



## COMMISSION OF INQUIRY RESPECTING THE MUSKRAT FALLS PROJECT

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Transcript | Phase 3

Volume 6

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*Commissioner: Honourable Justice Richard LeBlanc*

Wednesday

24 July 2019

**CLERK (Mulrooney):** All rise.

This Commission of Inquiry is now open.

The Honourable Justice Richard LeBlanc  
presiding as Commissioner.

Please be seated.

**THE COMMISSIONER:** All right.

All right, good morning.

All right, Ms. Muzychka.

**MS. MUZYCHKA:** Good morning,  
Commissioner.

This morning we have the witness Professor Ole  
Jonny Klakegg, but before we begin to have him  
affirmed, I just want to enter some new exhibits.

**THE COMMISSIONER:** Okay.

**MS. MUZYCHKA:** We have P-04437 to P-  
04440 and P-04467.

And then P-04527 and P-05 – sorry, 04528.

**THE COMMISSIONER:** All right, those  
exhibits will be entered as numbered.

**MS. MUZYCHKA:** Okay.

Professor Klakegg will be affirmed.

**THE COMMISSIONER:** All right.

Sir, if you could stand please.

**CLERK:** Do you solemnly affirm that the  
evidence you shall give to this Inquiry shall be  
the truth, the whole truth, and nothing but the  
truth?

**DR. KLAKEGG:** Yes.

**CLERK:** Could you state your name please?

**DR. KLAKEGG:** My name is –

**CLERK:** Turn it on.

**DR. KLAKEGG:** – my name is Ole Jonny  
Klakegg.

**CLERK:** Could you spell it please?

**DR. KLAKEGG:** O-L-E J-O-N-N-Y K-L-A-K-  
E-G-G.

**CLERK:** Thank you.

**THE COMMISSIONER:** You can be seated  
there, Sir.

**DR. KLAKEGG:** Thank you.

**MS. MUZYCHKA:** All right, I'll direct the  
witness and the Inquiry to Exhibit P-04437,  
which is at tab 1 of the book. And that would be  
Professor Klakegg's CV. I'll just take you  
through that, Professor. So I understand you are  
a professor in project management at the  
Norwegian University of Science and  
Technology.

**DR. KLAKEGG:** That is correct.

**MS. MUZYCHKA:** Okay, and that you have a  
Bachelor of Science and a Master of Science in  
construction – sorry, a Bachelor of Science and  
Master of Science in construction engineering?

**DR. KLAKEGG:** That is correct.

**MS. MUZYCHKA:** And a Ph.D. in project  
governance.

**DR. KLAKEGG:** Correct.

**MS. MUZYCHKA:** Okay.

So you have 29 years experience in research,  
teaching and consulting within the project  
management field.

**DR. KLAKEGG:** And now it's become 30.

**MS. MUZYCHKA:** Thirty, okay, time to  
update that résumé.

So you were – your position is a full-time  
professor at the Department of Civil and  
Environmental Engineering, correct?

**DR. KLAKEGG:** That is correct.

**MS. MUZYCHKA:** And you also work as a special advisor at the WSP Norway. And what would that be, Sir?

**DR. KLAKEGG:** Well it's a consultancy company that is actually owned by Canadian owners. It's – they bought a company that I was part of establishing back in 1997. And I've followed this consultancy as a sideline of my career for my whole – for my whole career –

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** – to now.

**MS. MUZYCHKA:** Now I'd like to refer to your qualifications, which are on page 1. And I'd like for you to take us through them so that we get a good idea of the nature of the work that you do and your expertise.

**DR. KLAKEGG:** Well, I've been doing research and I will – I've been shifting between research and teaching on hand – the academic side of my career and the practical side of my career through my whole 30 years. Project management is the thing that comes back to it all the time. Currently I focus more perhaps on construction management, specifically; not so much the general project management. But it's still within that area that I do my work. I've been focusing most on front-end issues, meaning the planning and estimations of the front end of projects. And my Ph.D. is in project governance, which is sort of one of the aspects of the whole area.

**MS. MUZYCHKA:** Can you explain project governance as opposed to project management?

**DR. KLAKEGG:** Yes. That's – that's one of the things that is confusing sometimes. Governance is more about the strategic level or the strategic perspective of projects, while management is more the operational and practical day-to-day management. Similar to what we would find in ordinary companies. You have strategic with the board and you have the day-to-day management with the administration.

**MS. MUZYCHKA:** Okay. So continue then, through your qualifications.

**DR. KLAKEGG:** Mm-hmm. Much of my early work was on developing new methods, new tools for project management and specifically for uncertainty management. You might call it risk management. You know, we make a distinction because we think that the opportunity side is just as important as the risk side of uncertainty. So, in the 90s my primary focus was developing methods to handle uncertainty in planning and decision-making.

My practical work has been, very often, to lead people through these processes to facilitate and moderate such processes. So that's one of the things I've been doing a more – a lot. I've been a project manager myself, for smaller projects. But as a professor, it's nice to have a little touch of the practical side as well.

**MS. MUZYCHKA:** I understand, too, that you do research.

**DR. KLAKEGG:** I do, yes.

**MS. MUZYCHKA:** And can you outline –

**DR. KLAKEGG:** And the biggest part of the background for being here is 10 years as – doing research on project governance and, specifically, the Norwegian and UK systems for quality assurance of major projects.

**MS. MUZYCHKA:** Okay.

You're also a prolific writer and you've written a number of text books.

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** And I have two of them here – or one of them – two of them. One is called *Governance Frameworks for Public Project Development and Estimation* and the other is *Early Warning Signs in Complex Projects* –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – that you're a contributor to.

**DR. KLAKEGG:** I was the main writer behind those. It was work that sort of was part of my Ph.D. work. It's published by the Project

Management Institute and it's available for everyone to download from their pages – every member. It's sort of the fundament for what I'm going to talk about today. So, that's where you can find more details than I'm able to present today.

**MS. MUZYCHKA:** Okay.

And also in your CV, starting at page 3 –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – you've listed a number of your scientific publications.

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** And you were kind enough to mark with a red M those that you thought would be more relevant to our –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – experience here today. Perhaps you could take us through them very briefly. There's one here, it's Governance in Public Projects: The Norwegian Case. Chapter 9.

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** And maybe they're similar, so if you could just kind of highlight those for us.

**DR. KLAKEGG:** Yeah.

This list is – were the newest ones first and then the older one. So, this recent one – most recent in this area – is about how to handle the human side of governance because most of my work up 'til recently was about the structures. And that's also the presentation today, it's mainly about the structures and the formalities that you use to govern major projects.

But lately I've been more interested in looking at what's – what does it do to people and how do people influence; how do our minds and our mindsets influence this? And that last one, the one on Governance in Public Projects for this Chapter 9 for Ralf Müller's book is more how

the structure and the mentality goes together in forming the effect of governance.

**MS. MUZYCHKA:** Okay.

And then the next one you've noted is: Successive Cost Estimations –

**DR. KLAKEGG:** Yeah. That –

**MS. MUZYCHKA:** – Successful Budgeting of Major Projects.

**DR. KLAKEGG:** That is a paper that documents the economic results of our projects over the last years, and it looks also to Denmark for similar results. And then we have the Successive Cost Estimations – now, that was the one we talked about.

Then we have the Taming the 'trolls' paper.

**MS. MUZYCHKA:** Yes.

**DR. KLAKEGG:** I – it's sort of a strange title, but the trolls are actually the major projects that are gotten – getting more complex, bigger, more risky, so they're getting wilder, while we, on the other hand, strive to become better at controlling them.

**MS. MUZYCHKA:** And that –

**DR. KLAKEGG:** So it's a metaphor.

**MS. MUZYCHKA:** Right, and that particular paper is in your binder at tab 4.

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** And it's Exhibit 04440 for reference.

**DR. KLAKEGG:** I found that one – when I prepared, I found that one particularly relevant for this presentation.

**MS. MUZYCHKA:** Okay.

And then on the next page, page 4, we have a number, about three or four, five, six more papers.

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** You don't need to go through each and every one of them but –

**DR. KLAKEGG:** Two of them are the books that you referred to.

**MS. MUZYCHKA:** Yes, the *Early Warning Signs* book.

**DR. KLAKEGG:** And then there's a small paper on ownership, because ownership is very fundamental in governance. What is the ownership – who is the owner and what is the role of the owner? So that's fundamental, but I don't think I've introduced anything of that in this presentation.

**MS. MUZYCHKA:** Okay. You may have questions on that.

**DR. KLAKEGG:** Okay.

Then there's the – there's my doctoral thesis, which is a huge volume, but I think all the main things are in the presentation or in the other references that I made.

**MS. MUZYCHKA:** All right.

**DR. KLAKEGG:** Then there's a list of papers that refer to the background work for the two groups that you refer to.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** So, it's our request, Commissioner, that Professor Klakegg be declared an expert in project management and project governance based upon the information he's provided in his CV.

**THE COMMISSIONER:** All right.

Do any parties have any questions of Professor Klakegg related to this? Any comments on the issue of his providing opinion evidence in those areas this morning? No?

All right, then in the circumstances I'm certainly satisfied that Professor Klakegg has some specialized experience and knowledge in this area of project management and project

governance, and as a result he will be permitted to provide opinion evidence this morning where needed.

I think a lot of his evidence, based upon the presentations, is factually prevalent, but in any event there may be issues wherein he may be required to express an opinion, and he will be permitted to do so.

**MS. MUZYCHKA:** Thank you, Commissioner.

**THE COMMISSIONER:** All right.

**MS. MUZYCHKA:** Okay, so today, Professor, you're going to be presenting a presentation entitled: **Governance frameworks**; The Norwegian State Project Model and other schemes. And that document – slide presentation – is found at tab 2, and it is Exhibit P-04438.

Now, we also have in your binders a presentation at tab 6, which is P-04527 – or 04537. Tab 6, 04527, and that is the same presentation but it has Professor Klakegg's notes attached to that. So that's there for your reference.

Professor Klakegg will do his presentation – or the format of the presentation – and then following his presentation I will have some questions and then other counsel will have questions for you.

**DR. KLAKEGG:** Good.

**MS. MUZYCHKA:** So if – I believe you have control of your presentation through the mouse?

**DR. KLAKEGG:** I hope so.

**MS. MUZYCHKA:** And a copy of your presentation has been loaded for your use.

**DR. KLAKEGG:** Thank you.

**MS. MUZYCHKA:** All right, thank you.

Proceed.

**DR. KLAKEGG:** Thank you very much.

Commissioner, thank you for inviting me. It has been a privilege.

This presentation could not go into every detail, so I've omitted quite a few things that, personally, I would be glad to talk about, but I've tried to select some aspects that I believe you would be interested in and I hope would be useful for you. There might be some mistakes, and there might be some opinions on matters in here, and I must be responsible for that.

The agenda is four points, and I've been asked to start to explain the Norwegian experience, the Norwegian State Project Model, which started out as simply the QA scheme – quality assurance scheme – of the Norwegian Ministry of Finance, and has developed over 20 years now.

I was part of planning that scheme and I was a consultant in that scheme in the beginning and then I dropped being on the consultancy side – the operative side – and I started doing research on it. So, I followed it as research director of the concept programme for – from 2002 to 2011, and further on for a bit.

Then I'll go over to talk about other schemes, other countries' governance structures, compare them and look at some similarities. And I'll comment on some differences that are relevant and interesting, the way I see it. And then, after that, I will go into some aspects of what kind of issues should be considered when developing such a framework for – for instance, for Newfoundland and Labrador. What matters in terms of what contextual issues have to be considered? And then I'll conclude by giving some comments and recommendations for Newfoundland and Labrador as far as I can – as far as I can go with my knowledge.

The Norwegian state project model it has – as I said, it has been developed over 20 years. So it has changed a bit from the beginning, but I will take you through that so that you can understand perhaps both why it has changed and how it has changed – and what the results are, what the experience is.

And I'll start with showing you this picture of why it came to be. As you can see through the '90s, things did not develop very well. This is from the road authority, so it's only road projects, but it's a very characteristic development at the time. This wave that came

has, actually, the name of a transport minister from the early '90s, because he was a very strong politician in getting new projects decided, but they were not of this – as well-planned, as we would want. And the consequence is, of course, that the cost rise.

And there was a cost governance committee that looked into projects at the time and decided to do something about it. And up came the Norwegian Initiative as a quality assurance regime. It was very simple. From the beginning there was actually only one of these two quality assurances.

But the number two, that's the one that started it. QA2, as I will call it, is the government quality assurance of the decision basis for the parliament. And it looks into the budgets and the plans and considers whether it's realistic and whether it is ready to go – ready to decide to execute this project. This was what was politically possible at the time.

It was controversial. There was several ministries that did not want this to go on. They didn't want the control. This was a – it was obviously a strong control regime that was – it was – there was no other way of looking at it as a – the government was taking control. So, they took away control from the agency and took it to the parliament. So, there was obviously a lot of controversy around that, so they could not go further than QA2. At the time, that was just external quality assurance. That's all we call it.

Later, when the first period of five years seemed to be a success – projects were getting better, the position's basis, the documents, the plans proposed to the government and to parliament was improving – that's when they found the opportunity to go one step further and introduce what today is QA1 – Quality Assurance of the Concept, the choice of concept, which is a more important choice for the total result but even more controversial because it goes into priorities that the different ministries and agencies would like to control themselves, obviously.

So, for this QA1, there needs to be produced a number of documents, and here is a list that shows you what should be included in those documents. These points are very similar to what you will find in any text book about major

projects, what is required for a big decision on should we do this project or should we not. And, from the beginning, it was very much about are we sure that this is needed. That's the question asked, basically, from the beginning. Is this needed? Do we need to do this?

And later it has become more mature. It has become more detailed. It has become more about what is the value of this project. It has become more a question of do we know that is a good investment for society. The quality assurance in QA1 position is to look for consistency between all the assumptions, between all the previous decisions and the plans for this major project. It's about relevance. Is this in line with needs and priorities and validity? Is it realistic? Is it the one – the solution, is it the right one? The quality assurance is by nature a very independent, external analysis. They go through the whole issue again, based on the document that I was given from the agency and also make their own assumptions and they make their own analysis, and they present another report – complete report with their own priorities and their own suggestions. And in the end, the one alternative that they would suggest to go further with or whether it should be sent back to the agency for the planning. That's QA1, and the big question is: Is it worth investing in?

The QA2, which comes later, a much more mature concept, a much more detailed basis. If you look at the contents of those documents, it's a complete strategy document with all the objectives, the scope, the implementation strategy and the framework for project management, meaning time, cost and quality. And it has to be – especially on cost – it has to be complete and detailed.

Lately, it has been some focus on revenues – on benefits, but this is growing into the system. It's something that is going on at the moment. It's not how it was in the beginning, and it's not really mature at that aspect. And then, the latest one is contract strategies, which is a new introduction this year, actually inspired by the system in Quebec, I think.

So, this is what we look at. The quality assurance responsibilities is to go through it all, make sure it's consistent, complete, correct and

clear, so that it is actually a good decision-making basis for the parliament. The focus is on cost and contingencies. That's what you would use half of the total resources or time on this quality assurance is focusing on the cost, and it was actually the only focus from the very beginning of the Norwegian system.

From organizational perspective, it's about control, it's about authorization, how to make sure that the project is well planned and organized, so it can actually deliver what it is promising through these documents. The question is: Is it realistic, and are we ready for execution of this project? That's how the Norwegian quality assurance scheme is set up.

I'm going to use the exhibit 47 [sp. Concept report 47; P-04439] a lot. That will be the main reference document for illustrations like this one. It's a schematic overview of how the Norwegian system is organized and it focuses on where quality assurance is anchored in our political system and the administration.

As you can see, it is directly under the – what's termed here PMO. That's project – no, sorry that's not project management office. It is, for those who (inaudible) in politics, it's the Prime Minister's Office. So it's a little bit unlucky to use an acronym that can mean many things, but it is the project – it is the Prime Minister's Office.

It's – the gatekeeper is the Ministry of Finance. They are administering the whole scheme and they are in charge of who's let through the gates into the quality assurance and who gets out on the other side as approved. The other ministries own the projects, so they have a different role. They are also head of the agencies and this is – these are actively taking part in the quality assurance. That's the symbolism that is used here.

Regional authorities, as you can see, they are not connected to the quality assurance. They have a role in making the documents before the quality assurance and between the two quality assurances, but they don't have a role in the actual quality assurance. That's why they are not connected symbolically in this figure. Similar illustrations will be used for the other countries to make comparisons. And it's done in report 47.

If we look at the Norwegian quality assurance scheme, over time we will notice that it changes. It changes – well, if you look at from the start to today, there's quite a big change really. And this comes step by step over time, as indicated here. From the beginning, it was just about cost-efficiency. It was only focusing on budgets, the decision-making about how much will it cost, the control of cost development and such.

That's a very narrow view of a project. Of course, cost and economics are very important, important for the government, for society, but it is not the most important criteria for a project, whether it's successful or not. It might just be worth a little bit more money if you get more out of it. That's the thought. And from that thought, it's developed – the first step is looking at the outcome, not just the output but the outcome. What can this – what can the users gain from this project. In transport, it's often about reduced transport time; it's about safety. It's about the environment and so on.

And then in 2015, it takes another step towards looking at allocation efficiency. Is it a social economic – a social economically viable project? Does it really deliver to society what we are looking at, what we're aiming for? So it's becoming more value focused, not so much on cost and resource use, but on what do we gain from this.

If we look at this, it includes some key elements of quality assurance in Norway. You'll see that there are some – these are the main changes. If you look at the purpose and the principles that we include, it was initially just about control, control with budgets. And you saw the curve that really peaked around 2000, it was very indicative that something had to happen. But lately we've seen – and we realize, of course, that that is not the biggest issue. The biggest issue is do we do good or bad investments? It's society's money; do we spend it right? So that's the focus today.

If we look at the structure, how it's done, you can see some of the things that I've mentioned already, but the main thing – main change that has happened was that originally, it was just a contract between the Ministry of Finance and consultants that did this in this external independent analysis and gave their advice.

Today it is turned into a general government directive, which means that it's implemented over all parts of government, even those that do not belong to the Ministry of Finance quality assurance scheme. So even those that are outside of this arrangement, they need to follow the same principles, which actually means that everyone is implementing it in similar ways. Not exactly the same, but in similar ways. So it's stronger today than it was back then in the beginning.

From the start, when I did my first research on this, I was very much into what are the fundamental principles that actually makes us follow or not follow these structures that we are given. And I looked into: What are the active elements that make people change their behaviour? What are we looking for? What are we using as the active control measurements here?

So I found some of these principles mentioned on the screen now to be very important, and I – oh, sorry. That's too long; I have to go one back. Oops. There.

The main – the biggest keyword here is transparency. That's the one that really makes a difference. In the Norwegian system, it is, brutally enough, everything is published – every word, every document is published, except for some state secrecy in defence projects, of course, but everything else is open.

So – and this tells us a little bit about the position of this scheme. It's really in a play – in a position that makes it – sorry – makes it impossible to go around. No one can go around it, and you have to sort of – you have to make good enough impression to become accepted for further development of the project. So everyone has to be open for scrutiny; that's a principle. And transparency is a very strong tool in making people actually do what you expect them to do because if they don't, it will be out there in the open.

Another thing is the aspect of learning. One of the reasons why the Ministry of Finance chose not to do it internally in the government, but using external consultants, was that the competence and capacity of the government was not enough to take on this responsibility. So it



was needed for that reason, but it was also – it's a way of lifting the level of project management in our society, and it actually has had a lot of influence in that direction. Professionalization of project management in Norway has taken many big and important steps through this period. So it sets high professional standards and it's very transparent about it, so when people do well, it's well known; when people do not so well, it's also in the open.

The external control, the independency part of it, it was as needed, as I said, but it's also a very strong principle because when the ministries and the government gets these reports from an external, they seem to believe more directly what it says. It seems to be stronger when it comes from the outside than from the inside. If you look at who's winning the battle, if there's a discussion of the cost level, for instance, or what is the best solution, normally, the external report wins that discussion. I don't know if that is a Norwegian thing or whether that would be the same here, but that's what we see from the experience so far. So being external is a strong position in Norway.

But the system as such needs to be anchored in a high place, in a very stable place, so that it doesn't change after each election. That's important. So anchoring in the Prime Minister's Office is a good choice for us. It might not be similar structures here, but think about the stability. You wouldn't want a system that is changed every time there's an election.

And reviews are non-political. That's also something that is important because we need to be able to talk about every aspect of the project, in technical terms and in economical terms and sustainability terms, without preaching some sort of political message. So, keeping a strict line division between the professional part, the planning part and the decision-making part, that's essential – at least, it was for us.

Up to now, or at least until February 2017, we had these number of projects that had actually gone through the quality assurance. As you can see, it's building up to quite a number of projects here, so the experience is building up to become rather convincing in some aspects – not in all. And, of course, as you can see here, over time not so many have been evaluated after

actually being operated for a while, which will, of course, reveal new conclusions and reveal the real truth about how successful they are.

But we can see that 252 have now been through some sort of quality assurance; 177 of those have only been through QA2, because there's a history, as you remember. Not all projects did have QA1 in the start, and, even now, there might be a very wide QA1 spanning a whole district, for instance, and then one – I'm talking about transport – a whole district may be covered, trains and roads and other transport modes and then they come back with one project that is a piece of road for the QA2. So that's why you don't find exactly the same numbers of QA2 and QA1. There might be a difference between the two.

