Analytic Hierarchy Process (AHP) for a Nuclear Renewable Hybrid Energy System

The following questionnaire will take 10 to 20 minutes to complete. Thank you for your time and consideration.

The questionnaire below is one part of my research evaluating the potential benefits of applying the risk assessment technique of Analytic Hierarchy Process (AHP) to compare different industrial processes that might be incorporated into a nuclear renewable hybrid energy system. AHP requires a group of experts determining the relative values associated with each of the options being compared. The questionnaire requests your expert opinion on determining the values associated with thermally coupling a desalination plant, a synthetic fuels plant, and a hydrogen production plant to a nuclear power plant. The three industrial processes are compared based on safety, flexibility, and economic value.

This survey assumes that the process used for hydrogen production is high temperature steam electrolysis with thermal as well as electrical coupling to the nuclear power plant. The assumed form of desalination is thermal desalination through distillation directly using heat from the nuclear power plant. The assumed synthetic fuel process is a Fischer-Tropsch method using coal as the hydrocarbon source. Assume each of the processes consumes the same amount of heat from the nuclear power plant.

The questions below deal with the relative value of each of the industrial processes based on each of the characteristics taken into consideration in this study: safety, ability to fluctuate, and profitability. Ability to fluctuate describes how difficult it is to start and stop the industrial process, as well as the ability of the industrial process to ramp to allow more or less heat to be allocated to electricity production to match demand from the grid. For example, if the process can start and stop, but the initial batch of product is of lower quality, that would negatively affect the "ability to fluctuate" as compared to a process that could start and stop with no impact on the initial batch of product after restarting. An industrial process that could more or less instantaneously reach full capacity steady state operation would rank higher than an industrial process that would take a long time to reach full capacity steady state operation.

For AHP, the range of the scale is from 1 to 9, with 1 representing when the two options are thought of as equal for the given characteristic. As can be seen below with the safety comparison of desalination to hydrogen production, you will have three initial options. If you choose that the desalination and hydrogen production are equally safe, that will be recorded as a 1 in the AHP. If you choose, for example, that hydrogen production is safer than desalination, then you will be directed to a second question which determines your view of how much safer hydrogen production is than desalination.

As AHP focuses on collecting expert opinions, you have been selected because you have either published research or a report on nuclear renewable hybrid energy systems, cogeneration, or have worked with a nuclear cogeneration system. I would appreciate it if I could include your name as participating in the research, as can be seen in the first question below. Your answers will not be shared, only that you were part of the expert group taking this survey.

I recognize that characteristics such as regional accessibility of feedstocks for each of the industrial processes will have a major impact on which industrial process would be pursued in a nuclear renewable hybrid energy system. For the purposes of this research, please assume all regional characteristics are equal. The goal of this research is to ascertain whether AHP can generally be applied to determining the relative values of different potential industrial processes for a nuclear renewable hybrid energy system.

Thank you for your time and willingness to participate in this research. If you have any questions about the survey, please contact me at:

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* Required

1. **Is it acceptable to include your name and the organization you work for as part of the group of experts participating in this survey? (If so, please enter your name and institution).** *

_____

2. **Do you think safety is more important than the ability of an industrial process to fluctuate?** *
Mark only one oval.

- ◯ Yes *Skip to question 3.*
- ◯ No *Skip to question 4.*
- ◯ They are of the same importance *Skip to question 5.*

Skip to question 5.

Safety more important than Ability to Fluctuate

3. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**
Mark only one oval.

- ◯ 2, experience and judgement favor safety over the ability to fluctuate by a small margin
- ◯ 3, experience and judgement moderately favor safety over the ability to fluctuate
- ◯ 4, experience and judgement clearly favor safety over the ability to fluctuate
- ◯ 5, experience and judgement strongly favor safety over the ability to fluctuate
- ◯ 6, practice suggests moderate preference for safety over the ability to fluctuate
- ◯ 7, safety is favored very strongly over the ability to fluctuate and has been shown in practice
- ◯ 8, it is fairly clear that, in practice, safety is more important than the ability to fluctuate
- ◯ 9, the evidence favoring safety over the ability to fluctuate is of the highest possible affirmation

Skip to question 5.

Ability to Fluctuate more important than Safety

4. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**
Mark only one oval.

