

The “Tao” of an Effective Energy Manager

Seah Xian Ming

Singapore Refining Company



Contents

- Introduction to Singapore Refining Company
- Self Introduction
- Issues an Energy Manager faces
- Stewardship Areas of an Effective Energy Manager
- Governance
- Technical
- Workforce Engagement

Introduction to Singapore Refining Company (SRC)

- Singapore Refining Company Private Limited (SRC) is a joint venture between Singapore Petroleum Company Limited and Chevron Singapore Pte. Ltd.
- Located on Jurong Island, SRC operates a refinery that is capable of processing 290,000 barrels of crude oil per day
- Our refinery mainly produces fuel products and chemical feedstocks that are supplied to domestic markets and overseas export markets under the brand labels of our shareholders.





SRC's Manufacturing Capability & Facilities

- Manufacturing operations are controlled by a network of computerized control systems managed by trained personnel, ensuring smooth and efficient operation
- Facilities in SRC includes
 - Crude Distillation Units
 - Catalytic Reformer Complex
 - Hydrocracker Complex
 - Visbreaker
 - Residue Catalytic Cracker Complex
 - Cogeneration Power Plant
 - Storage Tanks & Loading Berths

Self Introduction

- Energy & Loss Control Engineer
- Unit Process Engineer
- Refinery Shift Manager
- Energy & Loss Control Manager

Issues an Energy Manager faces



Stewardship Areas of an Effective Energy Manager



Governance

- Energy Management System
- Energy Policy
- Energy Management Team
- Guidelines for new Projects
- Energy and GHG reporting
- Monitoring platform



Technical (Daily Basis)

- Involvement in Plant Operation
- Plant Optimization

(Strategic Basis)

- Lead Energy & Decarbonization Studies and Audits
- Develop Project Roadmap
- Project management
- Involvement in Expansion Project



Workforce Engagement

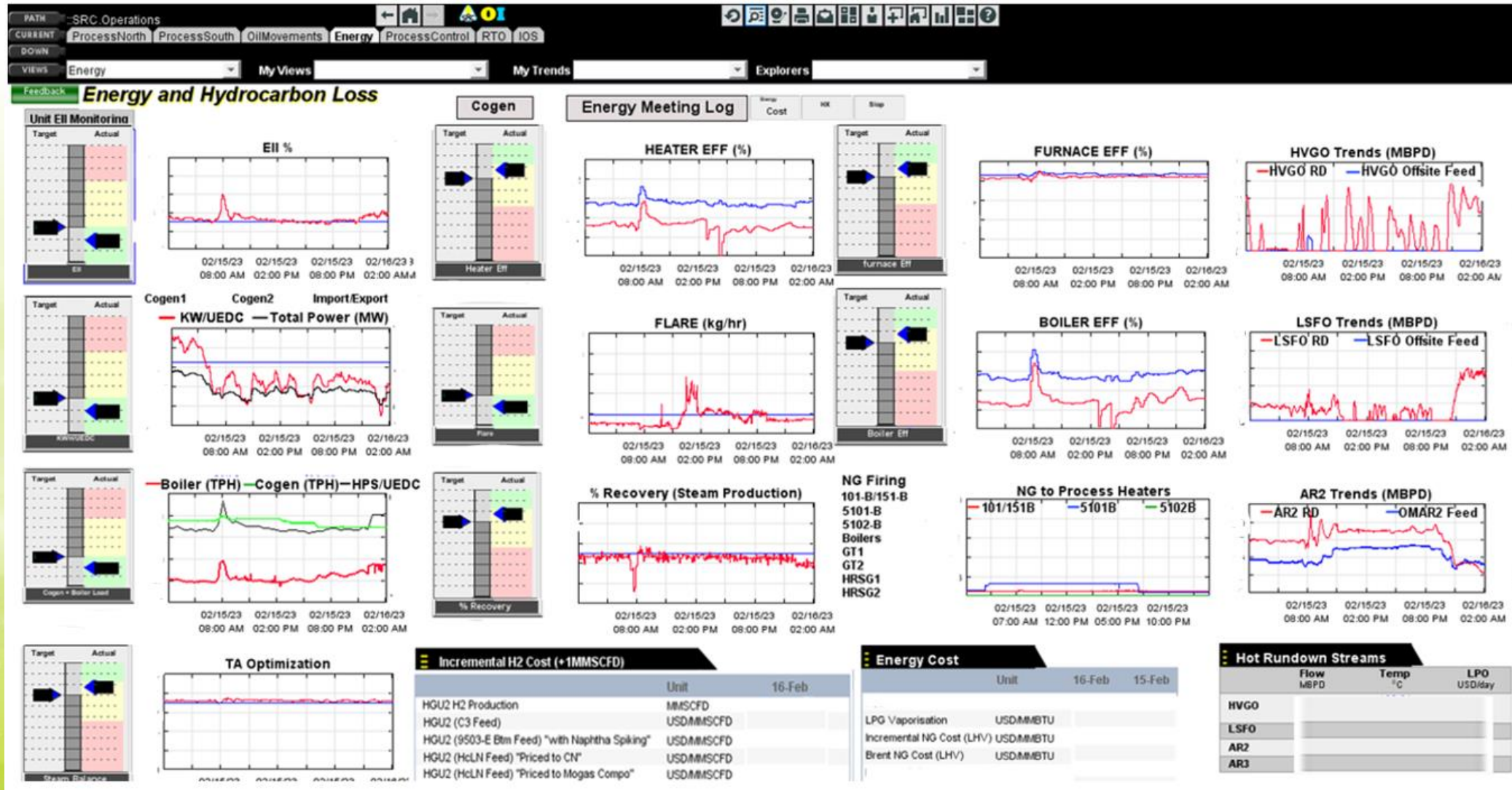
- Energy Saving Work Culture
- Field presence
- Site Walk and Audits
- Energy Campaigns since 2000s



