Approach to Saving Energy in Idemitsu Japan

The role of the Energy Manager to support energy conservation

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Introduction

Energy conservation is not a job that employees want to do. Also their mind cannot be moved by rules or governmental law.

On the other hands, most of energy conservation investments do not work out economically.

Therefore, the role of manager is very difficult and important.

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- About our company Idemitsu
- Background
- Governmental support
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About our company Idemitsu

Core Business

Resource Development & Procurement

Around 5,000 Gas Station retail

IDEMITSU

Refining and Petrochemicals

R&D

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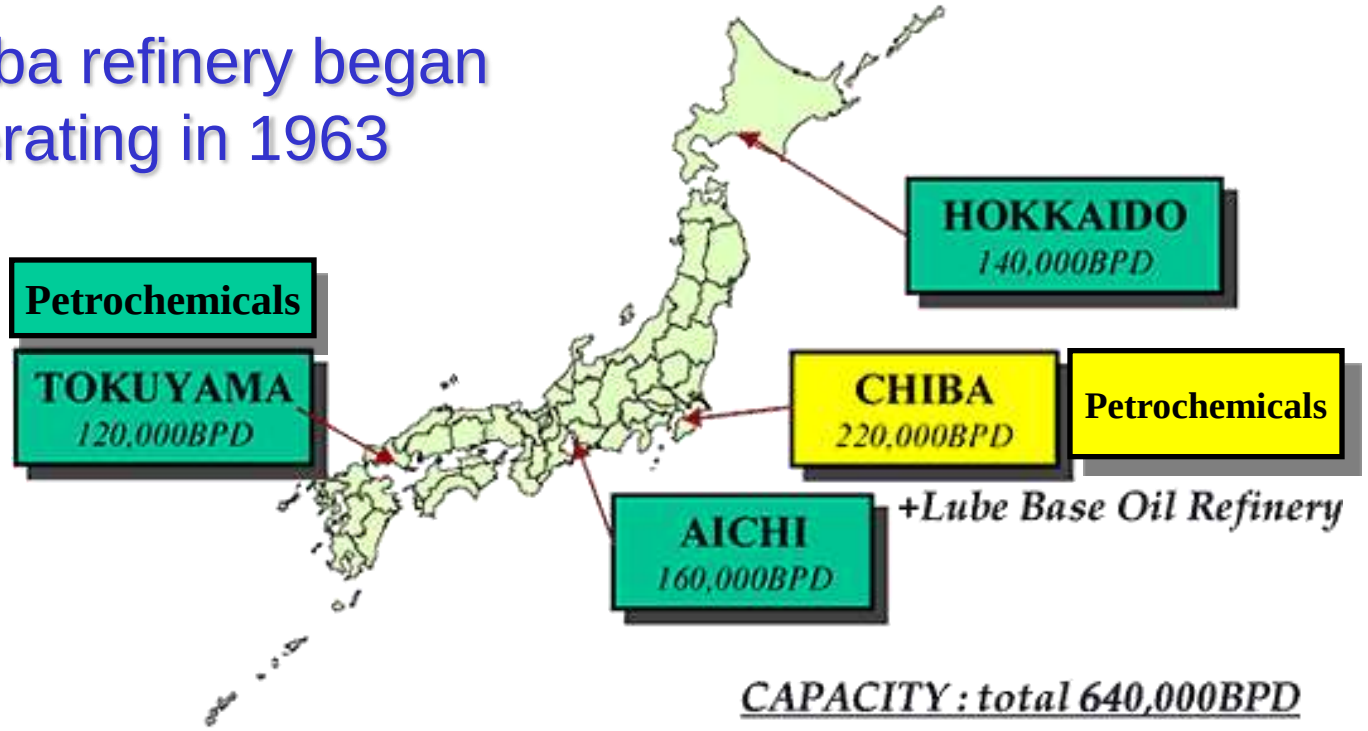
About our company Idemitsu

Idemitsu has 4 refineries and 2 petrochemical factories in Japan. Chiba refinery is the largest one in our company and well integrated in petrochemicals.

Chiba refinery began operating in 1963



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About our company Idemitsu

Mission

☐Survive our old refinery complex

⊙Basically, complex competitiveness is decided by configuration and its scale.

- Installed cutting edge technology
- High efficiency equipment are used
- Well considered configuration that suitable for the market

Big handicap in our old complex !

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About our company Idemitsu

Mission

☐ Survival key items

⊙ **Energy conservation** is one of key item to keep competitive edge

- To **integrate chemical products** (Fuel to Chemical)
- To **know our production plant well**
- To catch up **new technology**
- To **maintain equipment** well

Bring up intelligent operators through EC

Big handicap turns to a power !

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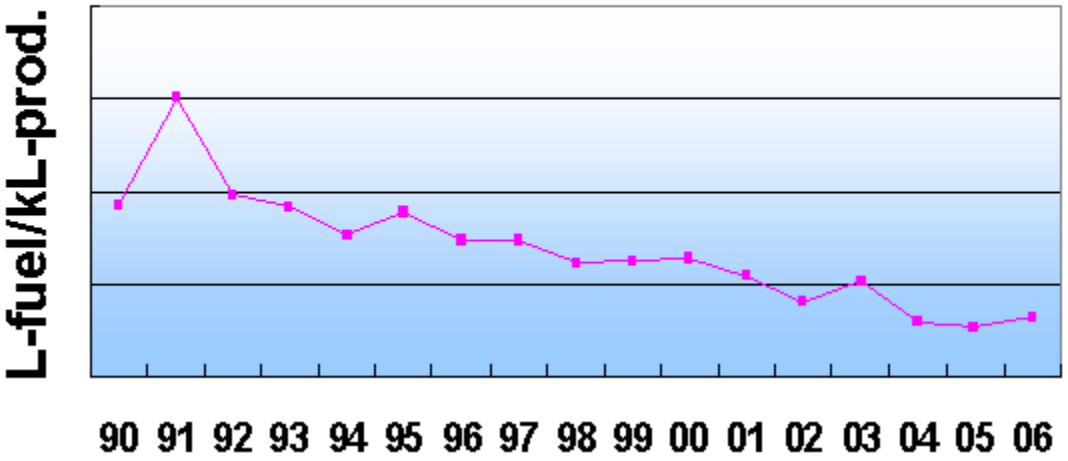
Background

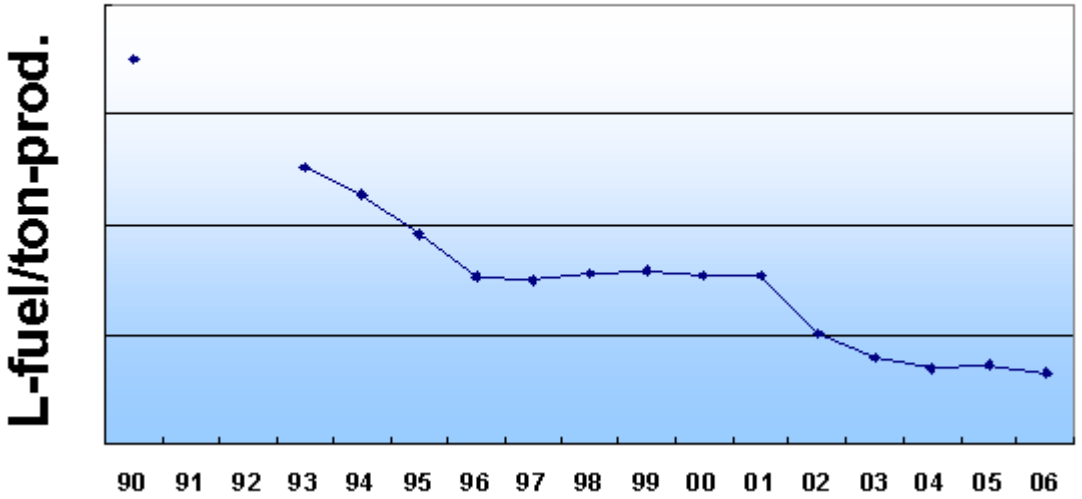
Refinery



Energy unit consumption

<Refinery>
Fuel oil litter/kilo litter prod.
<Petrochemicals>
Fuel oil litter/ton product

Petrochemical factory



Improvements what we can apply are lost for these several years.

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Background

Most energy conservation matters do not consist economically. So we need

➡ “Financial support”

➡ “Tax discount”

Motivation up

➡ “Mind & Technical support”

Energy managers have to manage them.
Governmental support is also important.