- ◯ 2, experience and judgement favor the ability to fluctuate over safety by a small margin
- ◯ 3, experience and judgement moderately favor the ability to fluctuate over safety
- ◯ 4, experience and judgement clearly favor the ability to fluctuate over safety
- ◯ 5, experience and judgement strongly favor the ability to fluctuate over safety
- ◯ 6, practice suggests moderate preference for the ability to fluctuate over safety
- ◯ 7, the ability to fluctuate is favored very strongly over safety and has been shown in practice
- ◯ 8, it is fairly clear that, in practice, the ability to fluctuate is more important than safety
- ◯ 9, the evidence favoring the ability to fluctuate over safety is of the highest possible affirmation

Skip to question 5.

Importance: Ability to Fluctuate vs Profitability

5. **Do you think that the ability to fluctuate is more important than profitability of an industrial process?** *

Mark only one oval.

- Yes *Skip to question 6.*
- No *Skip to question 7.*
- They are of the same importance *Skip to question 8.*

Skip to question 8.

Ability to Fluctuate more important than Profitability

6. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**

Mark only one oval.

- 2, experience and judgement favor the ability to fluctuate over profitability by a small margin
- 3, experience and judgement moderately favor the ability to fluctuate over profitability
- 4, experience and judgement clearly favor the ability to fluctuate over profitability
- 5, experience and judgement strongly favor the ability to fluctuate over profitability
- 6, practice suggests moderate preference for the ability to fluctuate over profitability
- 7, the ability to fluctuate is favored very strongly over profitability and has been shown in practice
- 8, it is fairly clear that, in practice, the ability to fluctuate is more important than profitability
- 9, the evidence favoring the ability to fluctuate over profitability is of the highest possible affirmation

Skip to question 8.

Profitability more important than Ability to Fluctuate

7. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**

Mark only one oval.

- 2, experience and judgement favor profitability over the ability to fluctuate by a small margin
- 3, experience and judgement moderately favor profitability over the ability to fluctuate
- 4, experience and judgement clearly favor profitability over the ability to fluctuate
- 5, experience and judgement strongly favor profitability over the ability to fluctuate
- 6, practice suggests moderate preference for profitability over the ability to fluctuate
- 7, profitability is favored very strongly over the ability to fluctuate and has been shown in practice
- 8, it is fairly clear that, in practice, profitability is more important than the ability to fluctuate
- 9, the evidence favoring profitability over the ability to fluctuate is of the highest possible affirmation

Skip to question 8.

Importance: Safety vs Profitability

8. **Do you think safety is more important than the profitability of an industrial process?** *
   Mark only one oval.

   - Yes *Skip to question 9.*
   - No *Skip to question 10.*
   - They are of the same importance *Skip to question 11.*

Skip to question 11.

Safety more important than Profitability

9. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**
   Mark only one oval.

   - 2, experience and judgement favor safety over the profitability by a small margin
   - 3, experience and judgement moderately favor safety over profitability
   - 4, experience and judgement clearly favor safety over profitability
   - 5, experience and judgement strongly favor safety over the profitability
   - 6, practice suggests moderate preference for safety over profitability
   - 7, safety is favored very strongly over profitability and has been shown in practice
   - 8, it is fairly clear that, in practice, safety is more important than the profitability
   - 9, the evidence favoring safety over profitability is of the highest possible affirmation

Skip to question 11.

Profitability more important than Safety

10. **From 2 to 9, how would would you compare the importance of safety of an industrial process to the ability of the industrial process to fluctuate?**
    Mark only one oval.

    - 2, experience and judgement favor profitability over safety by a small margin
    - 3, experience and judgement moderately favor profitability over safety
    - 4, experience and judgement clearly favor profitability over safety
    - 5, experience and judgement strongly favor profitability over safety
    - 6, practice suggests moderate preference for profitability over safety
    - 7, profitability is favored very strongly over safety and has been shown in practice
    - 8, it is fairly clear that, in practice, profitability is more important than safety
    - 9, the evidence favoring profitability over safety is of the highest possible affirmation

Safety: Desalination vs Hydrogen Production

11. **How would you say the safety of desalination compares to hydrogen production?** *
Mark only one oval.

- Desalination is safer than hydrogen production *Skip to question 12.*
- Hydrogen production is safer than desalination *Skip to question 13.*
- Desalination and hydrogen production are equally safe *Skip to question 14.*

Desalination safer than Hydrogen Production

12. **From 2 to 9, how would you say the safety of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor desalination over hydrogen production by a small margin
- 3, experience and judgement moderately favor desalination over hydrogen production
- 4, experience and judgement clearly favor desalination over hydrogen production
- 5, experience and judgement strongly favor desalination over hydrogen production
- 6, practice suggests moderate preference for desalination over hydrogen production
- 7, desalination is favored very strongly over hydrogen production and has been shown in practice
- 8, it is fairly clear that, in practice, desalination is safer than hydrogen production
- 9, the evidence favoring desalination over hydrogen production is of the highest possible affirmation
- Other: _____

Skip to question 14.