But from projects that are actually completed, we almost have 100 now. And we are waiting for them to be operated for some years so that we can look into what was the actually the effect. But that will be strengthened over time. And in this particular slide, I could mention also that the Norwegian system included establishing the concept research program that actually follows up this over time. Make sure that we document these effects and we actually have proof of what the effect is in the end.

I'm not saying that anyone else should do the same thing, but make sure that you do strategically and systematically follow up on these facts so that you can also stop if it doesn't work. That's an interesting aspect of the whole thing.

This slide shows you the result of QA1 and this is sort of showing us that there is actually possibilities to stop projects if they're not good. It shows us that, from the beginning, if you look at the numbers you'll see that from the 65 QA projects, this is QA1, that came in, that's 100 per cent; 3 per cent was actually withdrawn, after discussion about the quality of these documents, they were withdrawn, meaning that the agency realized this project is not good. It's – they realized themselves that this is not okay.

Three per cent was also put on hold because this is not the right timing. And then 6 per cent was rejected saying: This project will not go further, forget about it. Get on with other business. So it

is actually possible to stop a project that has started. And this is something that we thought of as pretty difficult and maybe impossible earlier on.

Nine per cent is sent back for more investigation, meaning that the documents are not good enough, they're not technical problems, there's something missing or something is inconsistent or such things.

And then they go further and, as you can see, most of them go further with one concept. That's the way it's supposed to be. In some cases, they are not – they're sort of indecisive about which alternative is the best, so they go for further clarifications and details of several concepts – 12 per cent, that is.

This one, in this case, I would also refer to a paper that I put in by Samset and Volden. It's now in Exhibit 04467. It explains some of the issues that I'm talking about in a good way – and among them, this one – better than I can. It illustrates facts that we have known for a while, but we didn't really have the exact notion of. If you put too much detail into a very early document, soon after it will be wrong. It – you will have spent a lot of time wasted on details that you don't need, and when you come to the decision, they're wrong.

So this illustrates why you should not go into detail before you have to. This is clear – it's very different from what I hear among planners that say: Oh, we have all these numbers; we need to use them. No, you don't – no, you won't – because that's wasted time. But what's important is to equally treat the alternative so that you can actually make a good choice among them. So you need enough details, not too many details, and you need to treat them the say way so you can actually compare them.

So that's the message here. It's – one thing is that you should not put in too much data; and the other thing is don't push it too far, too early. Another effect of that is that when you've done all that work, you will be very eager to see it through. So all those spent hours in planning a project will also mean that you're not accepting the decision to do something else or to stop. So there's many reasons to avoid too much detail, too early.

Okay, now I think my presentation is stuck. Okay, there it comes. Go as far as you need, but not longer.

If we go to QA2, the experiences from QA2 – and this is a longer time span. It's more projects, so it's probably even better documented. These numbers is the first 23 finished projects that actually had been through QA2, and we assessed them thoroughly and looked at a few criteria. You can recognize cost, time and quality as being the classical project management criteria, but also whether the organization was working well and whether it was executed well. It's not a complete success criteria as we would use it today, but this is back a few years. And what you can see here is that basically the projects are doing well. There's no really unsuccessful project along those 23 and there's many really successful ones.

There is a couple of comments, though, and one of them is that, of course, in the beginning we were very much focused – everyone was very much focused on having success. It is not allowed to go bad. So all the agencies, they used their best project managers, they had a lot of management focus on these projects.

And another minor detail, perhaps, is that these projects were given probably a better budget, a higher budget than needed, because there was a gap between the consultants – and I told you that the politicians actually listen to the consultants and not to the agencies. So when the consultants came with a cost estimate that was higher than the agency, they went with the consultancy budget. So they had more money than they asked for in some of these projects, and that actually saved them a couple of times. So they – that's what money can do with a project, it can buy some – some – successes.

Going further, if you look at it in a wider perspective, this is another picture that tells us that this has been quite successful, especially in the operational aspect. It has been – these projects are done very well, and this is a result of professionalization of project management. It has been in the agencies, in the industry and, not least, in the consultancies. They're becoming very much more professional through this period.

What is the least successful part here, as you can see, is the socio-economic efficiency which is not as we would want it to be, so that's where the focus is at, at this time. We are working with how can we improve on the socio-economic side of projects. Sustainability in this picture is a little bit limited because it's in – since you have this socio-economic side in the last column here, you would imagine that sustainability here is about climate and energy and that sort of thing. So it's the (inaudible) climate.

Relevance, to me, is a very important keyword. And as you can see here, most of the projects score high on relevance, and that's very good because that means they are actually what we need and what we prioritize and what the users have need for. So they are relevant in terms of they do actually give the effects that we are looking for. That's a good thing.

Now, let's dig into some details because, still, cost is very important, and cost is what we've spent much time on and done a lot of development around. We realized very early that – even before the QA system was established that uncertainty is a keyword. Risks, we have to control them, we have to plan for avoiding them, we have to find the opportunities and use them. So what we did in the beginning was a lot of work around how do we estimate the realistic costs of a project? And if we look at this picture, it gives us some – let's say – some concepts, some words that means something about how we work with cost estimates.

First of all, we start of the bottom with, basically, cost estimation, meaning the traditional deterministic way of putting out all the items and giving them cost and then summarize what that means. And we know that this is not the truth about what it costs. It's never going to be the truth about the cost. So we know that there's some things that we have missed. We call that the unspecified items and we add those. Those are typically something that is similar from project to project over a certain time and at a certain stage. So we add that, as you can see, the green one. And then we know, further, that the assumptions we make in the beginning, they will change. It will not go as planned. That's a fact.

So what's planned? What changes will happen? What changes may occur and can occur? We've worked a lot with finding ways of establishing those and see the effect of that. So we put in contingencies or we put in – actually, what we, on the next picture, we'll call expected additions. That tells us how much it's actually going to cost.

So I'll put up some more concepts for you. The things we know make up the base estimate, and then when we add the contingencies or the expected additions, we reach the expected cost. That's what it's actually expected to cost when it's finished, as seen from the starting point.

And then, of course, the politicians, they are not happy in – with going for being uncertain. They are not happy with a risk level that is 50 per cent. Expected cost is about 50 per cent. It's not exactly. But it's about 50 per cent, so it can go over and under, in theory at least. And they don't like that number because it's too uncertain. They are risk-averse, so they don't want that, they want more security.

So there's a question of how high would you propose the budget limit? And that is a question of how much additional risk are you willing to take, or not willing to take? The part that you are not willing to take, you cover with allowances. So there's an allocation to cover uncertainty on top to reach the level you want. And then above that there's always a rest uncertainty, meaning there is some risks that you do not want to cover simply because it's too expensive. So we forget about those, we accept those. And then we take these money – that makes up the wanted budget. And we think about how should we manage? How should we govern these resources? This is society's resources, it's public money, so we need to be – to control them.

So typically – and this is how the Norwegian system works now – the approved cost limit will be given to the owner of the project, the ministry that is responsible. It may be the Ministry of Transport, it may be the Ministry of Administration or any other. And they will hold back their own, as you can see, the allocation to cover uncertainty, they will typically hold that back for what's coming, as sort of a reserve to make sure that they have the opportunity to make decisions later on. And then the agency is

given the expected cost as a provision. This is what they can use, spend, for this project. This is what we expect you to deliver the project from.

The agency will typically, as indicated here, they will typically hold back a similar reserve, and give the project manager less to work with. And the point here is that everyone expects that money that is given, as allowed, as for use, will be used. So they hold back a portion of that to make sure that we are managing tightly. That's the idea. You never give away money if you don't know what it's going to go for, what it's going to be used for. That's the basic idea. So this – this is – this is a level that might be a rule. Like in the road administration, they give 45 per cent, P45, that's the level. So they keep 5 per cent in the transport administration to cover things that might happen. And the project manager has 45 per cent chance of success.

That's the theoretical view of the starting point. If he's a good project manager, he should be able to do that. If he's not successful, he will not be able to do that. That's the way it works.

If we look at the consequence, remember we are using sarcastic estimation methods, meaning that we are not giving one number. The project is not costing \$50 million, it costs somewhere between \$30 million and \$70 million. And you can read that from this curve, this S-curve, starting at a baseline level, this is how much money the items cost. You add the expected additions to reach the P50 or expected cost. I'm simplifying a little bit because those two concepts, statistically, are not identical, but I don't want to go into detail so I will not focus on that.

P50, which is easy to find because it's where the curve tips from rising to going down again, and it's a middle point. That's what – that's the point you want to know because you want – that's what you expect to use to produce this project. So that's how the expected addition to the expected cost. And then you put on more to be sure.

As the Norwegian system is defined, we go for P85, meaning there's 85 per cent chance of success and 15 per cent chance left for rest uncertainty. This is the part we don't want to finance because if you want to put aside money for that, it will set aside a huge chunk of the total

public budget, for no purpose at all, just to wait and see if something happens. So we don't wanna do that, we stop at P85. And even more, we take it down a little by what we call the reduction list.

So they withdraw from the – from the P85 the value of the reduction list. The reduction list is a sort of a construction, a concept that – it says that if you see that you are going over budget, you need to have a list of items you can take out to save your budget. That's the reduction list, things you can still take out later if you need to. This is a theoretical construction and it doesn't really work that way, but it is – because is it – the problem is that when you realize you are going over budget, it's too late to make a decision that it really matters. The big money is already spent.

So it doesn't really efficiently work in the way that the theory says, but still, it's a – it should say – it's a stick that you can whip the project manager with, sometimes.

From the ministry side, the contingency reserves are important to keep as their own control, they don't give away more than they have to. And the expected additions are typical what the agency would like to keep on their hand and not give too much of to the project manager until he comes up with the right reasons to allocate more money.

This is what we should focus on in terms of managing the money. How do we keep these reserves intact 'til we need them, and how to use them wisely? Not to gold-plate, not to extend the scope, but actually to make sure that we are successful in delivering what we've been planning to do.

This is where I could go more into detail, but I think that will be enough for now. And, of course, remember the rest uncertainty, don't touch that, it's too expensive.

Looking back to the start, you can see the development of our road projects here. It's not quite updated, but the development has been stable since then. This result is not just from quality assurance, it's also from the 'professionalism' increasing in industry. It's also from other trends that helps. It's also definitely a

result of a number of projects being finished that should never been started, which makes up the top of that wave.

So – but the quality assurance system and the – this – the regime that these put in place in 2000 has been very important in developing this control over public budgets.

Here you can see another item of proof. From one of the reports from the Concept Programme, you can see that exactly 80 per cent – 32 of 40 first projects – they were within their cost frame. So it was exactly as the theory would suggest that it should be, and even better because the total sum of money acquired for these projects were below expected costs. So actually, the theory that all money that is allocated will be used, it's not true. Actually, they gave back a few percentages. So there is a – one – they really want to deliver below budget because that's what the hero does – this, this.

There are some things we should be aware of. Ah, but we can take one point at a time, sorry. Statistically, we know that smaller projects, they vary a lot. Bigger projects have more resources, they have more time, they have more opportunity to correct. But small projects, they go bad when they go bad; and they go well when they go well. So they have a lot of variation as you can typically see on this chart. And this is all the projects over a certain size in Norway, so these are not big projects, these are all the projects, road projects.

If we look to the – what we are giving as the limit would be zero here, and you can see that there is a tendency to be just below the limit. This is also typical for projects. You aim for the maximum which means you go over. If you aim for the maximum limit, you go over, that's what many of them does. Some of them have good control so they aim below the maximum and then they spend the last money at the end to gain some more value, to add to the scope or something.

This is – many people in these projects, they find it's valuable to put in some extra at the end. Since there's still money, they can be kind to the local community, they can add some more value. This has been a tradition; it was more like this before when you didn't have the system that

actually shows that you go over. Previously, it was more, you get this kind of money and if you need more, you come ask for it, so they did. That's almost ended now. There's very rarely anyone coming back for more money and if they do, they follow the (inaudible) the routes for how to allocate more money.

But if you want to come close to the limit, you should keep aiming below, well below the limit. And then you have control, and then you will – that will also mean that you have tight cost control.

If you look at the robustness of the system as a whole, here's a point that is important to me, because we've focused so much on how to make sure there's room for handling things that might happen. This table shows you the difference between final cost and the original cost for contracts. It's not for projects, but it is for one item, one contract in the project.

And as you can see, the road administration still have a problem with their contracts. They go over, in average, on their contracts, meaning that the control is not on the contract level; it's on the system level. So we still have a problem with contracts going over, but the system as such is robust so still the projects go well. And that is because we have these reserves that we can take from when we need them because we know things are gonna happen, and contracts show exactly what happens, and we have additional funding to make sure that we can actually cope with those.

So still, even if they fail on contracts, they have successful projects.

And here's another illustration. This is more about mindset, actually. If you only focus risk, there's only one thing you can do and that's add more money. If you don't look for opportunities that can bring the cost down again, you add, you add more and more money. That's when the cost development becomes like the big red line here, it goes up and up and up. Because things will happen, you know that. Things are never going to follow plan and if the only thing you have in your toolbox is put on more money to handle the risk, then you'll add money and add money all the way.

So the mindset has to be: look for opportunities.

And then this case here – this is one real project. It's actually from Sweden because it's very illustrative. I have Norwegian cases as well, but this one is Swedish, from Faveo, now WSP.

As you can see, the budget – the blue line – has been taken down at several points when we have seen the opportunity to do that. The uncertainty marked by the upper extremity, that's P90, 90 per cent certainty, and P10, the other extremity on the other side. And you can see the development between those lines where the cost is; cost is in between the top and the bottom of this curve, and you can see that it narrows down until here, there's a break, but it opens up again, meaning we realized something was changing, something was changing that opened up new risks and new opportunities. We worked with that and came out with a new analysis – this is one month later – that took down the risks and the opportunities a lot, so it's tightened the economic system and took the budget down with several millions.

And this way of working, this mindset of looking for opportunities, not only risks, is very vital, because then you can systematically take down the cost and save a lot of money, delivering the same quality and the same project. Mindset is important.

This one tells us that, during this period, it's not just the Ministry of Finance that has introduced quality assurance; many other sectors – and some of these are also public – they're all public, sorry. They're all public in different levels and some of them are outside of the Ministry of Finance system because they're responsible for their own budgets. So they don't need money from the state to continue their operations, like airports. They can lend money in the open market. And hospitals, they're owned by regional authorities, not by the state, and so on and so on.

The Norwegian state today is open for privatization and they're open to trying different ways of organizing public sector. So they are establishing a lot of new organizations, state-owned companies that take over parts of the operations. Like Nye Veier, a very successful

alternative to the traditional road authorities. The railroad is reorganized, and so on.

But all of them is within the directions of Ministry of Finance in terms of how they qualify or how they quality assure their documents and then their projects. So they do similar things; not the same organization, not the same arrangement, but they do similar things and it seems to work across all these sectors.

So, in my opinion, I don't see any point in making such a big difference between sector to sector or industry to industry. In Norway, the one that stands out is oil and gas and that is because they started this; they have a different regime, but they started this 30 years earlier. So they're having a different way and a different set of regulations, but also they have good experiences.

The very latest developments this year, as I mentioned, contract strategies has come in as one of the requirements, that's new. It's very nice for me because I'm a professor in project delivery models so this tends to drag more attention to what I'm interested in today. This might be possibly inspired by Quebec because they introduced this earlier, I'll come back to Quebec at a later state.

Another one – another thing that comes in, it is the requirement of a benefits realization plan; this should have come many years ago, but finally it's there. And there's a requirement for a change log and this is not the traditional change log that you think of as project management; this is what is changed in terms of our assumptions and our – the prerequisite from society, it's a big strategic thing, it's not the small items of project management.

But these three strengthens the Norwegian system and I'm curious to see the effect of these coming in. I think the will be positive.

But we do have issues, we still have some challenges and these will be difficult for you as well as us and in all foreseeable future as far as I can see.

The first one I will mention is that the early, the really early cost estimations are very difficult and they're often quite off the chart. There's

many, many reasons. Maybe this is a good opportunity to mention that you could look at it as a problem of cost estimation only which would point to fundamental issues like optimum bias and political bias that you've heard from Professor Bent Flyvbjerg. Or it may be about the delivery of a project that changes goals, that changes through the project; things are not what they seem in the beginning and we learn throughout the process, so we change our opinion on what is the right way to do or the right thing to do.

So there's lots of explanations why this is difficult and it will stay difficult because these things are not going to be simple, whatever you do, unfortunately. But it can be improved; it can be improved a lot.

And another one is that we realize that the models that we use in terms of identifying and quantifying the effects, they're not perfect. And specifically in transport models we realize that not all significant negative effects – and I could also say positive effects because I think it is the same on both ends of the scale. We do not pick up on all the effects, and it's hard to pick up on some of them. One reason, obviously, is that they are hard to find, and the next thing is that if you find them, it's very hard to sort of connect them to the project. So this might have happened anyway for other reasons. So the connection, the causality between the project and the effects are not clear. This is complexity, and complexity will always be a huge challenge for us.

And when it comes to the end of it, even though you do have a good basis for decision, even though you do have good analysis and a good way of planning, reaching the best decision is still a challenge. And this has a political side, of course. There is struggle between different opinions and different values on what is important and what's not, and, of course, it is a question of who should be given priority over others because there is never going to be money to change everything for the better for everyone.

So priority and prioritization will always be a challenge, and that does not follow the technical and economical logic that we are using within this quality assurance system. It has many other aspects that will always be relevant and will always be – I will say it's okay. I mean, the

decision-makers, the politicians, they are there to make decisions. We are technical people that plans and makes budgets and suggest solutions, but it's not our decision to make. So that's a challenge that will still remain in the QA system.

So that ends the Norwegian system, and then I would like to look at other countries, more briefly. I will not go into similar detail on them. One reason is, I can, of course, not because I've – haven't worked with them in the detail that I have the Norwegian, and another one is that many of the issues are similar. So I would repeat the same things many times, and that's no point.

Let's look at Netherlands and let's look at what's different from Norway. In this – let's call it the schematic view of the system, how it's organized. You can see that it is anchored – the quality assurance is this brown one in the middle. And you can see that it is anchored one level lower than in Norway, which sort of indicates that it's maybe not as robust as the Norwegian one. But it depends, of course, on the dynamics of the Netherlands systems. As you can see, it's another organizational level lower than the government itself, in between the Ministry of Finance and the other ministries.

Specifically, we look at Infrastructure and Environment. So transport will be the item that comes up all through my presentation. Transport is what I've been working most on, so my examples are from that. And also the fact that many of these systems, I have focused specifically on transport. Netherlands and Denmark, for instance, is just for transport.

As you can see here, another difference from Norway is that the regional authorities are involved. They are involving in the process. And this has to do with the background of the whole thing. Because in Norway, as you recall, I call it a pure control system. That was what it started. In the Netherlands, the symptoms that something was wrong was rather similar. It went over time, over budget, didn't really succeed in delivering the right projects, necessarily.

So the symptoms were the same, but when they looked at what is the problem here – and, remember, Netherlands is the most densely populated area in Europe, and they have no space whatsoever to expand on without stepping

on someone's toes. So this has to do with involving the stakeholders. Their system – and I can continue a little bit just to illustrate that better, perhaps. Their process is a little bit more complex than the Norwegian one, because it has more interceptions with the planning process, but there's only one external review, so that – they sort of – they wait with that one until the really big decision in the end. And apart from that, they go for a multi-year planning structure. So it's not like the Norwegian one and just a gateway that you have to pass, but it is following up on a plan over 70 years.

But if we look at the particulars of the Netherlands system, they had a tradition – a very strong tradition. We can see that's the same thing in Norway, but it was expressed stronger in Netherlands that it was an expert system. It was a silo-based expert system. So the first expert does his part, leaves it to the next expert that adds his details and then it goes on and on. And there's no real security for consistency through this line of experts that go through the plans with their own focus.

And, of course, this takes long time, and, of course, it invites rematches. Because if you come to the third expert, and he does something that is different or in conflict with the assumptions of number one and steps on someone else's toes than the first one did, then, of course, you have opened up a whole can of opportunities for rematches on all the decision up to now.

So this was the situation that they had to change. So what they did was not to impose a lot of control, but they imposed a lot of involvement. So they went from a silo system where you pass the problem – the plan from one expert to the other to involving everyone in a process where we do things together and find the better solution.

We have similar working strategies in the agencies before we start QA1 and in between QA1 and QA2. So, in that respect, it's not so different in Norway; it's just that that's not looked at as a part of the quality assurance. That's an integrated part of the planning process. Here, it is the quality assurance process, so that's the difference. It's not so different, but it's still a different way of looking at things.

And, as you can see, wicked problems comes up, and this is also a result of the complexity. Of course, it's much more difficult to plan a new road or a change of the transport system in Netherlands than it is in Norway. We have lots of space. Like here, we have lots of – well, not so many people to be in conflict with, so it's easy – relatively easy compared to them – to Netherlands where you always will step on someone's toes, no matter what direction you go.

The result was trying to get things faster and better, and, as far as I know, they have succeeded. You could look into the (inaudible) paper, there are some indications there and some facts about how much – I – from my memory, I can indicate that the planning period went down from eight to four years, as an example. Two to four years, I think, but look for the details in the paper so that I'm not saying anything too much wrong.

