Creating Value at QIT: The QMM Project

November 2007

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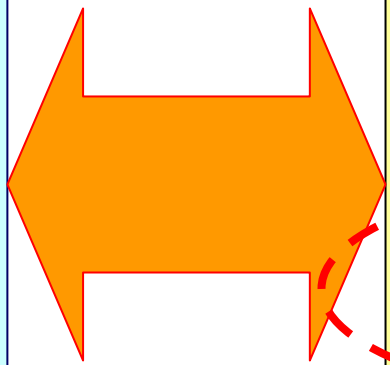
QMM Project Context

Technical challenges

-Brownfield expansion

-Spans all of QIT

-First time applications
- -New ore/ new slag product
- -Technical developments
- -Operational complexity



Management challenges

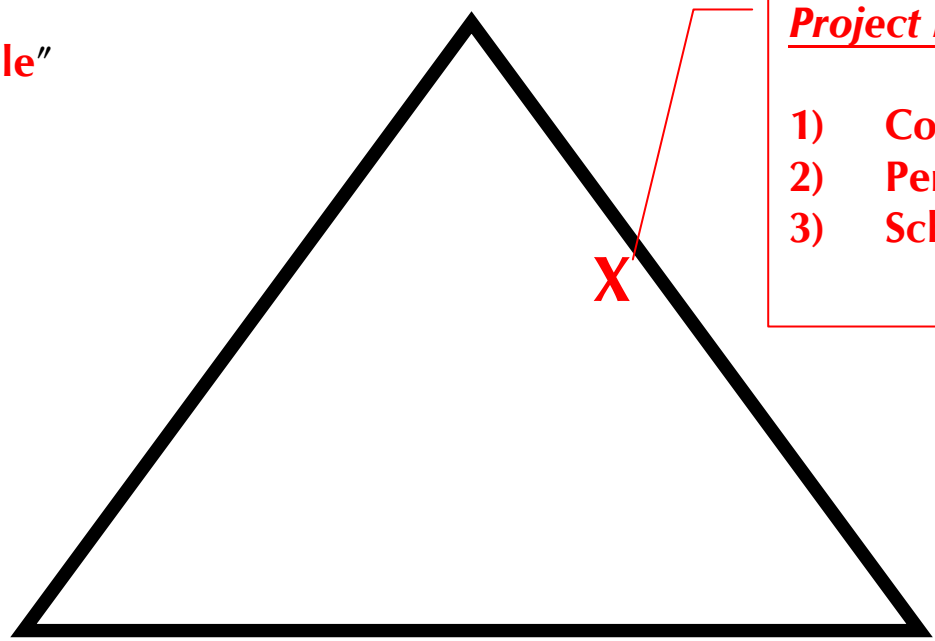
-Strategic project

-Marginal ROI

" **Define scope** to fit a **set budget** within **performance and schedule**"

QMM: Goal and Strategy

" **Define scope** to fit a **set budget** within **performance and schedule**"



Project Priorities

1) Costs
2) Performance
3) Schedule

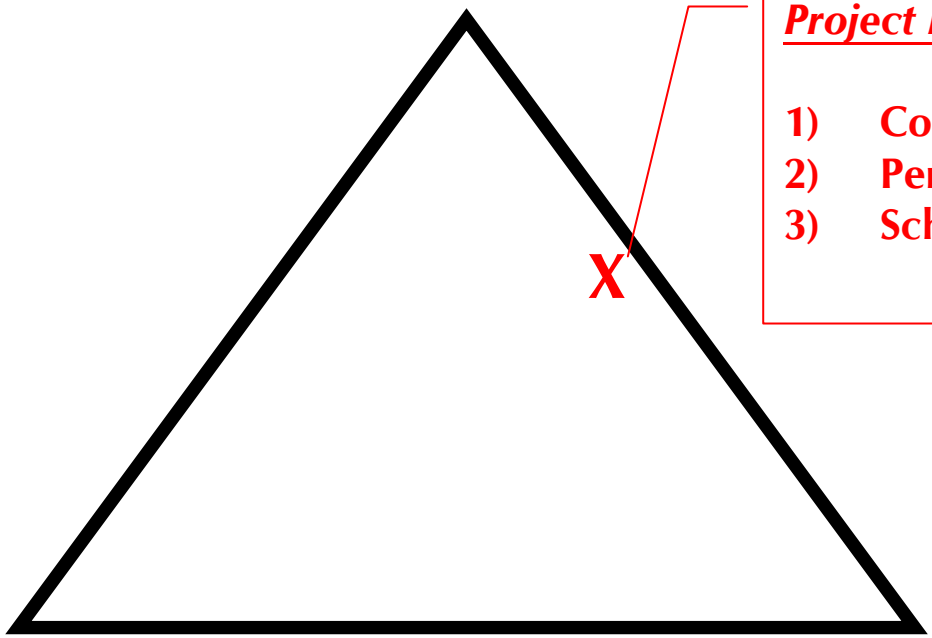
Introduction

Introduction

VA Results: QMM Project

(1) Costs

25% savings



Project Priorities

1) Costs
2) Performance
3) Schedule

(3) Schedule

On target

(2) Performance

+ 5% capacity

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Agenda

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- QIT-Hatch Partnership
- QIT-Hatch project definition framework
  - Project Life Cycle Process (PLP)
  - Context-Driven Definition (CDD)
  - VA integration in projects
- Value analysis applied to QMM project
  - Methodology
  - Examples

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manifesto

Hatch Manifesto

We are an **innovative** organization committed to helping our clients achieve **unprecedented and sustained business results**.

Our clients appreciate our added value, trust and communications, as well as our ability to transfer our expertise quickly, efficiently and safely on a global basis.

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Hatch et QIT

Une relation de confiance qui dure depuis plus de 50 ans

Global Operations

8000 total staff – Aug 2007

(Yellow indicates regional hub)

HATCH™

Hatch Services and Sectors

HATCH™

VA at Hatch

Our history with Value Analysis

- **VA at Hatch since 1995**
  - QNI (BHP Billiton)
  - Alcoa since 2000
  - Falconbridge
  - Inco
  - QIT (Rio Tinto) since 1998