Hydrogen Production safer than Desalination

13. **From 2 to 9, how would you say the safety of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor hydrogen production over desalination by a small margin
- 3, experience and judgement moderately favor hydrogen production over desalination
- 4, experience and judgement clearly favor hydrogen production over desalination
- 5, experience and judgement strongly favor hydrogen production over desalination
- 6, practice suggests moderate preference for hydrogen production over desalination
- 7, hydrogen production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear that, in practice, hydrogen production is safer than desalination
- 9, the evidence favoring hydrogen production as safer than desalination is of the highest possible affirmation
- Other: _____

Skip to question 14.

Safety: Desalination vs Synthetic Fuels

14. **How would you say the safety of desalination compares to synthetic fuels production?** *
Mark only one oval.

- Desalination is safer than synthetic fuels production *Skip to question 15.*
- Synthetic fuels production is safer than desalination *Skip to question 16.*
- Desalination and synthetic fuels production are equally safe *Skip to question 17.*

Skip to question 17.

Desalination safer than synthetic fuels production

15. **From 2 to 9, how would you say the safety of desalination compares to synthetic fuels production?**
Mark only one oval.

- 2, experience and judgement favor desalination over synthetic fuels production by a small margin
- 3, experience and judgement moderately favor desalination over synthetic fuels production
- 4, experience and judgement clearly favor desalination over synthetic fuels production
- 5, experience and judgement strongly favor desalination over synthetic fuels production
- 6, practice suggests moderate preference for desalination over synthetic fuels production
- 7, desalination is favored very strongly over synthetic fuels production and has been shown in practice
- 8, it is fairly clear, that in practice desalination is safer than synthetic fuels production
- 9, the evidence favoring desalination as safer than synthetic fuels production is of the highest possible affirmation
- Other: _____

Skip to question 17.

Synthetic Fuels Production safer than Desalination

16. **From 2 to 9, how would you say the safety of desalination compares to synthetic fuels production?**
Mark only one oval.

- 2, experience and judgement favor synthetic fuels production over desalination by a small margin
- 3, experience and judgement moderately favor synthetic fuels production over desalination
- 4, experience and judgement clearly favor synthetic fuels production over desalination
- 5, experience and judgement strongly favor synthetic fuels production over desalination
- 6, practice suggest moderate preference for synthetic fuels production
- 7, synthetic fuels production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear, that in practice synthetic fuels production is safer than desalination
- 9, the evidence favoring synthetic fuels production as safer than desalination is of the highest possible affirmation
- Other: _____

Skip to question 17.

Safety: Hydrogen Production vs Synthetic Fuels

17. **How would you say the safety of hydrogen production compares to synthetic fuels production?** *
Mark only one oval.

- Hydrogen production is safer than synthetic fuels production *Skip to question 18.*
- Synthetic fuels production is safer than hydrogen production *Skip to question 19.*
- Hydrogen production and synthetic fuels production are equally safe *Skip to question 20.*

Skip to question 20.

Hydrogen Production safer than Synthetic Fuels Production

18. **From 2 to 9, how would you say the safety of hydrogen production compares to synthetic fuels production?**
Mark only one oval.

- 2, experience and judgement favor hydrogen production over synthetic fuels by a small margin
- 3, experience and judgement moderately favor hydrogen production over synthetic fuels production
- 4, experience and judgement clearly favor hydrogen production over synthetic fuels production
- 5, experience and judgement strongly favor hydrogen production over the synthetic fuels production
- 6, practice suggests moderate preference for hydrogen production over synthetic fuels production
- 7, hydrogen production is favored very strongly over synthetic fuels production and has been shown in practice
- 8, it is fairly clear, that in practice hydrogen production is safer than synthetic fuels production
- 9, the evidence favoring hydrogen production as safer than synthetic fuels production is of the highest possible affirmation
- Other: _____

Skip to question 20.

Synthetic Fuels Production safer than Hydrogen Production

19. **From 2 to 9, how would you say the safety of hydrogen production compares to synthetic fuels production?**

Mark only one oval.