If we go to the UK, UK is one of the major forces in this business. They – globally, I think most countries look to UK for inspiration and quite a few countries have copied their way of doing it. My experience is that copying is not the way to go. That will not work because it's too much contextual dependencies in this. But if you look at it on the surface, it is, like in Netherlands, there's a different organization that is responsible, there's a unit – a new unit formed for this purpose. It has actually changed several times, it was the Office of Government's Commerce, then it was the Major Projects Party, and then now it's the Infrastructure and Major Projects Authority.

They report to the Cabinet Office which is important; that's very high in the system, in the political system, so that's a good thing. It involves other ministries. It does not, to some extent, involve the counties so it's not neither – like Norwegian one, it does not include the local authorities. But it's very complex, and as you can see here, it has lots of interventions. They constantly come back and look at the budgets, which means it is – on the surface, it looks like they might use more resources than the Norwegian one, but actually it's the other way around because in Norway, we do a complete set of external independent analysis, but these people in the UK, they don't. They come with



more – the mindset of looking at your plans and giving you some good advice on how to come further, how to improve.

So it's a brief process of two to four days, so it's – it may take four to six months in Norway, but this is two to four days actively working with the project. And the report is not like in Norway, public. It is certainly going only to the project responsible, which can choose not to do anything about it, or it can choose to take in this good advice and do something different. So it's very different in terms of, I would say, the lack of transparency compared to the brutal transparency of the Norwegian system.

It is also a little bit like the Netherlands: it's going by plan. So they, at the beginning – the IAAP, integrated assurance and approval plan, that's the plan that they follow up on and this strange notification here, "AS-AP," means as appropriate and according to plan, so it's according to the IAAP. So it's very different in terms of the long perspective that they follow the project with different inceptions.

They also have another thing that we don't: they have a strong focus on the business case. Actually, the difference is probably more language than it is reality because the business case includes the goals and the assumptions and all the effects that the – aim to get. So it's very similar, actually, to the logic of the Norwegian one, but we don't use the business case as the word for it.

I probably already mentioned some of this. One different from the Norwegian one is that this is internal in the government. It's internal as civil servants. They do use external consultants on an individual level, meaning they do invite prominent experts to talk to the project and to give their advice as part of these teams. So they do that and that's – from what I've heard, that is an important aspect because you don't always find the right expert within the civil servants or within the agencies or ministries.

And as you can imagine, of course, these teams, they need some recommendation also. It's not like the Norwegian one where they have the mandate to tear them apart and present an alternative, but they are looking at these documents and they're making their own

opinion on what is the good and bad sides of this strategy and how to improve it, and then they give their advice in a report that, as I mention, does not necessarily give any consequence.

But there's one thing I would like to look at in the UK model, and that's this one.

They have the same challenges as everyone else in terms of getting the budgets right. And they've done a great deal of work in developing this model that says that on every step and along the timeline, we go from a strategic outline case to an outline business case to a full business case. That's following the timeline. And as you can see here, if you follow the dark blue – what do you call them?

**MS. MUZYCHKA:** Columns.

**DR. KLAKEGG:** Columns, yeah. Thank you.

The dark blue columns, they indicate that when you come to the full business case, they represent 100 per cent of the budget. So then that means they're mature, they're complete and they're consistent. So they should include everything. That's when you come to the full business case.

On a medium stage, you'll find the outline business case is somewhere below that. And then the beginning, the strategic outline is, of course, even less.

You could imagine then that it is natural perhaps to add – if – this is statistics, this is statistics following different types of projects.

So let's say this is a road project we're looking at. You would say that if you look at strategic perspective or dimension of the business case, you would say that if we are on the strategic outline case, you would say that it covers 50 – no – 60 per cent of the total. So you would add 40 per cent.

When you come to the outline business case, it represents 90 per cent. So you would add 10 per cent more. And so on.

It's logical, but I don't believe in it because people will see through it. So I don't think that this really helps much, but it might raise the

awareness, it might have some good qualities. But I don't think that we can do this the statistical way. So it's not my suggestion for how to handle it. I'll come back to that on a later date.

Passing through Sweden. Sweden is our neighbour country, we are similar in many ways, but in this particular thing, we are very different.

As you can see, they also have a system that is high – or actually, the Ministry of Finance reports to the Prime Minister's Office, of course, but the QA system as such does not involve the political level at all; it is completely within the agency.

Sweden, they look at the quality of these documents and the quality of the planning as an internal thing in the agency, and they – the political side will always not interfere with single projects. They give the authorities – the transport authorities, they give them the budget and the mandate to prioritize within that budget. That's it.

The Norwegian tradition is very different where we decide each and every project in the Parliament. So every project has a mandate from the Parliament, with its budget, with its time frame and with its specifics.

In Sweden, they don't. They put all that responsibility down to the agency, and the agency has the resources and the mandate to handle it. So they also do the quality assurance internally. They have quite a few of internal quality assurances, so they – they do really look after these projects, but they don't – they sort of give up the opportunity to have externals, independent views coming in, so I think that they could have benefited from that, in my opinion.

But from – for this, we should notice that internal quality assurance is just as important as the external one, and the focus on improvement and on having the right mindset and doing the right things is just as important within the agency as it is by externals coming to sort of control what's going on. So that's a good thing to bring forward.

Denmark is different. And, again, looking at this picture, you'll see that the quality assurance – well, it is actually not so much a quality assurance, but it is a different approach, but it has some of the elements of quality assurance. I'll come back to the details. But I'm confused about the role of Ministry of Finance in these things. I don't think really they have much of a role, but it has to do with the budget and how much money is proposed for each project so the – it does involve the Ministry of Finance anyway.

But as you can see this is particularly for the Ministry of Transport, and they have a structure that is very similar to the Norwegian one in terms of when they interfere with the projects, but here's the thing: the chosen concept in Denmark is to – not to assure the quality of the documents but to add what they expect is missing. So it's quite similar to the UK concept in that respect. They get a document from the minister of Transport with a suggested budget and then they, from the statistics, add some extra funds to make sure that it is going to be within its cost frame.

This follows the logic of Flyvbjerg, is based on statistics, but Denmark has also another prominent professor called Steen Lichtenberg. He suggested in the 70s, actually, the successive approach which is what I've based my career and my take on cost estimation on.

So it's handling this in a very different way from Norwegian one and one thing is they don't do the external analysis and such. They just put on an extra budget to keep – to get the level that they feel certain about the opportunity to success – probability of success.

Twenty per cent, as you can see on this one, 20 per cent on top of the budget to make sure that the ministry has its reserves when it – when needed. Well, what to say, I am coming back to this when I talk about internal and external view on a later slide. That's the difference between successive approach, which is an internal view, and Flyvbjerg that argues an external view.

Ah, here it comes. Lichtenberg works with looking at your own project, the one you're responsible for. Always looking inwards, towards his own project.

Flyvbjerg argues for the external view. Now this is important because, of course, you don't know everything by looking at your own project. You only know what your own assumptions are, your own technical specifications, your own, well, strategies for execution of the project.

If you look outside of that, if you look to every other project, you will see what happened in that project and the other project and you can compare and you can learn from that. That's a very important and very good point from Flyvbjerg. You can actually see what happens in a general case when this is the situation.

And I approve of that – that's perfectly good logic. You should combine these two.

Oh, that was not my intention. So, that was my intention. Here's – there's one correction to this picture. In the outside view, please take away "your"; the word "your" is probably a copy-paste mistake. There should not be a word "your" on that side because it's at all other projects to consider what will happen in terms of when we do this sort of project.

You can look at these and you can see, okay, this is too simple and it's a different type of climate and a different type of terrain. This is too big, too complex. This is a different solution and a different concept. Not relevant. But you'll find some of them have something to them from, something to teach you. So looking first at your own project, then look at others, and then back to the internal view to see what should I test? What should I check? What should I be certain of before I go further?

Together, those two views will tell you in the best way whether this is – whether it is realistic or not.

Then finally, to Quebec. It's different. I don't know all the details about it, this is the one I know least about. So, just to say that I've never been involved really. I've read about it and I've discussed it previously with other professors, but this is the one I know the least of. But it is close to you, so you should definitely look at it.

Here's the same schematic indication that it is a responsible unit under the Council of Ministers and it reports – it, sort of, it's the binding

between Treasury Board and the ministers – ministries and also the – I don't remember the – what SCT stands for but I think it's here. Yes. The Treasury Board Secretariat is sort of keeping an eye on the quality assurance system and taking out the learnings from it. While the Société Québécoise des Infrastructures – I'm not – I don't speak French, to be honest, so don't take that for a true name – but they have this role of being the operational one in quality assurance.

And the structure of the Quebec system is quite complex and it's becoming more complex. They started out very similarly to the Norwegian one. We had Professor Brian Hobbs coming over from Quebec – from Montreal, and he took back home a few ideas and principles that he built – suggested as a basis for the Quebec system. And he also looked to the UK and took the best ideas and the best parts from those two to combine in this new system, back in 2009 I think or 2008.

Then it has been changed several times: 2010 and 2014 at least. And it has become more and more complex. As you will find a comment in report number 47, it may seem a little bit too complex, may seem to be going a little bit too far on some specific details. But it is based on the good ideas from the better, previous systems, so I believe this is a good platform.

It has the simple structure from (inaudible) it started there; it has become more complex later. It has the central unit for learning, which is very important for me. It has a strong position; this is obligatory. And it – I also like the focus on the business case, because that puts the aims and the purpose of this very clearly in front, and you need to argue why this is a good investment – that's good. It builds on internal expertise, which – it started out as, I remember, as external consultants, but then it turned internal, which means that, of course, they build up some competence and capacity within the government, which will be useful in many respects.

And then, of course, I would like to mention again, the early focus on project delivery models, which is a framework we use to actually operationalize these things in the projects. And this was later introduced this year in Norway too. So we learned back and forth between these systems; that's good.

If you can take any more, I will continue and go into why we need not to copy but actually design a system for each country or for each region. This is how they look, if you put every one of them up against each other. There is a clear difference between the Nordics and the national frameworks. And that has to do with complexity. The Nordics try to keep it simple. It has something to do with culture; it has something to do with the way we work, the way we talk, the way we interact.

For instance, we don't want to tell people how to do things. They need to find out themselves. They are very independent; we are egalitarian communities where we are all on the same level and they have to sort of decide themselves. They take their own decisions; they decide how to solve the problem. Internationally, there's more of a tendency to tell you how to do it, to give a lot of guidelines – follow this guideline and you will be okay, this is how to do it. UK is the primary example of that.

So this is two things that are very different from the two countries and when it started – restarted on – if this is sort of a scale from one end to the other, we started from opposite ends of that scale. But, over the years, we have come closer to the middle.

So the UK system has become more of a control system following some of the ideas from the Norwegian one, and in the Nordics we have introduced more guidelines, more indications of this is good practice, this is not so good practice. But we still never tell them how to do it. They have to look at that – that's good advice.

And this is because regions and countries – they are different and this is one aspect of it. This is just about urbanization and, as you can see on this list, these countries, they are very different in terms of how urbanized they are. As the Netherlands is extremely urbanized and the Great Britain quite much too, Canada – all in all, it's quite urbanized, while Sweden and Norway is less so. This tells us something about the context that we go into.

If you add the geographical differences – meaning the terrain, the climate – if you take in the economic situation, Norway has used this in the most – in the richest years of this country's

history. Would it work in bad times? We don't know. We haven't tried that yet.

Judicially, there's clear differences in the Nordics. The individual is not blamed for mistakes. The system is blamed. In UK, the individual is blamed. So in the UK, you make a mistake, you get fired. In Norway, you make a mistake, you get another project to try again. That's the difference. It makes your mindset different; it makes your way to respond different. And also, these traditions, they follow people. So it's all about people, really. Structures can do so much, but it's all about people in the end. So, traditions are also important.

Let's look a little bit on the demography and economy, just to add Newfoundland as a case here. I tried to prepare by looking into statistics and find some facts of Newfoundland and Labrador. As you can see, the gross domestic product per capita is very similar to Europe, so that's a good thing. You – that means we might compare. That sounds reasonably good. Topography is like Norway or the rest of Canada. It maybe adds some cost. Climate, as well, might add some cost, but it's not different, so it's a good case for comparison.

When you come to population, the population density is really, really low, and that tells us something about how this will work or not will work. And especially if you combine it into the road investments per capita, you'll see that the costs here – if my calculations are right – they are sky-high, which is no surprise knowing that the population is very small and the geography is wide.

So, obviously, there are some similarities and there are some differences and you would expect to have to take that into consideration when you design a system to govern your project. There's many details that are wrong in this picture, there's many details that are omitted, but that's just to give you an impression that, of course, this is relevant for what work you're heading into.

Another example – this is from Norway again – looking at all finalized projects in 2013 and looking at different regions of Norway. I've found similarities to all regions of Norway here

in Newfoundland, so it may seem to be relevant. I don't think that any part of Newfoundland is really very urban, so I don't think that end of the scale is so much relevant. But if you look at the very rural part, that would definitely come into use. And I think from what I've seen from here and a bit up north, it's similar to the west coast of Norway. So, you have a scattered towns and civilizations and you have distances in between and you have a landscape that is variable.

If you look at Norway, these results indicate that there is something going on when you go into rural areas. That's when the really big money runs out and when you get big over debt. The really rural projects are also going bad, relatively. Not that bad, but still bad. So there's something about doing projects in a very rural place and in a very urban place, but normal density, normal geography, is good. That's when we can control the cost. That's what this picture says. And you have to consider what that would mean in your local situation.

Going back to the early comparisons between Norway and UK, which I have much more detail on, but I don't want to go too much into it, but look at the variations of strategies that you could choose. The Norwegian one, I would characterize it as simplicity and robustness. That's the ideal. It's working by management of expectation. That's another indication of transparency, how important that is. The expectations are managed. You know that everything you do will be published – everything you do will be out there in the open, so everything you do should be allowed on front of the newspaper tomorrow. And when you know that, the expectations are: Do a good job. And sometimes it works and sometimes you have surprises you cannot really know upfront. And the review format is very independent and it's very much external control, so it's a controlled system still, but this is the characterization from the beginning.

On the other hand, the UK one, I've said it's a complex system; it tells you what to do, when to do and how to do. A lot of recommendation, best practices and sort of checklists to do everything. So it is a QA system, comes from the top down, while the Norwegian one comes from the bottom up.

I looked at the Ministry of Defence in England to see a different system. It was similar to the Norwegian one in structure. It's very easy, very simple to interventions, but their review format was very different and that's the interesting thing. They use what I call an arena. So that means they call in all the experts – oops – all the experts around the table with all the decision-makers and the proponents of the project plan and then everyone goes through it there. And they challenge it and they find the common understanding of the situation and then decision-makers withdraw and make their decision. So it all happens there.

Same thing happens in the Norwegian oil and gas industry. I think maybe because there's always many owners to the oil and gas fields. They are huge and risky so they have many owners. So the only way to make them make a good decision together is to get around the table and actually do it in one process. So that's a different take on how to work with reviews and quality assurance. So for your inspiration.

Yeah, here's a few points about how we started. I mentioned most of this. Yes, I have actually, I think, mentioned all of these except perhaps the bottom line point here: Norwegians are not fond of being measured. In the UK, they measure a lot. So just for indication of one thing that would also matter; in Norway, this QA system breaks with tradition. It introduces measurement where we normally do not do that. In the UK, it's sort of based on that tradition and then added the element of friendly advice. I mean, we could tweak it this way, we could do a better strategy that way and so on. So we had very different histories behind them and ways of introducing them.

Then back to people issues; governmentality. The mentality, the human side of governance: How do you present governance as a governing party towards the people that you want to govern? So it has to do with mindset, and these – I found a paper by Ralf Müller and colleagues that compares the Scandinavian countries and China. So it's not about QA, but it's about how these organizations work in terms of governmentality.

If you look at the right hand side, you see that these are quite similar and these are quite simple

structures. If you see what they mean here, this is for large construction organizations and this is from very large pharmaceutical organization. These are traditional companies that have been around for a long time. They have a lot of structure; they have a lot of internal culture and they have built up organizations over time.

Today, they're quite liberal. They have focus on projects. People are medium – given medium mandates to operate on their own. We see that when it comes to mechanisms, there's more control in China than in the Scandinavian countries, but then there's high level of institutionalism and 'projectification' in both countries. Same pattern in pharmaceutical. So, the established organizations, they are similar to this in both countries. But if you look at the other side, the left-hand side, on the top is small consulting organizations and on the bottom is medium-sized IT organizations. And you can see that the profiles are switched completely between the two countries in the two cases, indicating that here must be something interesting.

What I read out of this is if we look at the small consulting organization, I imagine that they have been around for a while. These are experienced people, and since they are small, there might be a few experienced individuals that have probably come from a big organization and established their own consultancy – this is what happens in Norway at least – and they have all these traditions with them.

So there's similarities to the traditional organization, but if you see what happens in Norway or Scandinavia on one side and China on the other, you see that the Scandinavian ones, once they break out, they go for a very liberal with high level of sovereignty and high level of trust, meaning these are individuals that operate more or less on their own.

In China, the situation is different. They're very authoritative. They have focus on process, not on values. They are medium on sovereignty. They are high on trust, actually, but then, they're very low on institutions, meaning they don't have all the structures that a company normally has in the west.

And then, comparing to the bottom side here, IT organizations, the picture is slightly different or, actually, opposite. Scandinavia seemed to be the conservative side, and China, the liberal side. And I think that means that these are new organizations. These have just started. These are organizations that have no long history neither in terms of technology or organization or knowledge or anything. So they are built from the bottom, comparing to these more – they have probably been around for a while. So IT has been an issue here in the West for a long time.

That's my interpretation. But the point is: if you look at what do they measure in terms of what is governmentality about, it asks about how do you make the people respond the way you want? How do you – how wide mandates do you give them, how much do you trust them, how much do you control them? That's what this is all about. That's useful when you're going to discuss what to do in Newfoundland.

Another thing that changes is the focus. It has traditionally been the project itself, meaning if you take a road or a railway, it would be the line from start to end, with all the close encounters with neighbours on both sides. That's what the road is all about, it's establishing this line of communication from one point to another.

That's not the situation anymore. And if you look at what has happened here – this is in European transport – it has evolved so that today we look at the whole area. We should look at the whole network of transportation modes. We look at transport as a function in society working together with all the other sides of society. And, of course, that means that the complexity is immense in the decisions we make, in the consideration we do up front. We do a much more advanced, much more complex consideration today than we did only 10 years ago.

This, in my opinion, expresses a change from focusing on what resources you put in to what do we gain from this. So it's another aspect of this value focus that I've mentioned before. Don't put too much emphasis on cost and resource use, but look very closely at what do we gain from this. Because that's when you get the right decisions. It might be worth more money if you gain more. And this is the

development we see very, very clearly in Europe.

It has also a very clear parallel in how we set up these projects – project delivery models. There's, internationally, a very clear trend away from the traditional one that is transaction-based, meaning there are contracts between parties A and B, a client and a supplier, that is based on competition and lowest price. Design big build, construction management are examples of models that would be traditional, and they are based on hierarchy and not models and theories that explains what happens in a bureaucracy or a hierarchy, traditional models.

On the other end of the scale, which is where we are moving these days, as a consequence of the development I've already mentioned, focusing value and bigger networks and more issues, broader perspectives, it means that things are getting too complex. We cannot keep on doing what they did in Netherlands, as I showed you, the silo expert from one to the other. We need to combine competences to handle this. It means we need to be 'solidaric'; we need to be in the same boat. This is what we're trying to do with the alliance contracts, meaning many parties sign the same contract. Share the risks, share the profit.

Multi-party contracts and the relations between the parties are regulated by different – by net worth – we understand it by net-worth theories, by contracts and other concepts than the bureaucracy. In this end of the scale, we find alliances, integrated project delivery or special project vehicles, like establishing a company to do the project.

In the middle, and this is an interesting position. Today – if we turn to Norway, this is the past. The specialist contracts is the past. Total contracts, that's today. That's what dominates the market today. Design-build, ABC contracts, private-public partnerships, turnkey – that sort of contract that actually leaves the responsibility with one party on behalf of the public client.

This can be used in a transaction-based way, and it can also be used in a relation-based way. And the trend is very typical that between the construction company and the client there is a close relationship based on being together about

the decisions and closely collaborating about planning and budgeting, while the construction company then turns to its sub-delivery and sub-consultants and sub-suppliers and drive the old traditional transaction-based squeeze. Not the best accommodation, but we are struggling by trying to get sort of a grip on this. It could've been done a fully relation-based way, it could've been done a totally traditional transaction-based way, but it's an interesting position because it could tip both ways.

The future, in my opinion, is the alliance contracts that will mean that we have to share risks and responsibilities and also the outcome.

That's the trend, and if we look at the frameworks, they develop the same directions. If you just look at this, the history about the Norwegian one and the UK one and Canada one, they – when – they started out with focus on cost, focus on resources, resource use, and ended up our – are today focusing on what we gain, what's the effects, what are the benefits from these projects? So there's a clear tendency also here to see the same development coming.

Actually, in Norway especially, it has led to this development. The quality assurance regime was what put value on the map, actually; not so much in the UK because they had the tradition when they took the – when they established the first framework, they took the business-case logic from the industry, so that was already there, but it was much more narrow at that time, it was on the – the business case was on the business of one specific party, while today we talk about the value for society, so it's much wider and much more including concept.

**THE COMMISSIONER:** So, before you go to –

**DR. KLAKEGG:** Yeah.

**THE COMMISSIONER:** – the last part, I think we'll take our morning break here now–

**DR. KLAKEGG:** Okay.

**THE COMMISSIONER:** – and, so we'll take 10 minutes at this time.

**DR. KLAKEGG:** Thank you.

**CLERK:** All rise.

### Recess

**CLERK:** All rise.

Please be seated.

