

Increasing Value of Capital Projects: *Through a combination of convergence and divergence*

European Value Management Conference
Brighton, UK

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Slideshow Storyline

- **Introduction**
 - Shell, Project Environment, Market Environment
- **Project Governance**
- **Design Class: Theory & Application**
- **Value Engineering: Theory & Application**
- **Assurance Availability Modelling : Theory & Application**
- **An example**
- **Conclusion / Recommendation**
- **Questions & Answers**



BUSINESS CONTEXT



Royal Dutch Shell



Royal Dutch Shell – The Project Environment

- US\$ 19 bln Capital Investment Programme (2006)
- Over 1,400 Project Engineering Professionals



Athabasca Oil Sands



Sakhalin II



GOVERNANCE



Project Governance

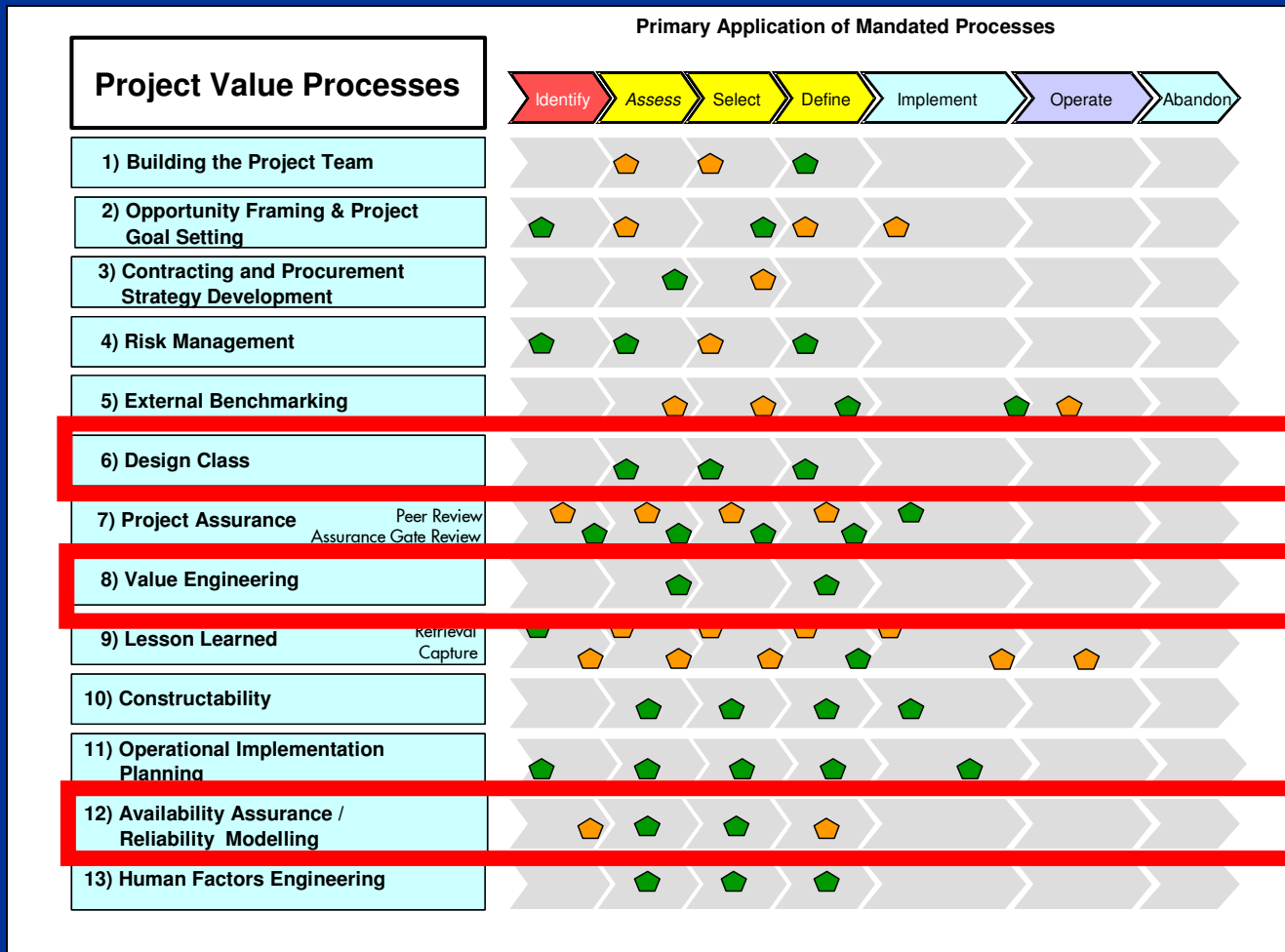
- **Stage Gate Process**



- **Mandated Deliverables per Project Phase**
- **Structured Assurance Reviews**
- **Series of Value Improving Practices**



Project Governance: Project Value Processes



-  Mandatory Process
-  Recommended Process

Design Class

Value Engineering

Assurance Availability & Reliability Modelling



Why Workshop format?

- ✓ Project external facilitation: establish team **focus**
- ✓ Stakeholder **alignment**
- ✓ Different **approach** to the opportunity
- ✓ **Build** on each other's expertise



The workshops: Before, during and after

Workshop preparation:

- ✓ **Agree** on workshop objectives
- ✓ **Stakeholder** analysis: Who can influence? Who will be affected? Who can challenge us?
- ✓ **Customized** format for the project



The workshops: Before, during and after

Drivers during the workshop:

- ✓ **Quality** discussions
- ✓ **Decision** driven: take the project further!
- ✓ **Action** driven
- ✓ Agree with the **way forward**: contract



The workshops: Before, during and after

After workshop:

- ✓ Outcome is considered a **contract**
- ✓ Outcome is **implemented** in project development
- ✓ Project team feed back = **improve!**



