



Questions?

Benefits

- Green halo
- First mover advantage
- New jobs
- Future energy demand

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Environmental Risks

- Maturity of CCS technology
- Risk of leakage
- Groundwater and local ecosystems
- Unpredictable environmental events

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Financial Risk

- Sole financial responsibility
- Uncertain investment
- Constant improvement required
- CCS is cost prohibitive

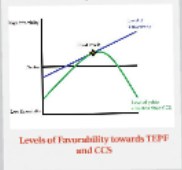
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Public Pressure

- Public sensitivity
- Lack of public understanding
- Lack of public support
- Reactions from NGOs are negative

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Public Engagement Analysis

Public engagement in this project is essential.

Total E&P needs to educate the public and set the tone of discussion about CCS.

Assumptions

- Total E&P France will invest heavily in CCS
- The public perception of Total E&P France will improve
- Educating the public about CCS will increase its favorability

Recommendations

- TEPF should be more proactive than reactive in revealing this plan to the public.
- TEPF's engineers (who possess technical knowledge of the process and the effects of injection) must work with the public relations professionals.
- There's far greater risk in surprising the public with something this big, as opposition could skyrocket well beyond expected levels.
- Prepare answers in response to potential concerns about the implementation of this project.

Other Recommendations

Safety methodology focused on prevention and training:

Since TEPF could be held liable for leakage of CO2 and damages to human health or property, TEPF should implement a monitoring system to detect any CO2 leakage from the storage reservoir and to ensure that water and air quality around the site is not affected by injection of CO2.

The monitoring system:

- Installation of leakage detectors
- Regular water sampling
- Measure gas seepage from the ground
- Maintain surveillance of the injection process and regularly check conditions of all operating facilities

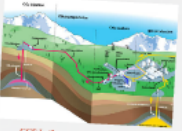
Contingency plan in the event of a major CO2 leakage:

- Form and train a team specifically to handle leakage emergency
- Run simulation exercises of CO2 leakage
- Coordinate intervention with local government emergency services

Background

Total E&P France is planning to retrofit its power plant in Lacq with a Carbon Capture & Storage (CCS) system, which is at risk of not being accepted by the public due to its unfamiliar and potentially dangerous nature

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CCS is the process of capturing waste carbon dioxide, storing it in a storage location, and keeping it in storage so it cannot enter the atmosphere

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Outotec (A): Project Capture

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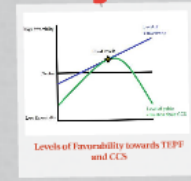
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Public Engagement Analysis

Public engagement is the process of involving the public in the decision-making process. Total E&P needs to evaluate the public and set the tone of dialogue around CCS.

Assumptions

- Total E&P France will have a positive view of the CCS project.
- The public perception of Total E&P France will improve.
- Allowing the public to share a CCS will increase its credibility.



Recommendations

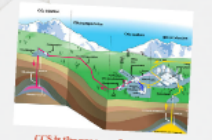
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Outotec (A): Project Capture

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Executive Summary

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Total E&P France (TEPF) should move forward with the Carbon Capture & Storage (CCS) system implementation at Lacq and proceed with a specialized public engagement to increase the company's transparency and favorability while boosting public support of the project

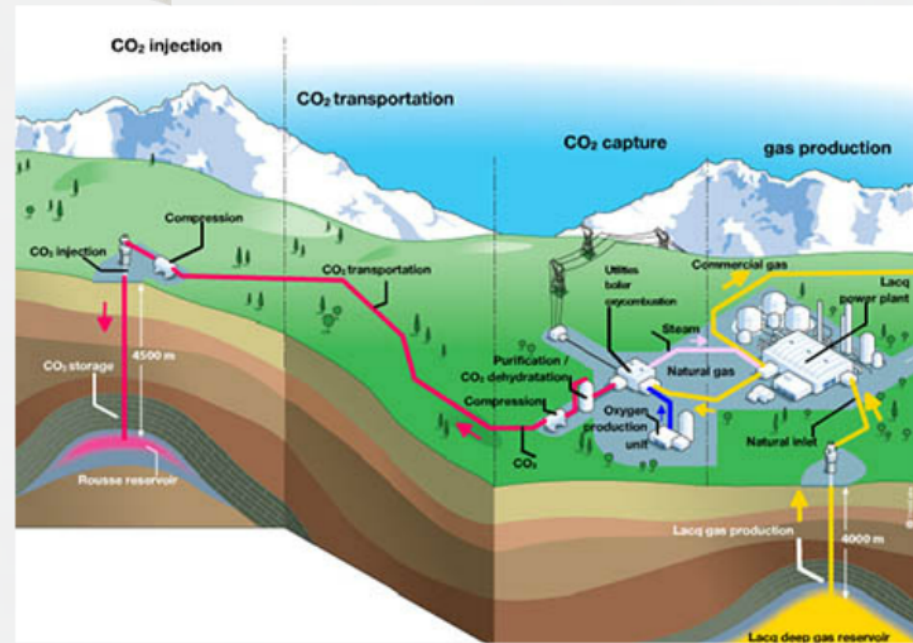
- IRR shows that this is a poor investment, but ...
- Societal and company benefits associated with the CSS implementation minimize the threat of the poor IRR
- Total E&P France should outsource public relations
- Engineers must develop countermeasures to address the potential risks
- Public concerns must be collected, and the people educated about CCS at a simplified, non-technical level.



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Financial Analysis

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- $0 = CF_0 + CF_1/(1+r)^1 + CF_2/(1+r)^2 + CF_3/(1+r)^3 + \dots + CF_{30}/(1+r)^{30}$
- IRR=r= -0.46%

Assumptions:

- Once the construction is completed, the CCS project can be used for 30 years, starting from 2010 through 2040.
- Initial capital investment of €60 million
- The price of CCS: €37.5/tonne CO₂
- Estimated cost of CCS:
 - €62.5/tonne CO₂ from year 2010 to year 2020
 - €37.5/tonne CO₂ from year 2020 to year 2040
- Annual demand of TEPF CCS: €75,000/tons per year
- Total additional cost (extra fuel, storage & system cost): €0.5 billion

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