**THE COMMISSIONER:** All right, and you can continue on now, Mr. Klakegg.

**DR. KLAKEGG:** Thank you very much, Commissioner.

Now I'm going to try to take it down to some specific advice, some – I've given you background on many ways to handle it, many choices that you can make, and at this point I would point out which ones I would choose and which ones I would not choose.

In the background now is a table from report 47, from concept. It systematically lists a few characteristics of the six countries that we have compared. And it raises the questions of who initiates the QA process, who decides the choice of concept and who determines the budget. These are formalities that are seemingly similar, but at the same time, this is important. And the first advice, of course, is to keep it on a high level. Give the system as much power as possible, and you do that by entering it high in the political system, making sure that it is stable, making sure that it has power and is mandated. It needs to be obligatory. It doesn't – it shouldn't be any discussion whether, oh, my project is so special, so I don't have to go through the quality assurance because it doesn't fit and it doesn't give any relevant feedback and all those arguments that you will hear as soon as you open up for that sort of discussions. So keep it on a high level, make it mandatory for all, end of discussion, because that leaves a lot of discussions that goes nowhere.

And probably those that fight hardest to avoid being controlled is the most important ones to control. That's a speculation.

Number two, you should definitely look at your own traditions in terms of how decisions are made, how politics go, how your society is built, the culture and all that. Take that into consideration. Build on that, and to the extent

that you have to, break with those traditions that are not helping you in doing successful projects, like we did break with the tradition of not measuring. We needed to introduce that and to specifically control and measure things. That was something that was missing in our tradition, so we introduced that. And as a part of the same logic, of course, you should challenge the existing – from day one and throughout, challenge the existing, see what's working, see what's not working and try to do improvements. It's a continuous process. Of course, we leave it unchanged in between – or in periods, so that we can actually implement the things that we have decided to change in the last period.

And then, of course, after a few years, we take a new stand and be – in Norway, it's a invitation to – for consultants to bid for contracts of doing quality assurance. We just had one in Norway, and that's a similar process every three or four years that gives us the opportunity to sort of renew the whole system. Use that opportunity, because it needs to be kept alive, it needs to be renewed and it needs to be improved all the way.

Number three, I would make sure it's completely transparent; that's the one thing that I believe in as being instrumental in building the success. Transparency is the one keyword that I would put on top. Of course, the point here is getting the right decisions. That's the main point. And I believe that transparency is not only the way to make all the professional planners do their best, but I also believe that it is the best way to make the decision-makers do their best. So I believe firmly in transparency as the most important, one issue that you should look at.

The next comparison goes over what are the sectors included in different countries and what are the threshold values, meaning what projects are actually taken into consideration in this – in this quality assurance. And as you can see also, there's differences here. And this has to do with – if we look at, first, the types of projects. From what I've seen, there's much more similarities than there are differences. Then, there are some technical differences that might change the contents of the quality assurance to some extent. But, to be honest, if you look at it, almost all the issues that are important in construction is also important in all the other industries and all the



other types of projects, because it's about people.

It's the people that does good and bad decisions, performs well, performs bad. The technicalities we have more or less in control. So I don't see any reason why there should be such a big difference between different sectors but, of course, be open to the technicalities that follows with each of them, and then they might have different structures, they might have different traditions that is relevant to Canada.

The next one goes for the threshold value or the selection value – (inaudible) selection criteria, I should say, which projects are important to actually do a quality assurance on.

First of all, remember that doing a quality assurance requires resources. It's not for free. It takes resources, which means you should use them wisely. And that's why we do not do it for all projects. Some projects are too small, some of them are too simplistic – there's no reason to do the quality assurance. And many of them are simple, day-to-day projects that doesn't really need it, either.

So there is a – there needs to be a balance between the use of resource, the effort you do to do quality assurance and the benefits from it. So that's why people – no, sorry – why countries focus on the large projects, the complex projects.

And almost – except for Sweden and Netherlands, because they have a more internal focus in their processes – it's always the large ones. And what is large in Newfoundland will be totally different from what's large in the UK, obviously. So your threshold value will be different.

My suggestion is actually don't focus so much on the costs, because it's the complexity that is the real issue here. The complexity – the complex, critical projects, those are the ones that need quality assurance the most.

The size is not always the thing. It can be big and simple. It is possible. So complexity and practicality are better criteria than size, in my view. But, then again, size is simple, and sometimes we use the simple one instead of the best one. So that's maybe even typical.

The third comparison is about who is actually doing this – these reviews, and that there's also – because of size of this presentation, I took in the private co-financing issue here. First of all, you should put the oversight where actually oversight belongs, with those – with the responsibility for the whole portfolio, because this is very closely related to portfolio – project portfolio management. It has to do with which projects are chosen and how to make sure that they control the totality of risks and opportunities and how it is in line with your strategies. That's what this is all about. So, it's closely related to project portfolio management. There's a lot of learn from that theory, and put this responsibility where it belongs with the responsible for the portfolio.

Then I think, from my experience, that assessments, as they require competence and capacity, that is not always available in the public sector, I think, for that reason, and also for the reason that coming from the outside gives you more different perspectives and more ideas to how to do projects, so I think it's very healthy to have external components of the quality assurance. I'm not saying you should go all external like Norwegian one, but I'm saying there should be some external aspects of the quality assurance systems, just to make sure that you have also the external ideas and that you are challenged from the outside.

The next one, it's really about avoiding false incentives or perverse incentives as they also are called. For example, if you – typically, in Norway, you have a state finance road project. Then, all the neighbouring stakeholders will have something that they would like to see done when this state – what they have open there – what it's – so why don't we add some more values here? And, of course, this is an understandable reaction. It's only human and it's a very normal thing to do. So, there might be some perverse incentives.

And one party is having the benefits, and another one is paying for the party. So there might be some – the (inaudible) between these interests are not so easy. And I don't have any fixed answer to that. I think it might be different in different countries. I do not think that you always need to or could require of the local authorities or the local societies to be part of the

financing. I don't think that's realistic and I'm not sure that it would work.

And I think you are such a small population that you would be challenged by such a strategy, so I don't think that's the way to go. But you could consider it. As we done in Norway, we do have a local contribution to the financing in terms of toll roads and that sort of elements, which seems to work but there's a limit to it. So today there's a very critical response to toll roads in Norway that people don't want any more of it. It's enough. It's enough. We've had enough.

So there's a limit to how far you can use that kind of tools in your governance. But do what you need to do to avoid false incentives. Respect the problem that stands out when you do have one party paying and another one getting the benefits – always a challenge.

If we go to this one, it has to do with what we're – what we – how we budget. The first advice is to take a stand on whether you want realistic – that means targets that you can actually reach with some probability or with some ease and whether it should be demanding. Here's a cultural thing. If you'll read textbooks on project management from the Nordic countries, they will always require stretch targets, stretching demanding targets – objectives that are hard to reach. Because we are, just to begin with, we are quite modest. We don't want to aim too high. We would like to be one of – we don't want to stand out. There's sort of a cultural thing that you don't want to stand out.

If you read an American textbook on project management, it's a little bit different, because project managers, they take it all out and they want to really break through the ceiling and go for the skies. So I feel I mentioned it wrong to begin with. They say you need to be realistic.

And in the Nordics we say you need to stretch. Where are you in this – on this scale, from one end to the other? Maybe closer to America, at least geographically, I don't know, but think about it: What is – what gives the project manager the right incentives? Because if you stretch it too far, it's no longer an incentive, it's the opposite. If you first realize I can never reach this goal then it all crumbles. Then you don't try anymore, so it all crumbles. So it needs

to be realistic and demanding – the right combination of realistic and demanding.

Yeah, and the next one is for the owners. It is expensive to cover too much risk because all the risk is costly, and the more money you put into the reserves to make sure that you can actually deliver within the frame of cost, you will sort of put more and more money in there that you cannot use for other purposes. So that will sort of – it would be a priority that leaves you less money for health, less money for any other item you would like to prioritize in your society. So, carefully consider the level of required security against overspending, and I'll come back to that but that's one thing you should really put some consideration into.

And following up on that one, you should be very strict on requiring a predefined criteria for how to allocate more money. Once you've set a budget or includes some sort of reserves for further decisions and further changes in your project, be very clear on what are the criteria that could give you additional allocations. That should not be a thing that you wait and see until it's there because then it's too late. That should be decided upfront.

To put some more explanation on these three advices, I think that might be necessary. You'll remember this picture from earlier in the presentation, and when I talk about the – number 9, this green arrow, which illustrates how much money you have identified for all the items of the project, all the defined items of the project, they make up some level of security for the budget but it's not enough. We don't expect that to be enough.

So, of course, if you want to keep the project manager on a tight line, you give him less money. Solve this problem with less money. That's a tough target. If you want him to be sure he will succeed, give him more money. And project managers would argue: I need more money. Be sure, they will argue: I need more money. Because that makes their success closer, that makes it easier for them to actually succeed. But as an owner, it can be wise to keep it tight. But you need to be able to give him some more when he really needs it.

So on the number 10, how much money should be allocated is a crucial question. And the first – at least in our logic – the first thing you have to decide is how high do you want to put this level? And in no way, as I've – I told you before, we could (inaudible) go for \$85 million, we accept the 15 per cent risk uncertainty, that's no problem. In turn, if you look at the S-curve, of course, you realize that as you close – get closer to a hundred per cent, it gets extremely expensive. Because the cost is on the X-axis here, so closer to the hundred per cent (inaudible), it will be extremely expensive to continue. So stop at the right level.

I think, personally – and this is probably more or less speculation from my side – but I think the Norwegian is too high. I think 85 is too high. I've done some simple simulations to test it out, and I think my results indicate that could be lower, that would be optimal. But don't go too low if you want to get rid of budget overspend. There's sort of a balancing of those things.

Then for the last advice, it's very, very important that you put up the requirements or the criteria for how to allocate money from the management contingency and the contingency reserves to the level below, upfront. As I said, don't wait until the need is already established, because then it's too late to discuss. Then you're in a need position. Do it while you have a choice, do it from the beginning. It's a hard thing to do. It's a hard thing to define, because you don't know what's coming. So expressing some general criteria on how should – what is the argument that I would listen to when I allocate more money. That's not a – not an easy thing to do. So we have worked with this since 2000 and we still don't have a good practice on that. It's still a challenge.

The next one goes about how complex the structure and how many interventions. I'll still – I'll simply say that you define as many as you find necessary. There is no proof that two is better than four, or six is even better than any other choice selection. So it's more a question of how do you want this system to work? Where do you want to have these checkout gateways? How often do you want to have these controls? What is the right level of intervention? What is the right use of resources in your situation? So there's no theoretical answer to that. There's no

limit. But I would keep it simple. Personally, I would keep it simple. I would not go as far as the UK and some others. Maybe not as simple as the Norwegian one, that depends on your situation, but maybe somewhere in between.

And when it comes to how to do these interventions, how to do the reviews, that's also something that we have looked on. There's many ways of doing it, and there's many different effects from that. So you should use the kind of intervention that works for the purpose. Sometimes – if you look at the Netherlands, they look at – they realize that involvement, that's the kind of process that gives a better result in their situation. Norway, we went for a control sort of approach, and in the UK they went for – bring in an expert, give some advice and leave it to the project to decide what to do. So there's – and there's many more. I mentioned the arena where we challenge everything over the table together and then the decision is made based on that. So there's lots of different ways of working this and they all have different qualities. I like all of them for different purposes. So it's up to you to sort of put in the tool box those approaches that you think would work in your case.

And we also have a different one that I haven't mentioned actually, is the following – the quality assurance that follows the project continuously. For instance, start with a consultant that actually sits beside the team that works on the project and follows the project, not everyday but fairly continuously over time. And the purpose of that is to help them find indications or early warning signs, as we call it, to see when things are developing, to see it from the outside and with full insight. That's a useful thing and that means that you can get the signals while you can still do something; you don't have to wait to see in the end how it goes before you do some corrections. So that's another way of working with quality assurance that could be relevant.

One specific thing, the typical response to complexity and I've observed that complexity is growing. Our projects are getting more complex. The way we think about them is more – a wide perspective, it's more long term, that means the questions are much more complicated and complex than before. And the usual response for – to complexity is to add more formalities, more

formalism, you have to report more, you have to do more formal analysis, and the fact is that the more complex the less it works. The formalities and the formal analysis has weakness, has limitations.

The only thing that actually can see through the complexity, as of today, is the human experience and competent mind. So using – what we in the book call gut feeling is actually – or intuition, if you like, that’s the one tool that is really, really important when it becomes complex. So that’s one thing that was sort of a surprise at the time we came to that conclusion because we saw everyone is adding more and more formalities as more complex it gets, but the opposite is actually working.

Okay, that seems to be stuck again.

Well, here comes my final suggestion for you: I would start looking at Quebec. It is a framework that developed from the ideas of the Norwegian framework and the UK framework, so it builds on some of the best ideas that we have for this area. And it’s your neighbour, you will have to collaborate with Quebec, obviously, and they are closer to you in geography and culture and, I guess, in many other aspects, so it would be the natural place to start. But I think you could simplify a bit. It is a good framework, but I would look for the opportunity to simplify.

And I would also – oops, wrong way. Oops. It’s hard to get this right. I would – and this may be fixed in the 2014 version. I’ve looked at the 2010 version, so there’s maybe done something. But I would put some more focus on value – less on resources, more on value from the beginning. That’s the one thing I would start with changing with the Quebec one, but then I would also try to look for simplifications. Apart from that, I think they have got all the good ideas, and they made a good framework out of it. But maybe a little bit to complex at this time.

But then the future doesn’t stop here. It will go on. And there’s a few things here that does change no matter what you do. And one of them is the digitization. You should start thinking about how to do this more and more at – actually try to start to think of this as purely digital, because that gives you, also, the opportunity for

total transparency. Again, back to what I think is the most important thing.

The digital tools will give you the opportunity to have the complete overview once they actually work, not just talk about it as is the situation today. But when they really work, it will give you the opportunity to really have the integrated work processes and the full transparency and access to all the information that you need as long as you are able to define what you need.

And work with the mindset. Structures are easy. Structures and formalities are easy to fix, easy to establish, easy to define, but the mindset – what do people think; how do they react – put that on the agenda and work with that from the beginning.

And learning – of course, I’m a professor, so learning and teaching is what I’m doing – research. So – but I’ve seen from the Norwegian – and I do see – I also review reports and papers from other countries. More and more countries actually start publishing results from their frameworks. So this is something that stands out as important. Make sure when you do have a system that creates all this data that is actually valuable when you can interpret them and understand them, then do that. Don’t let it go – pass by without any learning from it. That would be a waste.

Of course you should set high professional standards for collaboration. That is the trend these days. It’s not about competition and lowest price. Now it’s about collaboration, developing solutions together, finding the better answers. That’s what it’s – what’s happening out there, the way I see it.

And also, from the “Taming the ‘trolls’” paper, we realize that the effect of the system as a whole, it has a peak after a time when you’ve really gotten to know how to do it the best, and then it slowly deteriorates. So it has to be maintained, has to be changed from time to time, has to be improved as we go. That’s the wear and tear. We saw this in Norway and the UK. That was the two countries we had data from.

That was it.

**THE COMMISSIONER:** All right.

**DR. KLAKEGG:** Thank you for listening.

**THE COMMISSIONER:** Ms. Muzychka, questions?

**MS. MUZYCHKA:** I have a number of questions for you.

Just – I guess I want to start with two of the features that I see as being really the hallmarks of the Norway – Norwegian model, and that appears to be transparency and external review.

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** These seem to be two very important features that you discussed this morning.

I just want to talk a little bit about transparency and just get a sense or a little clarification as to what parts of a project are you referring to. Is it all – the budget, the progress, the planning stages? How far do you go with the transparency?

**DR. KLAKEGG:** All the way.

**MS. MUZYCHKA:** All the way.

**DR. KLAKEGG:** The only things that are not in there is the technicalities – I mean the technical solutions. And in defence, of course, there are a lot of restrictions in terms of what information can come out, so those are limited and that means that, all the secrets, they're put in an appendix, and the appendix is out of reach. But the report itself is open.

**MS. MUZYCHKA:** Okay, so does that include transparency from the beginning as the project proceeds, or is it all at the end?

**DR. KLAKEGG:** That is one thing that is actually an improvement potential in the Norwegian one. You could say that the QA1 is actually a little bit too late to capture the really, really early – let's say the early planning, the idea phase.

I think that the UK has one thing, the – that we should look at, the first intervention, the really early one, and I think also this is where the Netherlands might be also a helpful reference

because they have this as a part of the planning process from the beginning. We have sort of a – we have the planning process, and there's a lot of intervention in terms of involvement from stakeholders, but the QA system does not start until there's quite a lot of work already done, and this means that we might have missed the opportunity to do some corrections on a very early stage.

**MS. MUZYCHKA:** Okay, but in terms of the transparency aspect and making publicly —

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – available –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – the –

**DR. KLAKEGG:** All the –

**MS. MUZYCHKA:** – the idea of –

**DR. KLAKEGG:** – all the planning documents are also open.

**MS. MUZYCHKA:** Available to –

**DR. KLAKEGG:** Available to the public.

**MS. MUZYCHKA:** – to the citizens to review –

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** – and to voice any concern.

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** And then what about once you have budgeting set? Is that information – like a project budget. So we talked about that you have – you look at your base cost and then you –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – add the – the – I'm going to call them the forgotten or the ones that you didn't include, and then –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – there's the contingency for –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – change and then there's the management contingency.

So do you release all of that information, or is it simply the amount of information that you want the contractor to know?

**DR. KLAKEGG:** This is sort of a technical question.

So there are different practices. On the highest level, on the level of what is actually decided, everything is open, and all the QA reports are completely open. So what was suggested from the QA consultant is open –

**MS. MUZYCHKA:** So that would include –

**DR. KLAKEGG:** – including (inaudible).

**MS. MUZYCHKA:** – the budget.

**DR. KLAKEGG:** (Inaudible.)

**MS. MUZYCHKA:** The costing of the project.

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** But, of course, then you give the project to the agency, and the agency appoints a project manager, and these project managers, they're human; they're people. So they have different ways of doing this. Some of them would be withholding the information to make sure that they have the upper hand in negotiations, and then start their planning with – in terms of how they will – these people have the traditional approach to project delivery models, so they would go for competition and they would go for hiding information.

The other people would go for openness and to include – and it's the latest trend and the most noticeable progress in the latest couple of years is introducing best value procurement, where you actually go out and state all of these things before you go into the market.

**MS. MUZYCHKA:** And so how does the best value procurement work? Is that – do you receive bids, or do you receive –?

**DR. KLAKEGG:** You do receive bids after a procedure that is slightly different from all the traditional ones, and one of the – in this term, the most noticeable difference is that you actually tell them the upper limit before you start. So they need to deliver a bid within that limit or else it's off.

So it's –

**MS. MUZYCHKA:** Okay, so –

**DR. KLAKEGG:** – (inaudible).

**MS. MUZYCHKA:** – so they would know that the project –

**DR. KLAKEGG:** They would –

**MS. MUZYCHKA:** – is –

**DR. KLAKEGG:** – know

**MS. MUZYCHKA:** – \$5 billion –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – is our estimated cost with –

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** – for everything –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – and your bids must ...

**DR. KLAKEGG:** Mmm.

But, of course, there's lots of people that still works with the traditional approach because that's their experience, that's where they have their good results from. So they feel comfortable with doing that, and that's okay. As long as both parties agree that these are the rules we play by, fine, but the trend is very typical over to either best value procurement or a sort of – what do we call – the competitive dialogue, which is similar but a different procedure, and also to

negotiations in some – if it – if that is allowed within the area, public – the law for public purchasing.

**MS. MUZYCHKA:** Okay, 'cause one of the things that we've heard about releasing too much information about the –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – financial costs or the budget that the, you know, government has set aside for a public project, is this concept of red-meat syndrome. I don't know if you're familiar with that term –

**DR. KLAKEGG:** Not the term, but the – probably the concept.

**MS. MUZYCHKA:** The concept, you know, essentially that, you know, the contractors will see, oh, we've got this much money available –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – we'll basically build our costs in order to –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – to extract the maximum that we can from a project.

How do you –

**DR. KLAKEGG:** This –

**MS. MUZYCHKA:** – avoid –

**DR. KLAKEGG:** – is

**MS. MUZYCHKA:** – something like –

**DR. KLAKEGG:** – a –

**MS. MUZYCHKA:** – that?

**DR. KLAKEGG:** This is an opinion that we had from the beginning, that this is a fact.

But all the facts that we have discovered after we have collected these experiences, we see that that is not happening, so the projects actually deliver below expected cost systematically.

It is, of course, another question whether this level that we aim at is the optimal one. There is a risk that we aim too high. As I said, we aim for P85 to make sure that 80 per cent of our projects are within this cost frame, and that works, so we have control with the cost. But it doesn't mean that we wouldn't make it within, let's say, P75, just to mention a number.

**MS. MUZYCHKA:** Is that why you said that you think that the P85 is too high for projects and –

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** – that you, personally, would favour a lower number.