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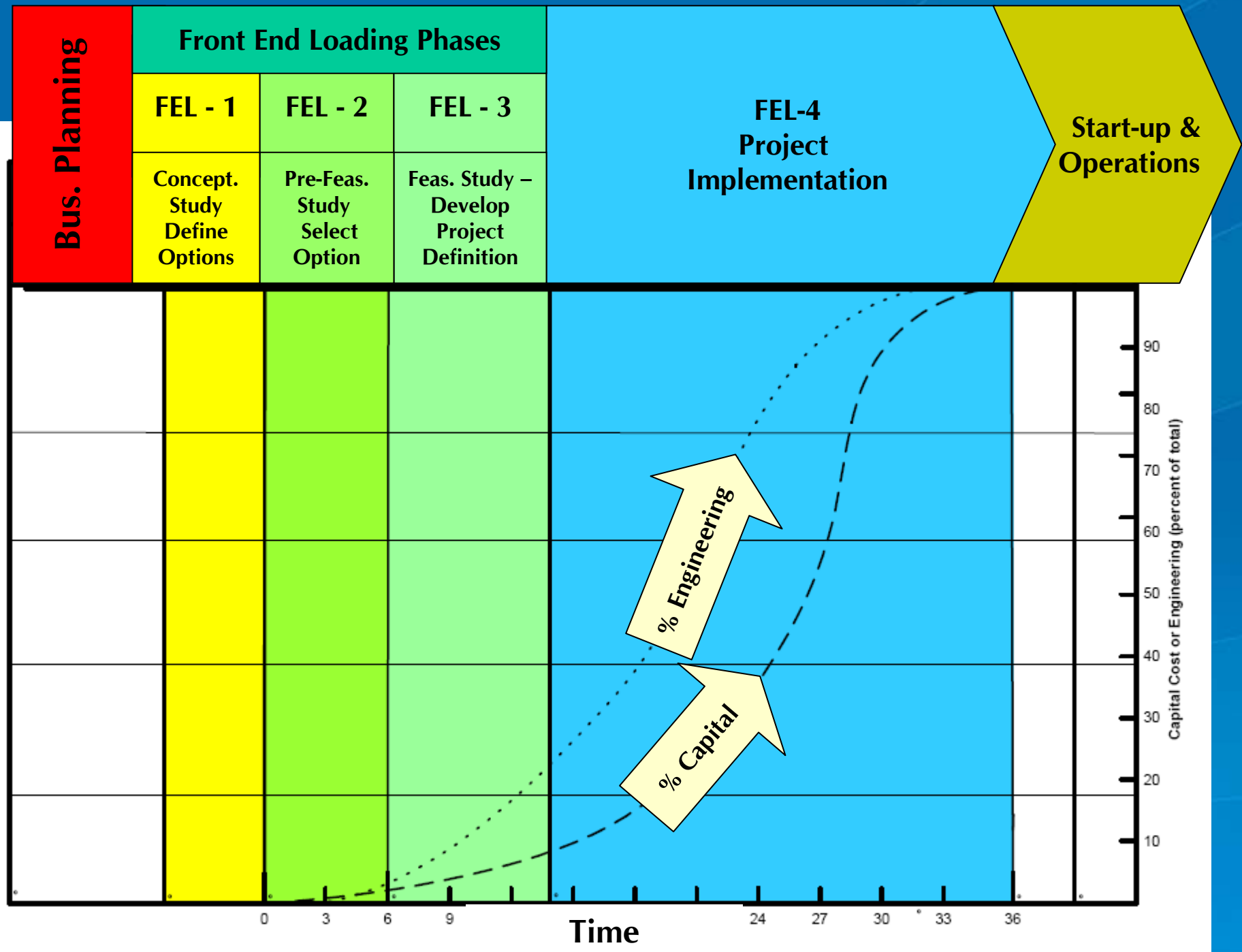
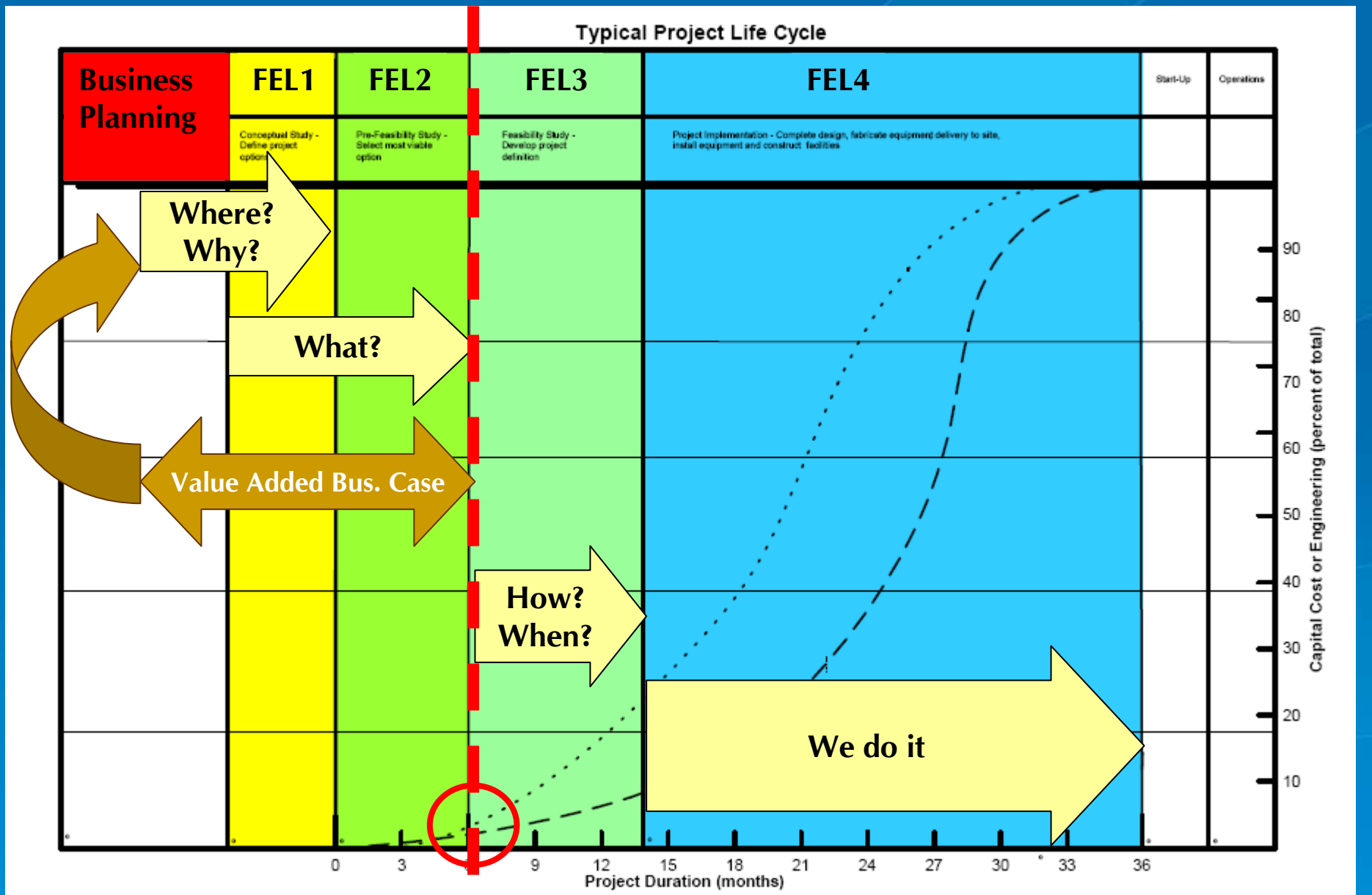
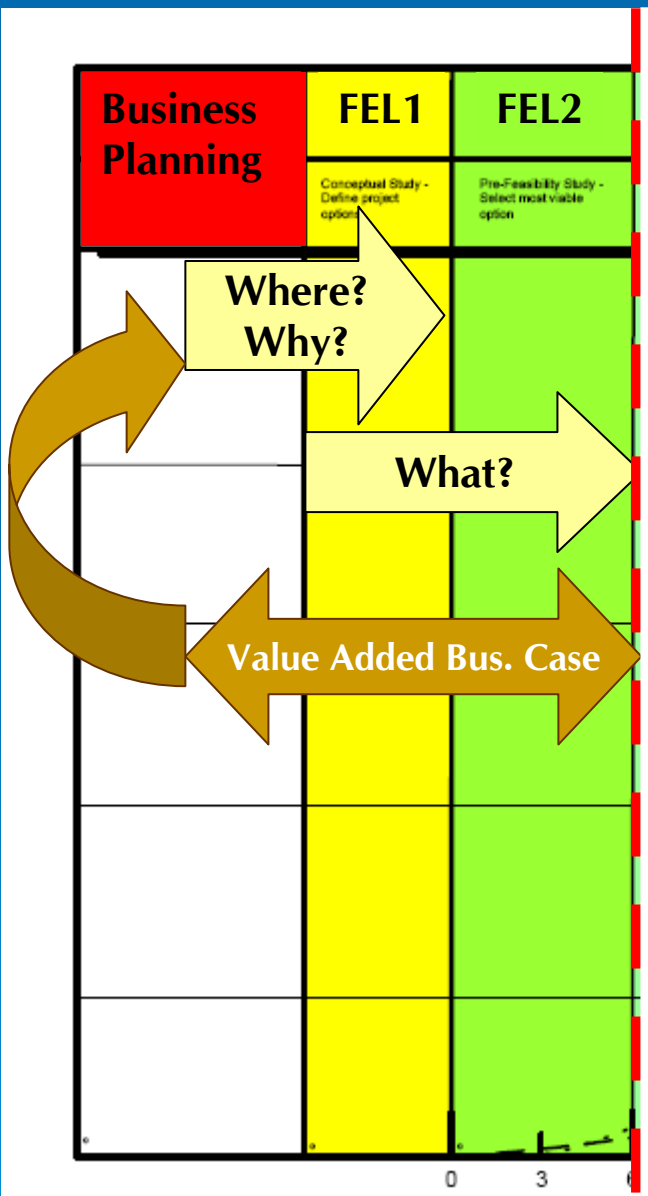

Bus. Planning
Front End Loading Phases
FEL - 1
FEL - 2
FEL - 3
Concept. Study Define Options
Pre-Feas. Study Select Option
Feas. Study – Develop Project Definition
FEL-4 Project Implementation
Start-up & Operations
% Engineering
% Capital
Capital Cost or Engineering (percent of total)
10
20
30
40
50
60
70
80
90
0
3
6
9
24
27
30
33
36
Time

Project Life Cycle Process (PLP)



Project Life Cycle Process (PLP)



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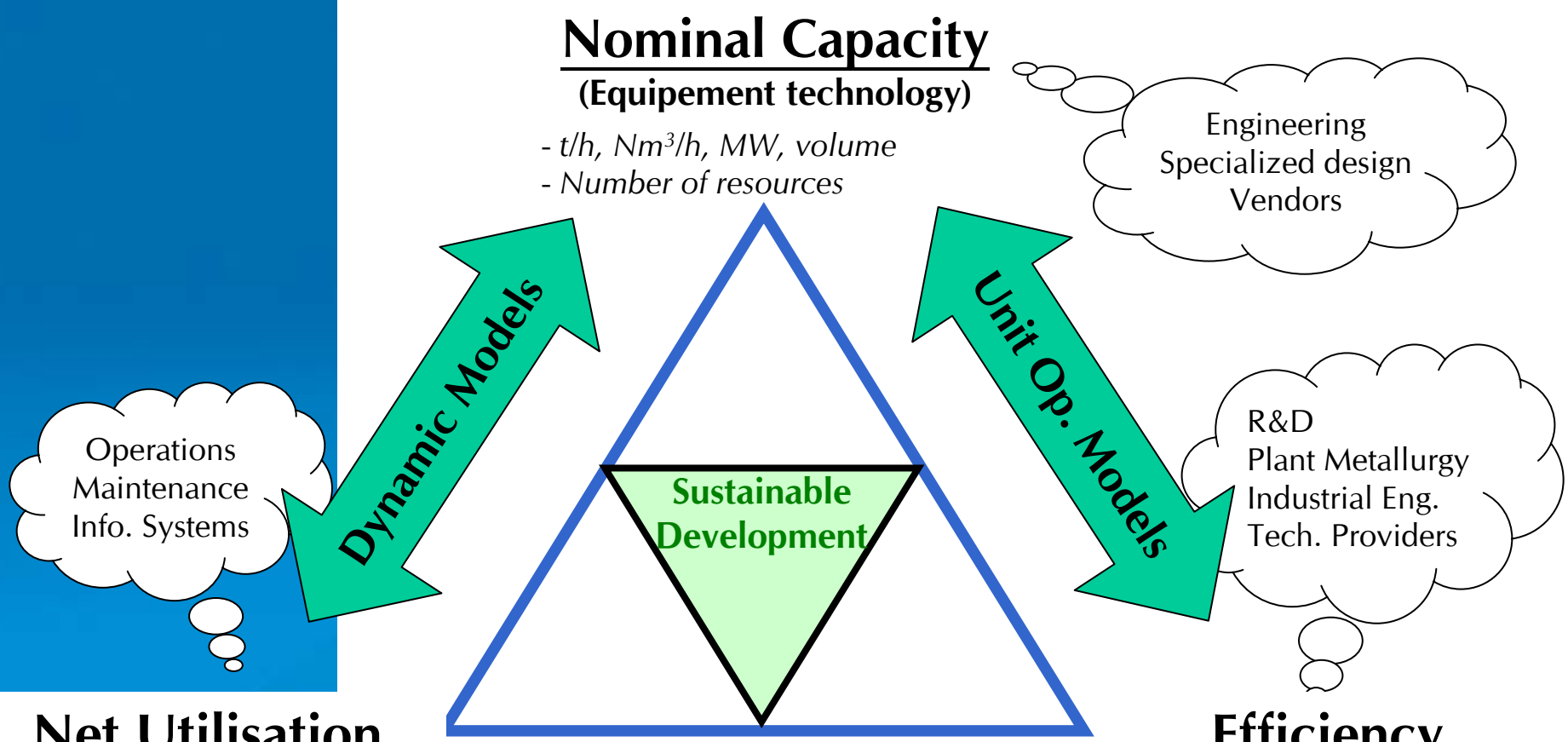
Context-Driven Definition (CDD)