Converging Design Class

Where the wants and the needs meet the capital

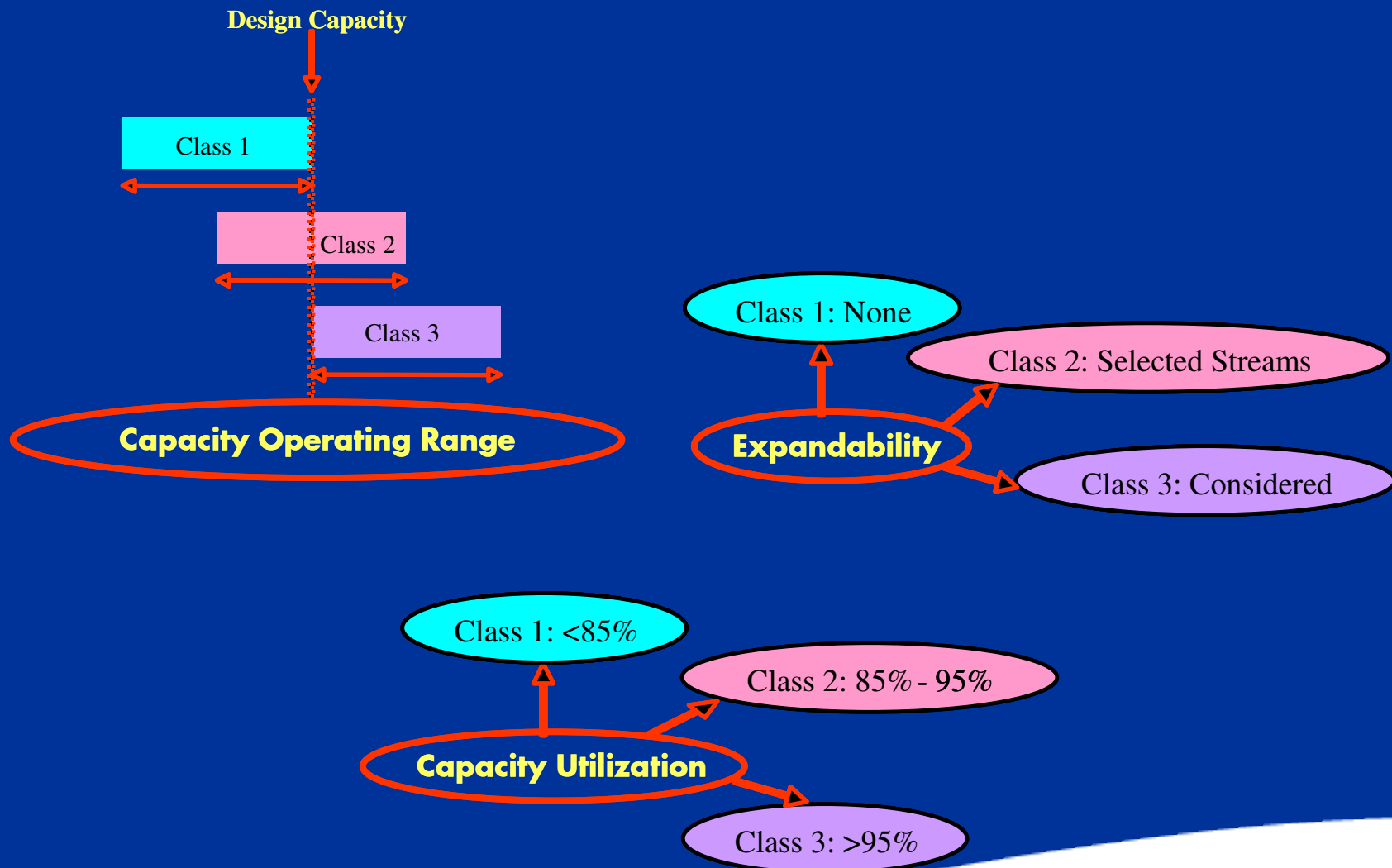


Design Class: In brief....what is it?

- ✓ **Structured** process
- ✓ With the right **stakeholders**
- ✓ To discuss the **performance requirements**
- ✓ Of project scope breakdown



Several performance factors



The three classes

Complexity increase

Class 3:

- Class 2 plus...
- Upgrade for higher assurance for most off-design conditions
- Costs will be higher than Class 2 plant

Class 2:

- Class 1 plus...
- Selective upgrade for higher assurance for some off-design conditions
- Costs will be higher than Class 1 plant

Class 1:

- Meets business requirements
- Minimum scope
- Without jeopardizing safety
- Lowest plant cost

CAPEX Increase
(Class 1) 0 - 6% (Class 3)



Design Class: focus in project phases

Identify

Assess

Select

Define

Implement

Design Class Select

Purpose: align priorities and requirements of facility between business, operations, projects, engineering

Deliverables:

- High level facility performance contract
- List of big ticket items
- Description of how these items impact schedule & cost

Design Class Detail

Purpose:

- Align engineering requirements between project team & engineers on equipment level

Design Class Detail

Deliverable:

- Design and engineering criteria on equipment level



Diverging Value Engineering

Approaching the opportunity with an open mind

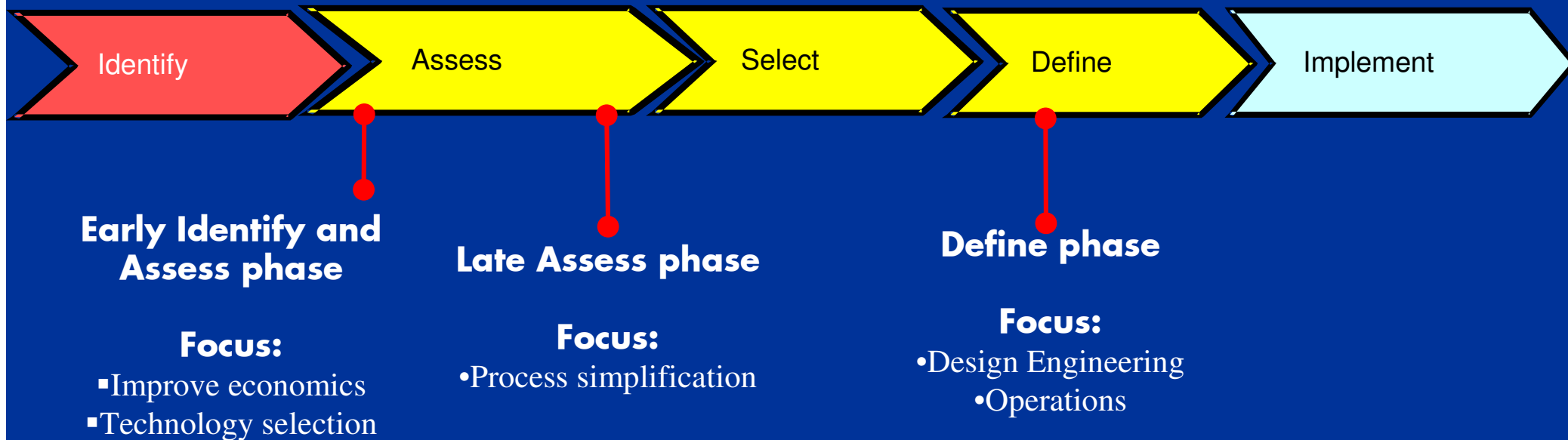


Value Engineering

- ✓ **Structured** process
- ✓ With the right **stakeholders**
- ✓ And expertise! **Challengers** from outside the project team.
- ✓ To discuss the hardware **requirements**
- ✓ For the **functions** the facility needs to fulfill