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** And is that to keep the –

**DR. KLAKEGG:** There's –

**MS. MUZYCHKA:** – parameters –

**DR. KLAKEGG:** – two –

**MS. MUZYCHKA:** – a little –

**DR. KLAKEGG:** – things –

**MS. MUZYCHKA:** – tighter?

**DR. KLAKEGG:** – with it. The one thing is the direct effect that has on the project, it might push the costs further down. So it might be optimal, I don't know, because we don't have that experience, but I – my – I think, from my opinion, that that would give cheaper roads, because it would be a more optimal level.

Now, on the other hand, it would add risk for budget overspend because it would mean that the budgets are harder to achieve.

So it's a give-and-take situation and you should consider that carefully.

**MS. MUZYCHKA:** To what would you attribute the success then – 'cause you did highlight a number of examples with the road projects –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – to – when you do have that level of transparency, that the projects do and can come in under budget?

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** What is it about the approach that you would say –?

**DR. KLAKEGG:** Well, I think it is the whole concept of everything you do is watched, so you'd better do a good job. There is a lot of focus from management, so you have the support and you do have the – your superiors watching, and you do get the resources and you know that if things happen – and you know that things will happen – there is always a procedure how to deal with that.

How to – when you really need it, you can actually go with the right argument and get an allocation that is enough to sort of handle the situation, and you'll still be within your cost frame up to when the reserves are used. And from what we see, actually, the experience is that they do, in general, come below the expected costs, so they don't use any of those reserves unnecessary.

**MS. MUZYCHKA:** Is that the result of public scrutiny, do you think?

**DR. KLAKEGG:** Yeah, I think that's a very important part of it. It's not the whole thing. As I mentioned also, it has to do with professionalism, which has increased a lot, and I think that is also a side effect; because it's so transparent and because there's so much scrutiny, people actually get better.

**MS. MUZYCHKA:** Okay, an interesting concept –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – for sure.

The other feature you talked about, of course, was the external review.

**THE COMMISSIONER:** Can I just – just before you go off of that topic on transparency ...

So, in Norway, if you – if this is a government project –

**DR. KLAKEGG:** Mm-hmm.

**THE COMMISSIONER:** – on the issue of transparency, would the decision-maker actually have complete knowledge of what that P85 or P75 number is?

**DR. KLAKEGG:** We always have this question of whether it is understood, whether these concepts are too difficult, not well explained, and I have to admit that we sometimes feel that we don't reach the decision-makers so well. So it's hard to get to a position where you can explain to them what these numbers actually mean.

So I think there's a challenge in terms of the decision-makers understanding the numbers they are given, and as a result of that, many of them ask for one number in the traditional way. They think there is one number that is the correct number which, to us, obviously, is not the case, and we would try not to give one number because that would mislead the decision-makers.

**MS. MUZYCHKA:** So the number that you would provide, or numbers, would be a range, depending on –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – the level of probability of risk.

**DR. KLAKEGG:** Of course there's plenty of different ways of giving this message, but the S-curves that I've shown examples of, they are standardized and always used as part of these documents that the decision is based on. And I know that some of the agencies have the practice of giving only bottom and top restrictions instead of telling what the expected value is, so they gave – give a range, as you mentioned.

**MS. MUZYCHKA:** (Inaudible) good?

**THE COMMISSIONER:** That's fine.



**MS. MUZYCHKA:** Okay, so in terms of the external review, the – this feature, I guess, of the Norwegian model and some of the other models, countries that you referred to, you seem to attribute to having success in terms of the project management, the outcome, success and so on.

Do you see a difference between having – and I suppose it wouldn't be external review if it was done in-house by a government agency –

**DR. KLAKEGG:** (Inaudible.)

**MS. MUZYCHKA:** – but how do you see the preferred approach to the review at each stage of the project?

**DR. KLAKEGG:** As I said earlier, I think there is – it's good to have a external element within the system. I don't think it's necessary to keep it all external as we did in Norway. I think it's good to build up this competency also inside the government or the agencies, but you have to consider the resources, whether the competence and capacity is available. You also need to consider how much, let's say, integration or learning you can have in between the external parties and the internal parties.

This is something we have also had a huge amount of focus on, is to have arenas where we meet and to discuss these issues between the industry and the government officials, and then there's also an arena where the different government parties discuss this in-house, without the industry.

So there's a – these are elements that also follows with the Concept Research Programme, that we do arrange for arenas for these individuals that are involved on government level and agency level and industry level to get together and discuss these matters.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** Learning.

**MS. MUZYCHKA:** So the external review happens at every stage of the project, right from –

**DR. KLAKEGG:** Not every stage.

**MS. MUZYCHKA:** – the initial concept phase and deciding whether or not it's an appropriate project for the –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – government to take on, and then it's also involved in scrutinizing the cost once a decision is made that this is, in fact, the right project for the public?

**DR. KLAKEGG:** The first decision is about the concept, not the project, but the concept.

**MS. MUZYCHKA:** The concept.

**DR. KLAKEGG:** How to solve the problem. This is the suggested best way to solve the problem –

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** – or to meet the needs.

**MS. MUZYCHKA:** So that goes outside of the –

**DR. KLAKEGG:** That's the first one.

**MS. MUZYCHKA:** – government.

**DR. KLAKEGG:** That's the QA1.

**MS. MUZYCHKA:** Right.

**DR. KLAKEGG:** That's all about, is this the right way to do it?

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** Then later on, the QA2 is about the project itself: Is the project developed so far that it is actually matured, that we know all the specifics we need to know, is it clear, is it ready to go into execution? So that's where the project itself is decision – or decided.

**MS. MUZYCHKA:** Okay.

And one of the things that, you know, seems to plague projects of –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – any large scale – even small scale, but certainly large scale – is cost overrun.

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** How do you ensure against cost overrun? Is it – do you look at – you know, at what stage – is there a guideline that you follow in terms of the degree of engineering, how defined the plans are and detailed, in order to ensure that you’ve got the best costs available?

**DR. KLAKEGG:** This is something that we discuss a lot.

Up to now, there has not been no detailed guidelines on how to do things, and I do think it will remain like that. We have a general guideline on what is good methodology for cost estimation, and there are also guidelines into how much should we expect of uncertainty related to those costs in different stages. But there’s no guideline that says you should do this and that and go in so much detail and – yeah, there’s no recipe that you should follow, because that is the responsibility of the agency. That’s their responsibility. So they give the guidelines.

**MS. MUZYCHKA:** Is there a guideline as to the degree or the amount of engineering? Like, we’ve heard evidence that some – to ensure that your project is properly costed –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – you need to have maybe 80 to 85 per cent of your engineering complete.

**DR. KLAKEGG:** We don’t have a specific norm or guideline for that.

**MS. MUZYCHKA:** But is it recognized that you –

**DR. KLAKEGG:** It’s recognized, yes.

**MS. MUZYCHKA:** – need a fairly high level of engineering in order to ensure your numbers are accurate?

**DR. KLAKEGG:** Yes, but, remind you, the effect of detailed information and the time that – it’s actually accurate.

We have the experience that accurate numbers early will actually be wrong numbers before you reach the decision. So there’s a question of how much is needed at this stage. Don’t push the details too early, because that’s just going to be wasted time.

**MS. MUZYCHKA:** Okay, so then at what point – once you’ve dealt with the concept and it’s been approved –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – then you look at the project itself –

**DR. KLAKEGG:** Yeah, that’s when you start to mature the concept into a project and that’s when you start to mature everything so that you find the correct numbers and the actual costs in the end.

And our challenge, as I mentioned, is to know enough to identify the right cost level in the very early stages. At concept stage, we are not certain that the correct level is reached so we have the same challenge that is handled with standard upheaval and correction factors in other countries. We have chosen not to use correction factors like that.

**MS. MUZYCHKA:** Okay.

Commissioner, I’m not sure when we were going to break for lunch.

**THE COMMISSIONER:** Okay –

**MS. MUZYCHKA:** I do –

**THE COMMISSIONER:** – (inaudible).

**MS. MUZYCHKA:** – have a few more questions though.

**THE COMMISSIONER:** Okay, well, maybe we’ll break now because it is – I just noticed it’s almost 20 to 1.

So we’ll break now until 2 o’clock.

**CLERK:** All rise.

**Recess**

**CLERK:** All rise.

This Commission of Inquiry is now in session.

Please be seated.

**THE COMMISSIONER:** All right.

All right, Ms. Muzychka, when you're ready.

**MS. MUZYCHKA:** All right.

This morning, just before we broke – this doesn't sound like it's being picked up. Does everybody hear me?

**THE COMMISSIONER:** Yeah.

**MS. MUZYCHKA:** Okay.

We were talking about probability factors and the difference and you had expressed an opinion, but I wasn't sure if we were clear on what you felt the appropriate number was when you said 85 was probably a little too high.

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** Did you have a specific number or were you just taking –

**DR. KLAKEGG:** No.

**MS. MUZYCHKA:** – my suggestion of 75 as being a reasonable one?

**DR. KLAKEGG:** That is a different number, and I don't have the correct number. I don't think there is a correct number, but I think there is a level that is too high and a level that is too low, and you have to consider what would be the correct or the optimal or the reasonable level for your conditions and your situation.

**MS. MUZYCHKA:** And I guess that would depend on the degree of risk that the owner –

**DR. KLAKEGG:** Exactly.

**MS. MUZYCHKA:** – is prepared to –

**DR. KLAKEGG:** Exactly. And the robustness of the economy, the state of the labour market, the political system, et cetera. There's many factors.

**MS. MUZYCHKA:** Okay.

One of the other things I wanted to ask you about is in one of your slides you had noted that people tend to focus risk, and not opportunities –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – and that a successful project requires a balance between them.

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** And you said in Norway you don't use the term risk, you look at uncertainties.

**DR. KLAKEGG:** Yeah. We use the term risk as well –

**MS. MUZYCHKA:** As –

**DR. KLAKEGG:** – but uncertainty to us is risk on one side and opportunities on the other. And you can't have one of them without the other.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** But if you only focus risk then your decisions will be unbalanced. So you always make safer decisions that you need to. You always will spend more money than you need to. You will always take a – have a tendency to the risk-averse side.

**MS. MUZYCHKA:** Now, opportunities aren't the same thing as mitigations where you mitigate risks and bring it down.

**DR. KLAKEGG:** No.

**MS. MUZYCHKA:** These are – can you give me an example of a type of opportunity that you would –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – factor in there?

**DR. KLAKEGG:** You could look at it this way: That risks and opportunities come in pairs. So every time you can identify a specific risk, you can usually also identify the opposite. The outcome that would be good, compared to the outcome that you think could be bad. So there's always this opportunity to look at these as – well, let's say, two sides of the same coin – if you like – in terms of a picture or a metaphor.

But as a concrete example, we had the new – we had recently the new National Museum, a huge, major project in our country and in our economic dimension. It was heading towards becoming too expensive. And it was, of course, based on the plans – the original plans that said we should design and build everything on site, it should be perfect, it should be the highest quality you could ever imagine, it should be there for 300 years, intact and functioning. So that's the quality level that they require for the whole construction.

When they came to the point that we needed to consider this is becoming too expensive, we cannot do this – there was an opportunity still to take the part of the building that was not for the public, not for the audience, but for the administration and for the preparations of exhibitions, things that are hidden from the public, they could produce the technical quality or standard for that part so that they could build it in a totally different technique. They could build it by pre-cost elements instead of the enormous and very high-level quality construction on site that was planned.

This saved them for – if I remember correctly, something like 60-million Norwegian kroner in one tiny decision and it was still time to do that without losing any time.

**MS. MUZYCHKA:** I see. Okay. So –

**DR. KLAKEGG:** That was something.

**MS. MUZYCHKA:** Yes. Okay. No, that helps.

We talked briefly this morning, too, about the inside-outside view and Professor Flyvbjerg was – had one particular view and –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – Lichtenstein [sp. Steen Lichtenberg] was the other –

**DR. KLAKEGG:** Well, he suggested the successive principle, which is a different take on uncertainty and risk which is – represents the inside view –

**MS. MUZYCHKA:** So if you –

**DR. KLAKEGG:** – with your own project.

**MS. MUZYCHKA:** And then take a percentage of those numbers.

**DR. KLAKEGG:** When you do a probabilistic estimation of your project or a stochastic kind of method to estimate the cost, you will always end up in an uncertain number. The result will be between a low level and high level somewhere and there will be always some sort of S-curve that describes this cost outcome. And this is similar in both cases. This is the fundament for both these views. There's no difference in that.

So the difference between the two views is that the inside view looks at your own project, where the outside view looks at the other projects, other similar projects, relevant projects that you can refer to, that you can learn from. They need to be similar in some respect that is relevant for what you can compare.

**MS. MUZYCHKA:** Right. I also noticed in the paper on reference class forecasting –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – that you provided me with. It's Exhibit P-04528 and it's at tab 7.

And in that paper there's some challenges to Professor Flyvbjerg's theory that cost overruns are a result of strategic misrepresentation and optimism bias –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – or deception and delusion as it was noted.

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** And there's some discussion there that that's oversimplifying these circumstances.

**DR. KLAKEGG:** It's not the – the problem is not about the understanding of the problem. It is the understanding of the means to correct that problem. That's where the difference is.

So, I think that all these researchers, although they sort of position themselves in two different communities: one claiming that the problem is the optimism and the political bias; the other one's claiming that the real problem is controlling and managing the project because the scope will creep, the changes will come, and this is too complex for humankind to handle.

So, but I think that these two views should be and can be combined. I think they are both right in their own ways. They focus two different things. Flyvbjerg and his colleagues, they focus what we as humans do and how we make decisions and our biases in terms of our cognitive ability to do that. Which is limited, obviously, we cannot see everything, we cannot understand everything, the complexity is a problem, so sometimes we make mistakes. Other times, we make deliberate mistakes by telling too low costs and claiming too big benefits because we, politically, have a system that may open up for that and it may give us the decision we want. So there's this reality in those views, so I support Flyvbjerg completely on that.

On the other hand, reality is that there is also changes and there are also surprises. And no matter how much planning we do, how much competence and experience we put in, there will be changes and there will be surprises. Our ability to handle that is also limited. So both explanations are valid in each – in two different perspectives.

When it comes to where I'm a bit critical, is – and that is the same that Dominic Ahiaga-Dagbui is concluding in his paper – that the response to this when you just use that just statistically, select a percentage, a number from statistics to add to the budget to sort of be safe enough, that's too simplistic because everyone will understand how to manipulate that. It's not a problem to get around that, it's – if you want to come up as the cheapest one, you just have to

take off 16 per cent more. If you wanna cheat, you can do that, it's not a problem. So, it doesn't help actually the decision-making problem.

**MS. MUZYCHKA:** Is that the – one of the criticisms of the reference class?

**DR. KLAKEGG:** Yes. And the other consequences, of course, that if you do that systematically, you add let's say 15 per cent, then the project is expected to become 15 per cent more expensive.

**MS. MUZYCHKA:** Right.

**DR. KLAKEGG:** And this is the thing that we don't know exactly, Norway even, what is the exact, right level.

**MS. MUZYCHKA:** I guess with the Monte Carlo-type modelling which leads to the probability analysis –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – that gives you more uncertainty or gives the contractors more uncertainty in terms of manipulating the numbers.

**DR. KLAKEGG:** No.

**MS. MUZYCHKA:** No? It does not?

**DR. KLAKEGG:** It helps us in avoiding that manipulation.

**MS. MUZYCHKA:** Yes. So that's what I meant.

**DR. KLAKEGG:** It's always – the problem is always when these – this information is hidden. When one party, and this is – this is what we call the agency theory. If one party does have the information and the other one does not, then it's a problem because then the party with the information can use that to manipulate or to position themselves to get, to win, as you – would appear, the game against the other party.

So, this is what we want to avoid. That's why we do these processes openly, involving the parties so that they have the same information. That's where the transparency comes in.

**MS. MUZYCHKA:** Okay. So, if you gave the contractors or the public the numbers that were generated through the probability analysis, you would say the target is P50 and that's where –

**DR. KLAKEGG:** Well, it's not just about the numbers, of course; it's about what are the conditions that lead to that number.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** Yeah. That's more important because that tells you where to look. Where are the uncertainties? What are the changes we are expecting? What can go wrong? What can be better? So, that – that's not in the numbers, but it is in the assumptions behind the numbers.

**MS. MUZYCHKA:** Okay.

So, I guess the – in your view, the main cost drivers would not be as simple as optimism bias or deception – trying to make a project fit within your desired parameters but – just reading the paper at 04528 – and it seems that there is a whole host of things that can contribute to its social organization, engineering, technical, environmental, political and economic sources, so they're really, you know – correct me if I'm wrong, but it doesn't appear that there's, you know, a one or two points as to why.

**DR. KLAKEGG:** No. So, my suggestion in this area is to do a thorough analysis with the inside view first. Know your own project before you look to the others. When you do look to the others, you should know what you look for. The cost level is only one thing. We look for other things. We compare elements of the project. Let's say it is a road project and we would probably look to reference projects for the whole cost, for parts – for elements of the cost to compare, to see whether this project is reasonably in line with what other projects have came up with or whether it's a difference that we need to look into, to explain, to find the reason why – is it the complexity, is it the nature, the climate, is it some sort of assumption about quality or the outline of the road itself, et cetera.

So we can compare on several different levels.

**MS. MUZYCHKA:** Test your numbers against –

**DR. KLAKEGG:** Test the numbers, see if they're above or below. And if they're different, you need to understand why. That's what we use it for.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** So we don't use the whole reference class forecasting because we don't have that much projects, we don't have data enough to put together a complete reference class so that's why we use reference projects. We see, we look at simple – let's call it benchmarking between projects and try to learn from that.

**MS. MUZYCHKA:** Okay.

Now I wanna turn your attention to the Concept 47 paper –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – which is at tab 3. And I guess that's the summary of the overview on which your –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – paper, your presentation today was partially based. And I note that you're noted as an author that's referred to in terms of your research or other papers.

Just looking at the UK experience –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – again and it seems that, from what I read, that the UK operates a scheme of mandatory quality assurance at various transitions between project phases.

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** And there's also a note that the UK has a much larger number of QA points during implementation and operation phase. And I think you might have mentioned that before, that there's –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – many steps. But it would seem that there's a fair amount of accountability that would follow after the initial, concept stage and the planning stage –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – to continue to monitor costing and progress and that sort of thing, which I'm not seeing clearly in the Norwegian models. So –

**DR. KLAKEGG:** That is correct. I –

**MS. MUZYCHKA:** – if you can kind of explain that in a little detail –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – because, intuitively, it would seem that – and maybe this is a North American view – but, you know, close oversight at each phase until you get to completion and then commissioning –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – and so on would seem to be a reasonable process.

**DR. KLAKEGG:** Yeah. It's not unreasonable at all and we have discussed this in Norway several occasions and we've come still to the conclusion that we don't want any more gateways or formal checkpoints –

**MS. MUZYCHKA:** Oversight points?

**DR. KLAKEGG:** – in terms of this quality assurance regime. But we do in terms of collecting data and collecting experiences, sharing knowledge and experiences about this project. We do that on the termination of the project itself and then later on for selected projects. Not for all, but for some that are interesting in some aspect, we follow up five years after or three or five years after the actual termination of the project to see whether it actually has delivered the benefits that we were looking for.

So they have also discussed this as the opportunity to introduce quality assurance number three, number four, et cetera. But we

have, in Norway, decided not to do that, at least yet. But following up over time is important.

**MS. MUZYCHKA:** So –

**DR. KLAKEGG:** So you should do that in one form or the other.

**MS. MUZYCHKA:** So the measuring of whether or not the outcomes are achieved happens after the fact –

**DR. KLAKEGG:** Yes.

**MS. MUZYCHKA:** – not along the way?

**DR. KLAKEGG:** We do the same thing in a way, but not in terms of the quality assurance system. It happens on another arena, the Concept Research Programme.

**MS. MUZYCHKA:** Okay, but does the government maintain control over the project as it's going through completion?

**DR. KLAKEGG:** These projects are public in the sense that the agency owns them – or actually the ministry owns them and the agency –

**MS. MUZYCHKA:** Yeah.

**DR. KLAKEGG:** – delivers them. And they will be – it will be overlooked or seen by the agency and reported to the ministry continuously, like the statistic that I've shown you for the road authorities.

**MS. MUZYCHKA:** Okay.

So they continue to be monitored –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – but there isn't the formal oversight process?

**DR. KLAKEGG:** Not in – not according to this system.

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** There are other internal systems that do the reporting.

**MS. MUZYCHKA:** All right, I understand.

In Canada, when I was reviewing the same paper – at page 99 is –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – is where the Canadian experience is noted. There's reference to a legislative scheme in Quebec that was adopted on public infrastructure which allows the SCT to produce directives in order to legally frame the governance of major infrastructure projects. And if we look at page 99 – right. It says: "... the Auditor general of Quebec plays an important role at a broader level. By reporting periodically about the state of the public projects, it forces political authorities to assess the situation and take measures to correct weaknesses in the framework."

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** And so it – also, if you go up further in the paragraph, it talks about reviewing the sponsoring ministry. It was responsible for producing the documentation and validating it. Essentially a means to keep a check on the –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – numbers, the schedule, the process and so on.

**DR. KLAKEGG:** Yeah. This is quite normal for many countries, that the Auditor General do the reviews and collect the data from the performance.

**MS. MUZYCHKA:** Are you aware of any of – I can't say that word – are you aware if there are any other countries that have legislative regimes in which the governance of public projects is imposed?

**DR. KLAKEGG:** Imposed in –

**MS. MUZYCHKA:** In like a – in Quebec, you know, this article notes that: "A new law was adopted" –

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** – "on public infrastructure, allowing the SCT to produce directives in order to legally frame the governance of major infrastructure projects."

