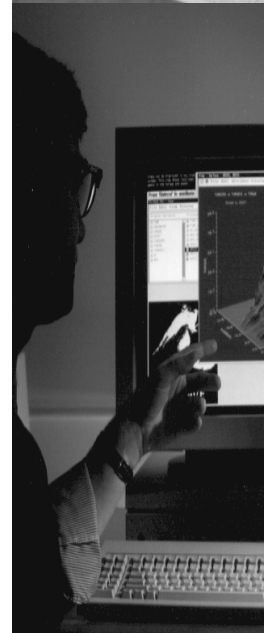
# High Level Benefits Estimate Example

Criteria	Potential for Benefit
Number of business processes to be covered	5
Degrees of freedom / flexibility in the system	4
Complexity of existing contracts / state of flux in utility market: - Gas - Electricity	2 4 3 (average)
Rate of change at the site	3
Scope of existing management tools	4
Likelihood of investment in energy efficiency	3
Variability of process operations	2
Operations liable to upsets / shutdowns	4
<b>Average</b>	<b>3.5%</b>



## Example of Workshop Scope of Work

- Review of Existing Tools
- Review of Existing Systems using Business Process Analysis
  - “As-Is” Business Process Mapping
  - Business Process Analysis to generate “To Be” business processes
- Definition of Solution
- Identify Benefits





## Benefits Assessment

- Use combination of business process analysis and engineering knowledge to identify benefit areas
- Calculate benefits using bottoms-up approach
- Validate benefits with top-down check
- Agree benefits with client
- Specific tools developed to assess specific benefit areas (e.g. load allocation)





# Implementation Stage at BP Site Identified Business Processes



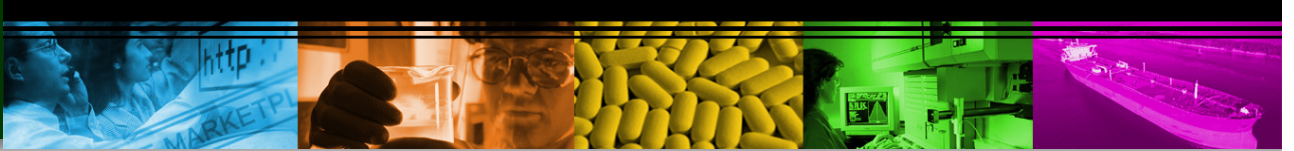
- Daily Gas Nominations
  - Natural Gas Demands have to be nominated on a daily basis, on a five week rolling forecast
- Utilities Production Planning
  - Advice on boiler load allocation, STG and GT power demands, fuel mix, drive selection
- STG Operation
  - Breakpoints for electricity price at which the power generation from the STG should be increased /decreased
- What-If Analysis



## BP Site Benefits

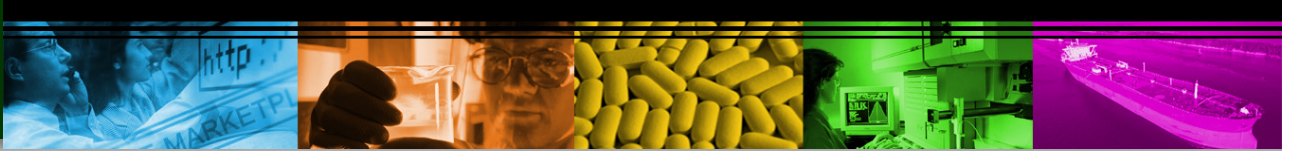


- Better selection of fuels
- Better natural gas demand management
  - avoid penalty payments
- Load management across the boilers
- Trade off fuel / power using the STG
- Develop optimum equipment line-up



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## Aspen Utilities Advantage – the Key to Success

- Business Process Approach – deliver value where you really need it
- Standardization – with Aspen as your technology partner
- Integration – with Aspen Plus, APC and supply chain optimization
- Support and Maintenance – large & experienced global team
- Multi-Period Optimization - combine with demand forecasting for improved decision-making
- MILP – obtain the global optimum solution with confidence
- Utility Management - performance monitoring, real-time pricing, auditing
- Flexibility – customize and add models as required
- Contract management, tariff & supplier selection



**AspenTech is the best  
investment you can make  
in your business.**