Value Engineering: focus in project phases

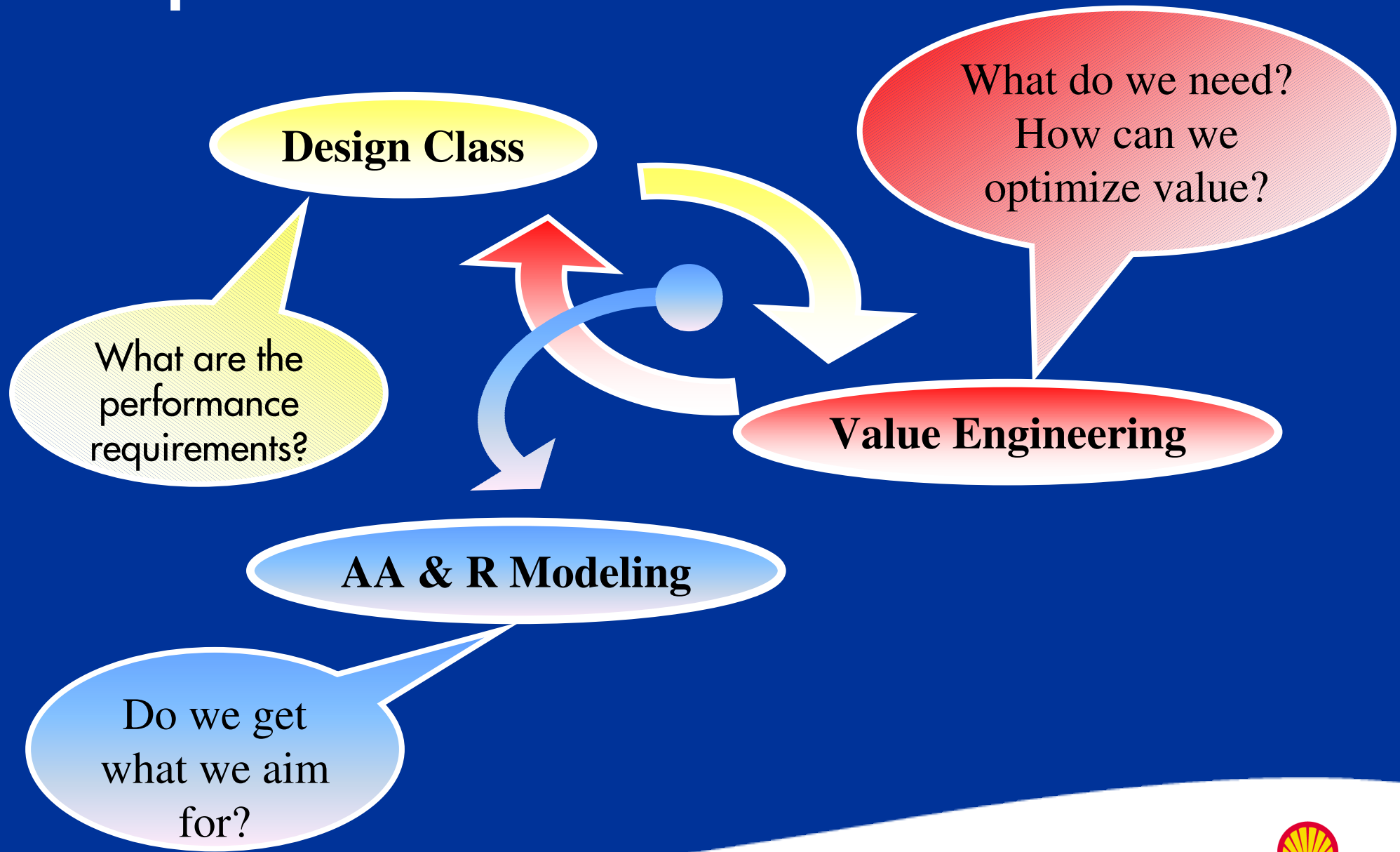


Converging Assurance Availability & Reliability Modelling

Will the project deliver on promise?



The power of the combination



A REAL CASE



Large Shell Chemicals Project in Asia



- Ethylene Cracker :
 - Part of integration between refinery and Chemicals Downstream