So does that process – is there a legislative process in Norway or in Denmark or in the United Kingdom that you're aware of in which the process of governance of these public projects is similarly governed?

**DR. KLAKEGG:** I don't know well enough the details from Quebec –

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** – so I'm not able to say, but they're all, if not legislated, at least they sort of become mandated, and, for the most countries, they are obligatory for any project to go through. So there is normally a sort of – I don't know if the – legislation is the right word, sorry, but –

**MS. MUZYCHKA:** Okay.

**DR. KLAKEGG:** – they will be part of the mandatory system.

**MS. MUZYCHKA:** Okay, so if it's a mandatory system imposed, one would presume that there may be some legislative –

**DR. KLAKEGG:** I assume so.

**MS. MUZYCHKA:** – role that would – or policy –

**DR. KLAKEGG:** Mmm.

**MS. MUZYCHKA:** – which would require that projects over a certain amount or certain complexity or –

**DR. KLAKEGG:** Yup.

**MS. MUZYCHKA:** – whatever cut-off –

**DR. KLAKEGG:** I would –

**MS. MUZYCHKA:** – that would –

**DR. KLAKEGG:** I would assume that.

**MS. MUZYCHKA:** Okay.



**DR. KLAKEGG:** I'm not familiar with it.

**MS. MUZYCHKA:** Okay.

One of the things that I gleaned from reading the Samset paper, or this Concept 47 is – and correct me if you're – if I'm wrong, but it would seem to me that the focus on project control appears to be heavily weighted on the early stages, the front end –

**DR. KLAKEGG:** Yeah.

**MS. MUZYCHKA:** – and that if you do a good front-end analysis from making determination of the concept planning and then moving to the budgeting, then that's the majority of what's needed to be done to ensure success.

**DR. KLAKEGG:** Well, it's very important, but what we've become more and more aware of lately is, of course, the importance of having the right information, having the right data.

**MS. MUZYCHKA:** Right.

**DR. KLAKEGG:** And if you look at it in a sort of a future perspective, you'll see that there's a lot of new opportunities coming for collecting more and more precise data from the use phase, from the operational phase. So the ability to collect and analyze the precise information about what has happened before and what is the current situation is increasing. So I'm looking forward to being able to use that data in improving the front-end engineering and, of course, decision-making.

**MS. MUZYCHKA:** Okay.

Now, in cost estimation, on the Concept 47 report at page 117, there's – at the last paragraph on that page, it notes that "Only Norway and Denmark are operating with a budgeted cost that applies to project governance at the ministerial level and a lower target cost at the agency level."

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** "The figures are estimated by agencies and quality assured by external consultants and" they "form the basis for the final budget decision of the Parliament."

**DR. KLAKEGG:** Mm-hmm.

**MS. MUZYCHKA:** And, again, that talks about the P85 and P50, but does that mean that when it's at the ministerial level, the – I guess I'm not clear on the difference between the ministerial level and the agency levels. So the –

**DR. KLAKEGG:** Mmm. I can exemplify again with the Norwegian system. The ministry which is the proper owner of the project, they can control the whole budget, the whole – until its limit. That means the P85, minus the slightly unclear list of reductions. So it's somewhere around P85 maybe P80.

**MS. MUZYCHKA:** Plus or minus.

**DR. KLAKEGG:** Yeah, plus – not plus, but minus.

**MS. MUZYCHKA:** Not plus, minus. Minus.

**DR. KLAKEGG:** But then again, they will not give away everything to the agency because they want to remain in control of what happens in the future. Future development.

**MS. MUZYCHKA:** Right. Because that's the part that's not transparent.

**DR. KLAKEGG:** Yeah. Well, it is transparent to the point that we don't know what will happen in the future, but we know that the ministry will keep the difference between P85 and P50 under their own control.

**MS. MUZYCHKA:** Oh, I see, okay.

**DR. KLAKEGG:** So the agency gets P50, which is the expected cost of the project. And this is a simplification because P50 and expected cost is slightly different, but that's –

**MS. MUZYCHKA:** Yeah.

**DR. KLAKEGG:** – statistics.

They're close, and, of course, that means that there is a delta, there is an amount of money, a reserve, on the ministerial level that they can make decisions about the future as it occurs, as the right arguments come up, and I was stating earlier it's so important to decide what criteria,

what arguments are okay to use to take from that reserve. That should be decided in the beginning.

Then the agency, which only can control the expected cost, they can also do the same trick towards their project managers. They give them only P45 or P40 or whatever they would choose to give to stretch the performance of the project manager.

**MS. MUZYCHKA:** Right, they give themselves a buffer.

**DR. KLAKEGG:** They give themselves a buffer so that they can also, let's say, have room to manoeuvre when the future shows that these assumptions that we made in the beginning are not exact, they are changing or they are slightly different and that costs more money than expected and then they do actually have a reserve to take from. Also this one should be – criteria to take from that should be defined from the beginning.

**MS. MUZYCHKA:** Okay. And does that work the same way using the Danish model, where they don't use the probability factors but they just use – add 20 per cent for calculated risks and other 15 per cent or what have you?

**DR. KLAKEGG:** The principal difference is in the 20 per cent, which is a standard factor. It doesn't have anything to do with the project; it's 20 per cent no matter. So it didn't come from the actual assumptions or situation around this project; it's kind of a statistic factor that says every project tends to be 20 per cent more expensive so we put – set aside 20 per cent.

**MS. MUZYCHKA:** Okay.

One of the things I noted in the "Taming of the 'trolls'" paper – that's P-04440 – is a reference at page 4 talking about in the UK projects – one of the reasons to subject projects "to external view on an empirical basis to avoid optimism bias." So that must be a measure recognizing that optimism bias –

**DR. KLAKEGG:** Hmm.

**MS. MUZYCHKA:** – is a natural human condition and one way to try and curb that, I guess, is to –

**DR. KLAKEGG:** Hmm.

**MS. MUZYCHKA:** – have an external reviewer –

**DR. KLAKEGG:** Exactly.

**MS. MUZYCHKA:** – who's not too close to the project.

**DR. KLAKEGG:** Exactly. It has the same effect as looking at other projects in terms of a reference-clause estimation or as a reference-clause analysis. You put in an expert that has this experience from other projects which he shares with your project, so it's, sort of, a light version of reference clause, just bringing in the person, not the data.

**MS. MUZYCHKA:** Okay.

And there's also reference at page 11 of that same article talking about warning signs –

**DR. KLAKEGG:** Hmm.

**MS. MUZYCHKA:** – and the conclusions that there are no ultimate warning sign that predicts project failure.

**DR. KLAKEGG:** Exactly.

**MS. MUZYCHKA:** And –

**DR. KLAKEGG:** Yup.

**MS. MUZYCHKA:** – that the reasons are contextual. So I wonder if you can explain that a –

**DR. KLAKEGG:** Yup.

**MS. MUZYCHKA:** – little bit.

**DR. KLAKEGG:** When we – this is – one of the books that you showed us this morning –

**MS. MUZYCHKA:** Mm-hmm.

**DR. KLAKEGG:** – *Early Warning Signs in Complex Projects*, when we started that work, our idea was that we would like to find the one early warning sign that tells you that this project is going to fail. We actually thought that there would be one or a few indications that you – could tell you from the beginning that this is going to fail.

But we – we failed to find such a criteria; there isn't any. There's so many different reasons why projects can fail, and there's so much differences in the contextual situation, in the projects themselves, in the way people respond, that you always have to have an open mind to the situational things in each project. So we couldn't identify one or a few particulars but we shifted the focus in that report from finding specific signals to discuss how should we look for early warning signs.

**MS. MUZYCHKA:** And how early is early in terms of early warnings signs? Do you look at it from –

**DR. KLAKEGG:** Yeah, good question.

**MS. MUZYCHKA:** – the beginning? Or do you assume after you've reached the point where you've had a thorough, conceptual analysis and you've done your thorough, externally reviewed project plan and cost, is it from that point forward, or do you look back to the very beginning and see are there any points of early warnings signs there?

**DR. KLAKEGG:** The last assumption is correct. We can look at any time, any point in time and look back, look forth. The point is that we look for the early signs of a development. There can be developments at any point, but it's so important to look from the beginning, from the very beginning. Because, of course, that's where it all starts. So as early as possible, you need to identify the signs that this is going off the track or in a different direction than expected.

**MS. MUZYCHKA:** But things can change, the climate can change –

**DR. KLAKEGG:** Exactly.

**MS. MUZYCHKA:** – economic –

**DR. KLAKEGG:** Yeah –

**MS. MUZYCHKA:** – oil prices can change –

**DR. KLAKEGG:** – and you need to –

**MS. MUZYCHKA:** – et cetera.

**DR. KLAKEGG:** – identify that as early as possible, and this might be on day one, or day 10 or day 5,000, it doesn't matter. It's still early if it's the earliest sign of a development that is relevant.

**MS. MUZYCHKA:** Okay.

So there isn't one thing, it's going to vary contextually with each project, each –

**DR. KLAKEGG:** Exactly.

**MS. MUZYCHKA:** – country, each circumstance, each –

**DR. KLAKEGG:** Yeah –

**MS. MUZYCHKA:** – economic climate.

**DR. KLAKEGG:** – and as I mentioned earlier, that's why the formal analysis is limited in terms of this ability to see this, because in the analysis, we follow the method, we follow the guidelines and we ask the questions that we are trying to ask. Actually the signals lies in the things that you don't ask. The things that slipped your mind and the things that fall in between chairs, that's where you should look.

**MS. MUZYCHKA:** Okay.

One final question from me is: How do you, based on the Norwegian model, measure success? How is that determined? At the end after you have done – your project is completed and you do your follow-up review, how do you judge whether or not the objectives have been met and –?

**DR. KLAKEGG:** We have to look at the project in different perspectives. And the first and the short-term perspective is the project itself. Does it deliver within cost, time and quality as you audit? So, that's the narrow and short-term criteria. Then the next perspective is:

Did it deliver the outcomes that the users need and want? Is it in line with what we expected in terms of capacities, functions and quality for the user?

Does it – and let's take roads again. Does it reduce the travel time as much as expected? Does it give the safety that we were heading for? Is it environmentally friendly and et cetera, et cetera? So it's about functions and capacities and capabilities. And then the third perspective and the really, really difficult one is: Does it give to society the benefits that it should in terms of why we actually built this road?

So it has to do with does it give better economy for the industry? Does it give better places to live, shorter (inaudible) getting in and out of town for work? Does it really have the effects that we used as the argument to do this investment? This takes time. This is a long-term thing. And when you come to let's say five years after the project, the real challenges then to identify is this development that we can see, does it really come from that project or does it come from other things that we've done in that same period?

**MS. MUZYCHKA:** Okay. Thank you.

**THE COMMISSIONER:** All right.

Province of Newfoundland and Labrador.

**MR. LEAMON:** No questions, Commissioner.

Thank you.

**THE COMMISSIONER:** And Nalcor Energy.

**MR. SIMMONS:** Good afternoon, Doctor. Dan Simmons, lawyer for Nalcor Energy. I do have some follow-up things for you. It was a very interesting presentation all morning and into this afternoon. So I'm going to refer to some of the slides from your presentation –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – some of the pages – kind of to anchor a few things that I want to ask you about.

**DR. KLAKEGG:** Okay.

**MR. SIMMONS:** So I'd like to go first – and the exhibit number, I think, is 04438, Madam Clerk, page 8. 'Cause I notice the version you're using didn't have the Commission's page numbers on it, but we do have one that's numbered sequentially, so I think –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – it's page 8 I'm looking for.

And, Madam Clerk, I don't know if you can turn up –

**THE COMMISSIONER:** Page –

**MR. SIMMONS:** – page 8 –

**THE COMMISSIONER:** Yeah, just bring up –

**CLERK:** Page 8.

**THE COMMISSIONER:** No –

**MR. SIMMONS:** That's page 8.

**THE COMMISSIONER:** – you're in the wrong one. Go to 04438.

**CLERK:** Oh, sorry.

**MR. SIMMONS:** 04438, yeah.

**CLERK:** That's 04438.

**DR. KLAKEGG:** Are we referring to the version with comments or without?

**MR. SIMMONS:** I'm referring to the version –

**THE COMMISSIONER:** I think that's the wrong one.

**MR. SIMMONS:** – that has the exhibit number on top, Madam Clerk –

**THE COMMISSIONER:** Right.

**MR. SIMMONS:** – and the page numbers on the right-hand side, 'cause we can't see the page numbers on the ones that the witness used in the presentation.

**THE COMMISSIONER:** You – your – the numbers you have them as, Marcella, may be different because the one that I have is the correct one.

**MR. SIMMONS:** No, this one will work – if we go to page 8 there.

**THE COMMISSIONER:** That is –

**MR. SIMMONS:** There we are.

**DR. KLAKEGG:** (Inaudible), yeah.

**MR. SIMMONS:** Thank you.

So I just want to – this diagram, as I understand it, sets out kind of conceptually the way that – where the quality assurance program that you’ve described fits into public infrastructure construction in Norway.

**DR. KLAKEGG:** And other industries as well.

**MR. SIMMONS:** And other industries as well.

**DR. KLAKEGG:** Yep.

**MR. SIMMONS:** Good. And the PMO, you’ve told us, is the Prime Minister’s Office –

**DR. KLAKEGG:** Yep.

**MR. SIMMONS:** – and do I understand correctly that the quality assurance program that you’ve described for us, that is a program that rests inside the government and, specifically, responsibility for it rests within the Prime Minister’s Office as shown on this diagram here?

**DR. KLAKEGG:** It is by orders of the Prime Minister’s Office that this is implemented and used to assure success in our projects.

**MR. SIMMONS:** Right. So if we had – if there’s a public project in Norway – it’s a road tunnel, for example –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – if I understand correctly, the responsibility for proposing the project, carrying it out, overseeing the construction,

delivering it, would reside within one of the government ministries, whichever –

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** – one is responsible for –

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** – road construction.

**DR. KLAKEGG:** Transport.

**MR. SIMMONS:** And then the Prime Minister’s Office provides a level of oversight in providing this quality assurance function on the – to ensure the activities that are carried out by that ministry in relation to that project.

**DR. KLAKEGG:** The Prime Minister’s Office is not, let’s say, actively involved in –

**MR. SIMMONS:** No.

**DR. KLAKEGG:** – the quality assurance, as such. No.

**MR. SIMMONS:** Yes. Okay.

So for the initiation, then, of the work that has to be done for QA1 –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – does the sponsoring ministry – are they the ones who are responsible for initiating those activities and ensuring –

**DR. KLAKEGG:** That is correct.

**MR. SIMMONS:** – they were carried out?

**DR. KLAKEGG:** That is correct, and the gatekeeper is the Ministry of Finance.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** Because they have the contract with the consultants that actually does the work, but the order to start the process comes from the sponsoring ministry.

**MR. SIMMONS:** Okay. Because it’s just some of these mechanics I want to make sure that I –

**DR. KLAKEGG:** Hmm.

**MR. SIMMONS:** – understand.

**DR. KLAKEGG:** Good.

**MR. SIMMONS:** So, if the Transportation ministry has a road tunnel –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – that they want to build. They propose it.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** And the responsibility, then, for making sure if the quality assurance activities are carried out – that rests with the Ministry of Finance?

**DR. KLAKEGG:** The Ministry of Transport will then suggest to the Ministry of Finance that –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – this project will be lifted up for decision.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** The Ministry of Finance will accept or not accept or they discuss whether to accept this for decision –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – and if they decide, together, that this is mature enough that we will start the process. The Minister of Finance will give this assignment to one of the framework contracts – one of the consultancy groups that does this kind of work.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** So, they will then start to prepare and deliver a report after. So (inaudible).

**MR. SIMMONS:** And, unlike the UK, for example, the Norwegian government –

**DR. KLAKEGG:** Hmm.

**MR. SIMMONS:** – does not maintain its own in-house expertise for the actual conduct of the quality assurance work that's necessary for QA1 and QA2.

**DR. KLAKEGG:** This is debatable –

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** – because they – if you would look at it as a – sort of, a shadow process – there's the internal process and there's the external process. And, actually, they do the same things.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So, some – my – considered this unnecessary in terms of doing it twice.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** And, personally, I've been thinking, sometimes, colleague – especially with the QA2 – that you might not have to do the whole process again as an external – given that the internal process did the same thing just a few months ago. But, of course, if you do it with other people – with other knowledge, other data, other experiences – you might get different results.

**MR. SIMMONS:** Okay. Let me use the road tunnel example now –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – because I'm not sure I'm getting the mechanics of –

**DR. KLAKEGG:** Okay.

**MR. SIMMONS:** – what the steps are –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – and who's responsible for the different steps.

**DR. KLAKEGG:** Okay.

**MR. SIMMONS:** So, the road tunnel project will have an estimated cost –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – that’s going to be used to build the budget and the proponent of the tunnel, the Transport department, will, I presume, primarily, be responsible for building an estimate or having an estimate built that can be used in order to put in place the proposed budget for the project. Am I right so far?

**DR. KLAKEGG:** That is correct.

**MR. SIMMONS:** Okay. So the quality assurance process – and this would be a QA2 –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – ’cause that’s where we’re dealing with the budget –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – right? At QA2, does the Ministry of Finance retain one of these private consultants –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – to then go do quality assurance on the budget?

**DR. KLAKEGG:** Yes, on the proposal.

**MR. SIMMONS:** On the proposal.

**DR. KLAKEGG:** It’s not budget yet, but on the –

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** – proposal –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – for the budget.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** Now, there’s a couple – I’d suggest maybe there’s a couple levels of depth that we can go into –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – in doing the quality assurance on the budget proposal. One would be to look at the way the department of Transport went about it –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – to ensure that they’ve used appropriate processes, that they had qualified people do it –

**DR. KLAKEGG:** Yup.

**MR. SIMMONS:** – and say, yeah, they’ve gone about it right, so we can trust their budget.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** The other way would be to go and do kind of a shadow budget.

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** Go separately and get estimators and build it up and do their own risk analysis and figure out how much contingency to put on it and do all that.

So in your QA regime –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – is it one or the other? Some combination?

**DR. KLAKEGG:** It is one.

**MR. SIMMONS:** Does it vary?

**DR. KLAKEGG:** It is the latter.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** They do a complete analysis of the whole project and comes with their own analysis –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – independent of the one made inside –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – government.

**MR. SIMMONS:** Yes.

Now, projects come in different shapes and sizes.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** And does the – and doing this kind of second complete analysis – and we're –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – budget as an example –

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** – of course – costs money to do it. Especially –

**DR. KLAKEGG:** Yup.

**MR. SIMMONS:** – if you're hiring an outside consultant to do it.

**DR. KLAKEGG:** That is true.

**MR. SIMMONS:** So when you have projects of different sizes or complexities does the – does that affect how much the Norwegian Ministry of Finance is willing to spend on doing that kind of QA activity?

**DR. KLAKEGG:** Well, they have been willing to use quite a lot of resources and –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – money to do this.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** And even time, because it takes time –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – take months. And the reason why they have wanted to do that is, of course, the outcome.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** The improved quality of the documents and the better decisions and the success of the projects. And –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – and less overspend on the budget, to be specific.

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** But of course, I've looked at it over time, and I think there are possibilities for simplification and to reduce the use of resources. In terms of having two completely parallel processes doing the same –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – mm-hmm – maybe we should not have to do that every time. Maybe that would be a thing we could reduce on some projects where it's a standard project. Where it's not very unusual or complex or critical –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – then it might not be necessary. So there's potential for reduction of resources, and, you know, also it could have been done faster if you really put your mind into it, so time, as well, could be reduced, that – there is potential, definitely.

**MR. SIMMONS:** Okay.

Now, on this graphic on page 8 there, in – the white boxes include other ministries, agencies and regional authorities.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** So can proposals for projects originate from either three of those –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – those groups?

**DR. KLAKEGG:** Yes, and traditionally it has always come from the bottom up.



**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Traditionally it was always from the regional authorities. These days, there are various processes and various ways a project can –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – to the surface.

**MR. SIMMONS:** Right.

Now, I'm sorry to say I'm not very familiar with the Norwegian political system as I should be. Canada is a federal system. We have 10 provinces which are, you know, the equivalent of states with certain –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – certain political rights.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And each province has its own government, its own legislature, and we have the federal government in Ottawa.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** Britain, the UK, I know, is a unitary –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – system where there is one Parliament –

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** – and there are counties, but really the single Parliament and the national British government is responsible for most of government activities –

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** – I think in the UK. Where does Norway fit?

**DR. KLAKEGG:** It fits more with the UK version.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** We have one state, one government, and it's responsible for the –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – for the whole country.

But there – if we specifically talk about roads, there is a reform coming up where the responsibility of roads – it has, actually partially – the ownership has partly already been transferred to the regional authorities.

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** But now we even transfer the operational responsibility, which has been residing within the Public Roads Administration up until now.

**MR. SIMMONS:** Right.

So for the purpose of the quality assurance program that you've told us about –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – that has operated in Norway on a national level –

**DR. KLAKEGG:** National level.

**MR. SIMMONS:** – rather than being separately administered by regions or other agencies –

**DR. KLAKEGG:** That is correct.

**MR. SIMMONS:** – or any subdivision, okay.

Does that give any kind of advantage of scale, where there is a single program so that expertise can be built up because of the number of projects that will come through –

**DR. KLAKEGG:** That is –

**MR. SIMMONS:** – to be examined?

**DR. KLAKEGG:** – probably true, and that's why the Concept Research Programme comes in, where –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – you have one place to sort of collect these experiences, analyze them and come up with conclusions and suggestions for improvement and the documentation of what are the real effects.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** So I think that there is some sort of scale involved. I think if you leave it for each region, which will probably from – in formality be the reality after this upcoming reform in the road sector, you might not have the same uniform quality in this planning and budgets process.