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Governmental support in Japan

<Financial support >

-Finance subsidy (NEDO, PEC)

-Taxation , Loan treatment

<Mental support>

-Commendation (EC award)

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Governmental support in Japan

NEDO New Energy and Industrial Technology Development Organization

NEDO: Up to 50% investment assistance to the excellent conservation of energy investment.

Affiliated association of the METI Japan

財団法人 省エネルギーセンター The Energy Conservation Center, Japan

ECCJ

ECCJ: Supporting financial matter and they host EC AWARDS in Japan.
They lead spilling over success case of EC

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Governmental support in Japan

Energy conservation is one of the activities of **TPM** (**T**otal **P**roductive **M**anagement) in IDEMITSU.

We keep being awarded the energy conservation prize that explained before for 24 years in a row !

Awards

<The small group activity>

It is usual to make a small group to advance the improvement activities.

Each group has a responsibility to do 'KAIZEN' (improvement activities) They are competing hard mutually.

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Management viewpoints

To success the energy conservation, there are two important viewpoints.

One is **“Improve Performance”.**
Another is **“Keeping Performance”.**

In old plant site such as ours, **Keeping performance** is more and more important.

The performance of the machine decreases without fail. Exchangers have to foul.

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Management viewpoints

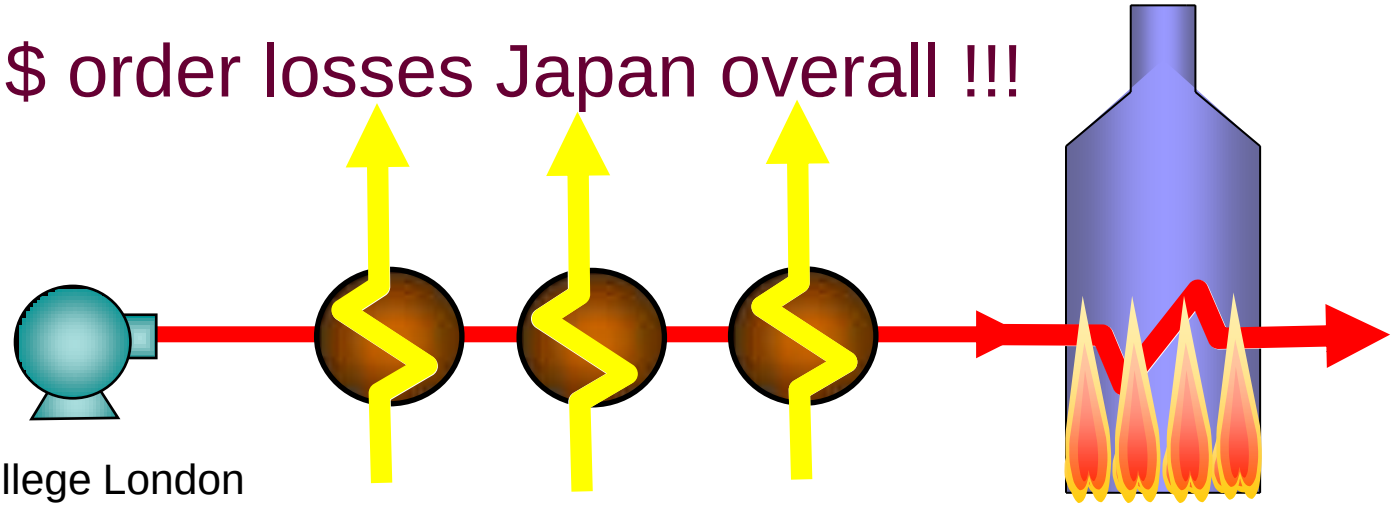
CROF (CRude Oil Fouling) PJ *1) says

Pre-heat train fouling is estimated to cost around $1.2 billion per annum in the US alone.

$ 6 billion per annum in the World ! !

$ 300 million per annum in Japan !

Billion $ order losses Japan overall !!!



出光 *1) Imperial College London

Management viewpoints

☐Basic idea

⊙How to treat the plant well?

- Check real time
- Think quickly
- Action agile

Manager needs “Checking tools” and “Organization that quick response can be achieved”

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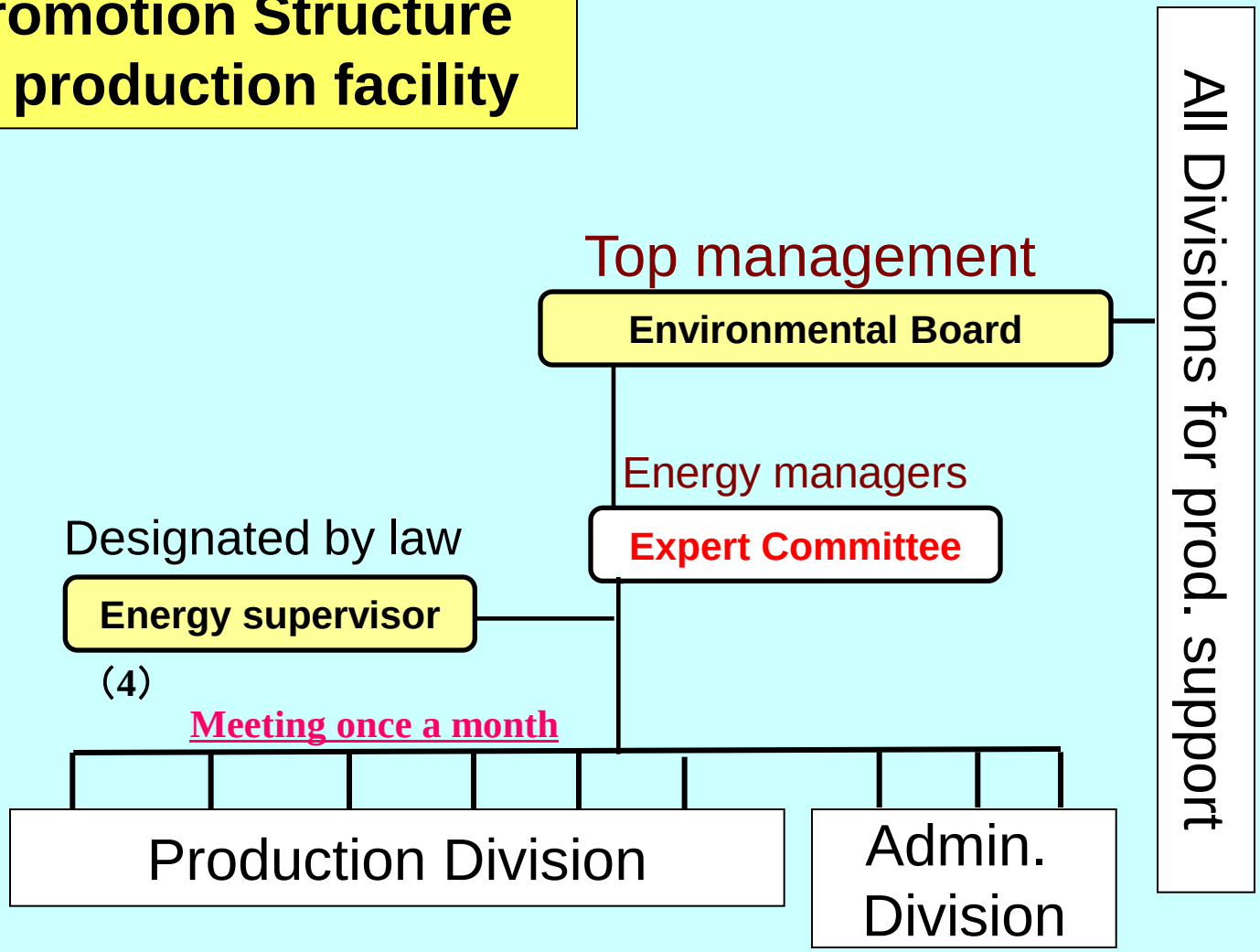
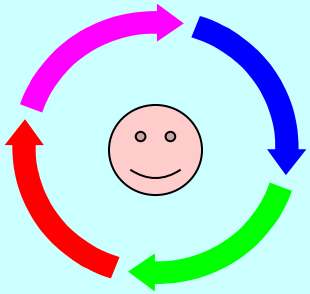
Promotion Structure In production facility



Promotion Cycle



Head Office

Midterm plan

Administration section

Annual Plan

Do

Check result

Twice a year

Production sect.

Prod. control sect.

