

Philosophy and Strategy of Idemitsu for the Future of Petroleum Refining Industry

- *In Pursuit of Harmony between Value of Hydrocarbons
and Conservation of Environment*

Presented by

Itaru Matsuhiko 松広 格

Executive Officer & General Manager

Technology & Engineering Center

Idemitsu Kosan Co.,Ltd.



Business Activities of Idemitsu

Idemitsu Group



Qatar Laffan Condensate Refineries
UAE Technical Research Centre
Vietnam Nghi Son Refinery

Expanding business
to the global market



Tokuyama Refinery and Petrochemical plant



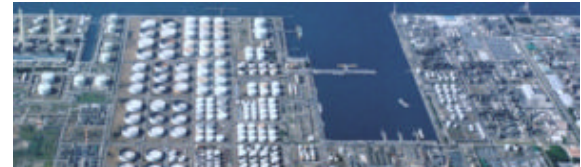
Hokkaido Refinery



Aichi Refinery



Chiba Refinery and Petrochemical plant



Operating four refineries and two petrochemical plants for Core Business in Japan.

Management Philosophy and Technology Strategy

**Idemitsu Kosan was Established in 1911
by Mr. Sazo Idemitsu, the founder.**

人間尊重



**Practicing the founder's concept of
'Respect for Human Being' in the conduct of
business through the history of Idemitsu
for over 100 years.**

Environmental Preservation

by Management Philosophy and Technical Innovation

Vision of the Petroleum Refining Industry Farther into the Future.

Environmental Preservation as Management Philosophy

‘Customers First’ : Consider customer satisfaction and act accordingly

1967 Constructed World First Resid HDS

1983 Launched Unleaded High Octane Gasoline First in Japan

1993 Launched Low Benzene Gasoline First in Japan



2005 Launched Sulfur Free Gasoline & Diesel Fuel

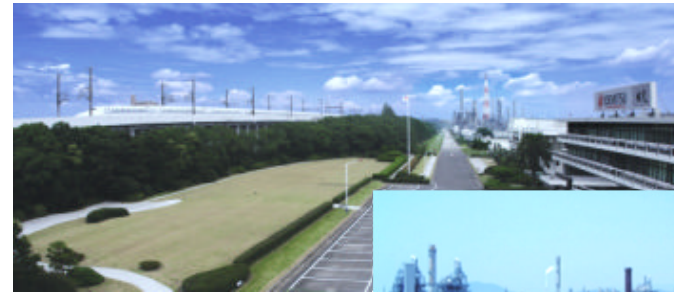


Environmental Preservation as Management Philosophy

Harmony with Communities: Contribute to the development of local community as a good corporate citizen.

1957 Construction of Tokuyama Refinery

The refineries incorporated a green belt intended to harmonize with the natural surroundings.