- 2, experience and judgement favor synthetic fuel production over hydrogen production by a small margin
- 3, experience and judgement moderately favor synthetic fuels production over hydrogen production
- 4, experience and judgement clearly favor synthetic fuels production over hydrogen production
- 5, experience and judgement strongly favor synthetic fuels production over hydrogen production
- 6, practice suggest moderate preference for synthetic fuels production over hydrogen production
- 7, synthetic fuels production is favored very strongly over hydrogen production and has been shown in practice
- 8, it is fairly clear that in practice synthetic fuels production is safer than hydrogen production
- 9, the evidence favoring synthetic fuels production as safer than hydrogen production is of the highest possible affirmation
- Other: _____

Skip to question 20.

Ability to Fluctuate: Desalination vs Hydrogen Production

20. **How would you say the ability to fluctuate of desalination compares to hydrogen production?** *

Mark only one oval.

- Desalination is more able to fluctuate than hydrogen production *Skip to question 21.*
- Hydrogen production is more able to fluctuate than desalination *Skip to question 22.*
- Desalination and hydrogen production are equally able to fluctuate *Skip to question 23.*

Skip to question 23.

Desalination more able to fluctuate than hydrogen production

21. **From 2 to 9, how would you say the ability to fluctuate of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor desalination over hydrogen production by a small margin
- 3, experience and judgement moderately favor desalination over hydrogen production
- 4, experience and judgement clearly favor desalination over hydrogen production
- 5, experience and judgement strongly favor desalination over hydrogen production
- 6, practice suggests moderate preference for desalination over hydrogen production
- 7, desalination is favored very strongly over hydrogen production and has been shown in practice
- 8, it is fairly clear, that in practice desalination can fluctuate better than hydrogen production
- 9, the evidence favoring desalination over hydrogen production is of the highest possible affirmation
- Other: _____

Skip to question 23.

Hydrogen Production more able to fluctuate than Desalination

22. **From 2 to 9, how would you say the ability to fluctuate of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor hydrogen production over desalination by a small margin
- 3, experience and judgement moderately favor hydrogen production over desalination
- 4, experience and judgement clearly favor hydrogen production over desalination
- 5, experience and judgement strongly favor hydrogen production over desalination
- 6, practice suggests moderate preference for hydrogen production over desalination
- 7, hydrogen production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear that in practice hydrogen production can fluctuate better than desalination
- 9, the evidence favoring hydrogen production as better able to fluctuate than desalination is of the highest possible affirmation
- Other: _____

Skip to question 23.

Ability to Fluctuate: Desalination vs Synthetic Fuels Production

23. **How would you say the ability to fluctuate of desalination compares to synthetic fuels production?** *
Mark only one oval.

- Desalination is more able to fluctuate than synthetic fuels production *Skip to question 24.*
- Synthetic fuels production is more able to fluctuate than desalination *Skip to question 25.*
- Desalination and synthetic fuels production are equally able to fluctuate *Skip to question 26.*

Skip to question 26.

Desalination more able to fluctuate than Synthetic Fuels Production

24. **From 2 to 9, how would you say the ability to fluctuate of desalination compares to synthetic fuels production?**

Mark only one oval.

- 2, experience and judgement favor desalination over synthetic fuels by a small margin
- 3, experience and judgement moderately favor desalination over synthetic fuels production
- 4, experience and judgement clearly favor desalination over synthetic fuels production
- 5, experience and judgement strongly favor desalination over synthetic fuels production
- 6, practice suggests moderate preference for desalination over synthetic fuels production
- 7, desalination is favored very strongly over synthetic fuel production and has been shown in practice
- 8, it is fairly clear that, in practice, desalination is better able to fluctuate than synthetic fuels production
- 9, the evidence favoring desalination as better able to fluctuate than synthetic fuels production is of the highest possible affirmation
- Other: _____

Skip to question 26.

Synthetic Fuels Production more able to fluctuate than Desalination

25. **From 2 to 9, how would you say the ability to fluctuate of desalination compares to synthetic fuels production?**

Mark only one oval.

- 2, experience and judgement favor synthetic fuels production over desalination by a small margin
- 3, experience and judgement moderately favor synthetic fuels production over desalination
- 4, experience and judgement clearly favor synthetic fuels production over desalination
- 5, experience and judgement strongly favor synthetic fuels production over desalination
- 6, practice suggests moderate preference for synthetic fuels production over desalination
- 7, synthetic fuels production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear that, in practice, synthetic fuels production is better able to fluctuate than desalination
- 9, the evidence favoring synthetic fuels production as better able to fluctuate than desalination is of the highest possible affirmation
- Other: _____

Skip to question 26.

