Concept Symposium 2006
Principles of Governance for Major Investment Projects

The Concept Program; NTNU; Department of Civil and Transport Engineering
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Predictable and Competitive Investment Processes. Experience from the Private Sector and Norwegian Petroleum Industry.

Hydro case history

How to achieve improved business result

Through:

Understanding of value chain
New communication arenas
Focus om work processes
Common Performance indicators
Best Practices

By: Arne Liverud, President Naturkraft

Agenda

- Introduction
- Technology
- Governance process
- Benchmark
- Conclusion

WHAT IS HYDRO?

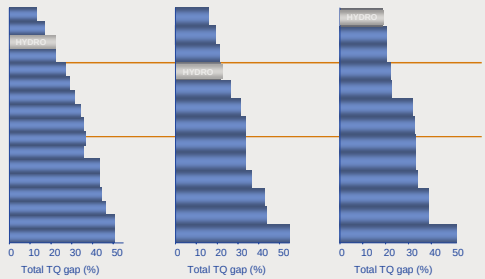
- Leading market positions in Oil & Energy and Aluminium
- Natural resources make what we do possible
- Business performance and social contribution is unseparable
- PROJECT MANAGEMENT IS ONE OF OUR CORE COMPETENCES
- Employ 37.000 people world wide

Highlights

- Turnover 174 BNOK
- Profit after tax 15,7 BNOK
- Major oil discovery in Iran
- Aquisition of VAW,Grman Aluminium Company-24BNOK
- Aquistion of Spinnaker Gulf of Mexico Oilcompany-24BNOK
- Aquisition of ENcana Chinock field Brasil

Strong international focus!

Mc.Kinsey benchmark : Operating cost in the North Sea.



TECHNOLOGY

Advanced drilling technologi has given 1400million barrels on the Troll Oilfield. Current value with todays prices 70B$.

1986: Reserver: 0

1997: 23 brønner
Reserveestimat: 1 200 Mill. fat

2000: 62 brønner
Reserveestimat: 1 330 Mill. fat

2005: 100 brønner
Reserveestimat: 1 400 Mill. fat

Tregrensbrønner
Togrensbrønner
Enkle horisontale brønner

21 togrensbrønner og 4 tregrensbrønner

2004: Ferdigstilt første femgrensbrønn

Troll Pilot – The world's only subsea separator

Two years of operational experience

Not quite Perrier, but.....

TYPICAL PROJECTS, TIME NOW.

Grane

Large and complex onshore developments

- Management of international contractors
- Optimal project execution strategies
- Implementation of new technology

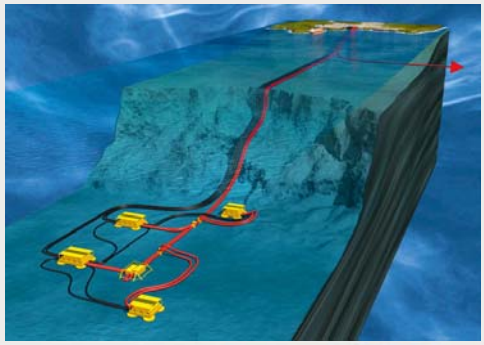
SU4

Modifications projects –

High risk due to ongoing production

- Focus on HSE
- Detailed work preparations
- Flexibility in execution
- Good interaction with Operation
- Completion within cost and schedule targets

Ormen Lange (66 BNOK investment)

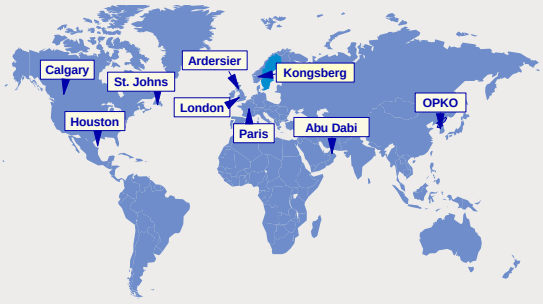


Prototype ⟷ High risk FPSO Korea

Culture - Risk - Communication

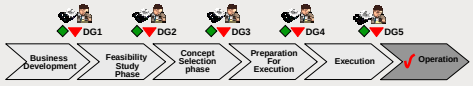
NEW FOUNDLAND
Iceberg – Risk mitigation (New environmental challenge)