1963 Construction of Chiba Refinery



1973 Construction of Hokkaido Refinery



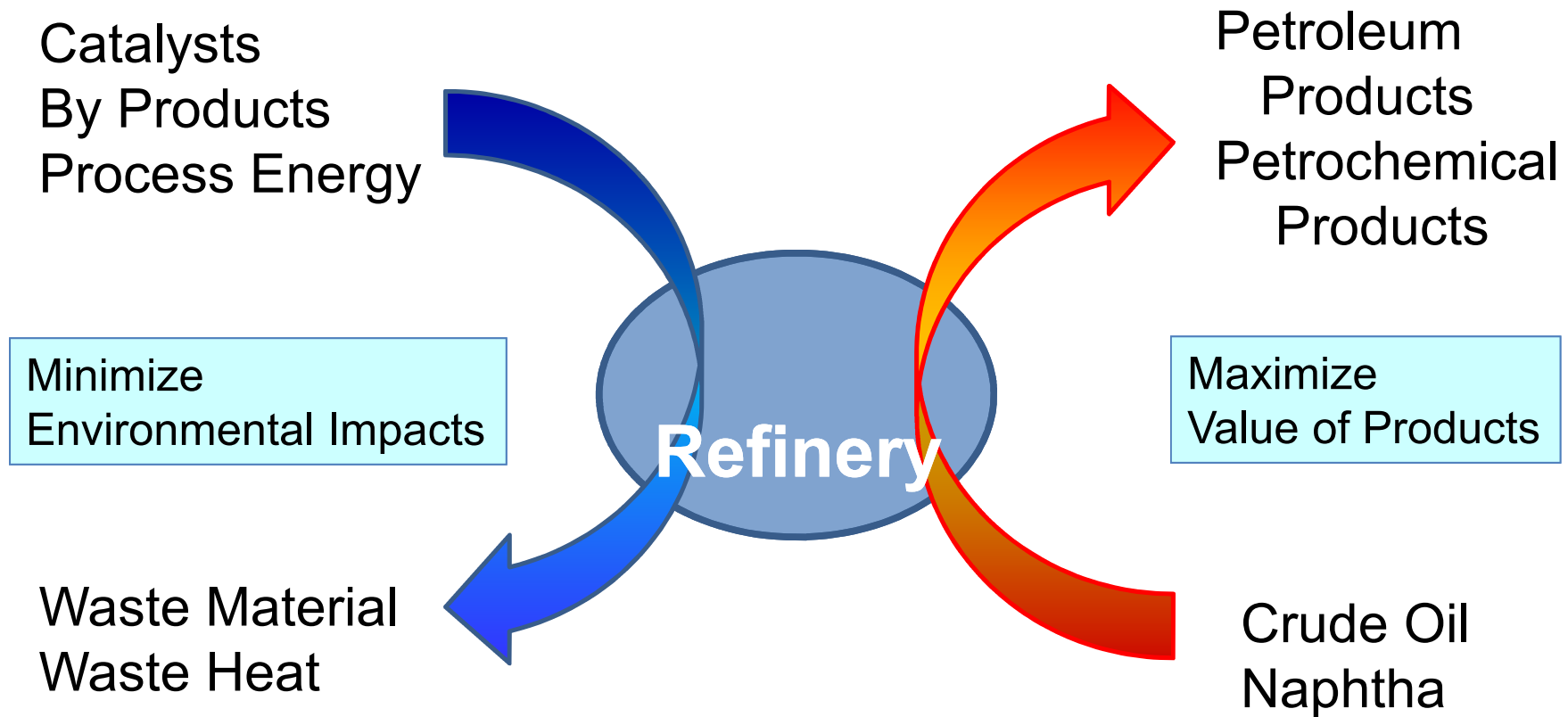
1975 Construction of Aichi Refinery



SEGES

Certified by
Social and Environmental Green Evaluation System

Balance between Value of Products and Preservation of Environment



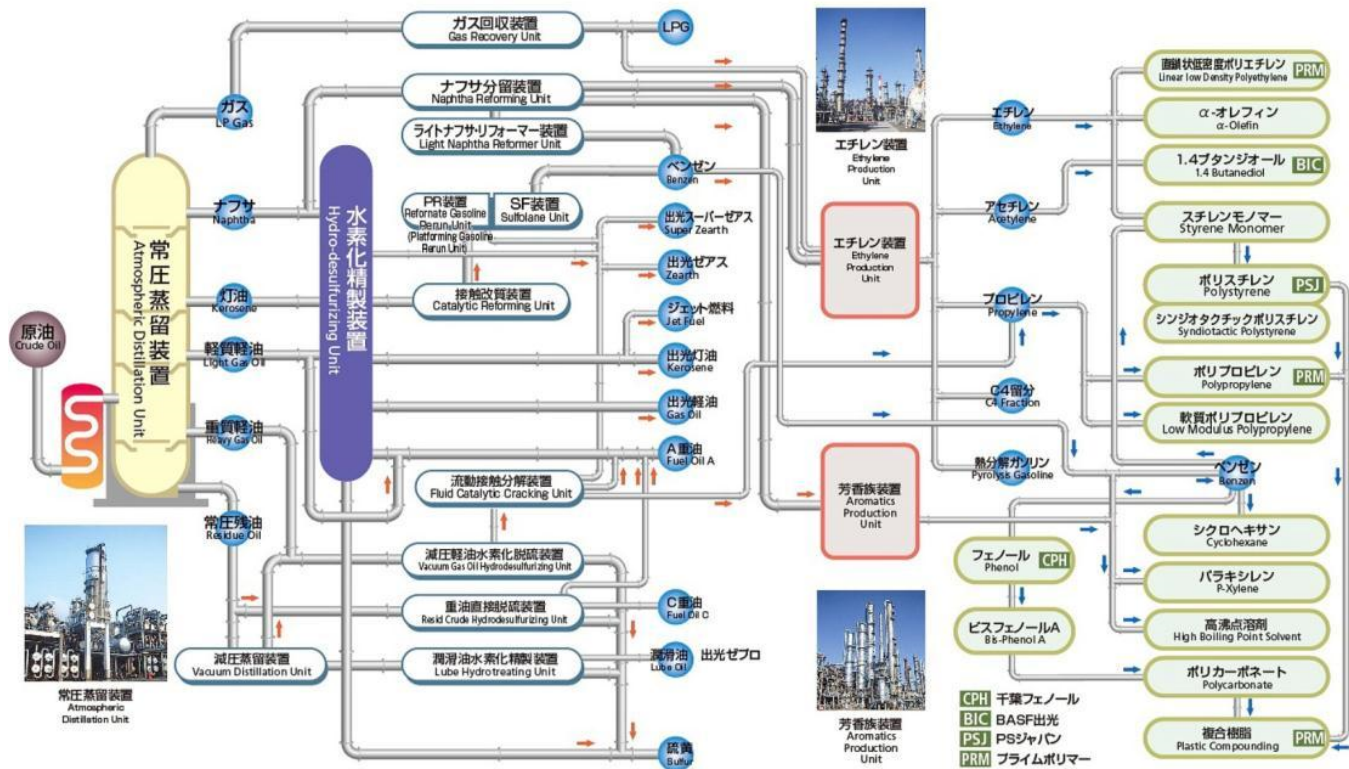
To Balance the Trade-Offs by Technology:
Future Vision of Refining Industry

Value Chain of Idemitsu: High Performance Plastics

Polycarbonate



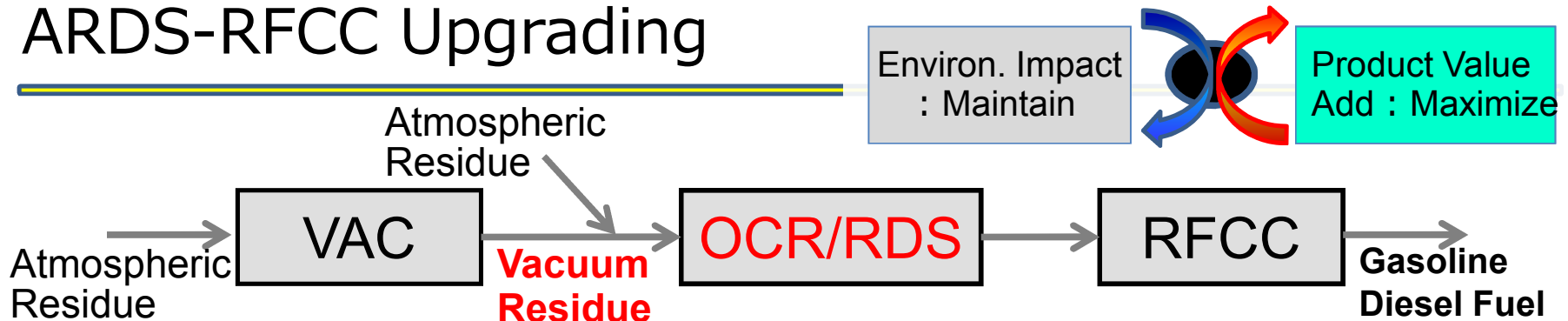
Syndiotactic PS



Low Modulus PP



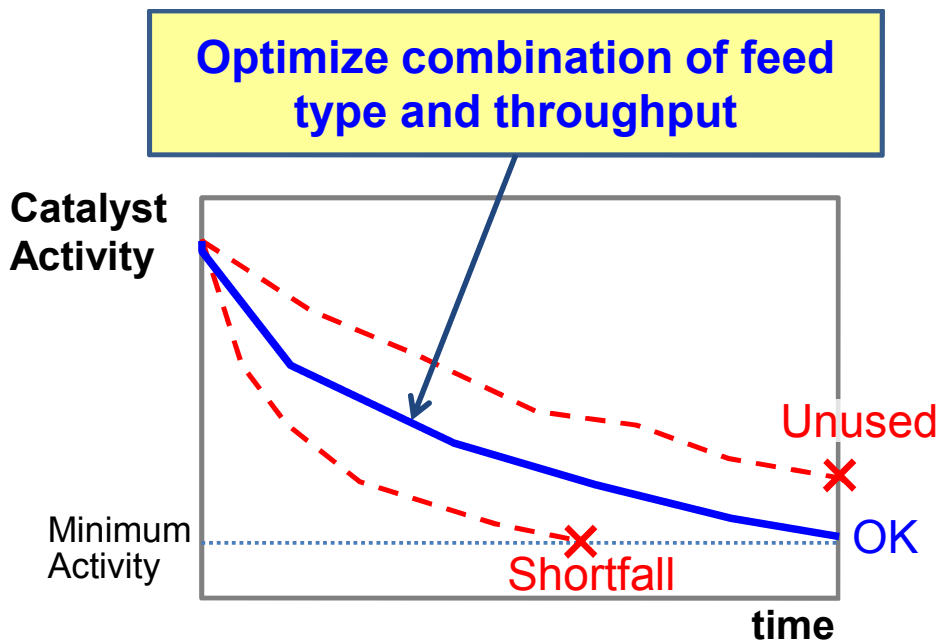
ARDS-RFCC Upgrading



Purpose: Maximize Charge of Vacuum Residue to RFCC

Condition: Control Catalyst Deactivation (Maintain Value of Products)