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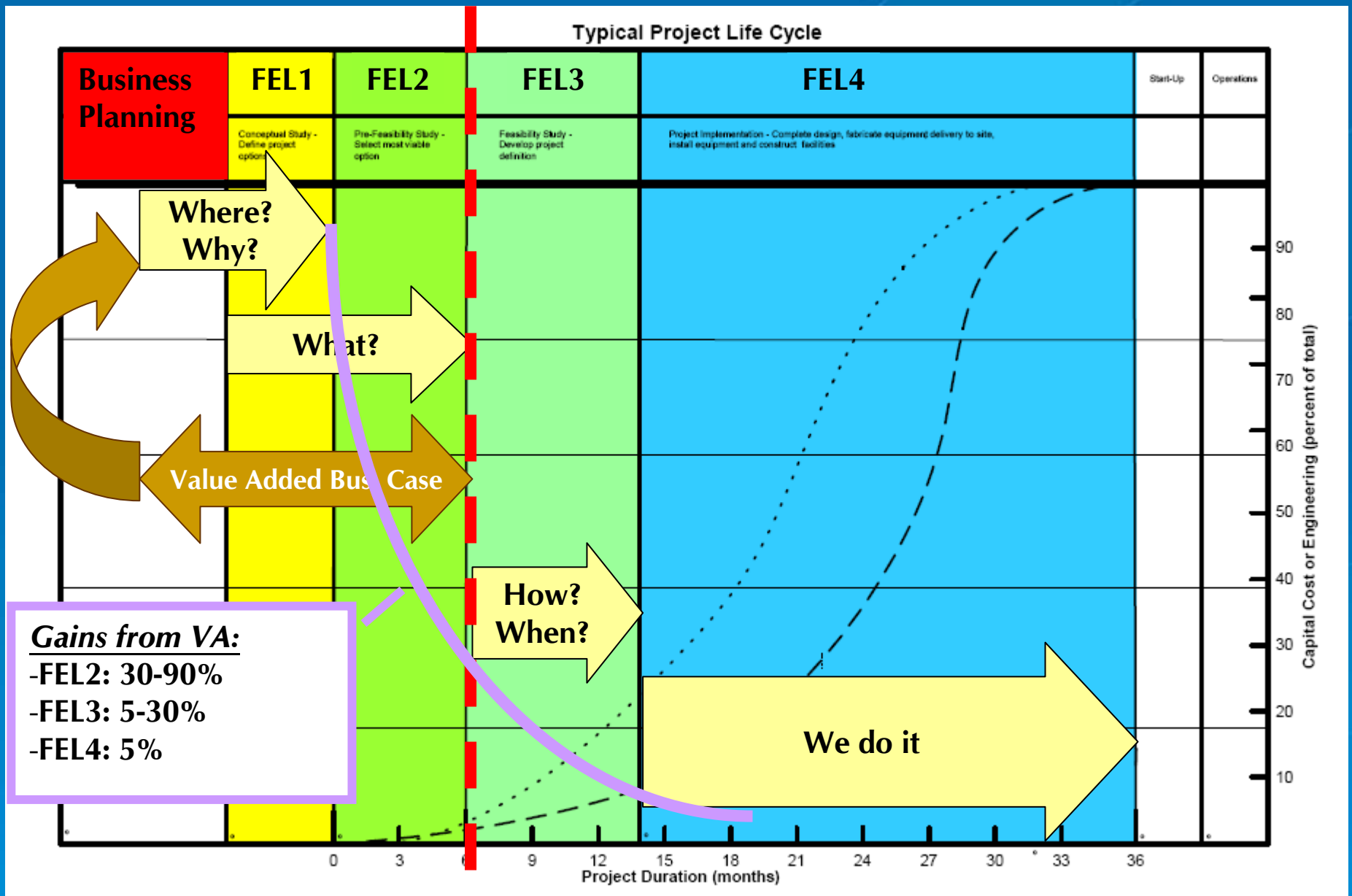
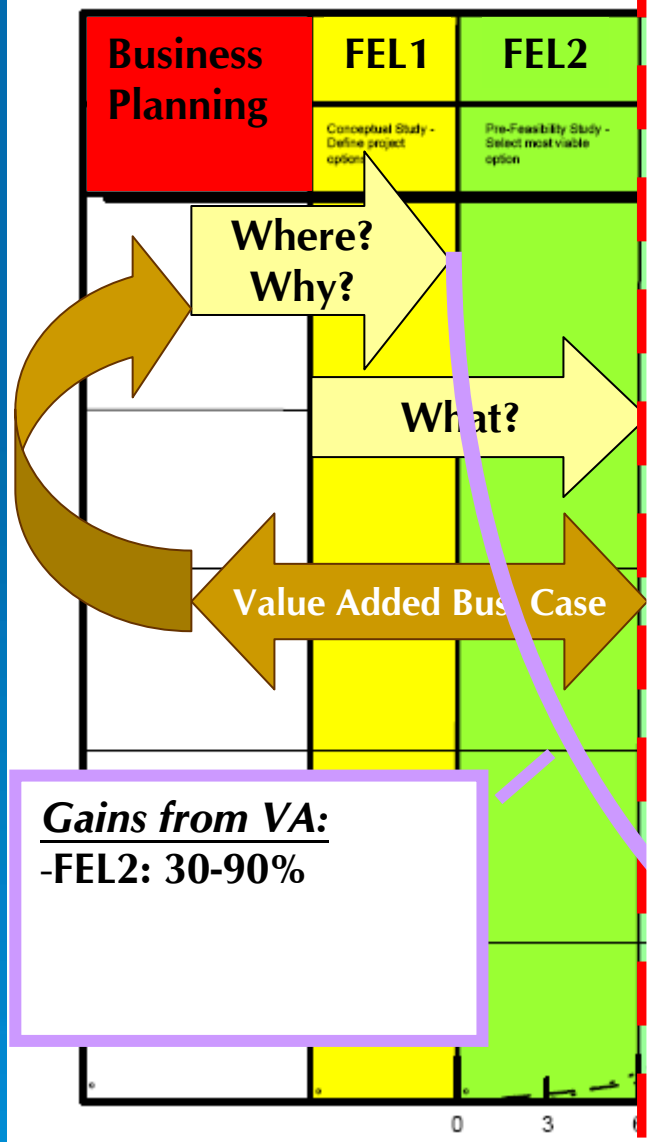
Project Life Cycle Process (PLP)



VA in Early Project Phases



Gains from VA:

-FEL2: 30-90%

Context-Driven Definition (CDD)

Nominal Capacity
(Equipement technology)
- *t/h, Nm³/h, MW, volume*
- *Number of resources*

Engineering
Specialized design
Vendors

Operations
Maintenance
Info. Systems

Dynamic Models

Unit Op. Models

R&D
Plant Metallurgy
Industrial Eng.
Tech. Providers

Sustainable Development

Net Utilisation
(Operation Technologies)
- *Operating time*
- *Operating factor (stability)*
- *« Average/ Nominal »*

Statistical Models

Efficiency
(Process Technology)
- *Mass yield (Prod/Feed)*
- *Energy efficiency (t/MW)*
- *Logistics (Cycle time)*

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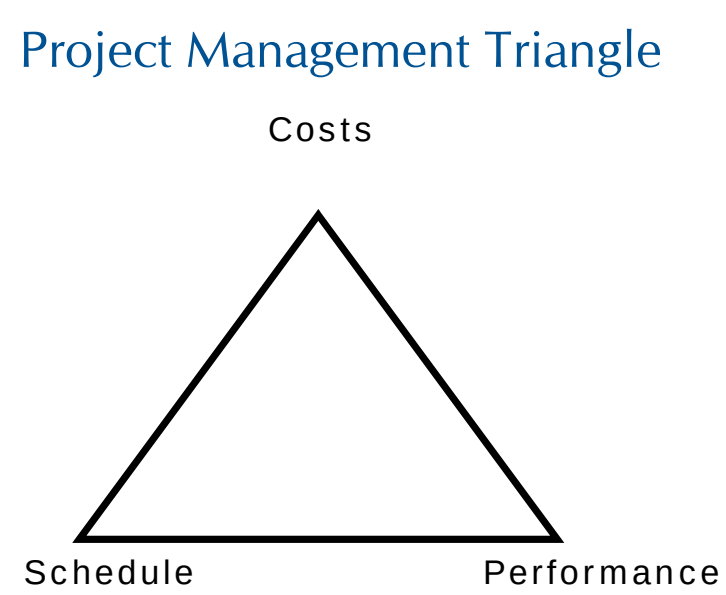
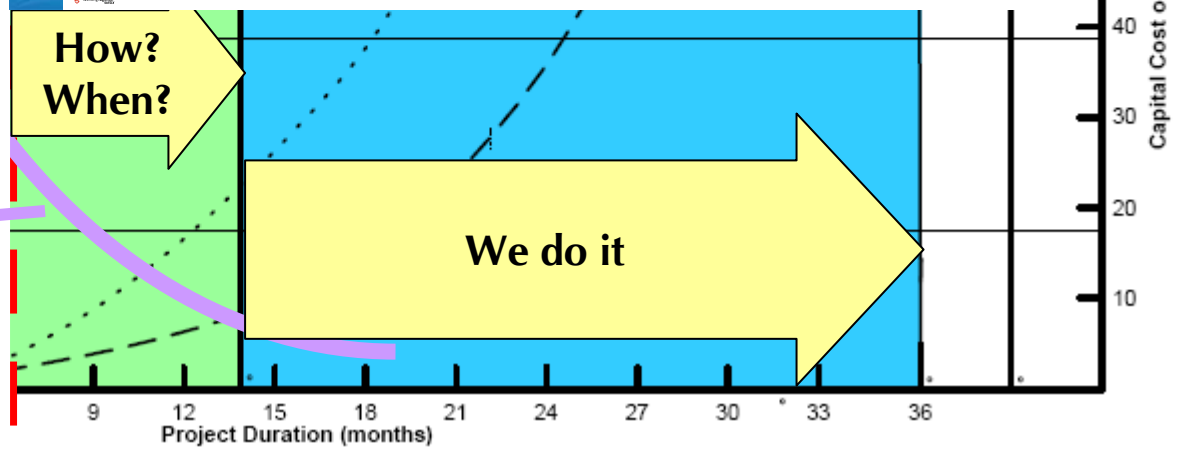
VA in Advanced Project Phases





Gains from VA:

-FEL3: 5-30%

-FEL4: 5%

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  - **Methodology**
  - Examples

VA on QMM Project

QMM Project: VA philosophy

- Phased approach:
  1. High Level sessions
  2. Detailed sessions by Area or Sub-area

- Integrated approach:
  - Involve all stakeholders
  - Facilitated sessions
  - VA part of every day's work

- Decision-driven approach:
  - Integration of value ideas using models
  - Cost:benefit analysis
  - Decisionmaking: steering committee