**MR. SIMMONS:** Okay.

So I want to look just very briefly at QA1 and QA2 for a couple of questions, and if we can go –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – to page 6, first, please? So this is your graphic showing the QA1 assessment.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And you've explained that this is where the concept is evaluated.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And from looking at the box on the upper right, I see that it includes the analysis of alternatives, which I presume would be different ways to carry out the conceptual objective. You're nodding, yeah.

**DR. KLAKEGG:** It is different concepts for how to solve the problem, yes.

**MR. SIMMONS:** And I don't see cost assessment in that box. To what extent does performing quality assurance on cost estimates come into play at this QA1 stage?

**DR. KLAKEGG:** It is there. It is part of the analysis of the alternatives.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** We need to know what they cost, what the risks are and what the benefits are. So you need to do the whole round of analysis.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** But, of course, it's not detailed like in QA2.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** It's not precise.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** It's an early stage.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** And, of course, we have the challenge that these estimates are often not very precise.

**MR. SIMMONS:** So how do you deal with that, then? Because if you're selecting between alternatives and you don't have very precise estimates, isn't that problematic?

**DR. KLAKEGG:** Not so much.

**MR. SIMMONS:** Doesn't that risk choosing the wrong one?

**DR. KLAKEGG:** Not so much as to choosing the right or wrong one.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Because we do treat them similarly.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So they are – if one is wrong, the other one is wrong as well –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – but it doesn't change the prioritization between them.

**MR. SIMMONS:** So the importance then is to apply, as close as possible, the same or similar criteria –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – to the development of the estimates to reach an alternative.

**DR. KLAKEGG:** That’s very important. And you do not go into detail on one alternative and leave the others on a sketch level.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Never do that.

**MR. SIMMONS:** And if we go then to page 7, please.

This is QA2 –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – and do I understand that this would be the point at which a decision is being made to narrow the project to one strategy or one approach or one selected alternative?

**DR. KLAKEGG:** The alternative was chosen or selected at (inaudible) –

**MR. SIMMONS:** Was selected at one, yes.

**DR. KLAKEGG:** But this one is the mature version of that selection.

**MR. SIMMONS:** Okay, yes.

**DR. KLAKEGG:** In the form of one suggested particular project.

**MR. SIMMONS:** Right, so is –

**DR. KLAKEGG:** With its cost and time and everything, and all the technical details needed to actually perform it.

**MR. SIMMONS:** So this is the point, is it then, when the decision is made whether to proceed with actually carrying out –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – and executing the project?

**DR. KLAKEGG:** Yes, exactly.

**MR. SIMMONS:** And there are – the next box after your QA2 decision there says, “Detailed engineering.”

**DR. KLAKEGG:** Mm-hmm. Yeah.

**MR. SIMMONS:** Now, you were asked some questions about level of engineering –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – that would be expected to have been carried out or level of project definition is something else we’ve heard, that would be expected to be carried out. Can you tell me a bit more about what level of engineering you would expect to be achieved at the QA2 decision point, versus what then goes into the detailed engineering to be carried out after?

**DR. KLAKEGG:** Yeah. That’s a good question, and it’s actually different from sector to sector. This is one of the items that are slightly different.

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** In a building project, the pre-project would come up with a – what we in Norway – we have a standard that delivers the cost details in three levels. And in buildings, this would be level 2, where the complete detailed one is level 3.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** In roads, which are slightly different because they have to be already through the local authority’s approval. And in – to do that, they do planning on a level that is similar to or equivalent with level 3, so they are actually very detailed already.

**MR. SIMMONS:** Right, so that’s a feature of the process that exists separate and apart from this QA process?

**DR. KLAKEGG:** Exactly, yes.

**MR. SIMMONS:** Okay, which brings them to a higher level at that point.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** Yeah. If you have a project of greater complexity, something that's more unique –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – buildings come in various combinations of predictable elements and –

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** – roads kind of do, too, I think, in a way, sometimes.

**DR. KLAKEGG:** In – to some extent, especially when there's bridges or –

**MR. SIMMONS:** Mm-hmm. Yeah. Let me give you something like a port redevelopment, where you might have various types of infrastructure, electricity –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – supply, roads, specialized wharves, docks. If you're doing something comprehensive like that –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – how would the level of expected project definition and engineering apply at QA2 for a project like that, versus what goes into the detailed engineering after?

**DR. KLAKEGG:** This is where we would probably see that the QA1 and QA2 differs.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** It's not the same thing that comes to QA2 that – originally, was in QA1.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** In QA1, they would consider the whole package.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** The whole complexity of every item that will be built, planned and executed in this initiative. When you come to QA2, they would probably give you one project for a specific role, one project for a specific construction or building, one project for special – the energy network, et cetera.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** So that's –

**MR. SIMMONS:** So –

**DR. KLAKEGG:** – how one QA – one QA1 could end up in being three, four, five, in principle, projects as QA2.

**MR. SIMMONS:** So for those projects when they reach the QA2 stage, then, do you expect the engineering design to be complete?

**DR. KLAKEGG:** For QA2, yes. But not in detail that is – you could say, the detailed engineering, to us, means the actual worksheets –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – actually this is what you build.

**MR. SIMMONS:** Hmm.

**DR. KLAKEGG:** So the tiniest details, they're not there yet.

**MR. SIMMONS:** Right. So the plans and specifications that would to be handed off for contractors to bid on –

**DR. KLAKEGG:** To bid on, yes.

**MR. SIMMONS:** – would they be done at –

**DR. KLAKEGG:** They would be –

**MR. SIMMONS:** – at QA2 or would they follow –?

**DR. KLAKEGG:** They would be at QA2, yes, exactly.

**MR. SIMMONS:** Okay. The –

**DR. KLAKEGG:** I have to – if it is a traditional delivery model.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** Okay. So that may vary, all right.

Now, this – the overall quality assurance model program that Norway has, that's administered through the Ministry of Finance – and I'm still not clear, but there is a – somehow the Prime Minister's Office has some involvement as well.

**DR. KLAKEGG:** They ordered the system.

**MR. SIMMONS:** They ordered the system, so they're responsible for the design of the system.

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** Ah, now I understand. Okay.

So governments, of course, have political elements.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** Governments change, there are elections.

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** Sometimes one government has a very different political outlook than another government.

**DR. KLAKEGG:** That is true.

**MR. SIMMONS:** What has Norway's experience been as far as the relative consistency or stability in being able to maintain this QA philosophy, an approach in place over – I don't know if there's been any changes of government in the meantime – but with changes in government and changes in political approach?

**DR. KLAKEGG:** There has been several changes of government and it has remained as is –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – through all those 20 years.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** I would not have guessed that it would survive in this form –

**MR. SIMMONS:** Why not?

**DR. KLAKEGG:** – from the beginning. Because it was controversial and Norway's second biggest political party was actively arguing against it –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – and has from time to time brought it up again that this is a waste of money, that we shouldn't spend this time and money on doing this.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** But it has survived. They are also in government at the moment.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So they're in position now, not in opposition –

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** – like they were when it started. But now they're in position, and they have kept it. And I believe that is because the experiences are so good that this is stable.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** And also, keeping it on a very high level gives it stability. That was the idea of anchoring very high.

**MR. SIMMONS:** So is it fair to say, then, that political support is important in order to maintain the consistency and stability for a program like this?

**DR. KLAKEGG:** I think – the way the Norwegian one is put together, yes.

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** You could do like Sweden have done and avoid that.

**MR. SIMMONS:** Mm-hmm.

Maybe we can just go to page 12, please, Madam Clerk.

So you've listed here the total number of projects that have been through the process in Norway.

**DR. KLAKEGG:** This is 2017, so they will be higher today.

**MR. SIMMONS:** Higher now, yes. And it does strike me as a large number, 252, at –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – this point. And I wonder – there is a slide later on, I think, that has some monetary threshold value for when a project is – when this –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – QA process is triggered.

**DR. KLAKEGG:** (Inaudible.)

**MR. SIMMONS:** And I think it was 750,000 Norwegian kroner.

**DR. KLAKEGG:** That was the previous round.

**MR. SIMMONS:** Mm-hmm. Okay.

**DR. KLAKEGG:** Now, it has changed from time to time, so it's the third version now. It started out 20 years ago as 500,000. Then it was 750,000 until the last round, now it has gone to 1 billion.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** But there is another change that came, and that is the threshold value for IT project went down.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So for IT project, the threshold value went down, I think – if I (inaudible) 300 million.

**MR. SIMMONS:** So is there any criteria, other than the budget value, that triggers –

**DR. KLAKEGG:** Well, it is –

**MR. SIMMONS:** – this quality assurance program?

**DR. KLAKEGG:** It is whether the agency is within or without or outside the system.

**MR. SIMMONS:** Mm-hmm.

So if the sponsoring agency is one of the ones within the system and it has any infrastructure project that meets that particular value, it's in, and this quality assurance –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – process, administered by the department of Finance, then applies.

**DR. KLAKEGG:** Exactly. And it's not – it is enough if only the cheapest alternative is –

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** – (inaudible) is beyond that value, then all alternatives have to go through.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** So it's the –

**MR. SIMMONS:** Yeah, yeah.

**DR. KLAKEGG:** – very cheapest one. And you're not allowed to divide it into two projects to avoid it or – that there's no way around it.

**MR. SIMMONS:** (Inaudible.)

Now, Google, this morning, tells me that 750,000 Norwegian kroner are about \$115,000 Canadian.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** Which doesn't strike me as a very high threshold to trigger this degree of administrative process.

**DR. KLAKEGG:** That's why we have the high number of projects.

**MR. SIMMONS:** Mm-hmm. Okay, yeah.

**DR. KLAKEGG:** But you need to consider whether it's too much. What is much in your economic reality can differ much from what is much in our. And also the use of resources should be considered, yeah.

**MR. SIMMONS:** Page 13, please. And I'm not working all the way through your presentation. (Inaudible) a few slides at the beginning.

So this was where you told us about the Norwegian experience at QA1, which is this conceptual screening stage before –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – we've got well-defined estimates and so on. And you did identify here that it is possible for a project to fail to pass through QA1.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** But I – it does look like four out of five projects make it through. So it seems to me that there's a fairly high success rate for projects that are examined –

**DR. KLAKEGG:** Yeah. That's true.

**MR. SIMMONS:** – at QA1.

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** Now, once we move beyond QA1, for the projects – the 80 per cent that move on – I don't know if all of them make it to QA2, but can you give me some idea of what the approval rate is once a project reaches QA2?

**DR. KLAKEGG:** That's a bit more difficult. I must answer no, I don't know. But I don't think there's many that fails QA2.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** They might fail in getting the actual political decision to go further.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** That's a different thing. But they don't fail the QA2 –

**MR. SIMMONS:** Oh, I see.

**DR. KLAKEGG:** – as such.

**MR. SIMMONS:** So most of the projects that make it through QA1, and unless the plug is pulled for some political reason, the QA2 evaluation tends to approve them and then it becomes a political decision –

**DR. KLAKEGG:** Exactly –

**MR. SIMMONS:** – whether to proceed.

**DR. KLAKEGG:** – and QA2 is not about stopping the project, really. It's about –

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** – making it realistic. So it doesn't really – traditionally or up to now, it has not really asked the question: Is it still worth doing?

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** But that is introduced – as I can interpret from the latest version – this came in February 2019, so I haven't seen the result of it – is that there is an increasing focus on benefits.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** And this is an indication that we are starting to ask that question and this is – for me, that is really important and this is a step forward for QA2.

**MR. SIMMONS:** Mm-hmm. Okay.

We had a witness here last week who spoke to a certain extent about, you know, benefits that can flow from projects which are more indirect, you know –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – general economic benefits –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – to an economy, strategic advantages that might be gained from having a project executed, those sorts of things.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** Are those types of considerations taken in in the Norwegian process at either QA1 or QA2?

**DR. KLAKEGG:** Especially in QA1.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** That's where this is, actually, a very important part of it.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** And there are challenges still. We don't have models good enough to, sort of, pick up on all these effects.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So, there's always these discussions: Should we include more? Should we include less? Do we actually –

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** – see all the more indirect positive and negative sides of the projects when we do these analyses?

**MR. SIMMONS:** So, the Ministry of Finance, then, does it use a financial and economic modelling in order to –

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** – assess those factors?

**DR. KLAKEGG:** They do.

**MR. SIMMONS:** And – picky question again – does it have its own resources and staff to do

that or is that something that looks to consultants for?

**DR. KLAKEGG:** Both. Depending.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Because they do their own analysis and, again, the consultants comes in and do their own.

**MR. SIMMONS:** Right. Okay.

**DR. KLAKEGG:** They have – it is easier for the consultants, in the terms that they already have the analysis, that is made internally, when they make theirs.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** So, actually, they might look at the internal one, consider whether they would agree to the assumptions and all that and then they do their own –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – with their own data.

**MR. SIMMONS:** So, even though, ultimately, the decision – the final decision to go with the project after QA2 –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – will be taken at a political level.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** The government decides to do it.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** It sounds like your QA process gives the politicians information about other potential benefits that they can take into account –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – when they make that political decision.



**DR. KLAKEGG:** That is true.

**MR. SIMMONS:** Is true, okay.

Now, after QA2, you don't have another checkpoint or gateway in your QA process.

**DR. KLAKEGG:** Not formally.

**MR. SIMMONS:** Not formally.

**DR. KLAKEGG:** That means that it shifts to an internal process from there.

**MR. SIMMONS:** I see. Okay.

Page 17, please?

We've talked lots about cost estimates here –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – since we've been here in September.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And I'm still not sure if we all understand how it all works other than it seems to be there are some elements of building these cost estimates that are very common in many models that we've seen.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And there's some variations between them. So, here what I'm interested in here is getting a little bit more specific idea of how transparency, as we've talked about –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – is going to apply –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – to the different estimates that exist here.

So, if I understand, correctly, the base estimate level, which includes a base cost estimate and then an unspecified amount on top of that.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** That's typically the number that turns into the budget for the project execution team, the people who are going to build it?

**DR. KLAKEGG:** It doesn't necessarily have to be that amount of money, or it –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – could, by coincidence, be –

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** – that amount of money.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** But when it comes as input to the process –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – it is the sum of all the items identified necessary for building this road –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – or this – whatever it is.

**MR. SIMMONS:** Right, okay.

**DR. KLAKEGG:** So these are the known elements.

**MR. SIMMONS:** Mm-hmm. Okay.

And then the contingency on top of that to bring it up to the expected costs is arrived at as a result of some risk analysis process –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – I presume, in order to determine what have we not precisely specified that we can expect we're gonna have to spend to get this job done to a P50 probability –

**DR. KLAKEGG:** That is –

**MR. SIMMONS:** – level.

**DR. KLAKEGG:** That is true, and in addition to that, also, which assumptions are prone to change?

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Which prerequisites may not happen? All those items that might turn out to be different from what we expect today –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – have to be identified and put numbers on. How much would that, sort of, influence the cost, the time, et cetera?

**MR. SIMMONS:** And then there's an amount on top of that to bring you up to the proposed cost limit.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** And in the S-curve that you got later on –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – we see that the Norwegian process uses a P85 value –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – to determine that proposed cost –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – limit, and then there's another 15 per cent on top of that that no one funds, no one –

**DR. KLAKEGG:** No one –

**MR. SIMMONS:** – creates

**DR. KLAKEGG:** – funds it –

**MR. SIMMONS:** – a reserve –

**DR. KLAKEGG:** – because –

**MR. SIMMONS:** – for, but they –

**DR. KLAKEGG:** – the –

**MR. SIMMONS:** – know it's potentially there.

**DR. KLAKEGG:** The state is self-insurance in the sense that if it comes –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – it comes, and we'll have to deal with it, when it –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – comes.

**MR. SIMMONS:** Right, okay.

And in your view, that P85 value could be lower, resulting in a little bit more that the state would just have to bear as part of the reality of building a public infrastructure project.

**DR. KLAKEGG:** That's true, but the delta would then be free –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – for other prioritized –

**MR. SIMMONS:** Yes, okay, so it's a balancing there, yeah, right.

So, let's say we're talking about the budget, the entire budget for a project.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** In Norway, is the P85 value publicly known before the project goes to tender?

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** Is the P50 value publicly known before it goes to tender?

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** Is the amount that's given to the project team, if it's less than P50, publicly known before it goes to tender?

**DR. KLAKEGG:** The version that goes into the QA report is known to everyone that (inaudible).

**MR. SIMMONS:** Goes into the QA report?

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** Right.

Now, did I understand you earlier to say that the version in the QA report goes in, but, in fact, the administrators of the project may break it down differently –

**DR. KLAKEGG:** They can –

**MR. SIMMONS:** – than what's in the QA report?

**DR. KLAKEGG:** Exactly, they can do that.

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** And that is why you need to read this page 17.

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** The left-hand side is one thing and the right-hand side is a different thing.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** The left-hand side is before the decision and the right-hand side is after the decision and you might use a different breakdown –

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** – when you come to execution.

**MR. SIMMONS:** Is that different breakdown publicly known? And known –

**DR. KLAKEGG:** It may be. That depends.

**MR. SIMMONS:** It may be?

**DR. KLAKEGG:** That depends. There are different strategies.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Some tend to want the traditional process with hidden numbers and

competition and lowest price, others tend to go for openness, trust and integration, which will force them then to share these numbers and then they would request to be shared this similar knowledge the other way, of course.

**MR. SIMMONS:** But the quality assurance program, though, doesn't require either one or the other.

**DR. KLAKEGG:** No, no.

**MR. SIMMONS:** (Inaudible.)

**DR. KLAKEGG:** It's open to any model that you would prefer.

**MR. SIMMONS:** That's open to the project to determine that, right. Okay.

Now, some projects may be executed on an EPC model –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – so you're going to call one tender, get one contractor, that contractor's going to do everything.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** So there's one price so the contractor knows exactly what the budgets are –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – and they bid, presumably, within the budget.

Other projects, I presume, maybe tendered in stages or for different parts or for –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – multiple work packages and so on.

**DR. KLAKEGG:** There's all sorts of (inaudible).

**MR. SIMMONS:** In that case, is the breakdown of the P85 number –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – between say, pieces of the work that are going to be tendered separately.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** Is that publicly known in Norway?

**DR. KLAKEGG:** I would assume that most of the time.

**MR. SIMMONS:** Sorry?

**DR. KLAKEGG:** Most of the time I would assume that it is actually known or actually available if you (inaudible) for it. I don't think they go out publicly and spread it around, but I think it's easy to get if you're interested.

**MR. SIMMONS:** Okay.

**DR. KLAKEGG:** I say, there's no secrecy around it.

**MR. SIMMONS:** Mm-hmm, okay.

So just to make sure I understand it, so that sort of information wouldn't be in the QA2 report –

**DR. KLAKEGG:** The QA –

**MR. SIMMONS:** – which is public.

**DR. KLAKEGG:** – the QA2 report is made before the decision.

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** And after the decision –

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** – the agency can use whatever breakdown they would like to –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – that they see fit to get the best result.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** So that might be quite different from the QA report.

**MR. SIMMONS:** Right.

So if the agency then is going to tender a project in different work packages, they don't have to release their breakdown –

**DR. KLAKEGG:** No, no.

**MR. SIMMONS:** – to the contractors.

**DR. KLAKEGG:** They don't have to.

**MR. SIMMONS:** They can choose not to.

**DR. KLAKEGG:** This is the policy of the governments, they leave this to the agency to find the best way to execute their projects.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** Unlike UK, which gives you the guideline you should do this and that and that.

**MR. SIMMONS:** Mm-hmm. Okay, I see. All right then.

Okay, so you have – you've given us some information on other governance schemes as well, from other countries. And starting on page 58 – maybe we can go there for reference – you have made some comparisons between them. This one has your advice bullets on it, but it just is as a reference.

**DR. KLAKEGG:** The original is from, again, report 47, which I did not –

**MR. SIMMONS:** Yes, yeah.

**DR. KLAKEGG:** – take part in.

**MR. SIMMONS:** No, that's fine for our purposes. And just as a note here, when you say Canada – on the right – that's the Quebec –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – program that you're referring –

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** – to there –

**DR. KLAKEGG:** Exactly.

**MR. SIMMONS:** – right. As opposed to something general – of general application in –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – Canada.

So I spoke a bit earlier with you about Norway being a more unitary type of government and the QA process rests with the government of the whole country. Is that the same for Denmark, Sweden, the Netherlands and the UK? Is that (inaudible)?

**DR. KLAKEGG:** Yes, I think that is correct. It's slightly different level of government, but it's all –

**MR. SIMMONS:** Yes.

**DR. KLAKEGG:** – national –

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** – government.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** And whereas for Canada, the example you've used is the program adopted by a single province –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – of Canada which has its own legislative authority over these sorts of things.

**DR. KLAKEGG:** That's correct.

**MR. SIMMONS:** (Inaudible) rests there. Okay.

**DR. KLAKEGG:** I don't know the background for the choice, except I can think of that it was the only one available.

**MR. SIMMONS:** Right.

**DR. KLAKEGG:** And I know also the history that there was a bit of communication before the

Quebec version was established between Norway and Quebec.