Action

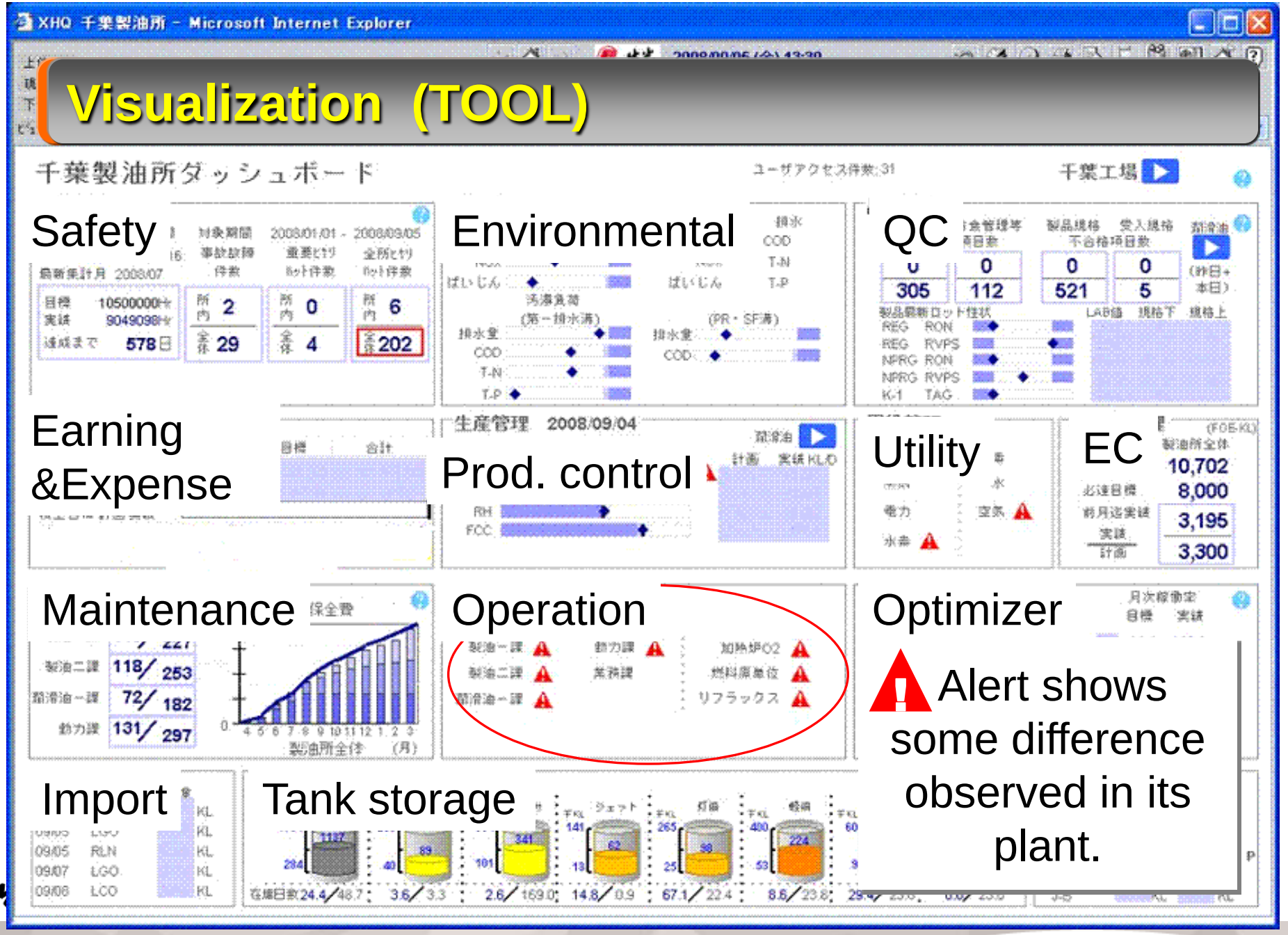
Discovering

Administration section

Review & Execution

Engineering section

Visualization (TOOL)



Visualization

☐Know the Original

- ⊙Operating conditions changed little by little from first design.
  - Catalysts, feedstock, fouling etc.
- ⊙We cannot judge present state good or not, if we do not know original design.

It's just like children's imagining Grandfather's younger days !

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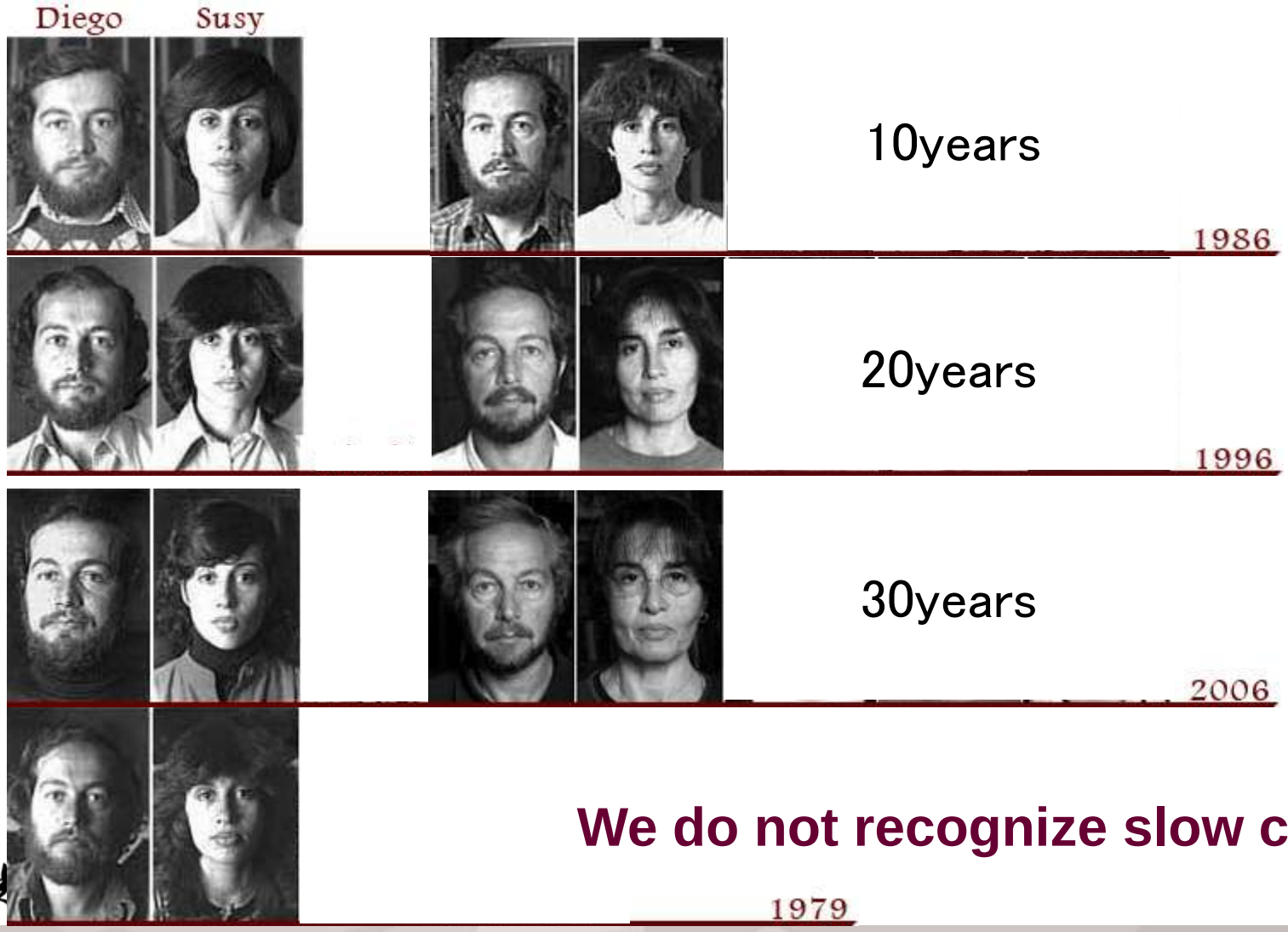
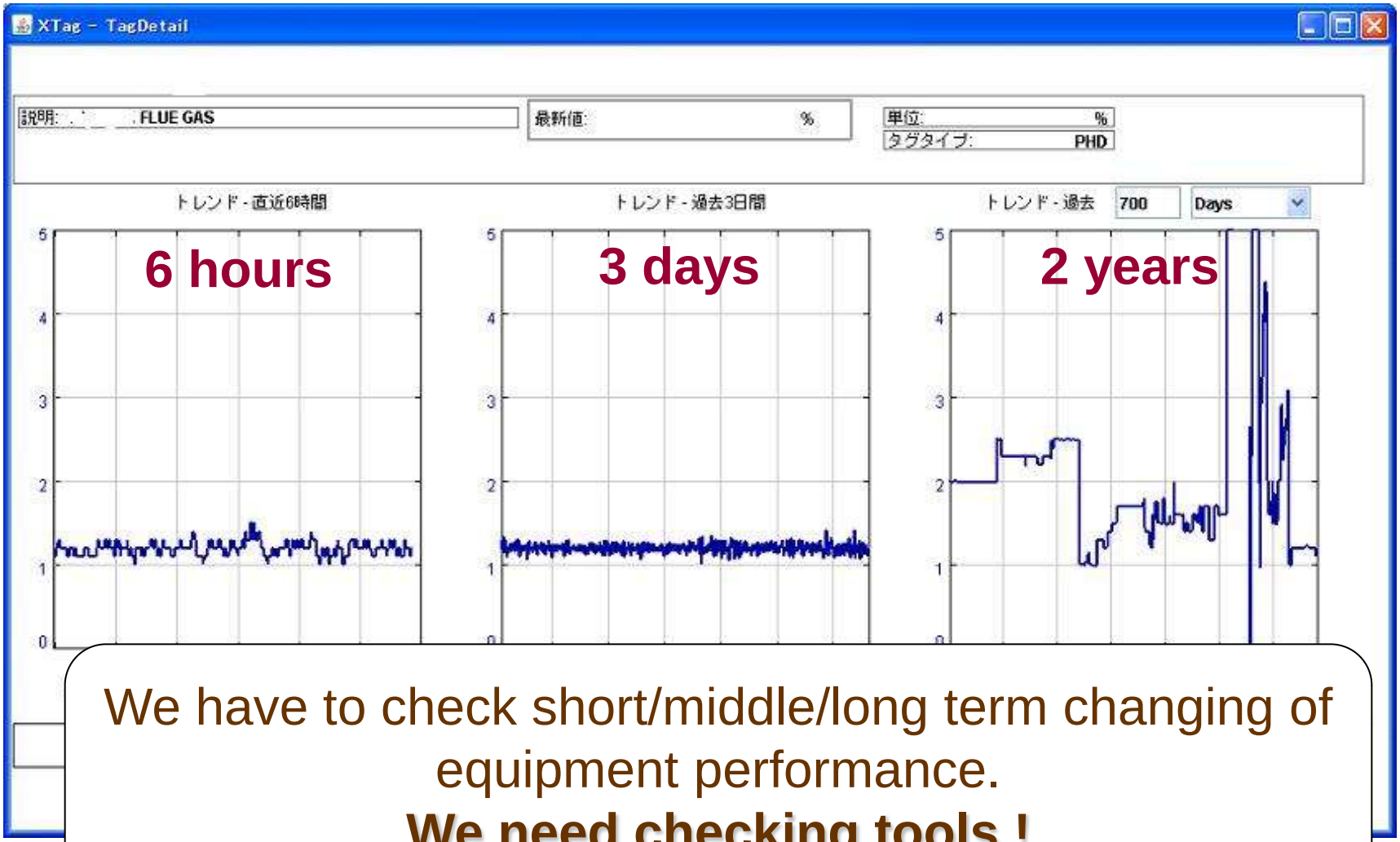
Visualization (term difference)