MULTICULTURAL ENVIRONMENT
Geographical challenges (Example) arctic development



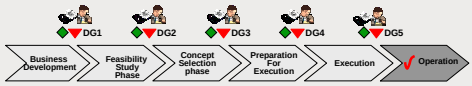
GOVERNANCE PROCESS

Hydro Stage Gate System (Capital Value Process)



To achieve
Predictable and competitive projects

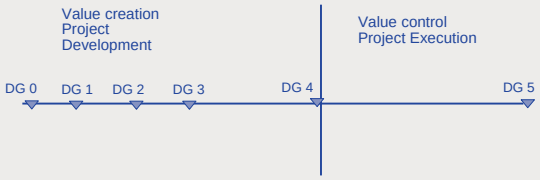
Capital Value Process (CVP) overview



- **Decision Gates**
- **Gatekeeper** (Project owner establish drivers and expectations)
- **Decision Gate review**
- **Decision Gate Support Package**

√ Evaluation of project after one year of operation

Hydro Capital Value Process OUR FOCUS AND ROLE



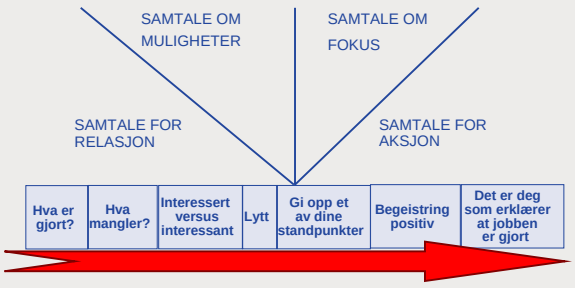
Next slides will mainly include tools and methods up to Project Execution DG4

Hydro Best Practices

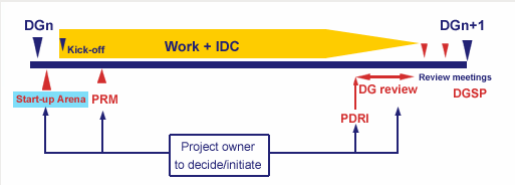
PURPOSE

- Consistent approach in Project Development
- To understand the business drivers
- Consistent approach in estimates
- Integrated teams
- Common terminology to avoid misunderstanding

KOMMUNIKASJONSMODELL



Capital Value Process Quality Control



Abbreviations:

DG – Decision Gate
PRM – Project Risk Managment
PDRI – Project Definition Rating Index
DGSP – Decision Gate Support Package
IDC – Interdiscipline Check

Start-up Arena

- Purpose
  - Ensure
    - Common understanding of the strategic fit
    - Common understanding of scope and necessary level of details
    - Alignment on objective, deliverables, critical success factors and goals.
  - Decide appropriate level of CVP implementation

POSSIBILITY	ACTION	EXPLANATION
DECLARATION	REQUEST	ASSESSMENT
		BLAME
STANDS	PROMISE	REASONS
		ENCOURAGEMENT
"I SAY"	OFFER	REPORTING
		OPINION
		UNDERSTANDING
VISION		EVALUATIONS
	INSTRUCTION	JUDGEMENTS
MISSION	INVITATION	DESCRIPTIVES
	TENDER	NARRATIVES
		OBSERVING
		ANALYSIS
		CRITIQUE
		INTERPRETATION
		STORY
		PREDICTION
NOW & ONGOING	NOW & FUTURE (BOUNDED)	PAST – AFTER THE FACT
AUTHOR/ INVENTOR	PLAYER ON FIELD	SPECTATOR "IN THE STANDS"