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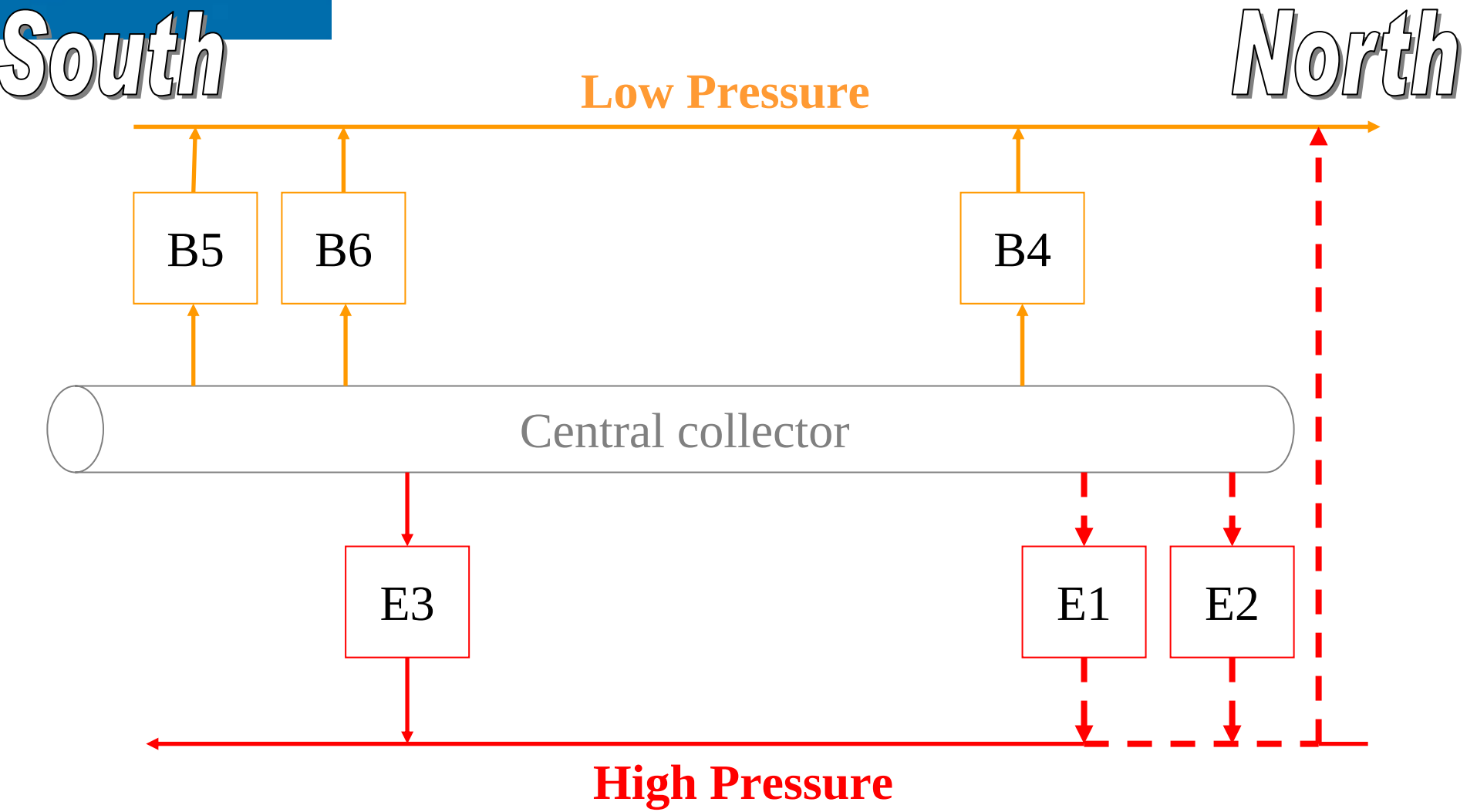
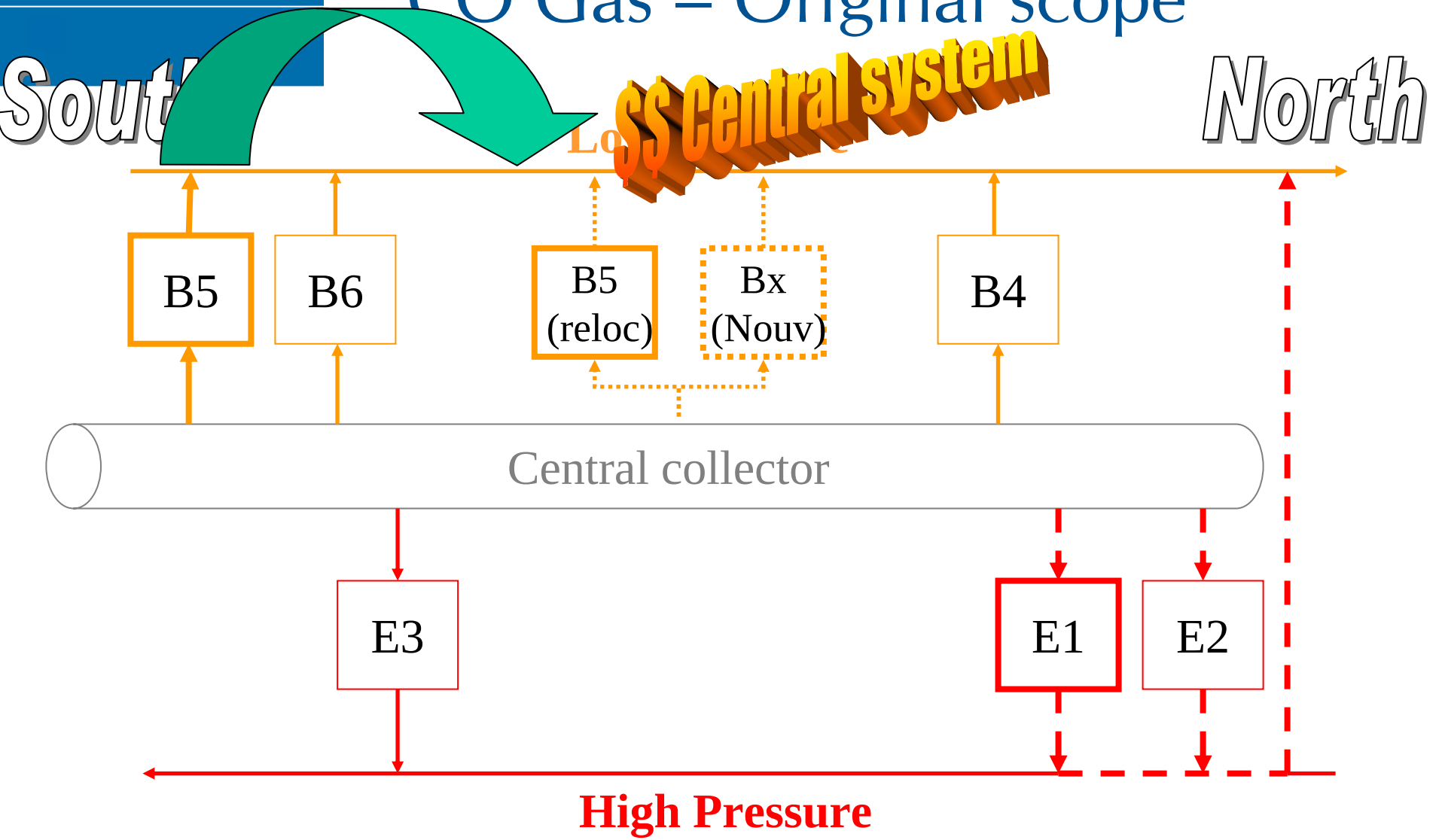
  - **Examples**
    - **CO gas system**

CO Gas - Existing



CO Gas – Original scope

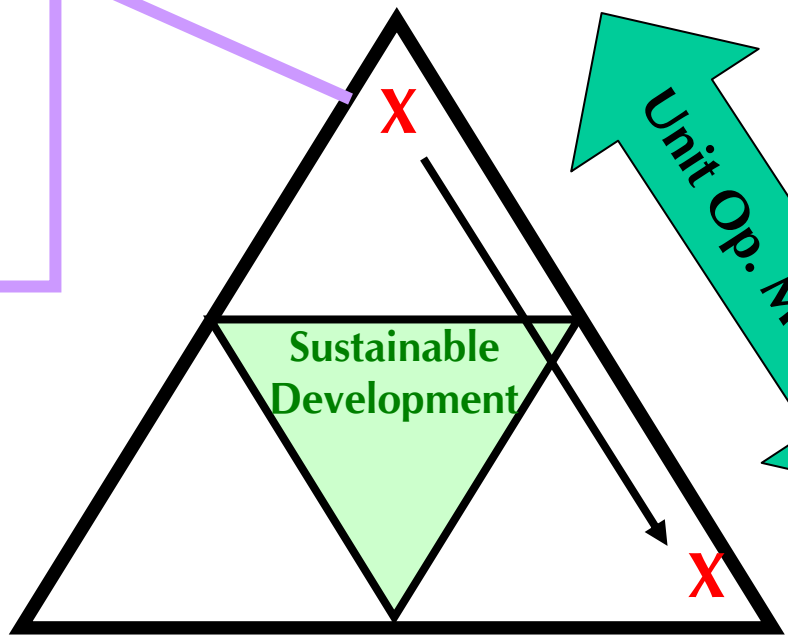


CO Gas

Nominal Capacity

VA:
-Functional analysis
-Idea generation
-Cost: Benefit analysis
-Decision making

- Add 3rd system
- New building and auxiliaries



Unit Op. Models

Optimize efficiency:
- Pressure losses
- System balance

66%

$

Efficiency

- Reduced pressure losses
- Balanced system
- Use of existing infrastructures (North system)