We do not recognize slow change.

Visualization (term difference)



We have to check short/middle/long term changing of equipment performance.

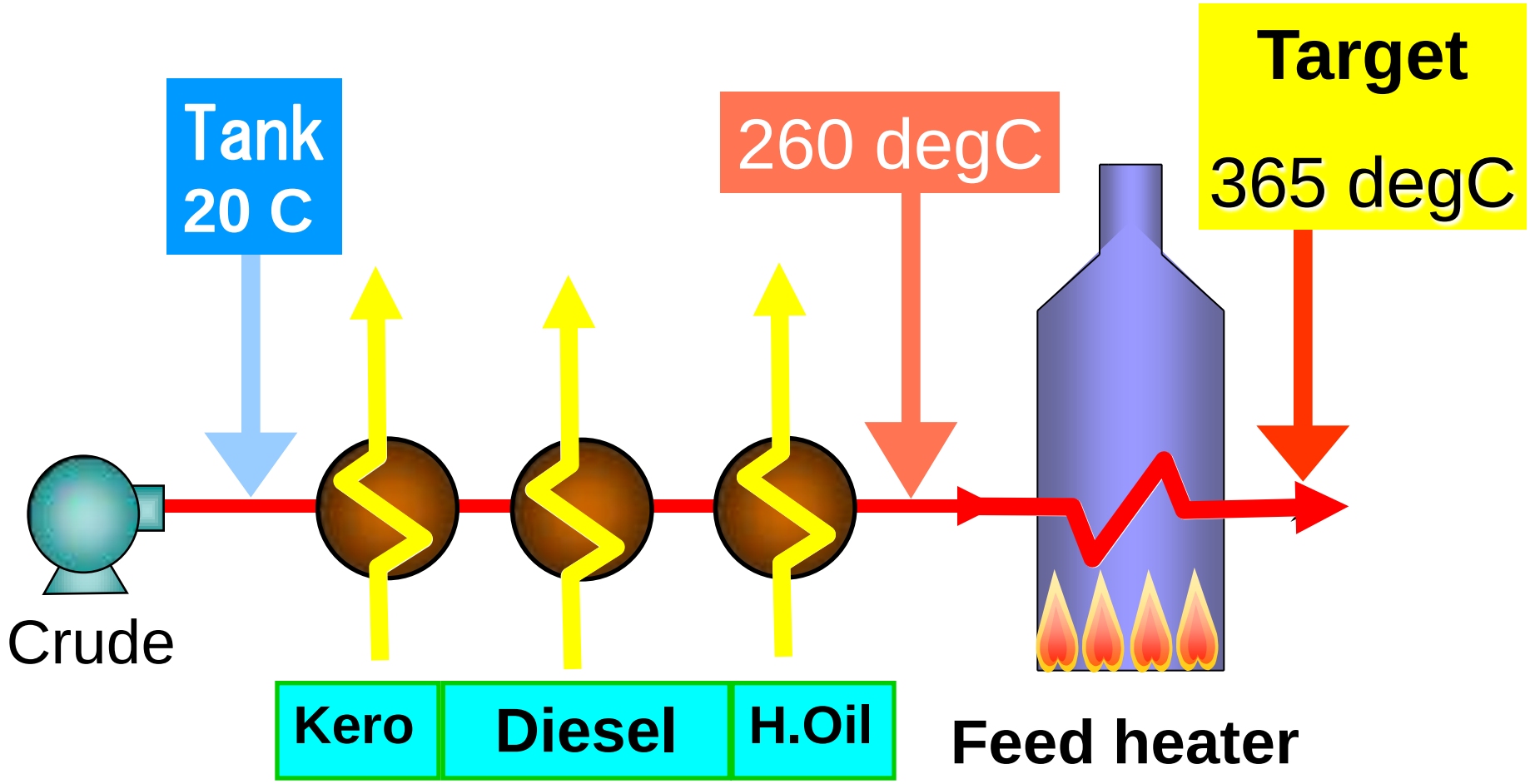
We need checking tools !