Approach: Predict and Use up the Activity in the Run Length

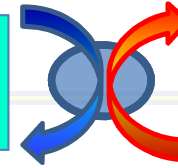


Steps of Approach

- Analyze Influence of Asphaltene and feed type to catalyst life
- Index Influence of feed type and throughput to the catalyst life
- Plan to maximize throughput of heavy bottom within the life
- Reduce feed cost & use up of the catalyst life**

I Catalyst Regeneration(RDS)

Environ. Impact
: Minimize

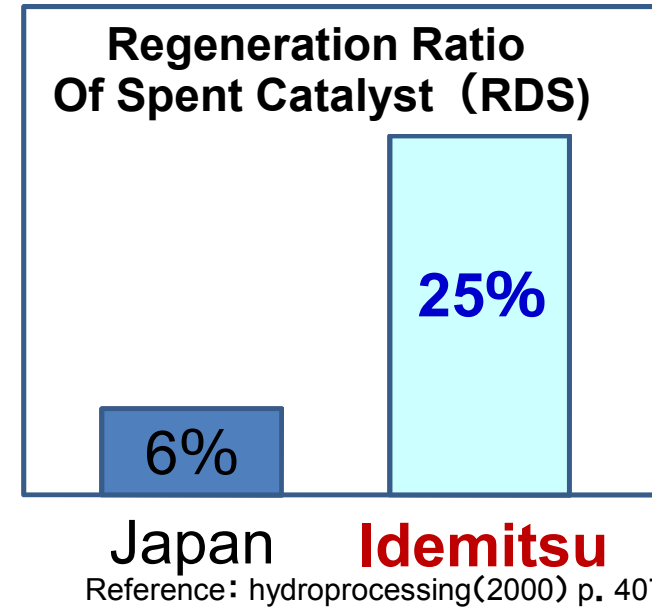
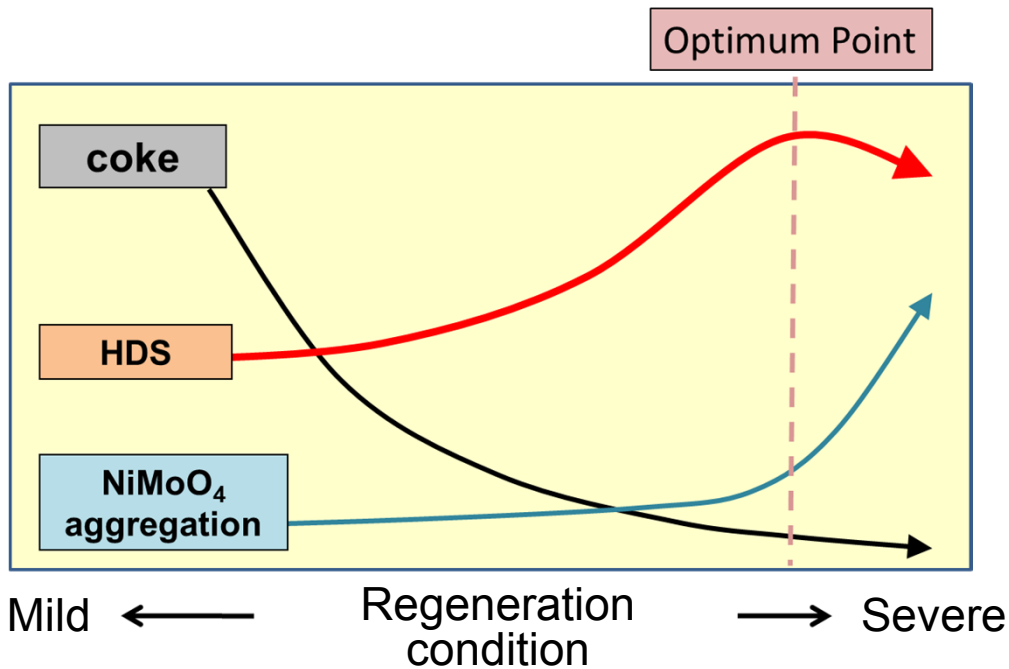


Product Value
Add : Maintain

Purpose : Reduction of catalyst waste and catalyst cost by regeneration of used catalyst

Condition : Recover 1 year of catalyst life (comparable performance as fresh catalyst)

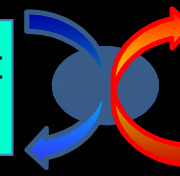
Approach : Determine optimum regeneration conditions