The Design Class outcome: Ethylene Cracker

Design Class Select workshop: held early Assess Phase

Value of Design Class Select:

- Alignment on high level performance
- Established the basis to equipment specification (Design Class Detailed)



The Design Class outcome: Ethylene Cracker

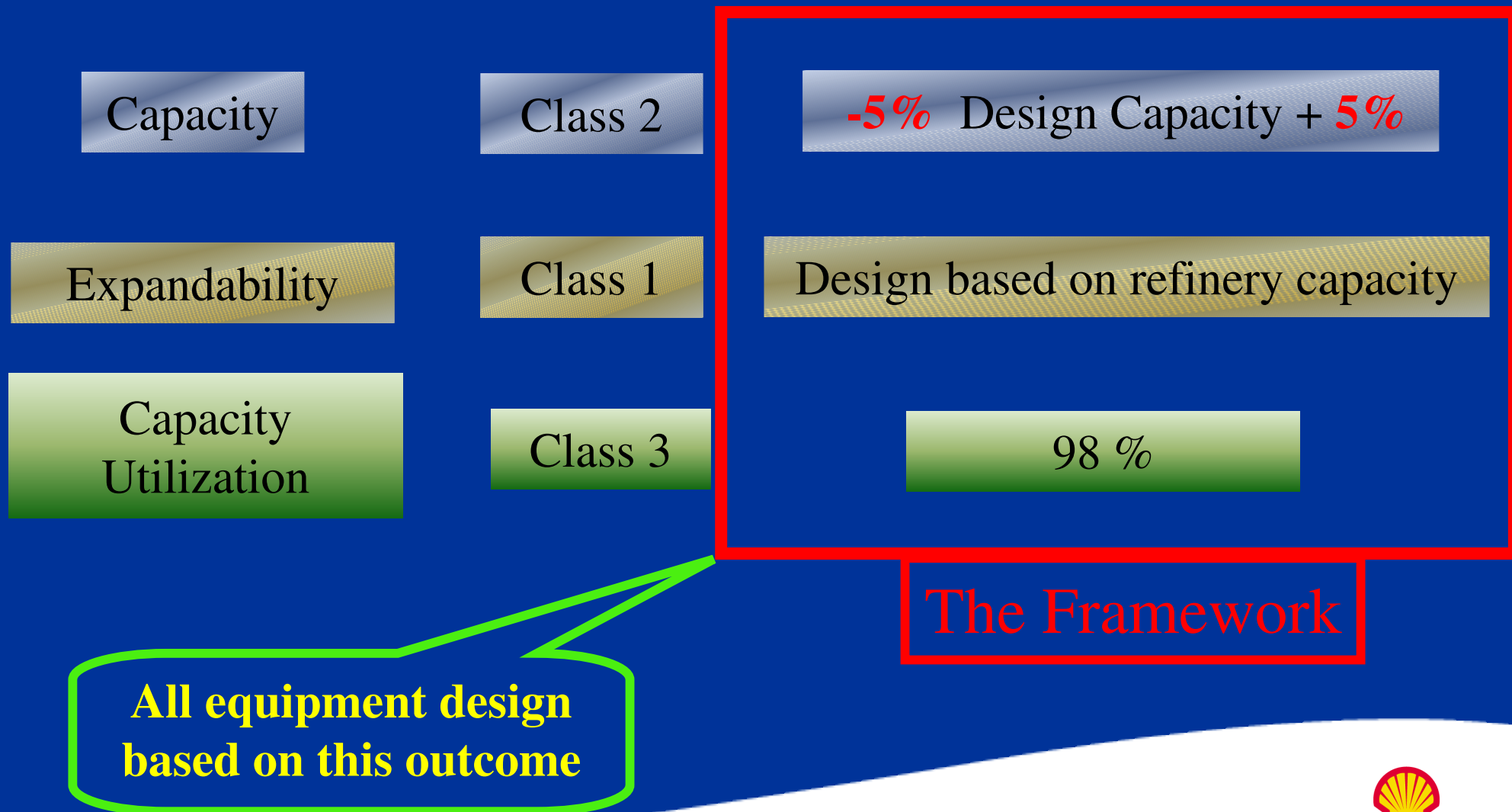
Design Class Detailed: Held in early Define Phase