Example

“ Keeping Performance”

Appropriate maintenance makes heat exchanger performance well

Ex. Background



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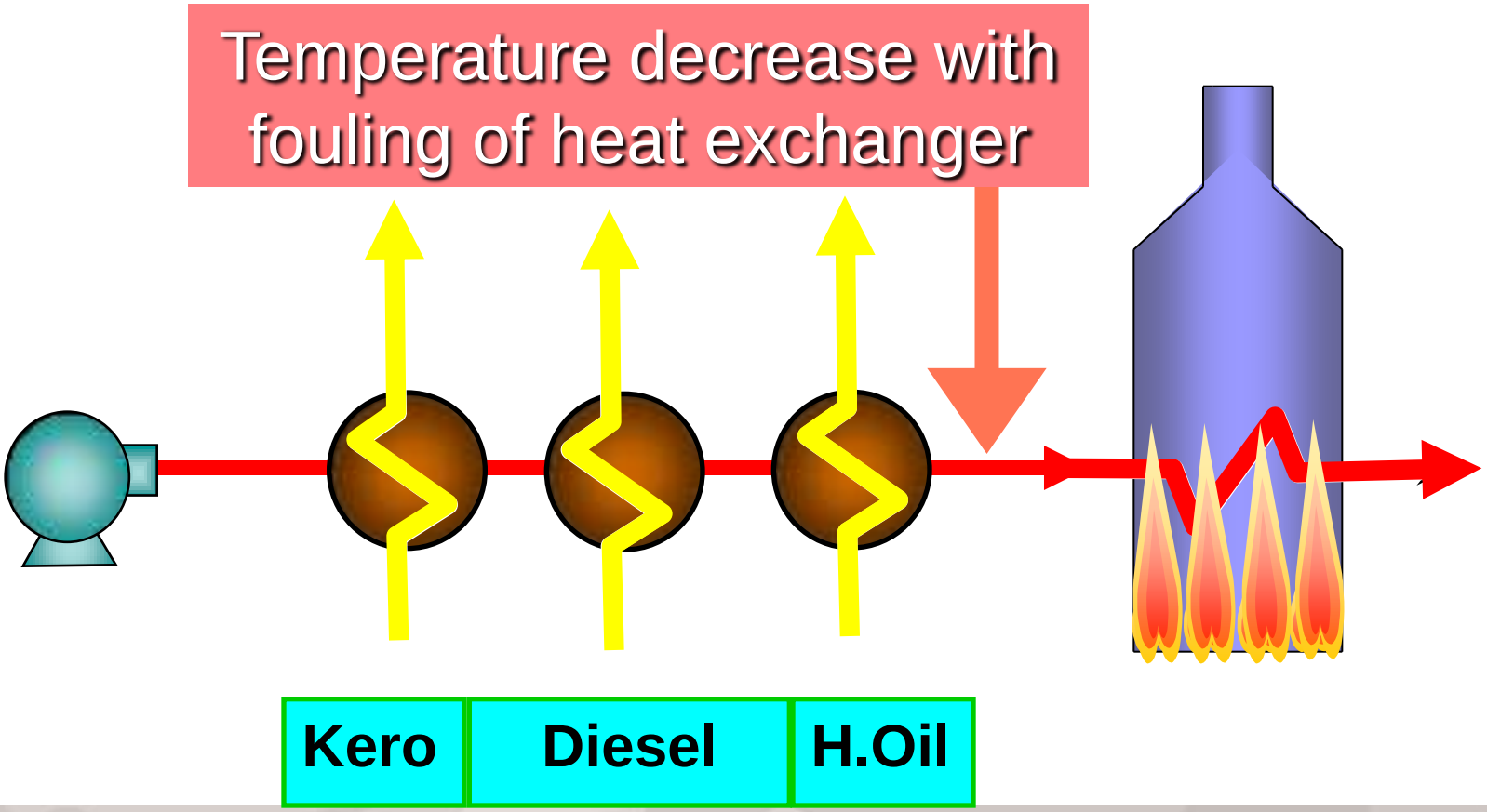
Ex. Basic Ideas and Anxiety

Fouling makes fuel consumption worse. And fouling tendency has been changed by crud oil property.