II By-Product Recycle to FCC

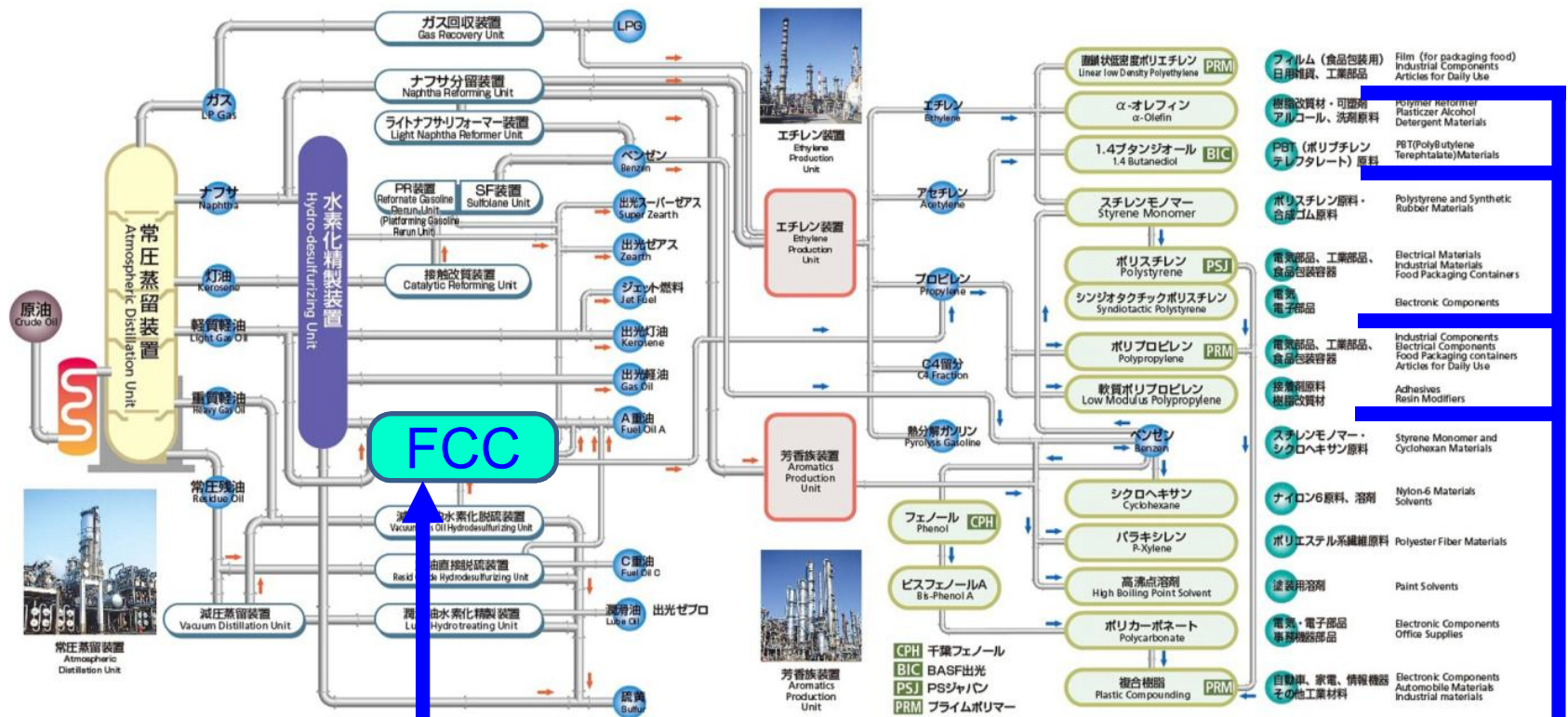
Environ. Impact : Minimize

Product Value Add : Maintain



千葉製油所 Chiba Refinery

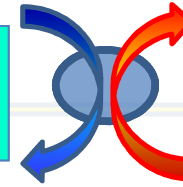
千葉工場 Chiba Plant



By-Products
Petrochemical Plant Residue in middle distillate range
Low polymers (PE, PP)

