

# Geotechnical Engineering in Offshore Wind



## Geotechnical site investigations

- how can we contribute to lowering the cost of electricity

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# Geotechnical site investigations

## Main Topics

- Geotechnical site investigation – what's involved
- Looking at some selected components
- Risk reduction vs. cost savings
- Sum up of some main points

# Geotechnical site investigation

## Geotechnical SI project phases

Is that not just drilling some holes and some in-situ testing?

- No - but it is one of the very important phases
- The ultimate success (SI field work) is closely linked to the projects pre- and post-phases.

Project flow:



The flow is “linked” – but the success is proportional to the quality of the input

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## Cost reducing the SI field work

- Just cut the “sales price”
  - not sustainable tactic for the contractor
- Optimizing work, higher efficiency/work smarter
  - yes (still ensuring safe operations)
- Development of new investigation techniques
  - yes (everybody wants development, but not change)



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## Typical SI field work components

- Drilling techniques such as: flush drilling, rotary drilling, percussion drilling, core drilling etc.
- Sampling as: Shelby push sampling, hammer sampling, core sampling, various disturbed sampling (auger, bailer etc.)
- In-situ testing: CPT (drilling mode or seabed mode), vane, SPT, bore hole logging, pressuremeter, P-S logging, HPD.....

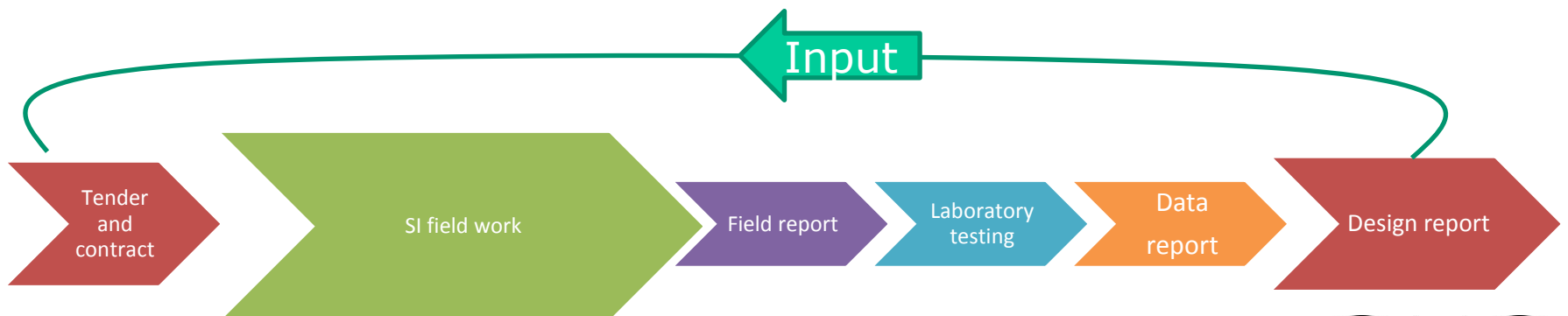
Cost reductions for the individual operations are mainly related to optimizing/ "work smarter"

Developments are in many cases "driven by" HSE



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- Executing the SI field work is not the “problem”
- Defining the right SI work is the challenge
  - Knowing the “end product” when setting up the requirements in the tender document
  - Specifying the optimal investigation campaign(s)
  - Ensuring the right sampling and lab testing program
  - Allowing realistic time frame for the planned work
  - Dialog between the parties as early as possible to ensure all valuable input



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- Risk reduction in SI work  $\Rightarrow$  cost savings? Yes
  - Higher degree of standardization in relation to
    - T&C (e.g. reference to international standard terms)
    - Technical specification (e.g. reference to new ISO 19901-8)
  - Sharing all available data up front (e.g. soil, metocean)
  - Flexible working window
  - WOW model - with risk sharing between the parties  
(the Contractor do not have more control over the weather than the Client! )



# Cost-effective site investigations in the future?

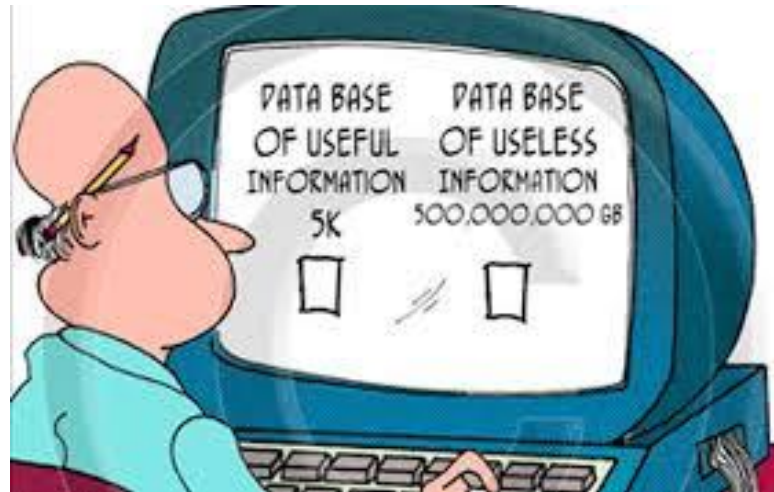
Where to look for cost efficiency – sum up

- Field operation optimizing work procedures
- Development of “new” methods
- Tender and Contract frame work
  - T&C
  - Technical solution
  - Time schedule and planning
- Closer dialog in relation to solutions (making use of all knowledge)
- WOW risk model



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The challenge is getting the right data – not necessary most data



*"If I had eight hours to chop down a tree, I'd spend six sharpening my ax"*

Abraham Lincoln

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Thank you