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Ex. Fouling

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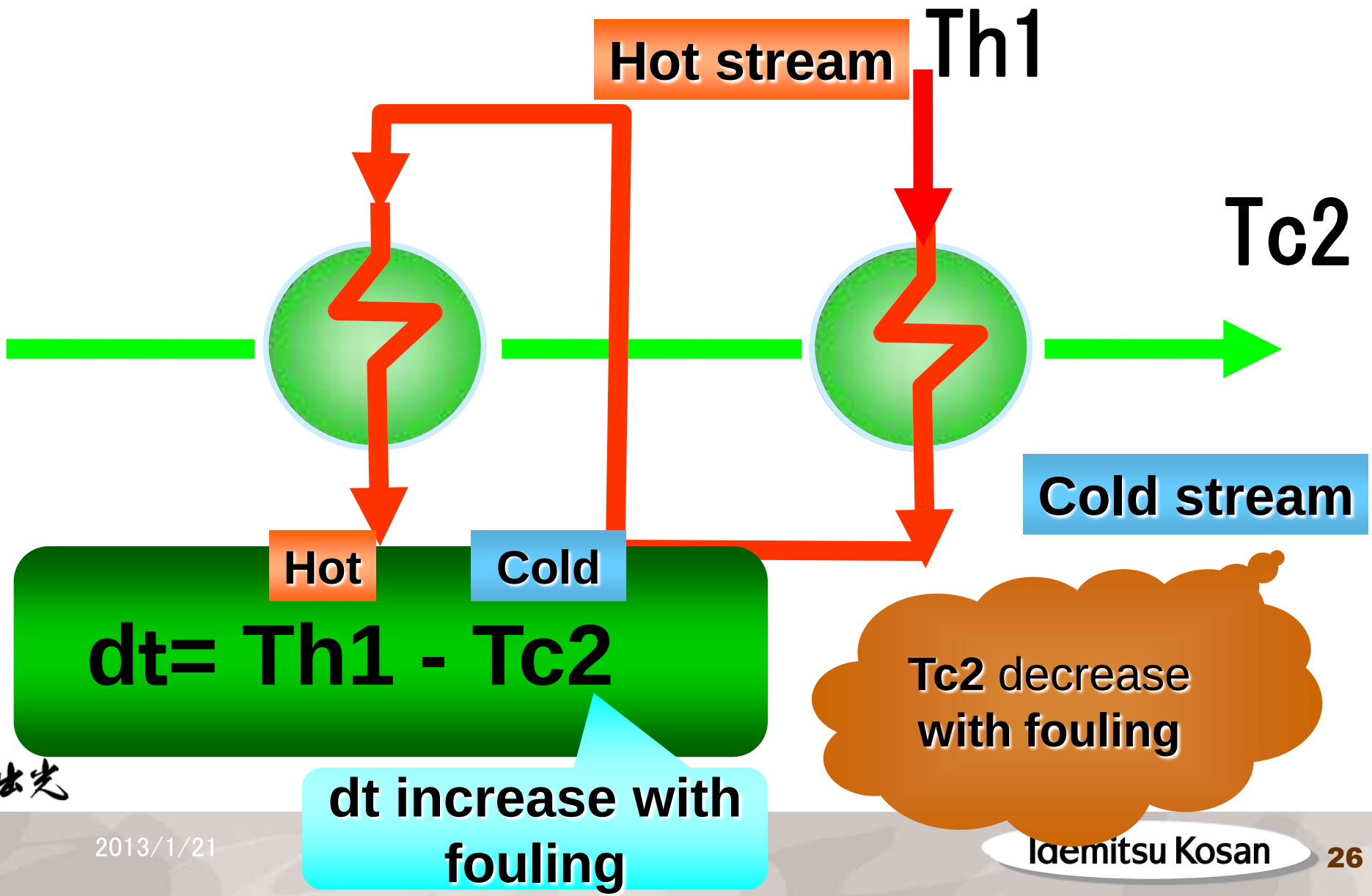
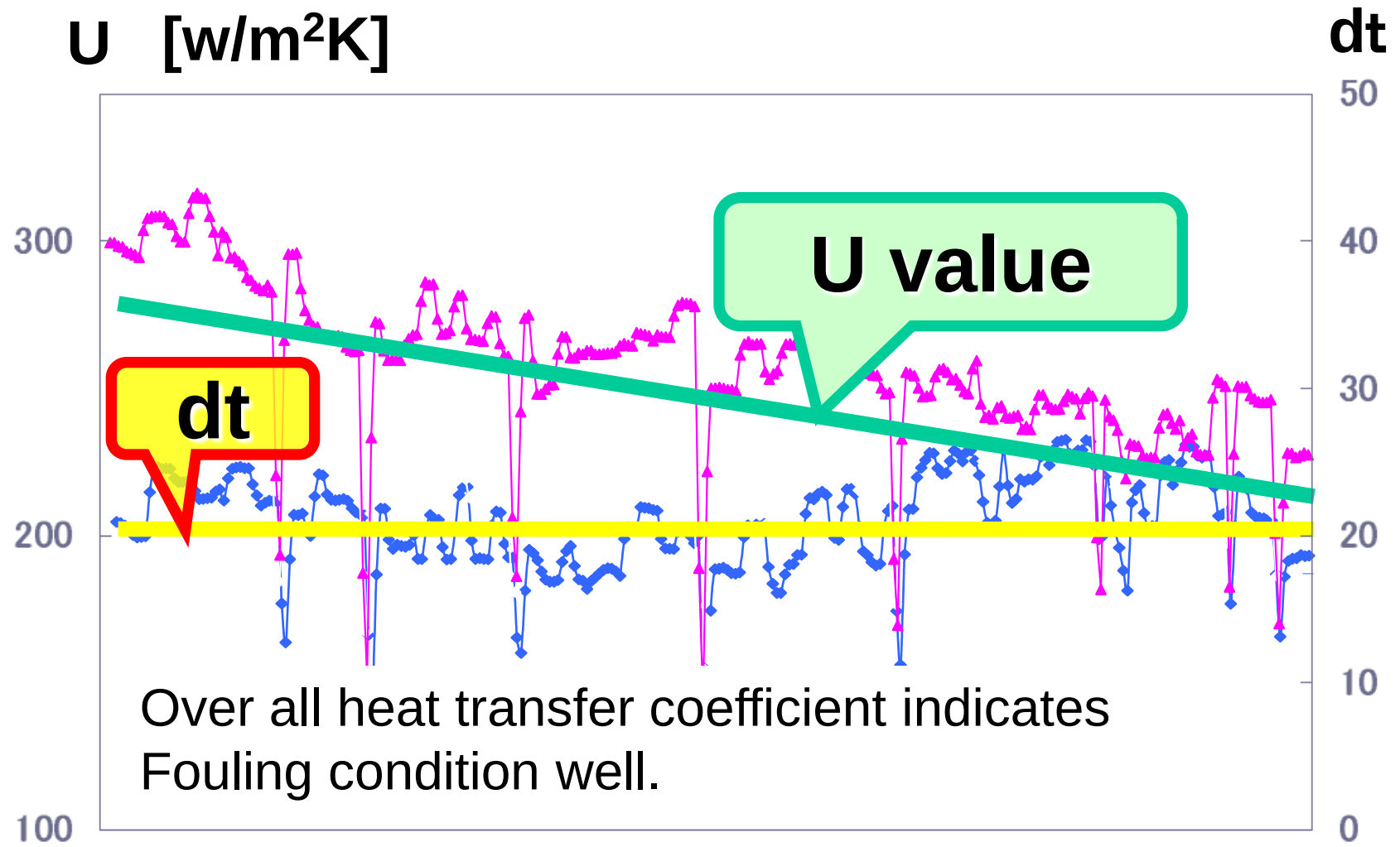
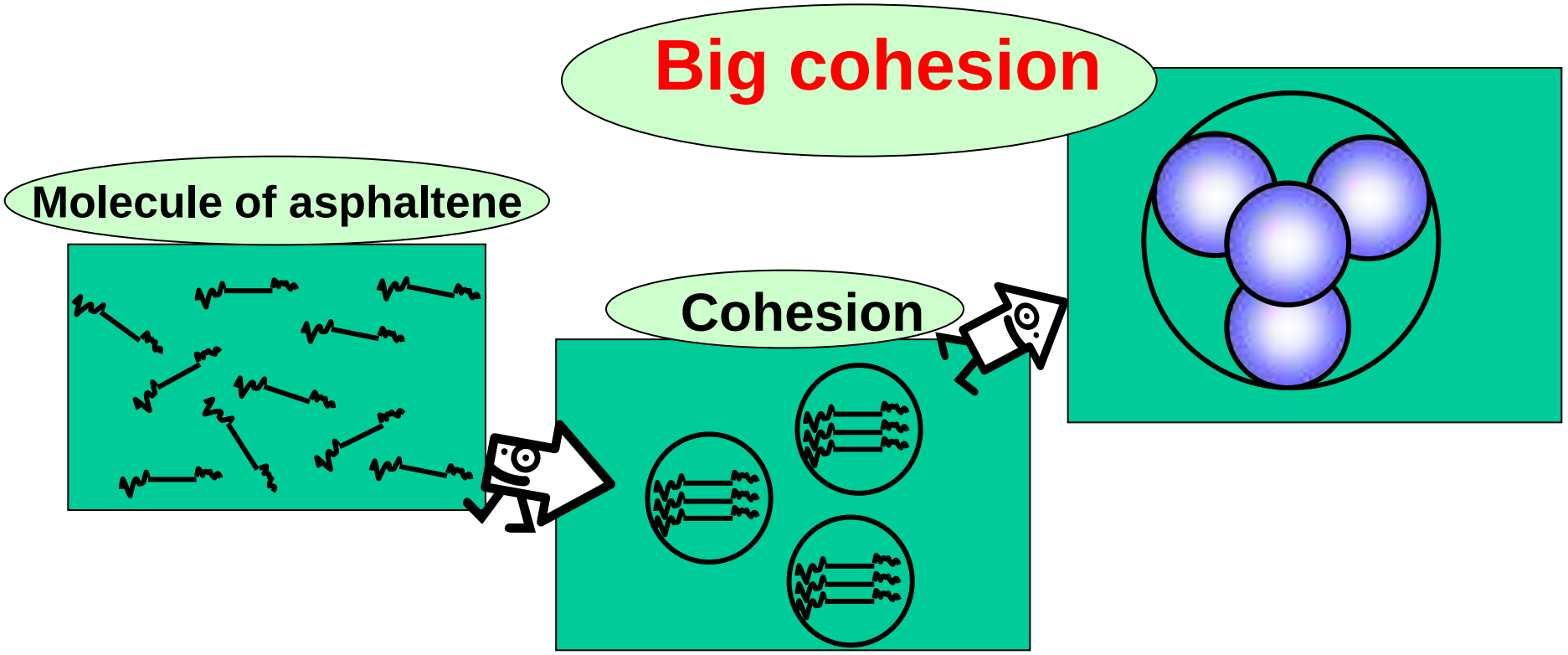
Ex. Previous fouling indicator



Ex. Fouling indicator



Ex. Fouling mechanism



Asphaltene causes fouling.

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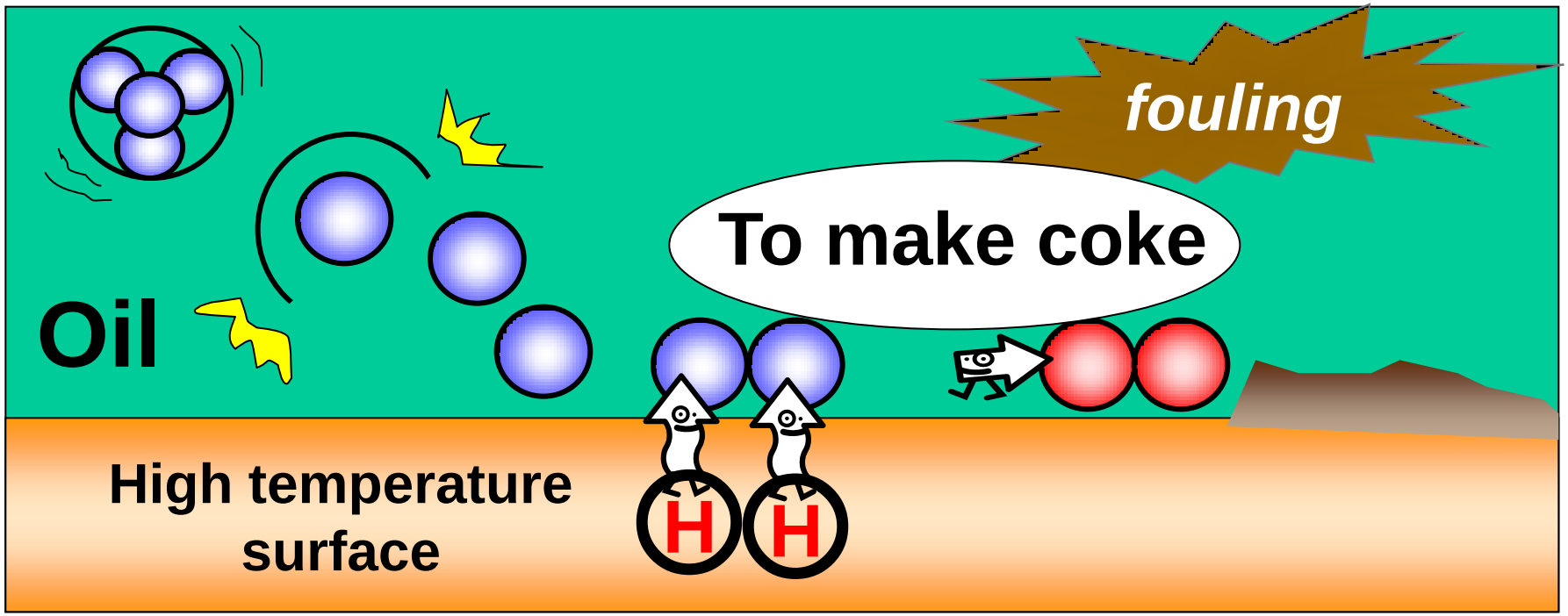
Ex. Fouling mechanism