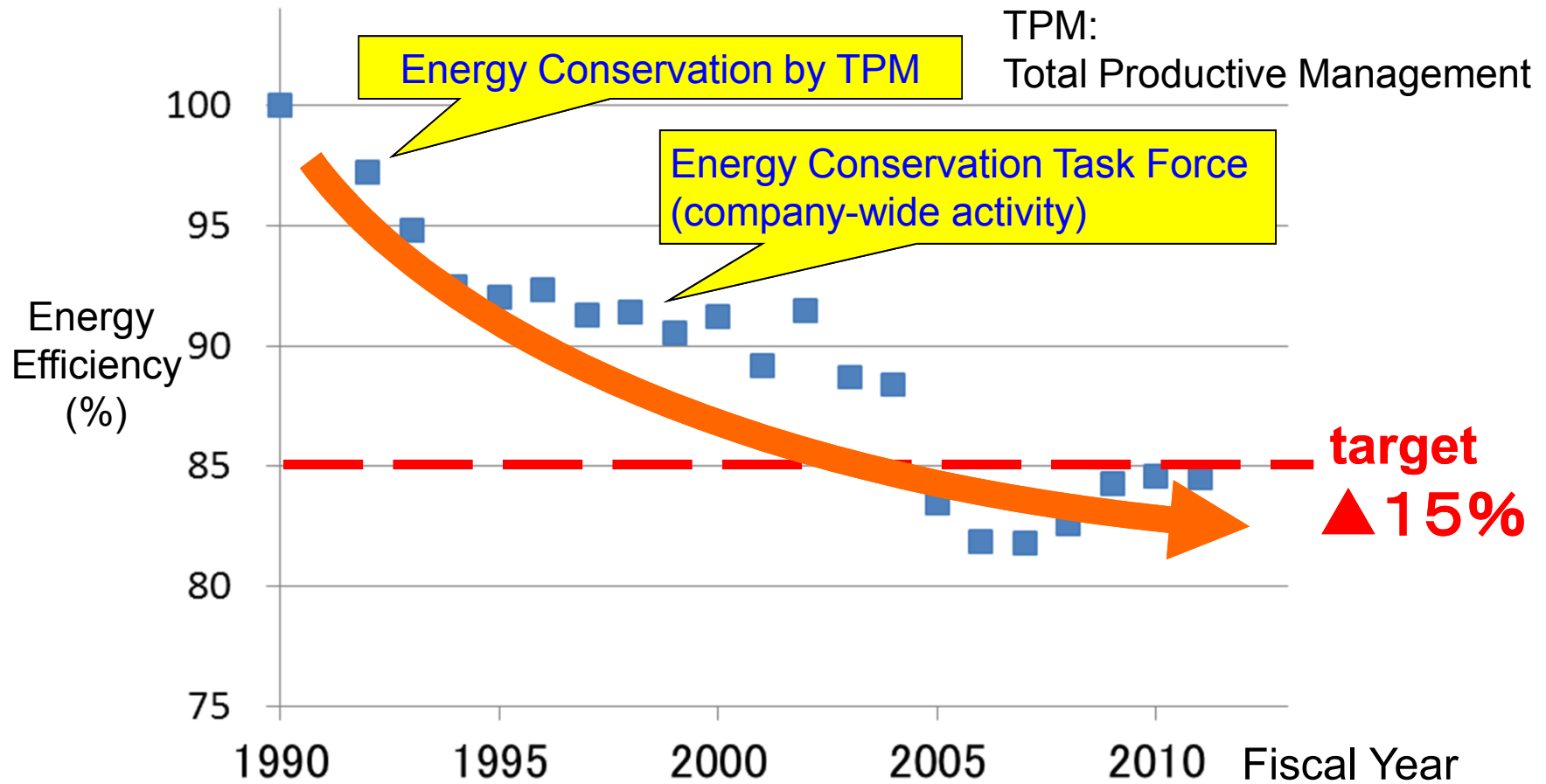
III Energy Conservation

Environ. Impact
: Minimize



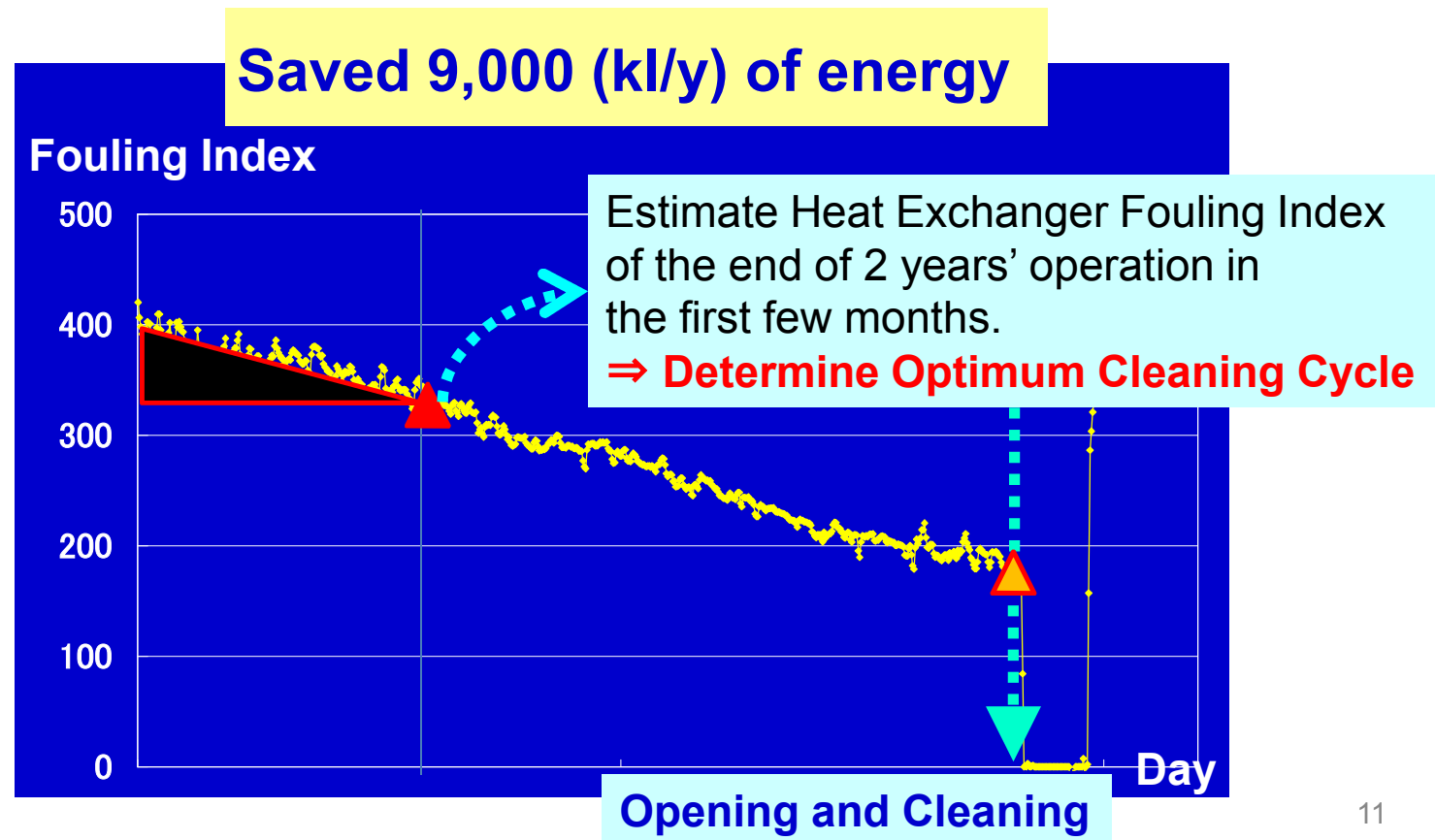
Product Value
Add : Maintain

**Improved energy efficiency
more than 15% in the past 20 Years**



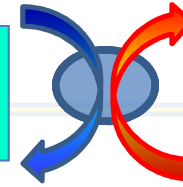
Optimization of Cleaning Cycle of Heat Exchangers

Purpose: Optimize Cleaning Cycle of Heat Exchangers
Conditions: Balance Cleaning Cost and Energy Conservation
Approach: Estimate Quantitatively Fouling of Heat Exchangers



