[SQUEAKING]

[RUSTLING]

[CLICKING]

RICHARD DE NEUFVILLE: So ultimately, then, we looked at, in this example, we looked at the various designs-- fixed design, no move, move option, and we valued flexibility and which was the best design under various criteria-- expected value, downward risk, upward risk, standard deviation, capital expenditure.

This typically refers to the initial CapEx, what you put down in front. And it's very significant because when once you've built it and you see how things are going, you have more confidence in what's at risk, so that you're generally speaking, or investors are generally speaking, more inclined to put in more money. But it's often that initial hit which is important. So reducing that initial CapEx can be very important.

So what we've done here was to highlight in bold what seemed to be the best solution according to that criteria. And so these flexible ones here are the best, the best design. There's one exception.

The one exception is if you're simply thinking about the standard deviation of it, that in this case, as often the case is, that the less variance of the possible return is associated with a fixed design not when you're possibly expanding it and pushing out the boundaries. So that if you are fixing on a robust design, which is that notion of the standard deviations being small, that the worst economic design also happens to be the robust design. Which illustrates the point that although robust designs can be very important in some cases, such as when you're trying to fit things together very precisely-- as in steel axles to steel railroad wheels, or tuning in to a signal-- that in general when you're dealing with flexibility, you want to increase the maximum possibility, the best possibility, as much as possible.

You want to push out the standard deviation. You want to increase the possibilities of high returns. And you are operating exactly against the notion of a smaller standard deviation.

Now, putting this all together-- so on this scale, you have the economies of scale factor from having none, with the highest alpha, to the lowest economy of scale we looked at to various learning rates and the value of the flexibility. And what I would like you to take away, or think about taking away, as we change the economies of scale that when the economies of scale decrease in this direction, that flexibility is more valuable. Or contrarily, with high economies of scale, they're not as great or they may disappear in your case.

And as learning increases, it's better, so that if there are lesser economies of scale, less aggressive economy of scale, more learning is better. So the takeaway in some ways is-- and this is a very notional representation-- somewhere in here, where there is some learning and not too heavy economies of scale, there's a sweet spot. So that in general, the point being in general that having looked at the range, it seems very plausible that a flexible design in some ways is a very good solution.

So that's where I wanted to leave things, with the takeaways. I think that the LNG case demonstrates that, as I started off in the beginning, that flexible design can provide clear economic benefits. It's pushed by the discount rate and learning effects, building on modular designs that mitigate the economies of scale. And the actual expected value of the CapEx project under uncertainty is less than the deterministic estimation.

So that's the takeaway. And that's where I'm finished for today's presentation, bringing together a lot of the features of what I've been trying to share over the course so far. So please, your comments, questions, and so forth.