Clean surface that has high temperature makes more coke. (Good chemical compound is necessary)

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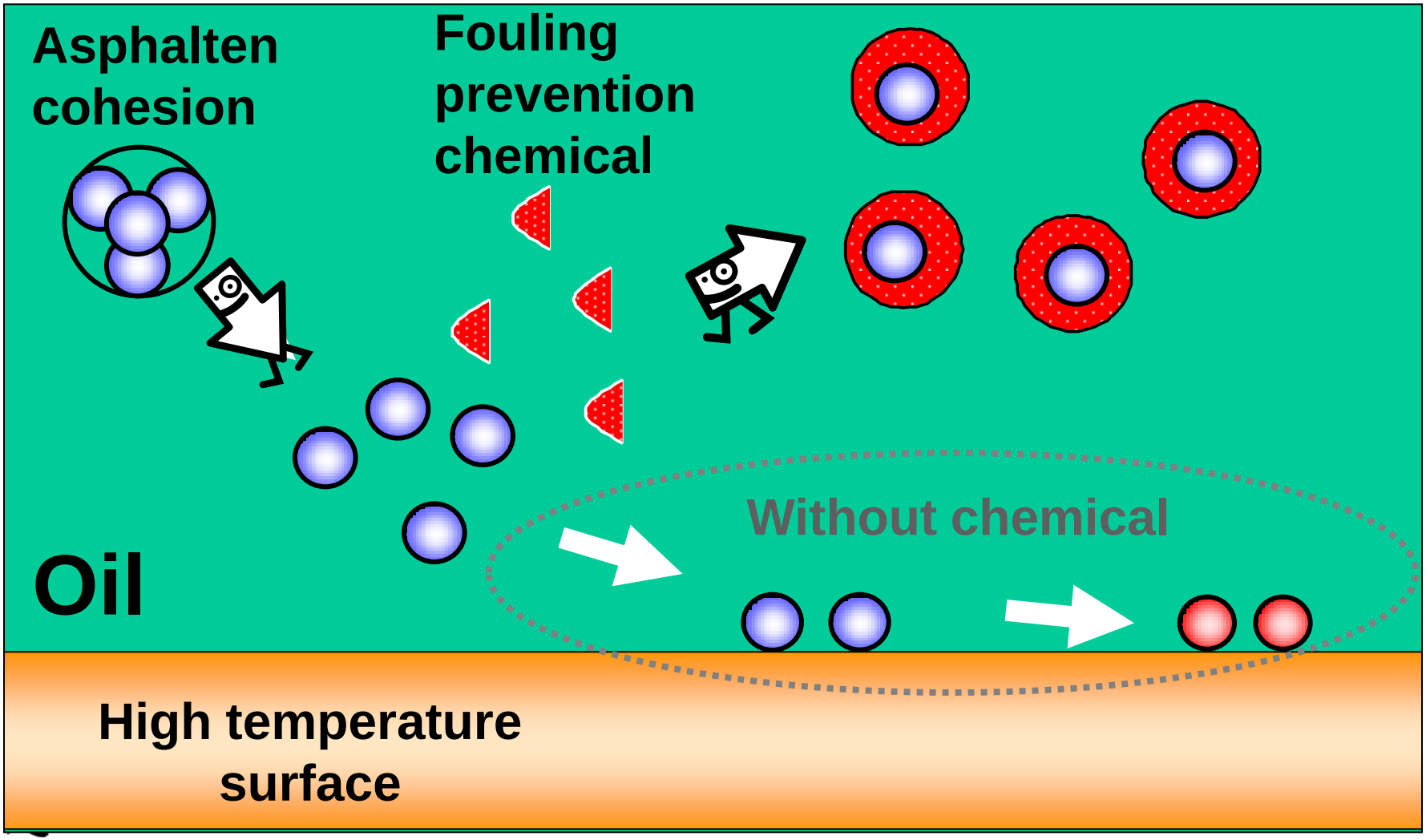
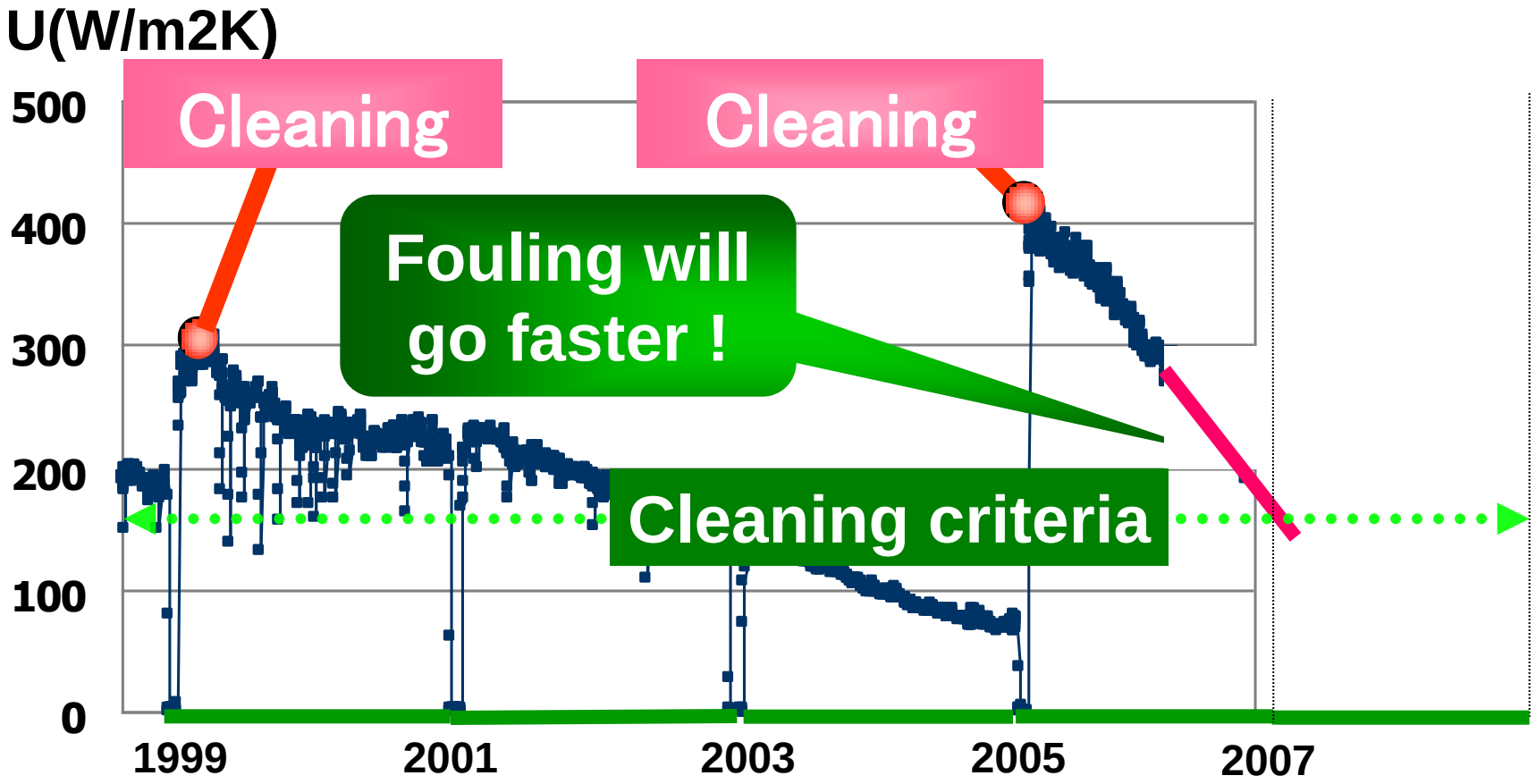
Ex. Fouling prevention Chemical Effect



Ex.2 Improvements



We check fouling trend of each heat exchanger.
And we decide cleaning schedule.