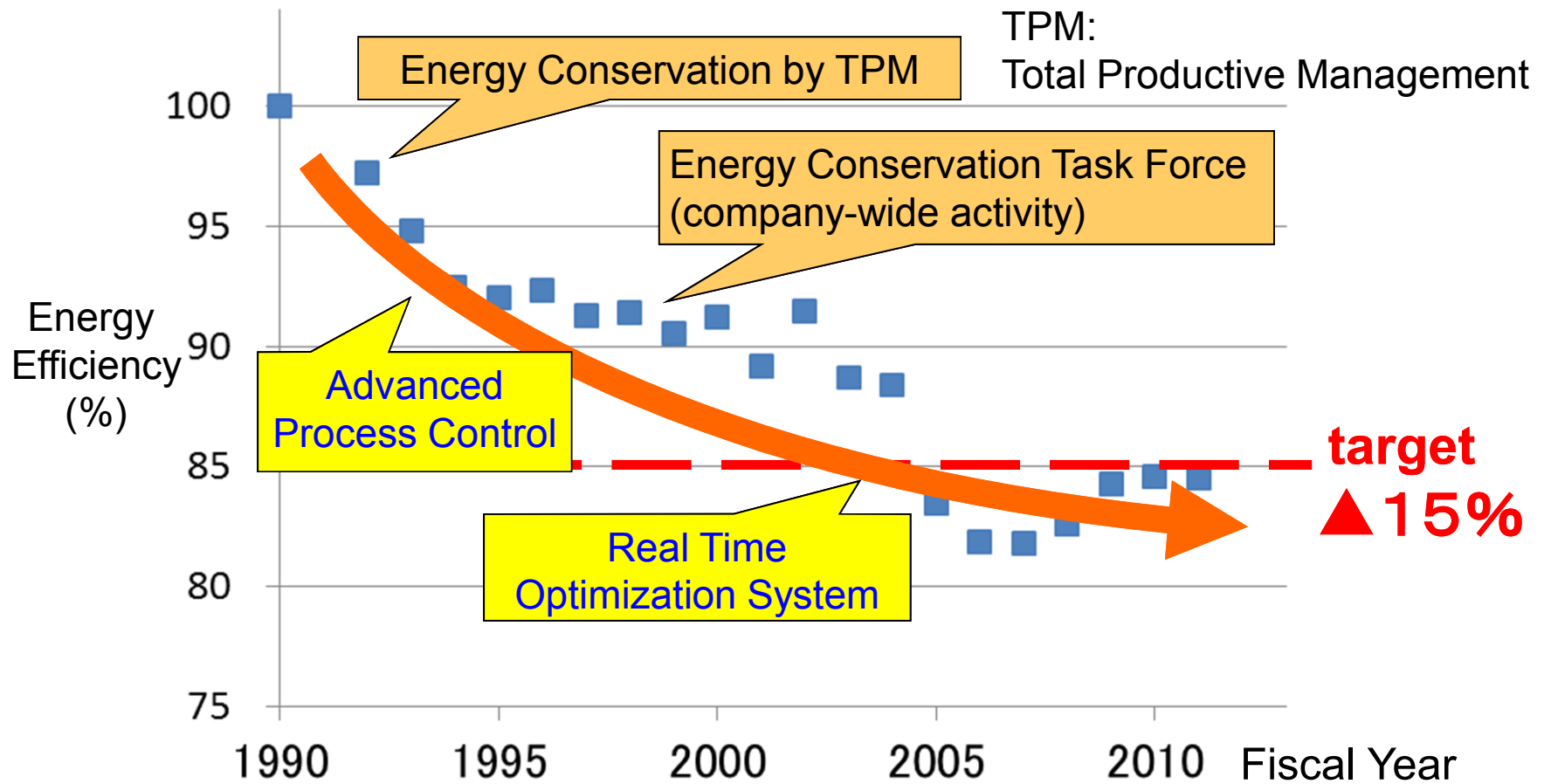
III Energy Conservation

Environ. Impact : Minimize



Product Value Add : Maintain

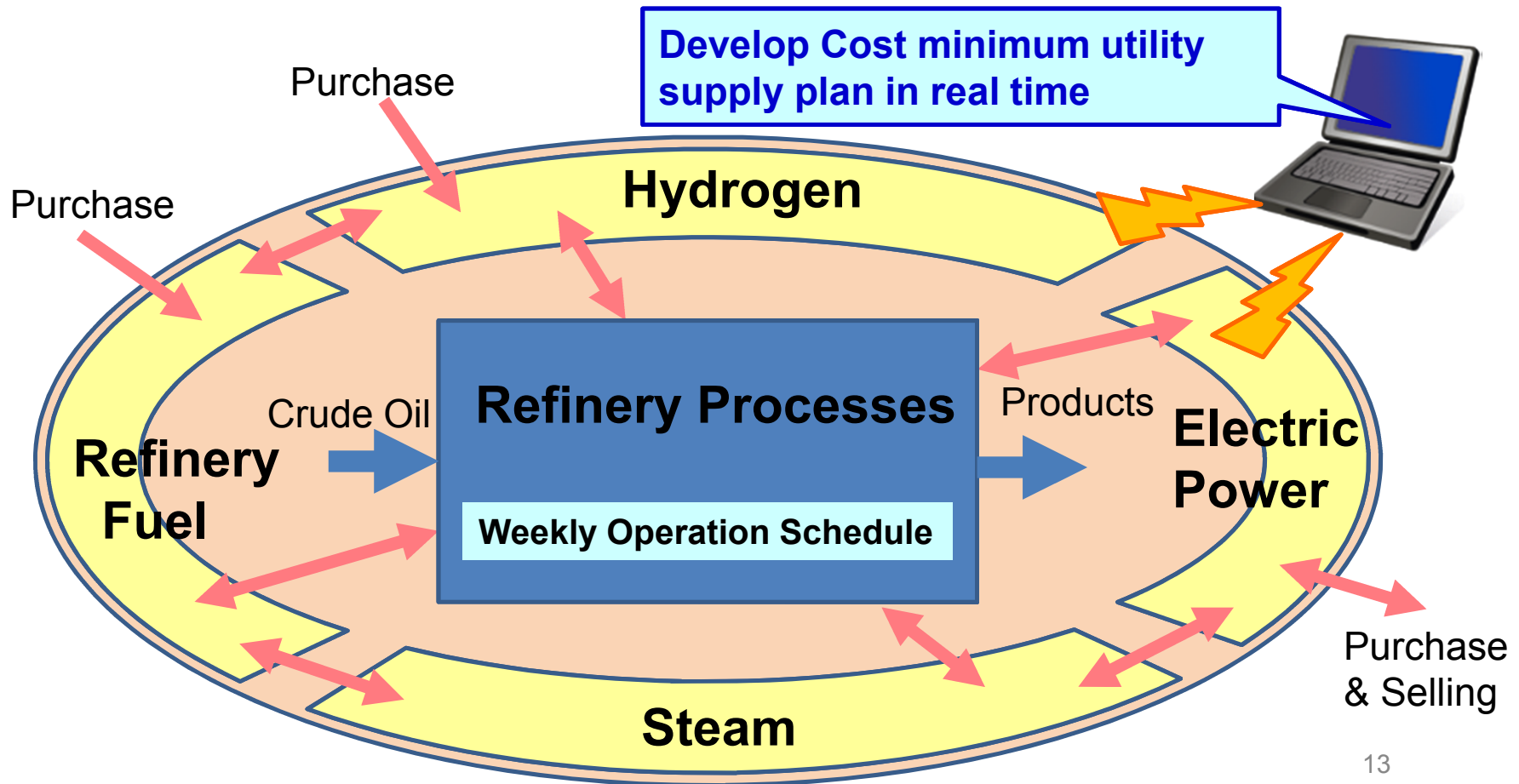
Improved energy efficiency more than 15% in the past 20 Years



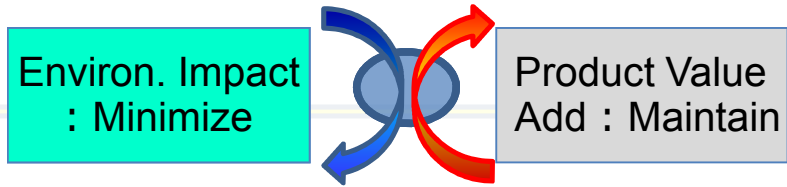