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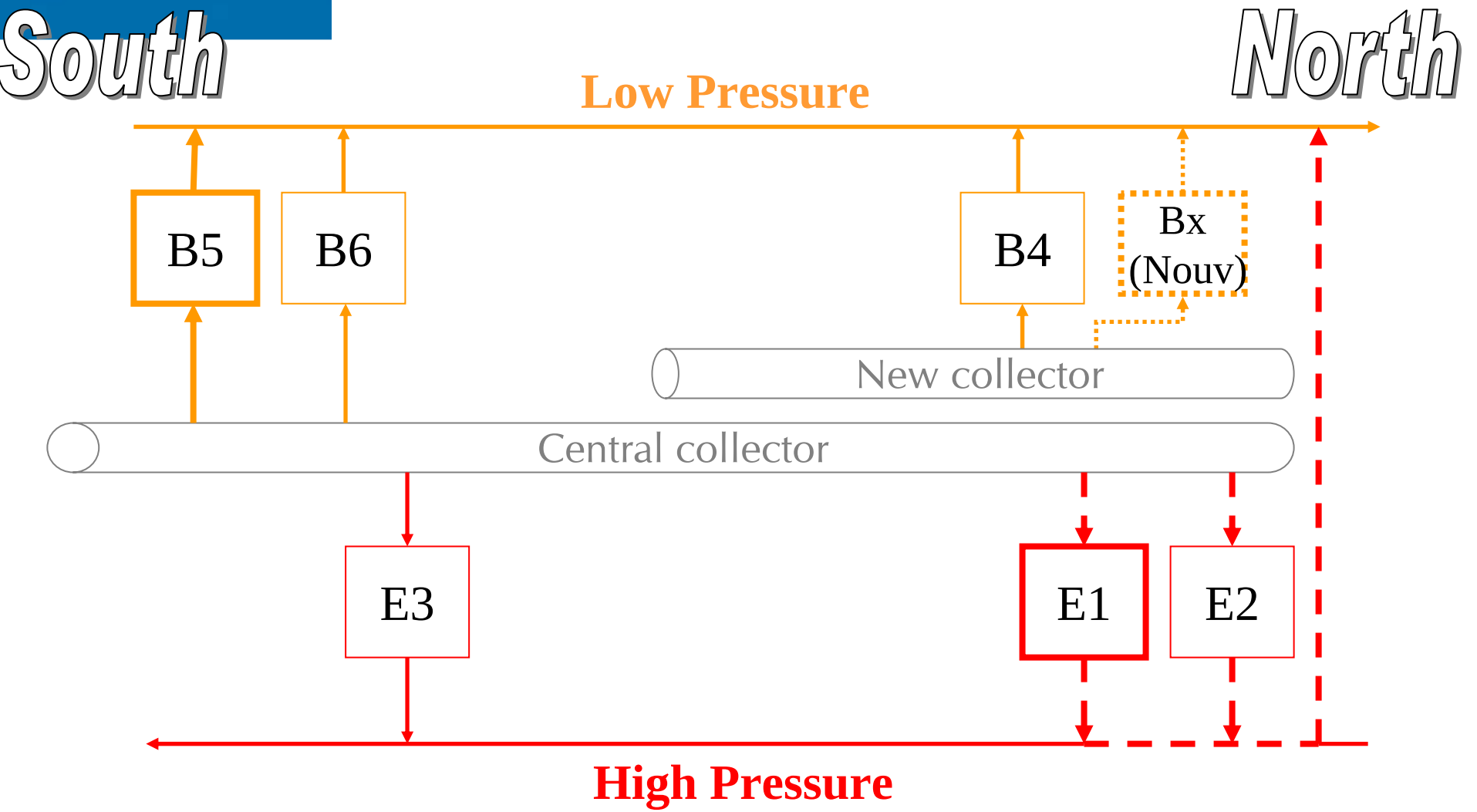
CO Gas – Optimized scope



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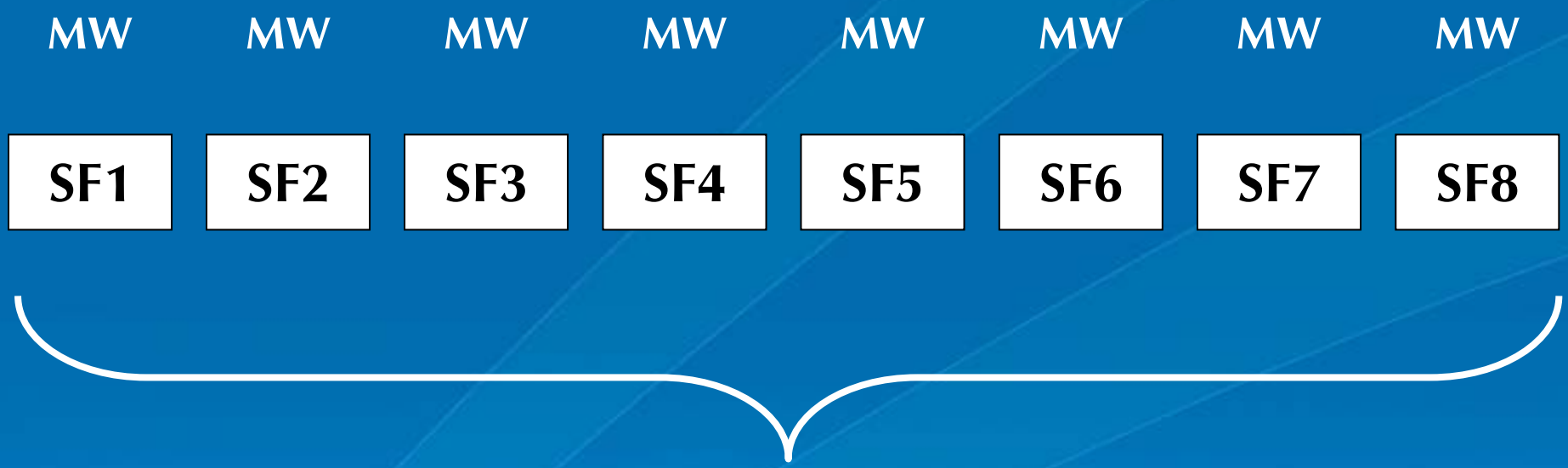
    - CO gas system
    - **Furnaces**

Smelting Furnaces (SF)



Incremental Capacity : Add MW

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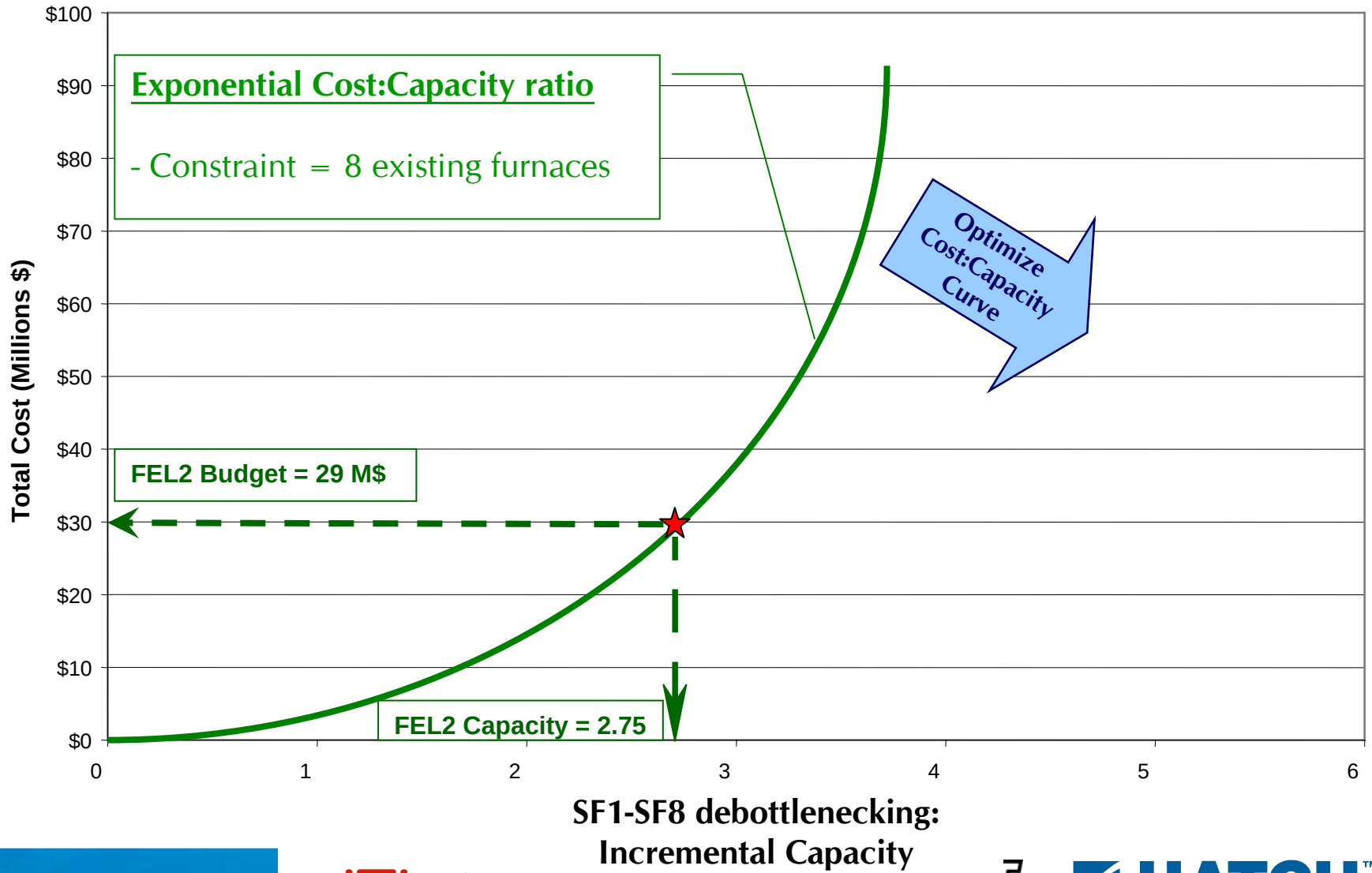
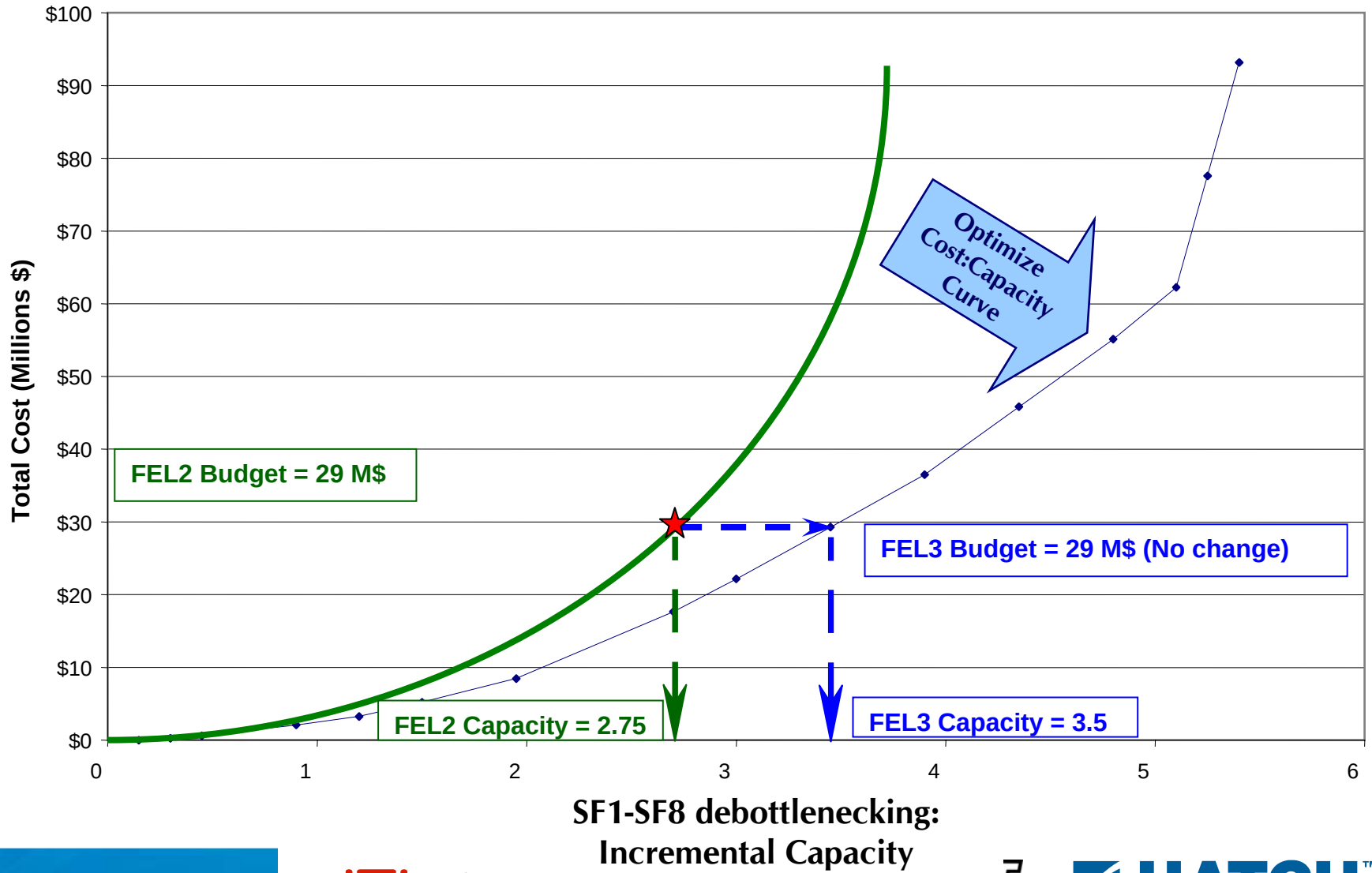
Furnace Cost:Capacity Chart