Ability to Fluctuate: Hydrogen Production vs Synthetic Fuels Production

26. **How would you say the ability to fluctuate of hydrogen production compares to synthetic fuels production?** *

Mark only one oval.

- ◯ Hydrogen production is more able to fluctuate than synthetic fuels production *Skip to question 28.*
- ◯ Synthetic fuels production is more able to fluctuate than hydrogen production *Skip to question 27.*
- ◯ Hydrogen production and synthetic fuels production are equally able to fluctuate *Skip to question 29.*

Skip to question 29.

Synthetic Fuels Production more able to fluctuate than Hydrogen Production

27. **From 2 to 9, how would you say the ability to fluctuate of hydrogen production compares to synthetic fuels production?**

Mark only one oval.

- ◯ 2, experience and judgement favor synthetic fuels over hydrogen production by a small margin
- ◯ 3, experience and judgement moderately favor synthetic fuels production over hydrogen production
- ◯ 4, experience and judgement clearly favor synthetic fuels production over hydrogen production
- ◯ 5, experience and judgement strongly favor synthetic fuels production over hydrogen production
- ◯ 6, practice suggest moderate preference for synthetic fuels production over hydrogen production
- ◯ 7, synthetic fuels production is favored very strongly over hydrogen production and has been shown in practice
- ◯ 8, it is fairly clear that, in practice, synthetic fuels production is better able to fluctuate than hydrogen production
- ◯ 9, the evidence favoring synthetic fuels production as better able to fluctuate than hydrogen production is of the highest possible affirmation
- ◯ Other: _____

Skip to question 29.

Hydrogen Production more able to fluctuate than Synthetic Fuels Production

28. **From 2 to 9, how would you say the ability to fluctuate of hydrogen production compares to synthetic fuels production?**
Mark only one oval.

- 2, experience and judgement favor hydrogen production over synthetic fuels production by a small margin
- 3, experience and judgement moderately favor hydrogen production over the synthetic fuels production
- 4, experience and judgement clearly favor hydrogen production over synthetic fuels production
- 5, experience and judgement strongly favor the hydrogen production over synthetic fuels production
- 6, practice suggests moderate preference for hydrogen production over synthetic fuels production
- 7, hydrogen production is favored very strongly over synthetic fuel production and has been shown in practice
- 8, it is fairly clear that, in practice, hydrogen production fluctuates better than synthetic fuels production
- 9, the evidence favoring hydrogen production as better able to fluctuate than synthetic fuels is of the highest possible affirmation
- Other: _____

Skip to question 29.

Profitability: Desalination vs Hydrogen Production

29. **How would you say the profitability of desalination compares to hydrogen production?** *
Mark only one oval.

- Desalination is more profitable than hydrogen production *Skip to question 31.*
- Hydrogen production is more profitable than desalination *Skip to question 30.*
- Desalination and hydrogen production are equally profitable *Skip to question 32.*

Skip to question 32.

Hydrogen Production more profitable than Desalination

30. **From 2 to 9, how would you say the profitability of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor hydrogen production over desalination by a small margin
- 3, experience and judgement moderately favor hydrogen production over desalination
- 4, experience and judgement clearly favor hydrogen production over desalination
- 5, experience and judgement strongly favor desalination over hydrogen production
- 6, practice suggest moderate preference for hydrogen production over desalination
- 7, hydrogen production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear that in practice hydrogen production is more profitable than desalination
- 9, the evidence favoring hydrogen production as more profitable than desalination is of the highest possible affirmation
- Other: _____

Skip to question 32.

Desalination more profitable than Hydrogen Production

31. **From 2 to 9, how would you say the profitability of desalination compares to hydrogen production?**
Mark only one oval.

- 2, experience and judgement favor desalination over hydrogen production by a small margin
- 3, experience and judgement moderately favor desalination over hydrogen production
- 4, experience and judgement clearly favor desalination over hydrogen production
- 5, experience and judgement strongly favor desalination over hydrogen production
- 6, practice suggests moderate preference for desalination over hydrogen production
- 7, desalination is favored very strongly over hydrogen production and has been shown in practice
- 8, it is fairly clear, that in practice desalination is more profitable than hydrogen production
- 9, the evidence favoring desalination over hydrogen production is of the highest possible affirmation
- Other: _____

Skip to question 32.