Optimization of Utilities (Total Utility Management)

Operation Scheduling: Crude Oil Processing and Process Operation Schedule based on Market Demand

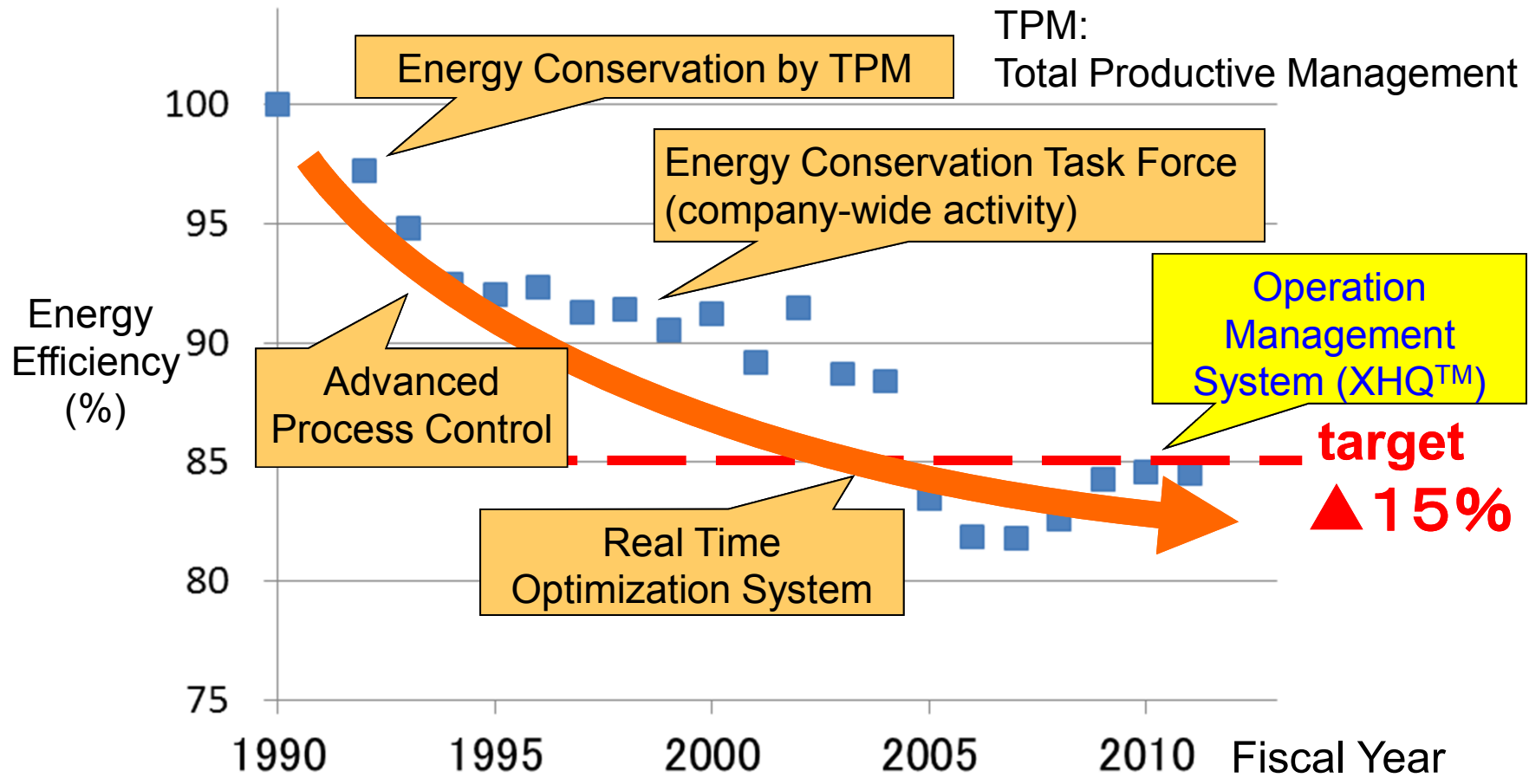
Utility Scheduling: Need detailed coordination of operation schedule and utility supply balance.