Start-up Arena – Key Focus

Allign those who generate income possibilities (geologists, reservoir engineers, drilling engineers)

WITH

Projectprofessionals

TO

Balance risk and opportunities

AND

Achieve best overall business result for Hydro and Partners

- Designing a consistent system is 10% of the work
- Implementation in work processes, people and organisations is 90% of the work
- We have therefore designed a training camp with real business cases to capture Capital Value Process way of thinking and working into our employees mind
- Results are:
  - Highly motivated workforce because they understand the drivers & overall issues
  - Efficient use of resources. We do no more than what is necessary

Our focus during Project Execution

- Frames
  - Contractors does most of the work through EPC or split contracts
- Owner has a strong & competent team to:
  - ***Manage contractual & technical interfaces***
  - Control safety through strong leadership
  - Avoid scope changes
  - Schedules trending & control
  - Control cost
  - Control quality

All based on standard systems

We seldom use Management contractors because:

- The MC is usually acting in place of the owner, but can not deliver owner-quality decision-making
- The MC adds a layer of organizational complexity
- The MC adds a significant amount of overhead costs
- Owners need to understand that contractors trust other contractors even less than owners
- When the MC also has a piece of the execution work, the level of distrust goes off-scale

Megaprojects and Owner involvement

- Strong, sizeable owner teams actively managing the project are almost neccessary to project success:
  - Team integration is the single most important driver
  - Team integration requires that key positions be filled with owner pesonnel:
    - ✓ **Project Manager**
    - ✓ **Scheduler**
    - ✓ **Contracts Specialist**
    - ✓ **Constuction Manager**
- Lump-sums and MCs do not help reduce personnel requirements
- Owner hoping to execute successful megaprojects "on the cheap" will be disappointed

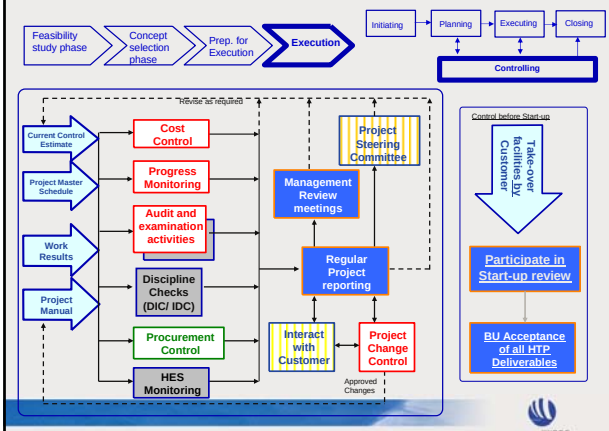
10 Project Rules for the Business Professional

1. Speed kills; let the data drive the schedule
2. Use the approval process to level the playing field
3. Think of cost and scope as the same
4. Share the underlying business case
5. Large complex projects are easily derailed: avoid change
6. Counting sheep is better than EPCI LS to get to sleep
7. Your engineers and contractors are selling distinctly different services by the same names
8. You will need your project organization later
9. The business is accuontable for capital
10. Measure performance holistically and well

HTP Work Processes supported by PIMS

Project Management processes:
Time Management, Cost Management, Risk Management and Quality Management processes

Procurement processes:
Market assessment and procurement strategy, Prequalification and ITT preparation, Tender evaluation and Contract award and Contract administration and close-out, Procurement decision process (IAK)



PIMS from a cost control view

PIMS contract register
- WBS
- Project currencies
- Contract info
- Commitments
- Potentials/forecasts
- Earned Value

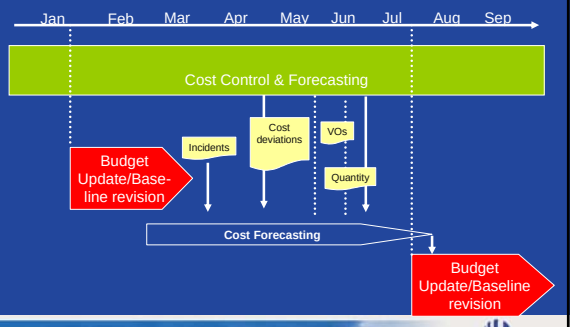
SAP
- WBS
- Contract info
- Commitments
- Accruals/ reimbursements