Value of Design Class Detailed:

- Open detailed discussion among different disciplines
- Full detailed alignment between Shell and contractor
- Improved project continuity in knowledge on decisions made on (detailed) scope level



The Design Class outcome: Ethylene Cracker



The Value Engineering outcome

Workshop with focus on **design simplification**:early Assess Phase

Workshop with focus on **engineering and operations** :early Define Phase

Value of applying the process:

- Significant costs saved
- 60% of total “idea value” was incorporated
- The incorporated ideas fit within the frame established through Design Class
- All agreed!



The Value Engineering outcome

Examples of **ACCEPTED** Value Engineering ideas:

Idea: delete dedicated steam let down station for steam export to the refinery. This system lets down SHP steam into HP, MP and LP steam.

Justification: The refinery will use system as backup once in 8 years.

Saving: \$ 2000 K

Idea: Delete LP refinery gas feed system (compressor + vessel + heat exchanger)

Justification: The system is only used 2 weeks every 6 years for pressurizing LP gas to the cracker furnaces

Saving: \$ 4000 K



The Value Engineering outcome

Examples of **NOT ACCEPTED** Value Engineering ideas:

Idea: Delete the sweet fire water pumps. Fully use Salt water in case of fire.

Justification: Sweet fire water only used the first six hours, remaining time salt water is used

Saving: \$ 1300 K

Not accepted: Risk of Stainless steel corrosion. Increased long term maintenance costs and decreased availability of the system



The Value Engineering outcome

Capacity: Class 2

Expandability: Class 1

Capacity Utilization: Class 3

The Framework

- Ideas only accepted if facility performance stays within pre-determined frame work
- Within framework sufficient room is left for alternatives



The Assurance Availability outcome

Assurance Availability started end Assess Phase

Outcome:

- Based on proposed (proven) configuration the calculated **Availability**: 98%
- Aligns with **Design Class** established framework
- Accepted **Value Engineering** alternatives no impact on performance



Conclusions & Recommendations



Drivers for success

- Power of the **VIP tripod**
- **Expertise** available during the workshop
- Right **stakeholders** involved (influence & impact related)
↓
- Timely contactor involvement (in workshops)
- Workshops held at the **right time** in development
- **Externally facilitated**: Quality, alignment, decision driven



Questions & Answers Session



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