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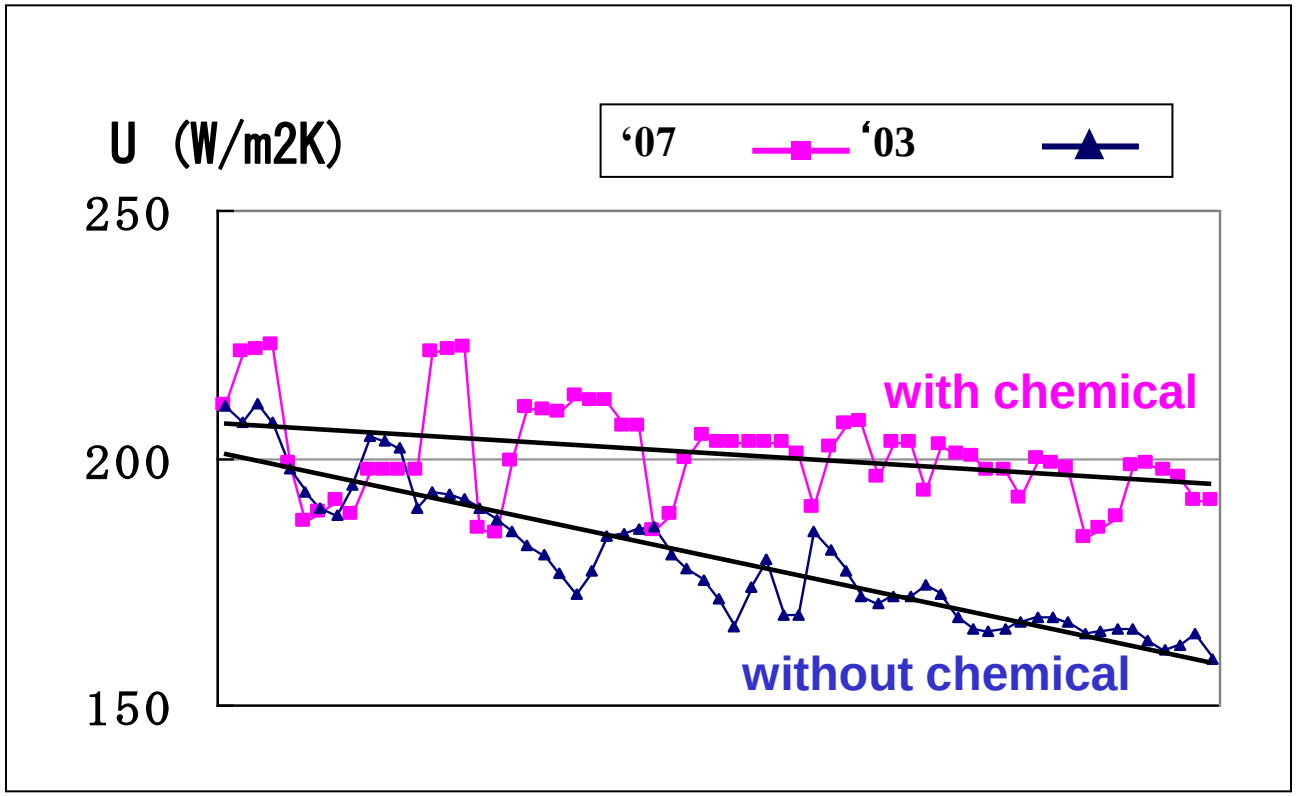
Ex. Improvements

Fouling prevention chemical works well



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Ex. Energy savings

Saving energy amount	9,000coe-kl/y
CO2 reduction amount	2,400 ton/y
Saving cost amount	4 million $/y

Coe: Crude oil equivalent

Fouling prevention technology and right timing cleaning are necessary.

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Extreme ideas for fouling prevention

<Fouling Decrease Project in Japan >

We are advancing the preparation for the project now.
Significant fouling and CO2 decreasing are expected.

Extreme ideas for fouling prevention

<Fouling Decrease Project in Japan >

Usually, provision against fouling is cleaning and adding the chemical.
We will find the mechanisms of fouling and apply these theory to real plant to demonstrate them.

Visualization is not enough way to prevent fouling.
We have to get new weapons against them and spread them.

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Summary 1

⊙Energy Manager have to do…..

- **Check performance (Visualize)**
  - Check initial design , performance ……
- **Correct agilely if changing occurs**
  - Change operating conditions soon
  - Suitable organization was constructed.
  - Recover the performance of equipments
    - » Renewal, cleaning etc.
- **Check new technology and apply**
  - Develop new ideas based on the logic
  - Evaluate new technology and demonstrate

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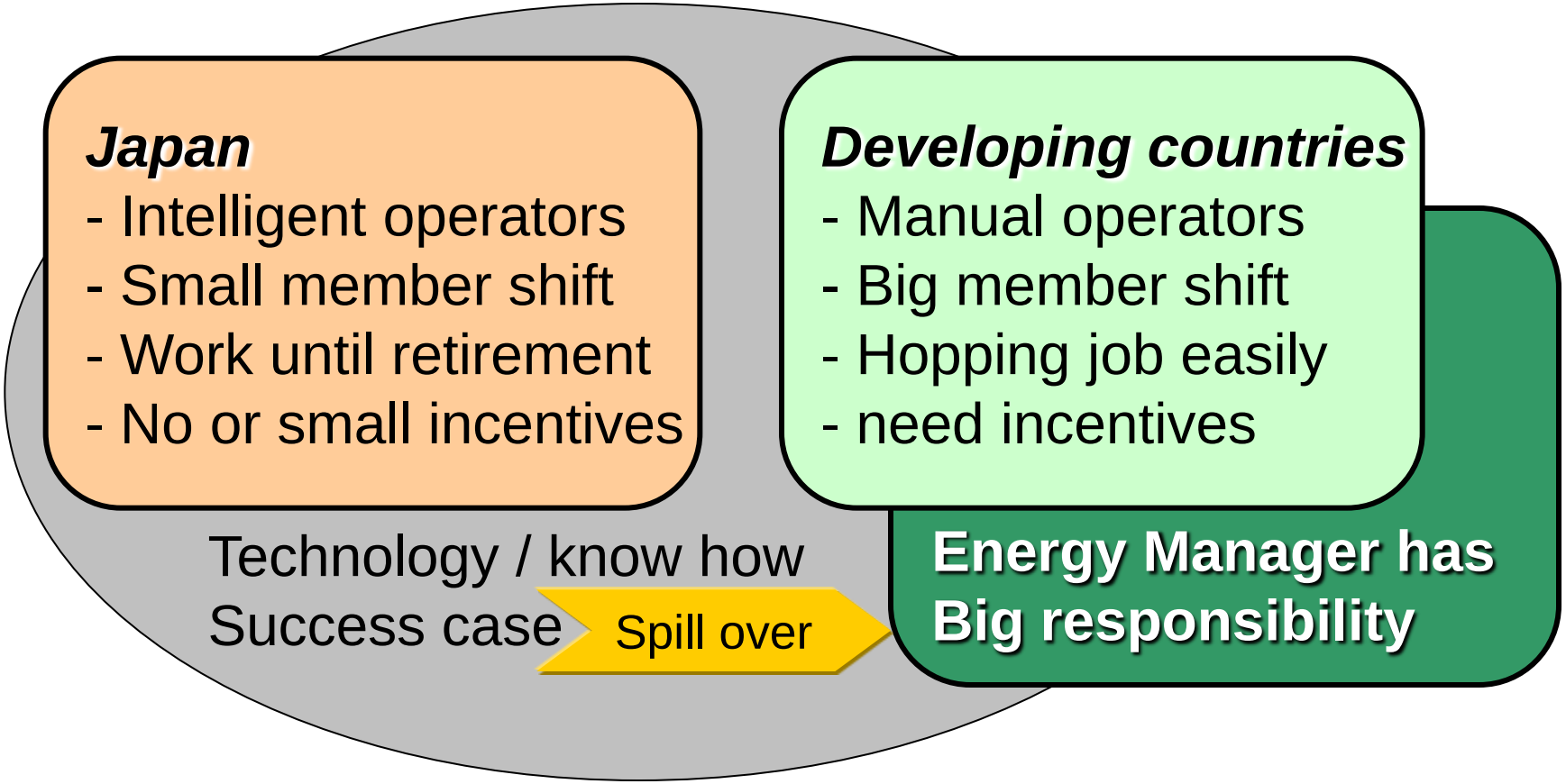
Summery 2



Spilling over success cases makes big improvement!
Spilling over items are the easier the better.

Thank you for your attention.