Effective Stewardship in Energy Efficiency

Governance

- SRC Energy Monitoring Platform



Low Efficiency Furnace Replacement Project

- **Background**

- Low efficiency furnace (vintage design) to provide heat for process to 200degC
- SRC HP steam saturation temp is > 250degC
- Cogeneration Duct Burner is capable of generating HP steam at higher efficiency

- **Proposal**

- Replace inefficient furnace with HP steam exchanger

- **Outcome**

- Estimated carbon abatement of 5kTon per annum achieved



Replacement of Condensing Turbine Project

- **Background**
 - Overall efficiency of condensing turbine is low with significant heat rejected to atmosphere
 - Power Substation limits possibility of motorization
 - Existing steam balance in SRC allows for conversion to backpressure turbine
- **Proposal**
 - Replace condensing turbine with higher efficiency backpressure turbine
- **Outcome**
 - Estimated carbon abatement of 8kTon per annum achieved

Energy Blitz Campaign

A concerted effort to enhance the SRC energy culture that strives to reduce energy consumption in the refinery.

Energy Blitz Objectives:

- Enhancing SRC's energy culture via engagement
- Generate and consolidate energy-saving ideas to achieve tangible refinery improvements

Workforce Engagement

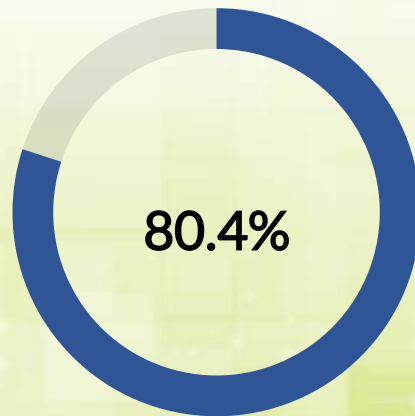
Energy Saving Work Culture

Steps

1. Communicate meaning & instill passion
2. Foster relationships and connections
3. Listen (as a group and individual)
4. Encourage positivity
5. Direction-setting
6. Recognition and Celebrate Success

Campaign Results in a glance

Overall Engagement Rate



Target: 80%



Engaged Shift/Frontline Personnel: 100%



Engaged Non-Shift/Frontline Personnel: 71%

Campaign Results in a glance

Overall Savings



Target:

**Savings of
\$1 Million /year**

Overall Annualized Savings Achieved

Over \$1 Million /year



Campaign Results in a glance

Awards and Recognition

- Among the >100 ideas gathered, the **top 3 idea** contributors recognized for their efforts.
- Personnel who displayed great motivation and passion for energy conservation being nominated by their fellow peers as the **Energy Culture Champion**.
- Friendly competition within each process area for both **Insulation** and **Heater** topic found opportunities that translates to savings of over \$500 per day



Energy Blitz Lookback

- Engagement Done



Achieved via 82 Group Engagements over 11 Weeks

- Was **there a** sufficiently large pool of people being engaged to enhance culture?
- In a span of 11-week long Energy Blitz, 82 engagement sessions were carried out physically or online. This **reached >80%** of the SRC staff population
- All of the **Ops Shift personnel** have been engaged through the multiple engagements which is around **42%** of the total engaged personnel

Energy Blitz Lookback

- **Did the staff display receptiveness to meet the same goal?**
 - The interactiveness of the sessions reflects people's understanding of that topic and willing to find out more and contribute
 - 42% have gotten back to energy team with feedbacks/ideas/comments
 - To further break it down, 58% of the feedbacks are from shift personnel. This shows quite a fair distribution of feedback gathered from shift and non-shift personnel

WHEN WE ENGAGE PEOPLE,

42%

of them do feedback to us, which is indicative of highly interactive sessions and support for the campaign!

Imagine having 40 participant feedbacks in a meeting of 100!

Energy Blitz Lookback

How do we measure the enthusiasm in the staff to adopt the culture?

- Based on the quality of feedback / amount of thoughts was placed by them
- Total of over 200 feedback/ideas/comments were received, and out of these, over 100 unique feedback/ideas have been gathered
- There is a good balance of ideas contribution which 65% of the unique feedback/ideas coming from the shift

WHEN THEY SPEAK TO US,

Unique Ideas

65%
35%



● Shift

● Non-Shift

There is a good balance of energy saving ideas coming from both shift and non-shift personnel. Having this many actionable ideas indicates high quality discussions!

PARTING WORDS THANK YOU