PIMS cost reporting
- Commitments
- Budgets
- Earned Value
- Reimbursements
- Currency impact

Other PIMS registers:
- *Risk management*
- *Project change control (PCP's)*

PIMS estimate register (for budgeting)
- Commitments
- Potentials/forecasts
- Estimates

PIMS - Cost Forecasting – Budget updates



BENCHMARK

External benchmark

- Norsk Hydro uses IPA (Independent Project Analyses) to benchmark our competitiveness both in project development and project execution phase.
- Learning
  - Integrated teams through project development, consisting of business owner, reservoir engineers, petroleum technology, drilling and facility engineers, is imperative for success.

The Database IPA (Independent Project Analysis)

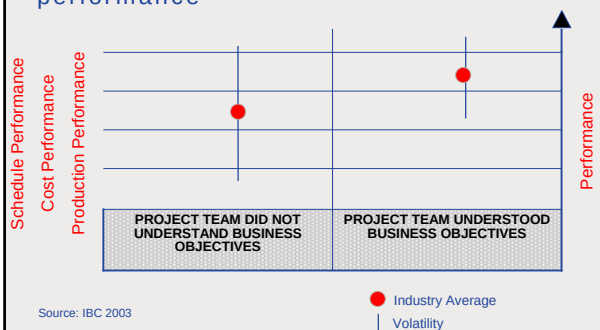
OVERALL PROJECT DATA	• **312 Projects** • **Represents over $95 Billion in capital investment**
MEDIAN AUTHORIZATION DATE	• **1999 (1996 to 2003)**
ASSET COST (n = 157)	• **Average $475 MM** • **Range: Less than $10 MM to more than 4,5 Billion**
FACILITY COST (Includes Export)	• **Average: $250 MM** • **Range: Less than $5 MM to more than $3 Billion**
WELL CONSTRUCTION (n = 157)	• **Average: $140 MM** • **Range: Less than $5 MM to more than $1,5 Billion**

Scope – Cost Consistency and focus

- Project Scope ⟹ project cost. There are no painless cost reductions in well-defined projects
- Cost reduction exercises after the start of FEL-3* often cause projects to fail
  - Definition (FEL) is seriously degraded
  - Many of the changes made reappear in execution
  - Production attainment is jeopardized
- After a cost reduction exercise, the project must be returned to the correct point in the project cycle, which is usually 6-12 moths ago

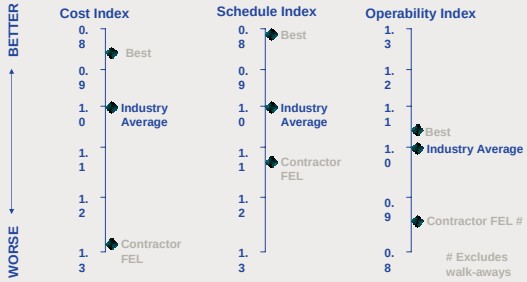
*FEL-3 equal DG3

Benchmark Statistics to measure our performance



Source: IBC 2003

Projects Front-end Loaded by Contractors



Merrow, Yassori, and Hartung: ***Lessons learned from contractor front-end loaded projects***

CONCLUSION

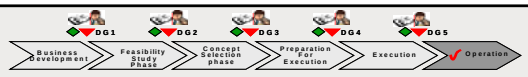
OUR CHALLENGE

ESTABLISH CONSISTENCY BETWEEN

Scope, quality, estimate, schedule, technologychoice, project execution model,market opportunities and HESrequirments

at

each DG



WHERE ARE WE HEADING

Project Risk Assesment will be in addition to current use a

- key issue in developing our project organisation and quality assurance strategy across project phases
- key in optimising personnel resources across projects and phases