

1.4 End User's perspectives

What are companies and CAPE professionals looking for in CO compliant software components?



Large companies active in different sectors

- ▼ Multiplicity of process simulators used
- ▼ In-house knowledge is providing competitive edge
 - ↪ Most often captured in software
 - Thermodynamics
 - Unit Operations
 - Hydraulic correlations
 - ↪ Need to use same in-house knowledge in all simulators available
- ▼ A single process simulator may not be providing complete solution to a modeling problem



TOTAL: several PMEs used

	Chemicals	Refining & Marketing	Upstream
Aspen Plus	X		
HYSYS		X	X
PRO II		X	X



Needs to be addressed for TOTAL

▼ Needs in the Upstream business

- ➲ Integrated multiphase flow simulation platform from reservoir to the surface production facilities
 - Easy interoperability with other software suppliers
- ➲ Capability to include detailed reactor modeling in process models
 - Need to rely on both modeler tool and process simulator

▼ Needs in Refining & Marketing business

- ➲ Use of identical models in planning/scheduling as well as in process simulation activities

▼ Needs of Chemical business

- ➲ Advanced models of unit operations
 - Access to best-of-breed software



CAPE-OPEN: an industry standard

- ▼ Open for use by any compliant supplier or user
- ▼ Modification by wide consensus only
- ▼ Widely implemented
- ▼ Technology owned by non-profit CO-LaN
- ▼ Freely available



Benefits of standards for manufacturers (ARC)

- ▼ Increase market access and acceptance
- ▼ Reduce time and costs in product development
- ▼ Gain competitive advantage and faster time to market
- ▼ Cut costs in component and material acquisition
- ▼ Reduce administrative and material expenses
- ▼ Lower insurance cost
- ▼ Protect against litigation
- ▼ Reduce uncertainty in implementation
- ▼ Increase productivity in system design and training
- ▼ Reduce product variability
- ▼ Increase asset availability
- ▼ Create higher-level comprehension and awareness



Strategy decided by TOTAL

▼ TOTAL chose to get involved with standards making

- ↪ A commitment of more than 800 K\$ over 10 years

▼ TOTAL chose to adopt CAPE-OPEN standard

- ↪ Adapted to its industry needs

- ↪ Developed in collaboration with end-users, software vendors and academics

- TOTAL involved previously in POSC and STEP

- Learnt from past experience that such a mix was necessary

- ↪ Quickly available to the market place

- Development started in 97, draft available in 99, first commercial tools implementing CO in late 99, early 00



Policy enforced by TOTAL

▼ Software development

- ⇒ CAPE-OPEN standard compliance included in software specs
 - Deep offshore well metering and permutation testing: WellCOMon (see OTC 2002 presentation)
 - TINA product developed jointly with IFP (see presentation by BLB)

▼ Software purchase

- ⇒ CAPE-OPEN standard compliance included in the requirements to be fulfilled
- ⇒ Priority given to suppliers implementing CO standard



Targeted parts of CAPE-OPEN standard

▼ Chemicals

- ↪ UNIT Operations
- ↪ Property Packages
- ↪ Physical Properties Data Banks

▼ Refining & Marketing

- ↪ UNIT Operations

▼ Upstream

- ↪ UNIT Operations
- ↪ Property Packages
- ↪ Solvers



Conclusion

- ▼ Standards are key to success
- ▼ CAPE-OPEN is the only industry standard for simulation
- ▼ CAPE-OPEN is key to success in TOTAL projects supported by modeling and simulation



The Dow Drivers

- ▼ Integration of tools is key to efficient CAPE and low-cost solution development
- ▼ Alignment with few vendors offers minimum variability (built-in integration)
- ▼ No single vendor has all the best solutions
- ▼ Integration to be done in the market, not in-house
- ▼ CAPE-OPEN standard is Dow's path forward



The Dow Approach

- ▼ Company-wide single PME loaded on all CAPE professionals' PCs
- ▼ Business specific physical properties added to standard phys props package
- ▼ Company-wide standard PMCs for specific Unit Operations – available from software bookshelf
- ▼ Requiring all software suppliers to be CO compliant
- ▼ Specific groups (R&D, Advanced Modeling) given allowance to work with non-standard packages (from universities, new vendors, etc.)
- ▼ New PMCs become standards when proven



Dow CO Value Proposition

- ▼ Standardization drives lower costs, reduced variability, and consistent solutions
- ▼ PMCs from equipment suppliers is a real opportunity – not just model a compressor, model the brand and model of compressor to be used in the plant
- ▼ Standardized equipment and CO compliant software yields low capital cost, low maintenance cost, and high plant efficiency





**Many major industrial companies
including BP, Shell and BASF
agree with the key structural
drivers listed by Dow and
TOTAL.**