Profitability: Desalination vs Synthetic Fuels Production

32. **How would you say the profitability of desalination compares to synthetic fuels production?** *
Mark only one oval.

- Desalination is more profitable than synthetic fuels production *Skip to question 33.*
- Synthetic fuels production is more profitable than desalination *Skip to question 34.*
- Desalination and synthetic fuels production are equally profitable *Skip to question 35.*

Skip to question 35.

Desalination more profitable than Synthetic Fuels Production

33. **From 2 to 9, how would you say the profitability of desalination compares to synthetic fuels production?**
Mark only one oval.

- 2, experience and judgement favor desalination over synthetic fuels production by a small margin
- 3, experience and judgement moderately favor desalination over synthetic fuels production
- 4, experience and judgement clearly favor desalination over synthetic fuels production
- 5, experience and judgement strongly favor desalination over synthetic fuels production
- 6, practice suggests moderate preference for desalination over synthetic fuels production
- 7, desalination is favored very strongly over synthetic fuels production and has been shown in practice
- 8, it is fairly clear, that in practice desalination is more profitable than synthetic fuels production
- 9, the evidence favoring desalination as more profitable than synthetic fuels production is of the highest possible affirmation
- Other: _____

Skip to question 35.

Synthetic Fuels Production more profitable than Desalination

34. **From 2 to 9, how would you say the profitability of desalination compares to synthetic fuels?**
Mark only one oval.

- 2, experience and judgement favor synthetic fuels production over desalination by a small margin
- 3, experience and judgement moderately favor synthetic fuels production over desalination
- 4, experience and judgement clearly favor synthetic fuels production over desalination
- 5, experience and judgement strongly favor synthetic fuels production over desalination
- 6, practice suggest moderate preference for synthetic fuels production
- 7, synthetic fuels production is favored very strongly over desalination and has been shown in practice
- 8, it is fairly clear that, in practice, synthetic fuels production is more profitable than desalination
- 9, the evidence favoring synthetic fuels production as safer than desalination is of the highest possible affirmation
- Other: _____

Profitability: Hydrogen Production vs Synthetic Fuels

35. **How would you say the profitability of hydrogen production compares to synthetic fuels production?** *

Mark only one oval.

- ◯ Hydrogen production is more profitable than synthetic fuels production *Skip to question 36.*
- ◯ Synthetic fuels production is more profitable than hydrogen prodution *Skip to question 37.*
- ◯ Hydrogen production and synthetic fuels production are equally profitable *Stop filling out this form.*

Hydrogen Production more profitable than Synthetic Fuels Production

36. **From 2 to 9, how would you say the profitability of hydrogen production compares to synthetic fuels production?**

Mark only one oval.

- ◯ 2, experience and judgement favor hydrogen production over synthetic fuels production by a small margin
- ◯ 3, experience and judgement moderately favor the hydrogen production over the synthetic fuels production
- ◯ 4, experience and judgement clearly favor hydrogen production over synthetic fuels production
- ◯ 5, experience and judgement strongly favor hydrogen production over synthetic fuels production
- ◯ 6, practice suggests moderate preference for hydrogen production over synthetic fuels production
- ◯ 7, hydrogen production is favored very strongly over synthetic fuel production and has been shown in practice
- ◯ 8, it is fairly clear, that in practice hydrogen production is more profitable than synthetic fuels production
- ◯ 9, the evidence favoring hydrogen production as more profitable than synthetic fuels is of the highest possible affirmation
- ◯ Other: _____

Stop filling out this form.

Synthetic Fuels Production more profitable than Hydrogen Production

37. **From 2 to 9, how would you say the profitability of hydrogen production compares to synthetic fuels production?**

Mark only one oval.

- ◯ 2, experience and judgement favor hydrogen production over synthetic fuels production by a small margin
- ◯ 3, experience and judgement moderately favor hydrogen production over synthetic fuels production
- ◯ 4, experience and judgement clearly favor hydrogen production over synthetic fuels production
- ◯ 5, experience and judgement strongly favor hydrogen production over synthetic fuels production
- ◯ 6, practice suggests moderate preference for hydrogen production over synthetic fuels production
- ◯ 7, hydrogen production is favored very strongly over synthetic fuel production and has been shown in practice
- ◯ 8, it is fairly clear, that in practice hydrogen production is more profitable than synthetic fuels production
- ◯ 9, the evidence favoring hydrogen production as more profitable than synthetic fuels is of the highest possible affirmation
- ◯ Other: _____