III Energy Conservation

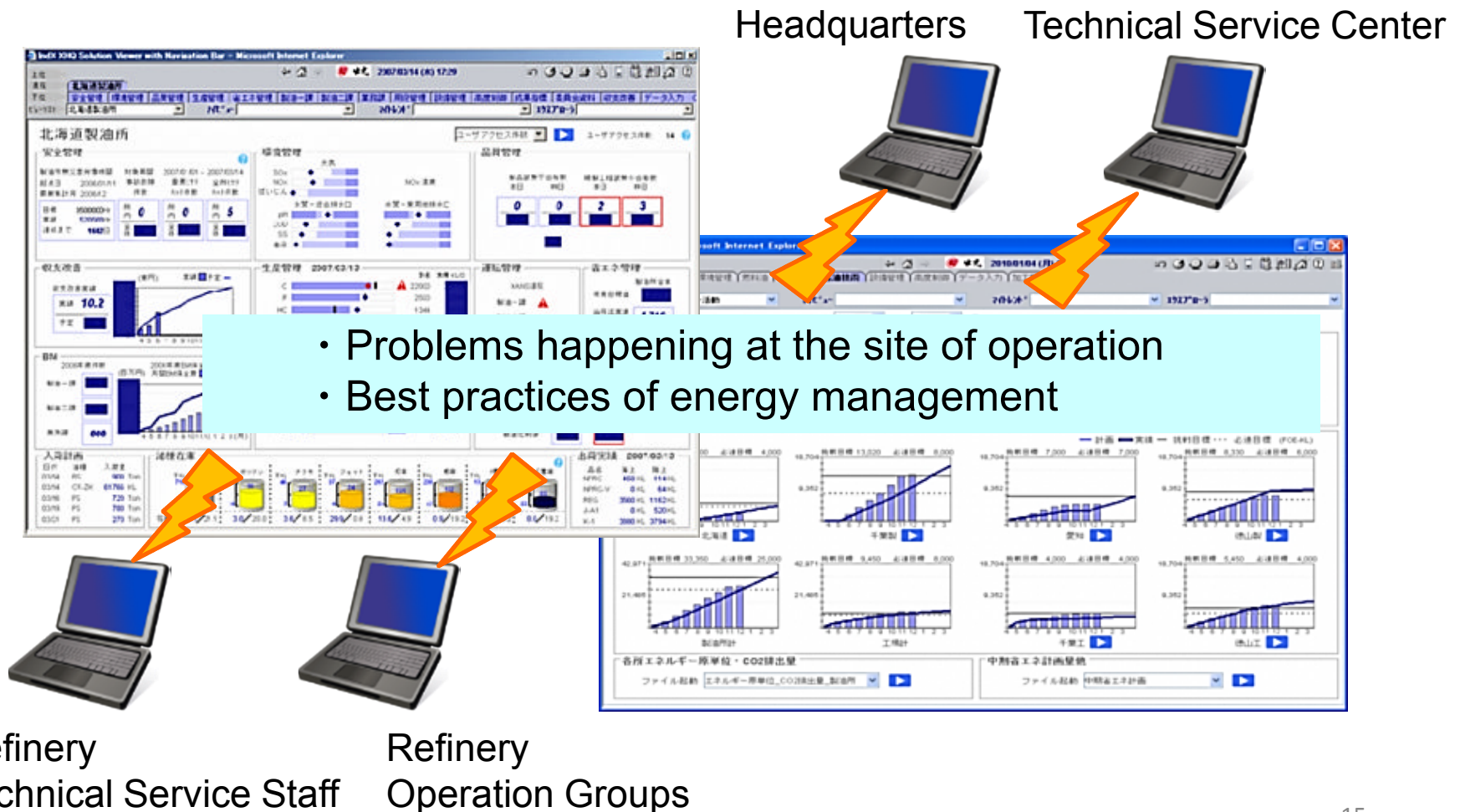


**Improved energy efficiency
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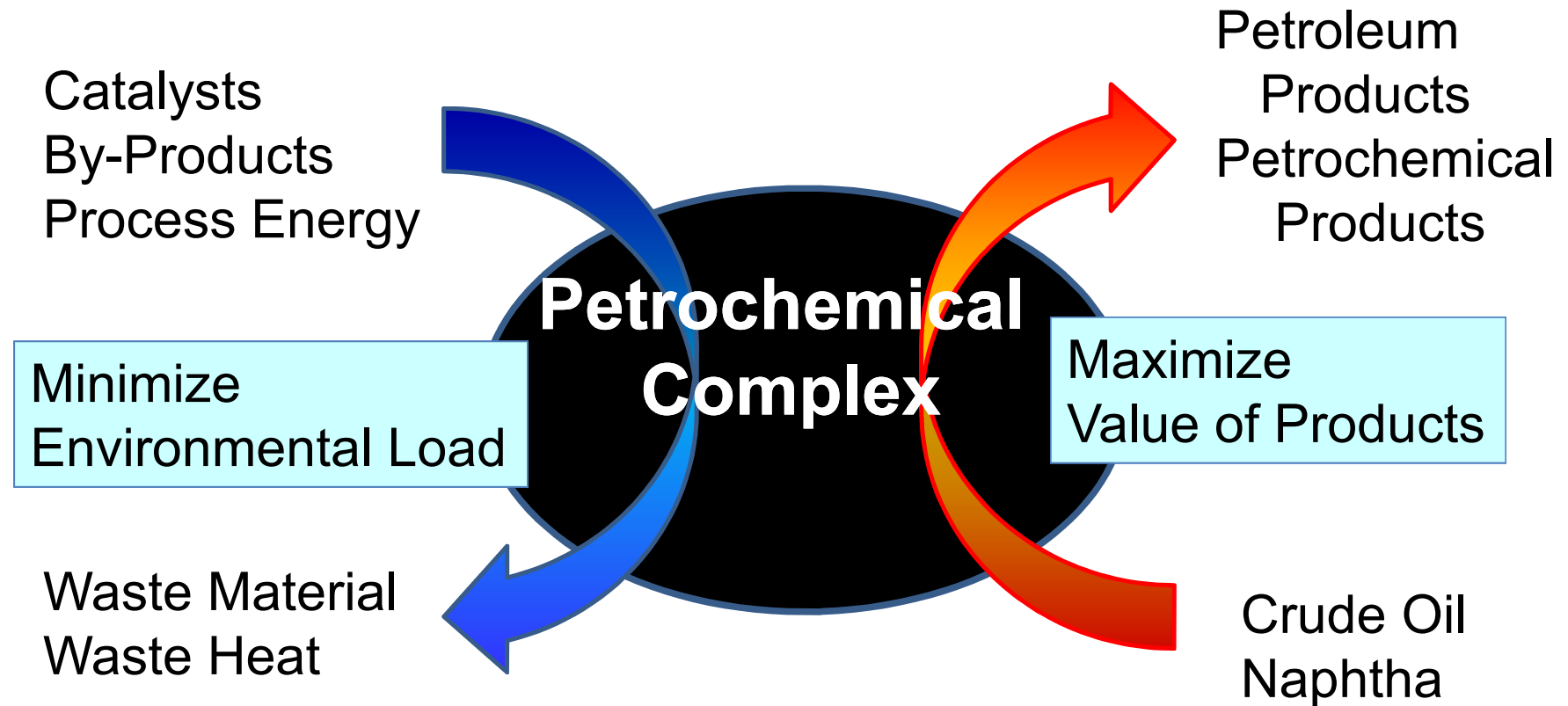
Optimization of Utility Supply (Management by XHQ™)

Enabling refinery operation information sharing simultaneously and in real time
Timely Decision and Problem Solving (from the top management to operators)



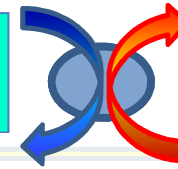
Enhancement of Competitiveness and Environmental Preservation in Petrochemical Complex

Develop energy management practices from one refinery to the whole petrochemical complex



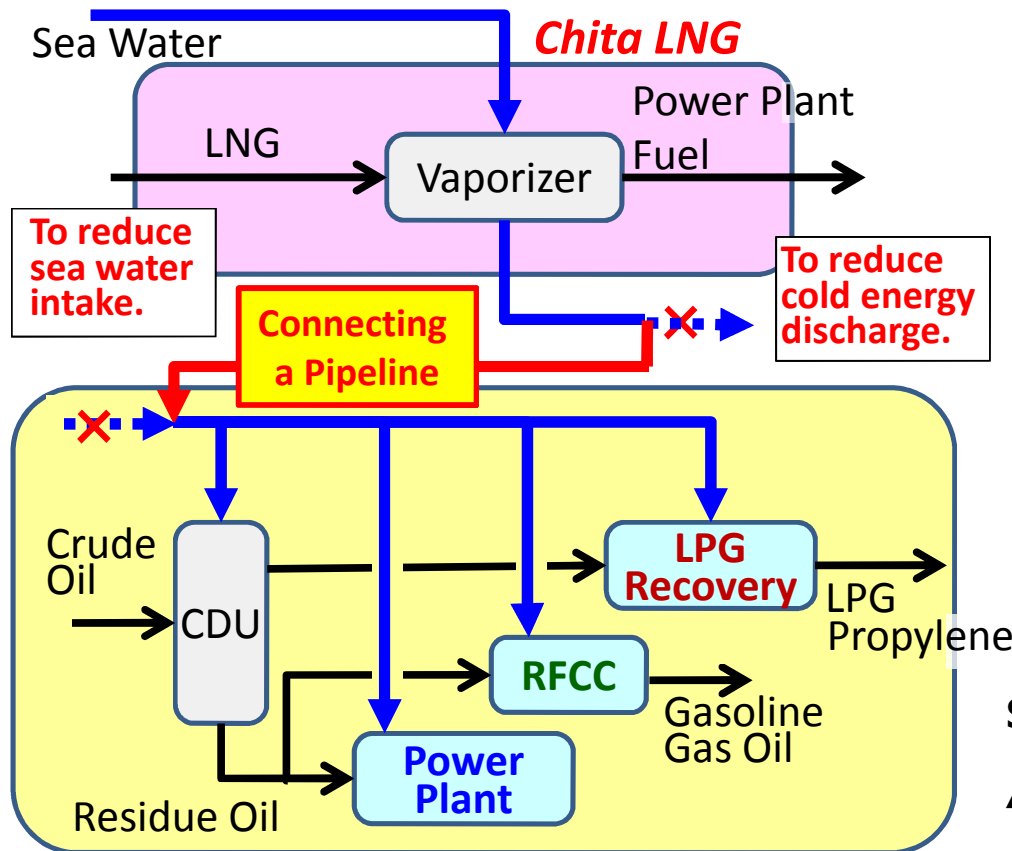
Cold Energy Utilization at Chita

Environ. Impact : Minimize



Product Value Add : Maximize

Cold Energy from Chita LNG's Vaporization Plant is introduced to Aichi refinery for process cooling
 ⇒ To improve cooling efficiency of the refinery



Reduced 40,000KI of crude oil throughput.

- Increase Recovery Ratio of LPG and Propylene
- Increase Crackability
- Energy Conservation

Started operation in 2013 as one of the programs of RING's "Projects for Stable Supply of Petroleum Products"¹⁷

Idemitsu Aichi Refinery

RING : Research Association of Refinery Integration for Group-operation

Epilogue

Technology Management of Refineries for Future

- Keep up with the latest technology
- Build up operation technology and know-how elaborately



- Balance between value of products and impacts to environment
- Essential for the next generation refinery



Technology Exchange with Oil Producing Countries



Oil producing countries and Japan are good business partners into the future. Idemitsu Kosan will promote technical exchange with oil producing countries through the JCCP programs.





Thank you for your attention