Furnace Cost:Capacity Chart



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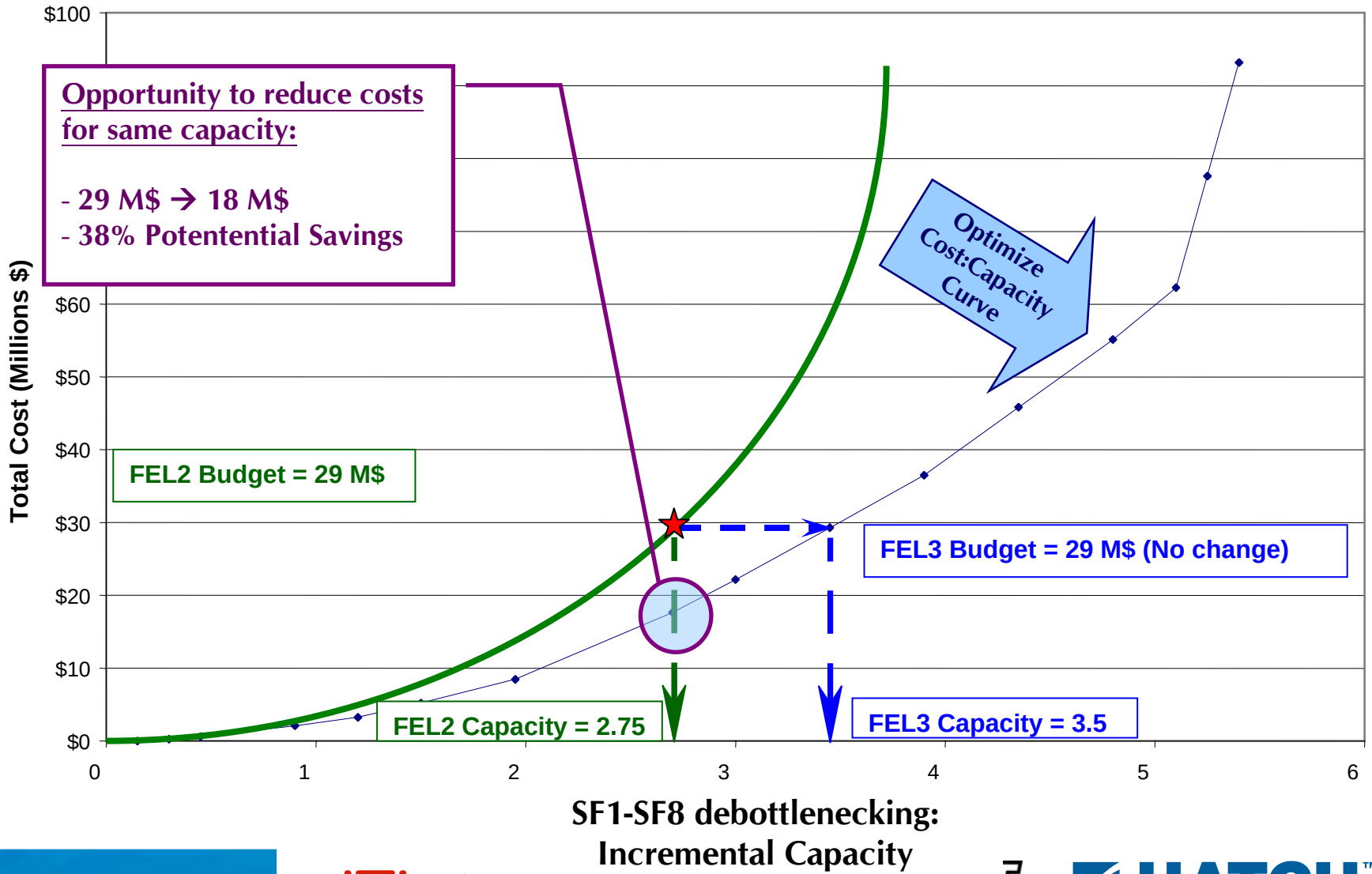
Furnace Cost:Capacity Chart



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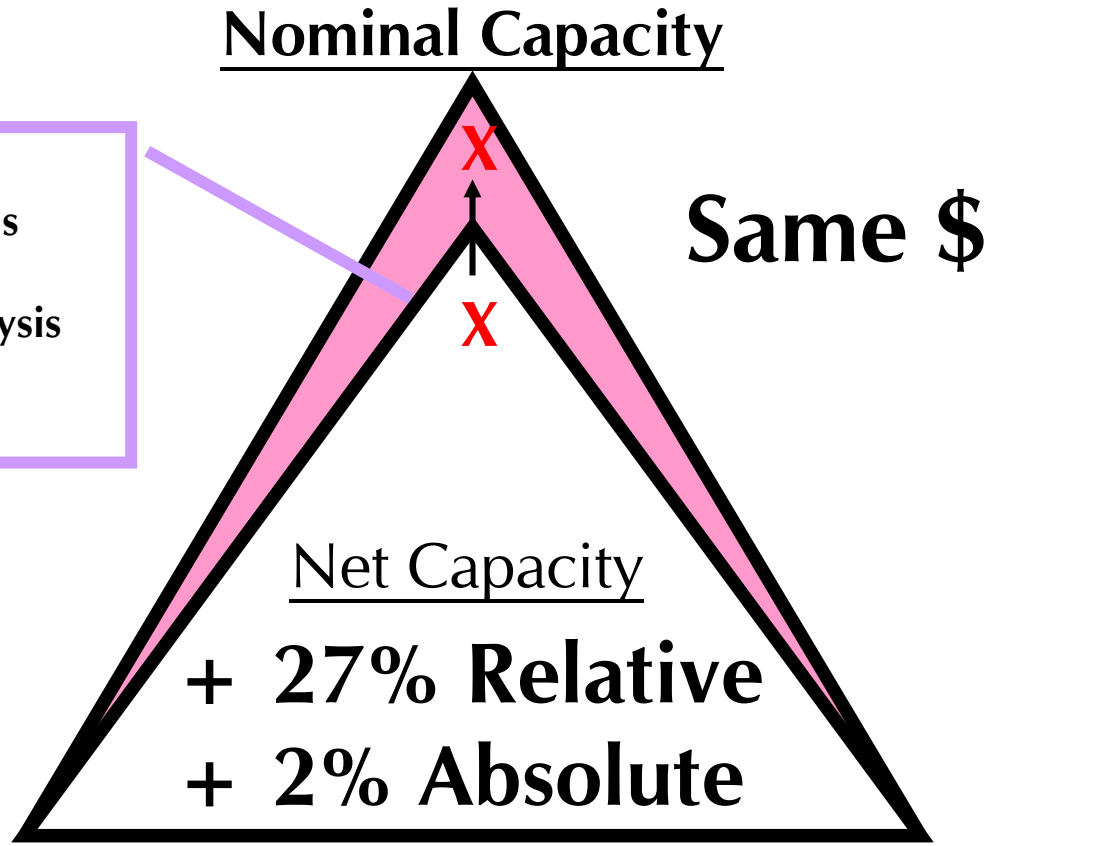
Furnaces

VA:
-Functional analysis
-Idea generation
-Cost: Benefit analysis
-Decision making



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    - CO gas system
    - Furnaces
    - **Iron Ladles**


