Energy & GHG Emissions Reduction – An industrial case study

Eight session of the Group of Experts on Energy Efficiency

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Advisian is the global advisory, consulting and early project development line of business for Worley and is a key enabler to the broader business.

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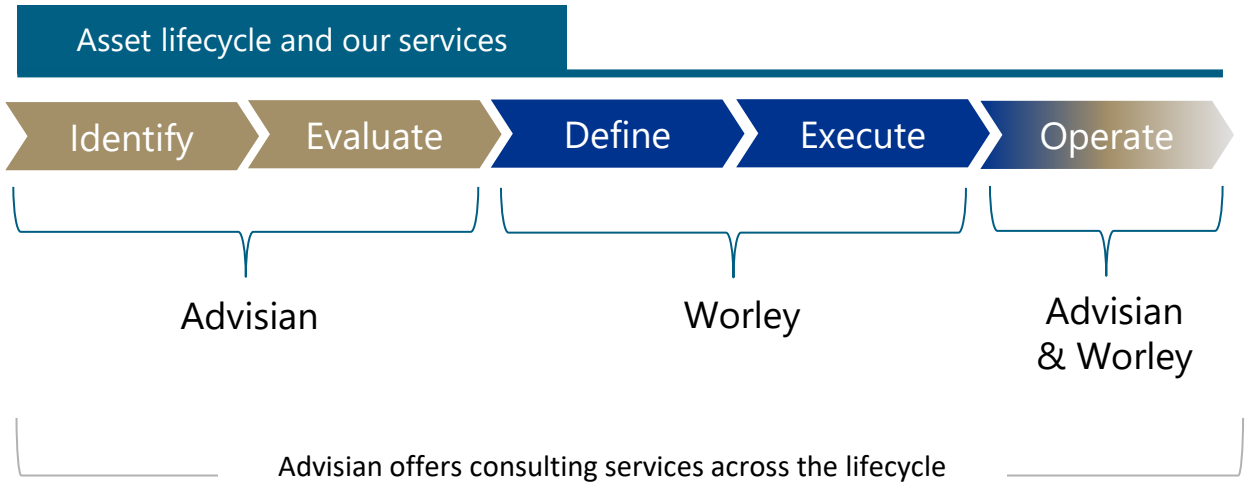
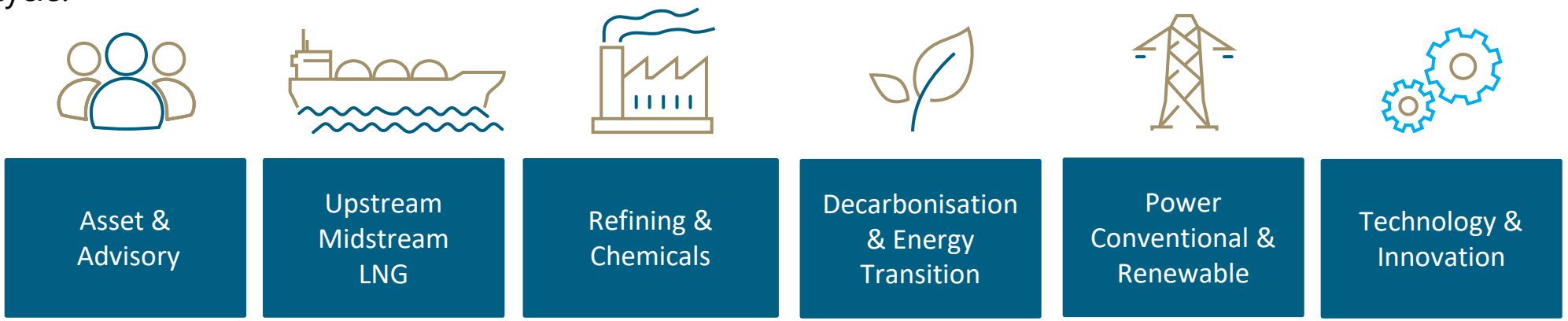
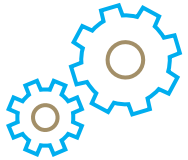




All the elements of decarbonization need to be considered in combination, not isolation

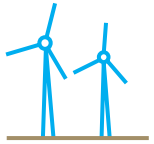


Process/energy efficiency

Scope 1

Operate in yield/energy efficient manner, electrification of key drivers

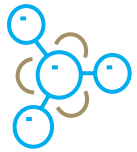
Monitor, report and act



Renewable power

Scope 2

As plant electrifies Scope 2 emissions increase; renewable power provides a proven technology solution plus integral part of H_2 economy



Hydrogen economy

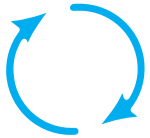
Scope 1 & 3

Green or blue hydrogen projects enable fuel switching to take place and support low carbon feedstocks

Low carbon feedstocks

Scope 3

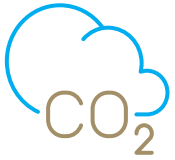
Renewable fuels and low carbon products



Circular economy

Scope 3

Integration of chemical recycling of plastics within the refinery / petrochemical / polymer supply chain



Carbon capture utilization and storage

Scope X

Match sources of CO_2 against sinks; integration within industrial hubs

underpinned by understanding of regional energy policy/regulations, digitalization advances, monitoring and reporting, and supporting organizational governance plus realistic business case development

Enabling the Energy Transition

Energy and CO_2 emissions reduction

Project Highlights

Case Study

- A petrochemical complex (Cumene-Phenol) in the South of Spain

- Energy Bill
  - >100 t/h of steam import from next door refinery
  - >100 MW of natural gas import to fire a Hot Oil utility furnace
  - ~ 20 MW of electricity

- Study Objectives
  - Identify opportunities for energy and GHG reduction
  - Client is looking for a STEP CHANGE, not a marginal reduction
  - Payback 2 to 5 years
  - Apply Pinch Analysis
  - Technology Transfer

Our approach to Energy and GHG Reduction

Determine Base Line

Understand the production process

Interactive workshops & brainstorming

Energy Benchmarking & Energy Targeting (Pinch Analysis)

Identify projects

Feasibility Analysis

Implement selected projects

Results

- Study identified 25 project ideas:
  - Operational changes: 7
  - Capital (process design) changes: 18

- Annual energy bill reduced by 16%

Results

- Some operational changes included:
  - Relax specifications (purity)
  - Reduce column operating pressure
  - By pass a preheater
  - Distillation column feed tray optimization

- Some capital changes included:
  - Improve process heat recovery
  - Increase preheating of one of the streams
  - Install side condenser in one of the columns
  - Increase pressure of low-pressure steam generation for site´s heat integration
  - Feed conditioning to one of the distillation columns
  - Use low-pressure steam for stripping
  - Waste heat recover

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