QiT
RiT

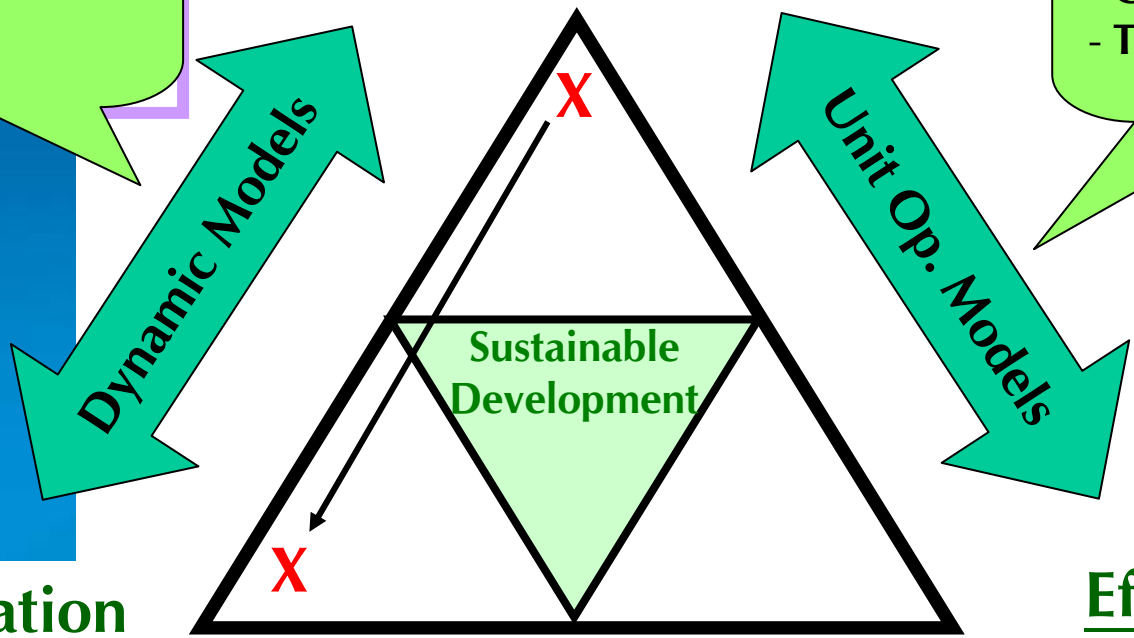
Iron Ladles

Nominal Capacity

Optimize utilization:
- **Scheduling**
- **Resources**
- **Availability**

- *Increase ladle size*
- *Upgrade crane and auxiliaries*

Optimize capacity ($):
- **Benchmarking**
- **Cycle time**
- **Tap size**



Net utilisation

Reduce tapping delays
- *Increase and reorganize crew*
- *Opex only – no Capex*

Efficiency

75% **$**

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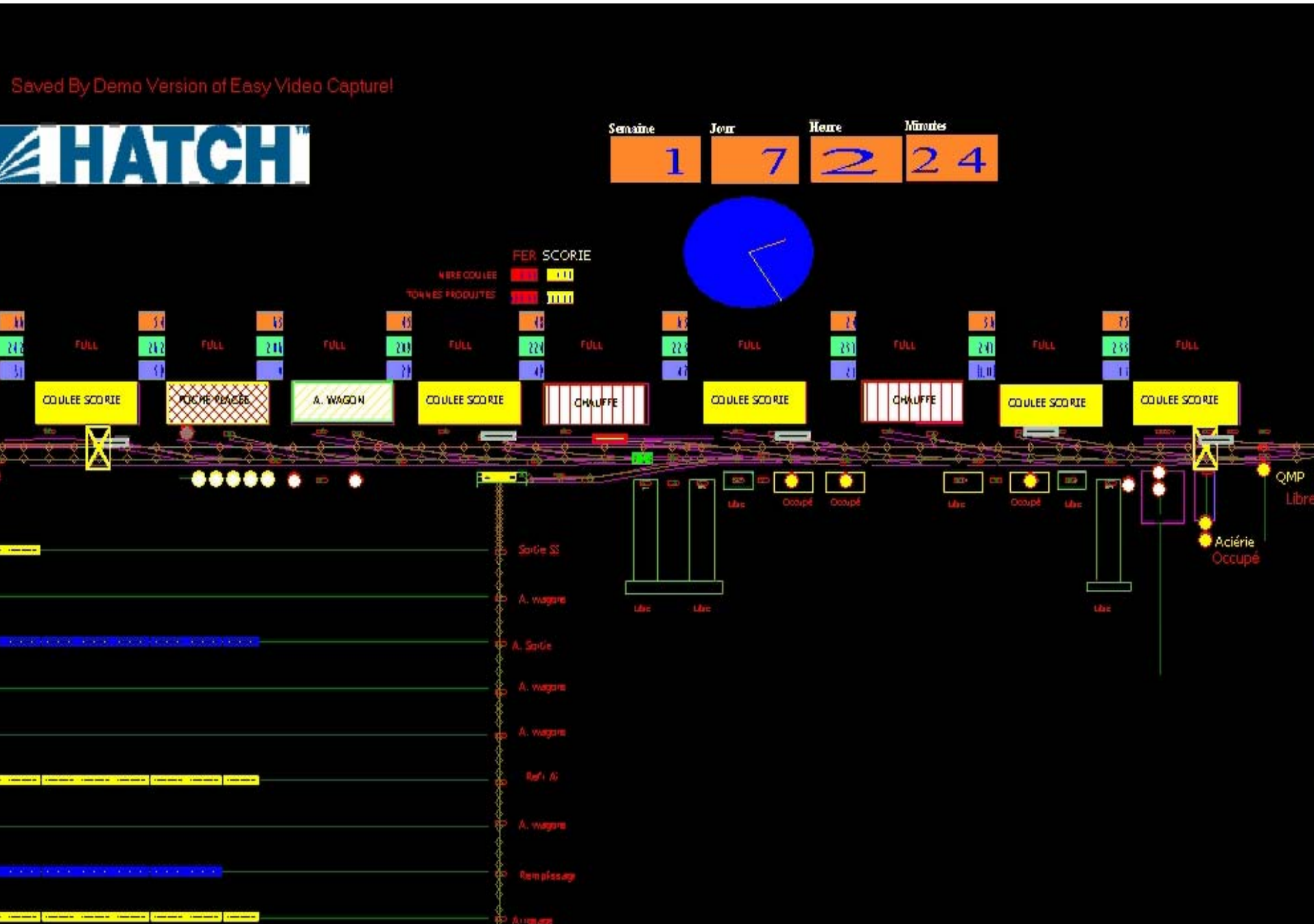
Saved By Demo Version of Easy Video Capture!
HATCH
Semaine
Jour
Heure
Minutes
1
7
2
24
FER SCORIE
NBRE COULEE
TONNES PRODUITES
FULL
COULEE SCORIE
POCHE VIDEE
A. WAGON
CHAUFFE
Libre
Occupé
QMP
Aciérie
Sortie SS
A. wagons
A. Sortie
Remplissage

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    - Furnaces
    - Iron Ladles
    - **Slag Cooling**

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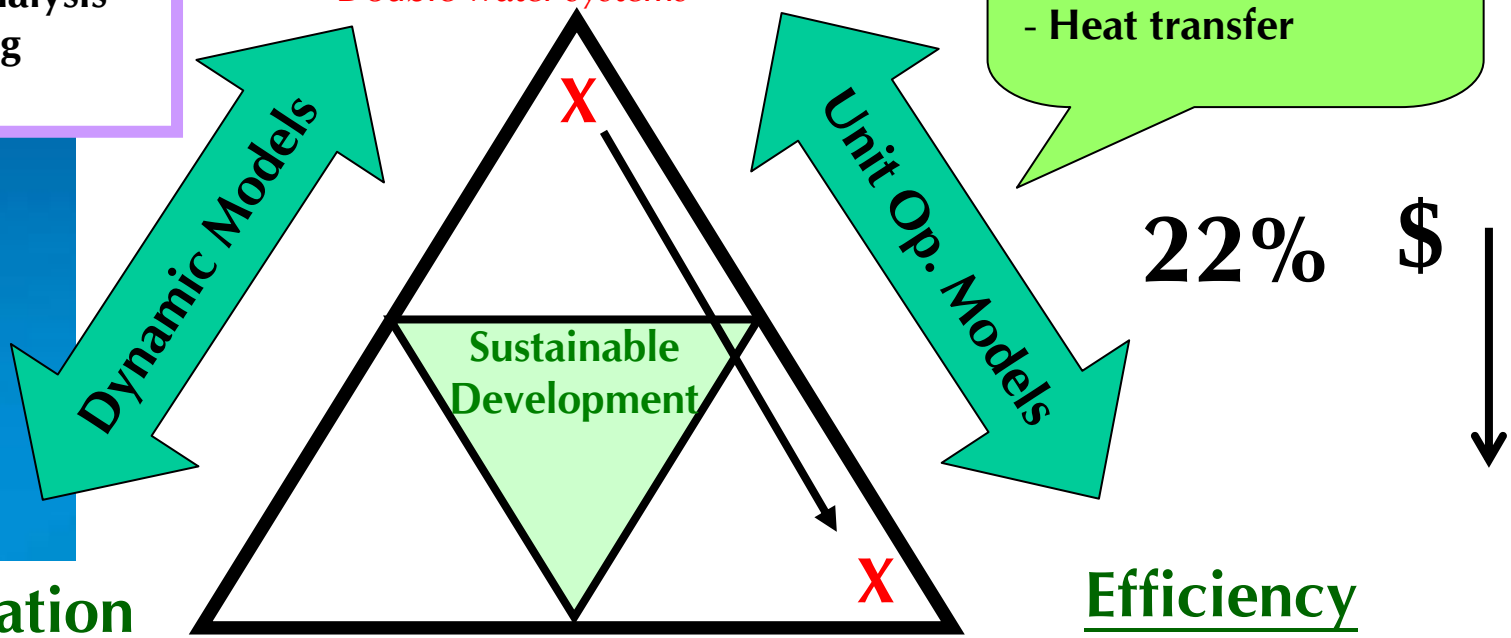
Slag Cooling

Nominal Capacity

VA:
-Functional analysis
-Idea generation
-Cost: Benefit analysis
-Decision making

- Segregated slag cars (2 slags)
- Dedicated shower lines
- Double water systems

Optimize efficiency:
- Cycle time
- Logistics
- Heat transfer



22% **$**

Net Utilisation

Efficiency

- Mix cars using tracking system
- Reduced no. Shower lines
- Reduced water consumption within existing capacity

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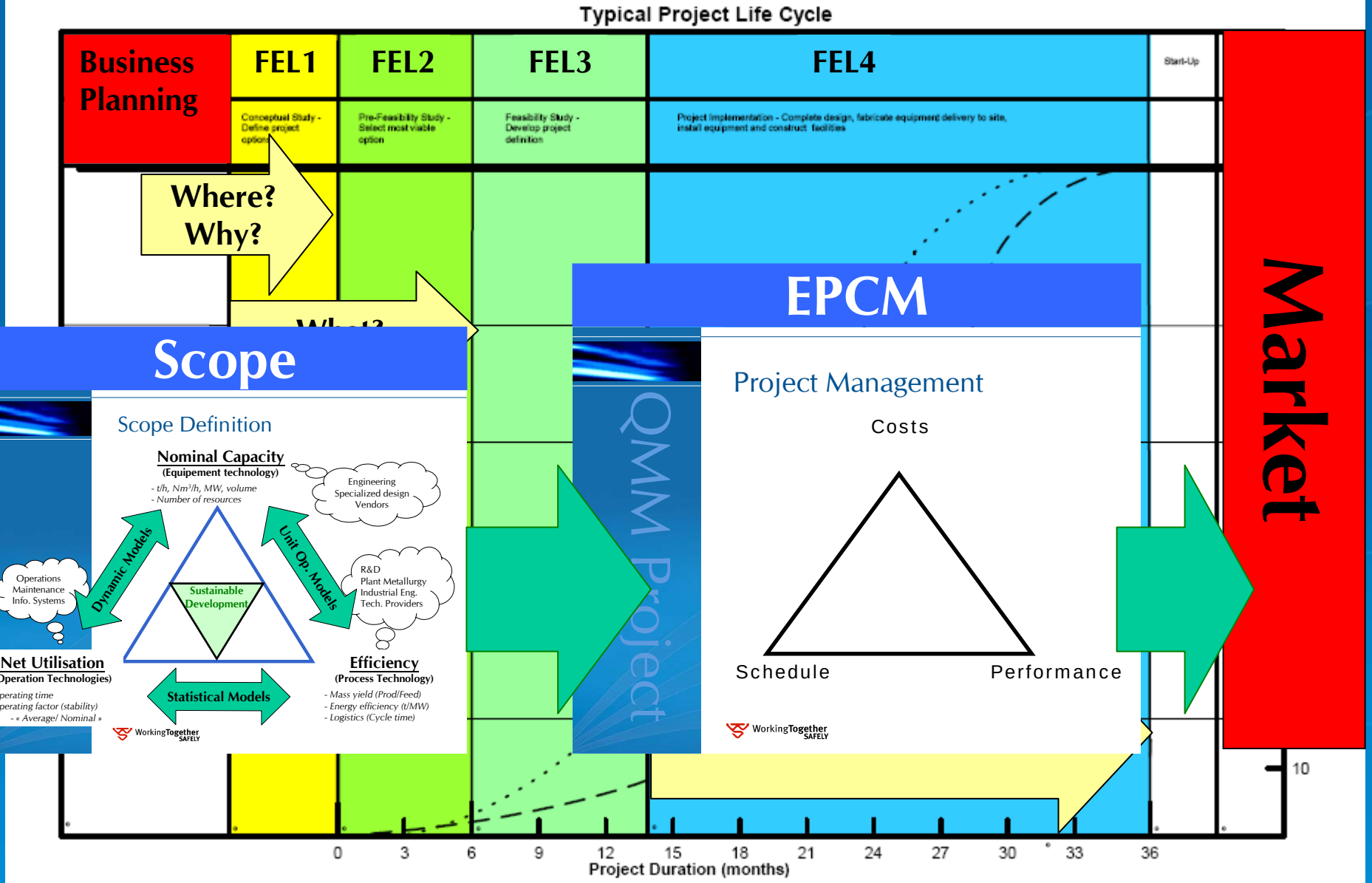
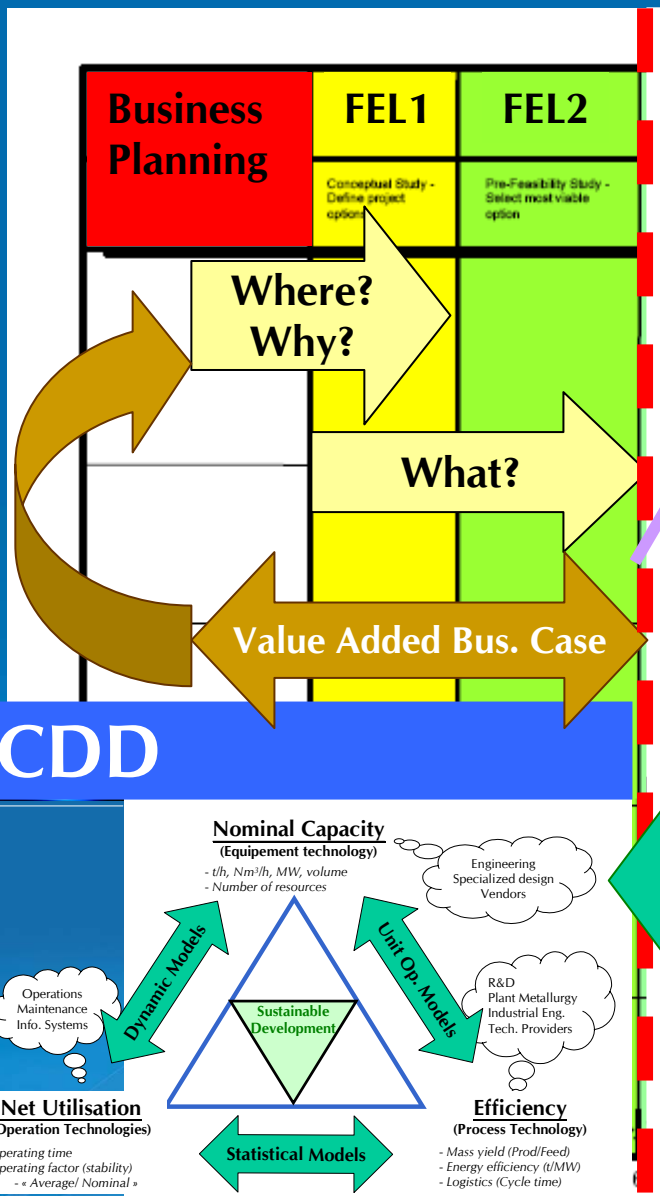
Conclusion

Linear Definition Approach



Context-Driven Definition (CDD)



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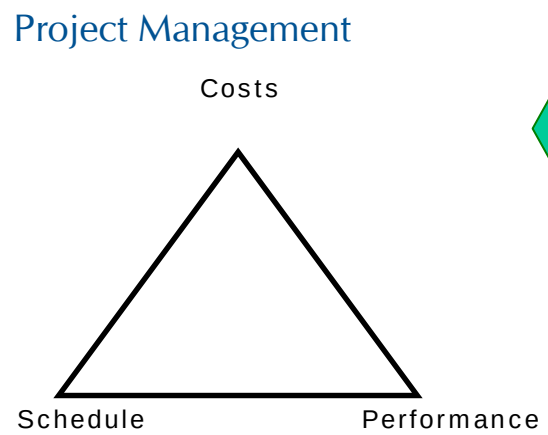
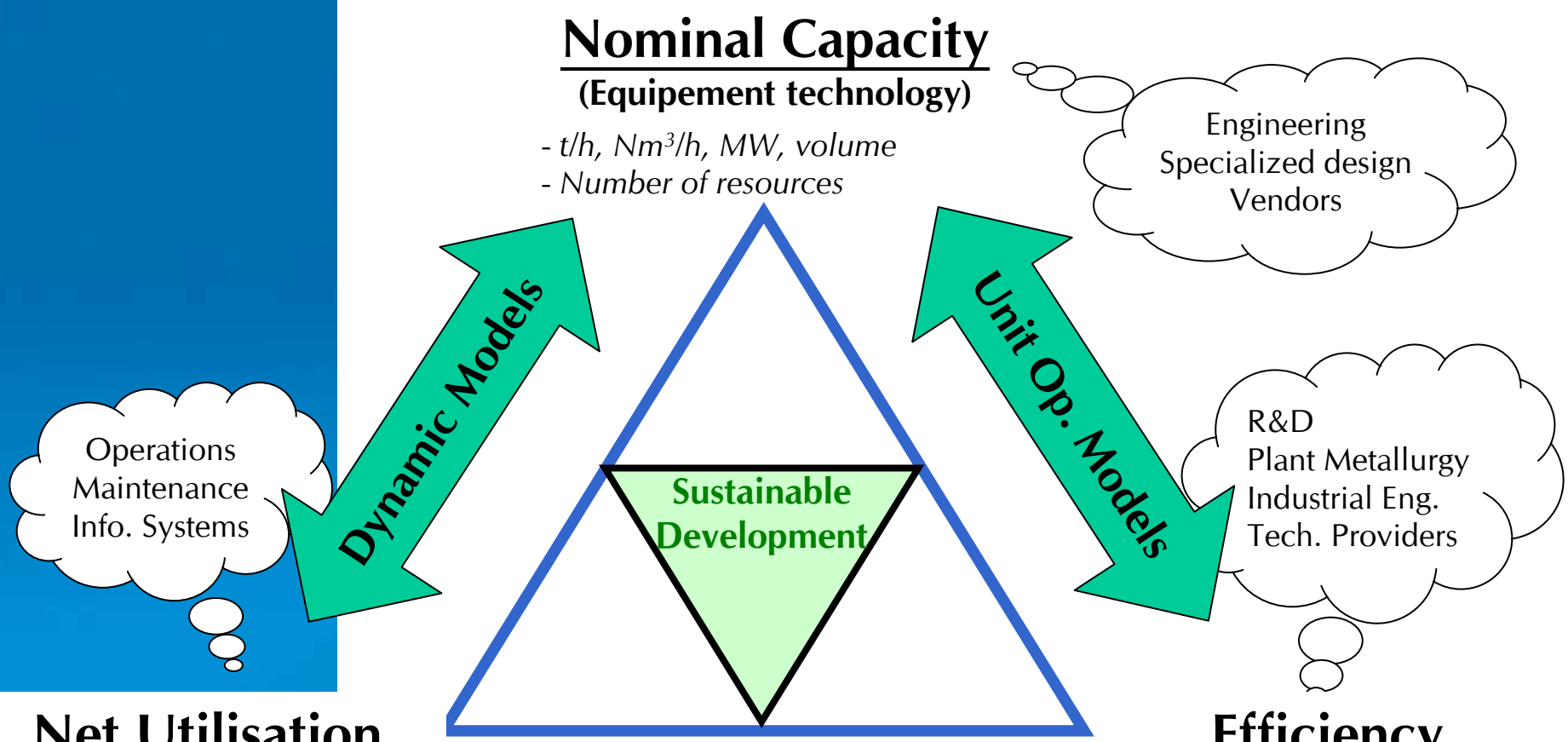
EPCM Goal/ Strategy



Market Projection

Context-Driven Definition (CDD)



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