**MR. SIMMONS:** Okay. So when I look at the relative sizes of these different – of the references you have here –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – population-wise, Norway – Google tells me – is about 5½ million people.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** And Denmark's about the same?

**DR. KLAKEGG:** A little bit more.

**MR. SIMMONS:** A little more. I didn't look up Sweden. Netherlands is 17 million, which surprised me.

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** And the UK is, I think 67 million or something.

**DR. KLAKEGG:** Something like that.

**MR. SIMMONS:** And even Quebec is over eight million.

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** Now, Newfoundland and Labrador is half a million people.

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** So that means that we don't necessarily have the same capacity for government programs and infrastructure. And it also may mean that we may not have the same volume of projects to be reviewed.

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** Now, I'm not saying that Newfoundland and Labrador shouldn't have a program like this. But I'm interested in your thoughts on whether there might be particular challenges that this province would face because of its relatively small size –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – and if you’ve got any comment or advice –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – on how that might be taken into account.

**DR. KLAKEGG:** I think that you will have a challenge in finding all your projects to be socially, economically viable. I think you will have a challenge in finding – the population is so small that it will look extremely expensive no matter what you do to – when you suggest a new road or another big project. Per capita, it will seem –

**MR. SIMMONS:** It’s the QA system I’m thinking about now –

**DR. KLAKEGG:** Yeah.

**MR. SIMMONS:** – about the cost of that.

**DR. KLAKEGG:** Yeah. So, this is – if you, for instance, require every project –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – as such –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – to be socio-economically viable, you might actually end up with not serving your population as you want to and as they expect.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** So I think you need to use these right – these criteria with very – with strict consideration. I don’t think it will fit for your situation as is in the other countries, but I would start with simple things. I would go down to the principles and I would choose those that sort of seem to give you the best outcome without spending too much resources on small and everyday type of projects –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – but focus on the critical ones, complex, critical ones.

**MR. SIMMONS:** Right. And one can – and having worked through the Norwegian model and having seen what you’ve said about some of the others, one consistent point in it seems to me – maybe I’m wrong – is that the quality assurance activity seems to fairly consistently take place at a level in government that is above the agency that’s carrying out the project.

**DR. KLAKEGG:** Correct.

**MR. SIMMONS:** So is that a feature that you would see as being appropriate for application in a – in this province as well?

**DR. KLAKEGG:** The difficulty for me is to see whether the fact that you’re a province and not the national level –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – whether that would make any difference in that question.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** If it doesn’t, I would say this is probably a good idea; it gives stability, it gives the position that you could require or make it mandatory. I think that’s a good starting point.

**MR. SIMMONS:** Right. And that it would reside at a level in government, as I say, above or separate from the agency that’s actually –

**DR. KLAKEGG:** Exactly –

**MR. SIMMONS:** – running the project.

**DR. KLAKEGG:** – because you know that –

**MR. SIMMONS:** Is this is what you’re suggestion would be?

**DR. KLAKEGG:** – this is about the big priorities in –

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** – society. So if you only ask the road authorities what do we need, then, of

course, the answer is more road. If you only ask the health authorities what do the society need, they will answer more hospitals or whatever.

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** But you know the answer on that level, what they are looking for.

**MR. SIMMONS:** Mmm.

**DR. KLAKEGG:** So if you want to have a real priority between different purposes, you need to lift it to a level that is actually overseeing the priorities on that level.

**MR. SIMMONS:** Right. And so since your expectation is that agencies like road authorities and hospitals would of course promote the – meeting the needs that they are responsible for –

**DR. KLAKEGG:** Mmm.

**MR. SIMMONS:** – for meeting, but it is at a higher level in government that the political decisions have to be made –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – as to how resources are allocated and what's done –

**DR. KLAKEGG:** Mm-hmm.

**MR. SIMMONS:** – that it would seem that this quality assurance activity would rest at that higher government level in order to ensure that they are getting the information they need to make these choices.

**DR. KLAKEGG:** Yes.

**MR. SIMMONS:** Yes, okay.

**DR. KLAKEGG:** You could do like Sweden has done and put more of the different – let's say all the transport modes in the same agency.

**MR. SIMMONS:** Mm-hmm.

**DR. KLAKEGG:** That was one thing that they did –

**MR. SIMMONS:** Yeah.

**DR. KLAKEGG:** – which gives a more balanced priority between roads and railway and other means of transport, for instance.

**THE COMMISSIONER:** Could you also – just to follow up on your question, Mr. Simmons, could you also put it in a ministry, for instance, that would not be basically looking to propose any projects, like your Ministry of Finance, for instance. You – in many of the models that you talked about, they seem to have an integral in this.

**DR. KLAKEGG:** Mmm.

**THE COMMISSIONER:** So for a province like Newfoundland, aside from having it in a Cabinet council if – whatever you call it, or the Premier's office is what – we have a premier here, not a prime minister.

**DR. KLAKEGG:** Mmm.

**THE COMMISSIONER:** – you could use your Ministry of Finance? Or could you –?

**DR. KLAKEGG:** You have to look at all the roles together to make sure that the relation between them would be in balance. The Ministry of Finance in our country is always keen on controlling budgets, of course. That's their role. They sort of modify and keep the brakes on, when everyone else demands more and wants more and more and more from the state.

I think they wanted to be outside of their own doors, because they want to be independent as well. They don't want to be a party in the discussion whether this number of – or this cost is correct or not. They would like, rather, to be on the sideline and be the gatekeeper of the process. That gives them more power over the process and what happens.

**MR. SIMMONS:** Thank you very much. I don't have any other questions.

**THE COMMISSIONER:** Thank you, Mr. Simmons.

Let's take our break here and then we'll move to the Concerned Citizens Coalition. Let's take 10 minutes.

**CLERK:** All rise.

**Recess**

**CLERK:** All rise.

**THE COMMISSIONER:** All right, Mr. Hiscock.

**CLERK:** Please be seated.

**MR. HISCOCK:** Good afternoon, Doctor. Will Hiscock, I'm here on behalf of the Concerned Citizens Coalition, and that's basically a group of people who were early critics of the project.

**DR. KLAKEGG:** Hmm.

**MR. HISCOCK:** Number of questions for you. Starting off, when doing your review in Norway, are base assumptions re-tested along the way? And by that I mean projections such as the load or the number of customers, the amount of traffic, to ensure that the business case still makes –

**DR. KLAKEGG:** Hmm.

**MR. HISCOCK:** – sense going forward.

**DR. KLAKEGG:** This is something I would have wanted to strengthen in the Norwegian system for a long time. Actually, this latest development, the latest changes with the focus on the benefits that is increased in QA2, is a step in the right direction. But you're right, this should be tested over and over again.

**MR. HISCOCK:** Do you have any suggestions for how we would continuously test or carry on testing the business case through a longer process?

**DR. KLAKEGG:** You could be inspired by the UK system, which does that quite systematically.

**MR. HISCOCK:** Okay. So the UK would be the model that you would look to for the continuous testing of the business case –

**DR. KLAKEGG:** I think so.

**MR. HISCOCK:** – would you say – okay.

**DR. KLAKEGG:** But there is also this risk of doing too much of it.

**MR. HISCOCK:** Okay.

How do we combine the construction risks and the business risks in our assessment as we move through the QA process or ...?

**DR. KLAKEGG:** We look at the whole thing and we try to look at it from all perspectives, from all sides, up and down every time. So the construction is never isolated from the context. It's never isolated from the organizational issues. It's never – well, we try simply to see all sides of it and in the long perspective.

**MR. HISCOCK:** Should there be a re-baselining of risks after the QA2 process in the Norwegian model or at what point should there be a re-baselining of the risks?

**DR. KLAKEGG:** This depends a little bit on what you want with that baseline. Standard project management theory would say that when you start a project, you do your baseline, and that's what happens in the Norwegian case as well. After QA2, you have the final decision to go. And that's when you have your baseline.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** And if you would like to sort of keep that as the one that you measure against, you just keep – leave it as the baseline. If there is scope changes that require you to sort of – for the comparison to be relevant –

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** – you have to – you need another baseline that is more in line with what is actually the current situation, then you do that.

**MR. HISCOCK:** So re-baselining should run in tandem with scope change basically?

**DR. KLAKEGG:** That is the general idea.

**MR. HISCOCK:** Okay.

Doctor, we've heard much evidence at various stages of this Inquiry about the failures of governance following the sanction of this



project, but also in the pre-sanction stage as well. Failures have been noted at the board of director's level of Nalcor; key government departments, especially Finance and Natural Resources. And even when, in response to public demand for oversight, there was a committee established, it was largely composed of public servants, not having an engineering or project management experience themselves.

Taking that preface on its face, a precursor to good governance is that the proponent must see the value in good governance and good governance processes.

**DR. KLAKEGG:** Mm-hmm.

**MR. HISCOCK:** While the statement might seem right, fundamentally good governance is reliant on good government – a government that desires that oversight and that process, right?

**DR. KLAKEGG:** Mm-hmm.

**MR. HISCOCK:** Isn't it also the case that it's axiomatic that effective oversight is possible only if those given that responsibility have the technical capabilities – engineering, financial, legal or whatever?

Do you feel that in the Norwegian process or whatever, that the expertise are sufficient there? How do you go about ensuring that you have those sufficient expertise? Because our oversight, you know, would be criticized by some anyways –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – not necessarily just that there weren't the proper processes in place, but we didn't have the right people in those jobs –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – necessarily.

**DR. KLAKEGG:** This is a challenge. And I guess in a small community with a small economy and with a smaller government, which I assume there is, smaller administration, you would be restricted in terms of having all those expertise and all those experiences and competencies in-house. So this is another

argument why I would assume that you would be helped by having some external helpers in the process.

But in Norway, we do not expect all the competencies to be within the government, and definitely not with the decision-makers. So the role of professional planners, I assume that we – when we –

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** – work with planning and estimation, we are the professional part. So we have to be very clear on our assumptions and our prerequisites and our basis for suggesting this decision over that decision, et cetera. So it's our responsibility to be clear about that. And then the decision-makers, if they understand it they can make their decisions; if not, they can ask. And, well, there is a problem with decision-makers that doesn't understand the basis for a decision. That is a reality, sometimes.

**MR. HISCOCK:** Just jumping to a point before it slips my mind, I guess, one of the last things you were just talking about when you were being asked some questions earlier was –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – in relation to your suggestion of the – well, the Norwegian P85 as the cut-off, and you're suggesting that it could be a little bit lower, perhaps, in the Norwegian case.

Would it be your view that the P-factor should be a factor, basically, of – or would you see it as the scope and size of the project in relation to the funding jurisdiction or the jurisdiction itself affecting that P-factor? And I just want to put this in context, you know, even if we had the same fiscal position as Norway –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – and the same GDP as Norway – and we don't – we're still a population of 10 per cent the size.

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** And so a \$7.4-billion project here is the same size as a \$75-billion project or something in Norway.

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** Would that affect where you would want that P-factor to be –

**DR. KLAKEGG:** Absolutely.

**MR. HISCOCK:** – or would it be there regardless?

**DR. KLAKEGG:** It would – remember, we're talking relative sizes here.

**MR. HISCOCK:** Yes, relative, exactly.

**DR. KLAKEGG:** And that is important. In absolute sizes, the difference is huge. In terms of the relative size and when this percentage is a relative measure, it would be a question of what is the robustness. What is your – how much overspend can you tackle? How much can you handle in your position, in your – Newfoundland and Labrador as a community?

If you cannot take any overspend – if you can't cope with that – then you should put this level high. If you can cope – and the Norwegian situation has been we can cope, we have had a period of good economy, so we can cope, so we should push it down.

**MR. HISCOCK:** Yeah, okay.

And so – yeah, the more limited your fiscal position, the higher you might want your P-factor to be.

**DR. KLAKEGG:** (Inaudible.)

**MR. HISCOCK:** Yeah, okay. Yeah.

I'd also like to get you – also like to receive your views regarding Nalcor's treatment of the Public Utilities Board here in Newfoundland following government's reference to the board of the Muskrat Falls Project at DG2 stage. Essentially, the history is that Nalcor dragged their feet giving the Public Utilities Board information. The end of it, the information was not just late, but it was inadequate and it was out of date.

In your view, what should have occurred as this problem was being experienced? Should the government have suspended the process until Nalcor was ready with the information that the PUB – the Public Utilities Board – had sought?

In our case, the Public Utilities Board ultimately reported to government, citing amongst other reasons, the dated and insufficiency of the information. Should the board have arbitrarily paused the reference, even though it was given a deadline by government to report? What could have been done in that situation where Nalcor wasn't providing the proper information for them to make their determinations?

**THE COMMISSIONER:** Mr. Simmons.

**MR. SIMMONS:** Commissioner, if I might.

I've understood this witness to be called as Phase 3, he hasn't been asked, as far as I understand, to investigate the – any of the evidence concerning this actual project or provide any opinions or evidence concerning it.

This is a very specific question asking for an opinion on something that's before the Commissioner to consider and I don't think it's appropriate for this witness.

**THE COMMISSIONER:** I just wonder, Mr. Hiscock, I understand the reason you're asking the question, but I don't know whether the witness would have enough foundation to be able to offer a view. I mean, I'm not sure he would know what the – what our – what the PUB –

**MR. HISCOCK:** Public –

**THE COMMISSIONER:** – Public Utilities Board would do. I'm not sure he would understand the sequence of events that led to this. It wasn't – I don't even know if he'd understand what a reference case is. And so I'm just thinking maybe that might be outside his ambit of knowledge.

I did bring – we did bring him here, basically, to talk about governance systems and, to be frank, I didn't ask him to look at the project at all.

**MR. HISCOCK:** No troubles. I'd be happy to move on to some other questions then.

**THE COMMISSIONER:** Yeah.

**MR. HISCOCK:** I'm not sure if you're aware, but Nalcor in this case was exempted from the public tendering act. To what extent have the jurisdictions that you've studied provided exemptions from tendering rules that apply to smaller projects? And if there are exemptions, on what grounds are they provided and do you think that exemptions are appropriate in certain circumstances?

**DR. KLAKEGG:** The only kind of exemptions that I have noticed is in case of where the – the item in question is either a defence item, meaning that there are security around it.

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** That's one thing that leads to such situations. And the other one is when you are not really able to define it upfront, so you have to have an integrated process to develop the plans themselves. Which happens from time to time, but normally it's not very often.

**MR. HISCOCK:** Is there any research that you're aware of on the merits of either looser or tighter tendering rules? Is there a preference in the literature on that?

**DR. KLAKEGG:** I wouldn't divide in looser and ...

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** But, yes, there's quite a lot of literature on how different types of tendering processes and tendering – or contract strategies work within projects and what it results in. There's quite a bit, but I –

**MR. HISCOCK:** Is there a tendency in one direction or the other these days?

**DR. KLAKEGG:** As I mentioned in one of my slides, there is clear tendency to leave the traditional transaction based ones, where competition and lowest price is the thing, and over to a more integrated and collaborative, relation based sort of collaboration.

**MR. HISCOCK:** What approach is taken in Europe to the scale of contract awards? Is there a limit to the size of the individual contracts? Or is there a tendency to bundle projects together in areas that are more remote and sparsely populated?

**DR. KLAKEGG:** I can't say that it has some – has anything to do with the geography or demography, but it – there is a very clear tendency for larger contracts and larger projects.

We've seen – among the arguments for doing that is – as I showed you in one of my slides – there is a clear tendency that smaller projects have bigger variations, and there's no doubt that this is the case. And there's some good reasons for it. One of – from practical perspective it's because they don't have the resources, they don't have the ability, they don't have the time to do anything to, sort of, meet those challenges that they made. While the big one – they have competencies, they have money, they have time, so they can sort of correct the situation along the way.

That being said, in Norway we have this discussion going on whether there is a limit as you – I think you mentioned – and there, the industry, itself, has argued that the contracts are becoming too big and the risks are too big, so they claim to, sort of, hold back on their bidding. On the other hand, there's no indication that this is actually posing any problems or happening in real life because the major contracts, that have been out over the last years, have, just like before, went to the Norwegian construction companies. Although, there is, of course, very often a combination of Norwegian and foreign construction companies –

**MR. HISCOCK:** Joint venture.

**DR. KLAKEGG:** – joint ventures –

**MR. HISCOCK:** Yeah.

**DR. KLAKEGG:** – of different sorts to answer these huge contracts that are in the market.

**MR. HISCOCK:** Is there a tendency for senior officials at the permanent secretary or the deputy minister level to serve on the board of government-owned corporations? And if so, do

they perform an oversight role, and is that welcomed or is it considered intrusive?

**DR. KLAKEGG:** I can't go into detail on that one.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** I would assume that this is the situation, and I would assume that they use their competence and experiences in asking the right questions.

**MR. HISCOCK:** How much engineering design is necessary before a project is sanctioned, in your mind? Is there a concept of provisional approval which allows for the withdrawal of sanction if cost overruns occur or ...?

**DR. KLAKEGG:** There is a whole range of different strategies and your strategy should also include how much engineering you put in place before you go into the market. The tendency, today, is to do less engineering and the idea is to get the construction company involved on an early stage because they have competences that you need to make sure the strategy is robust.

So, we see a clear tendency that construction companies come in earlier on a less engineered basis.

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** And they contribute to developing that concept into a good project.

**MR. HISCOCK:** Okay.

I guess, tied into that, or related to that, is the question of what provisions are made in Europe for escape ramps or off-ramps abilities to shut down the project if indicators of performance reveal major problems, which I assume would be more likely with the lower amount of engineering before moving into the construction phase.

**DR. KLAKEGG:** Yes, that's a reasonable assumption. We only have these two points in time where we do a quality assurance. One is very early and, beyond that point, it's just normal that these projects, they change. The

assumptions change. And when it comes to the QA2, it's a mature, well-planned and detailed project. So – well, I kind of lost the thread here but – sorry about that.

**MR. HISCOCK:** No, no, that –

**DR. KLAKEGG:** If you help me back on track, I would –

**MR. HISCOCK:** Well, I mean we were talking about where the escape ramps or the off-ramps – the ability –

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** – to shut down a project, right?

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** Yeah.

**DR. KLAKEGG:** At QA1, there is a fairly good – fairly good chance of doing that where – if it is a bad suggestion. Either by sending it back to the planners and do a better job or you – some, you can say, no way. This is not the right way to go. Come up with something else.

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** So we've – and – or don't come with anything at all because we don't want to go that way. Like, with the Olympics, we had this process that, typically, ended up in saying no way, we don't want the Olympics.

And so, yes, QA1 can give you the opportunity to stop a project and there is, actually, proof that we have done so. Later on, the question should be asked: Is it still the appropriate project? Is it still needed? Is it still the right scale? Is it still the right thing to do? When you come to QA2, we haven't asked that question systematically, but it's coming to the surface now.

**MR. HISCOCK:** And within the Norwegian system, it wouldn't be picked up at QA2. Would that decision to, you know, that one of the major risks that you were concerned about does materialize or one of the risks you didn't foresee materializes –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – in a substantial way –

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** – would the decision to pull the plug or to walk away from a project, that would fall within the actual agency that's carrying it out within the Norwegian –

**DR. KLAKEGG:** That system.

**MR. HISCOCK:** – system, right? Okay.

**DR. KLAKEGG:** And they also have this opportunity to go back to Parliament if the right criteria is met –

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** – to get more money for the project. But that is very rare these days.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** It was quite usual. Now it's reduced to quite rare.

**MR. HISCOCK:** Has it been reduced because of a better quality assurance process –

**DR. KLAKEGG:** Yes.

**MR. HISCOCK:** – in the earlier stages? Okay.

**DR. KLAKEGG:** Exactly.

**MR. HISCOCK:** Yes.

What methodology is used to assess the projects? Do you use benefit-cost analysis?

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** Okay.

What discount rate is used to evaluate costs and benefits? Do – are you –

**DR. KLAKEGG:** (Inaudible.)

**MR. HISCOCK:** – the discount rate, is there ...?

**DR. KLAKEGG:** Discount rate is a big discussion. We have – the concept report – the concept program has several reports on how to decide the right discount rate.

**MR. HISCOCK:** Is there a particular one that's been settled or ...?

**DR. KLAKEGG:** Yes. There is – the Ministry of Finance actually decides what interest rate to use, but there is a discussion whether this rate should be reduced over time so that you don't sort of lose the long-time effects.

**MR. HISCOCK:** Okay, yes.

**DR. KLAKEGG:** It's (inaudible).

**MR. HISCOCK:** We've heard some evidence about the loss of the long-term effects previously on discount rates, yeah.

**DR. KLAKEGG:** We have the same discussion, yes.

**MR. HISCOCK:** Is it important for projects to generate enough revenue to be cost-compensatory and recover all of the cost? I assume that's a basic part of ...?

**DR. KLAKEGG:** Yeah, we have this situation where QA under the state system is – always puts up the cost benefits as one of its criteria. But the reality is that the decision-makers – the politicians – they don't always look at that.

**MR. HISCOCK:** Sure, okay.

**DR. KLAKEGG:** So they make decisions whatever they want.

**MR. HISCOCK:** Yeah.

**DR. KLAKEGG:** Which is –

**MR. HISCOCK:** On a –

**DR. KLAKEGG:** – their roles.

**MR. HISCOCK:** – political basis –

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** – that’s why they’re politicians.

**DR. KLAKEGG:** Yes.

**MR. HISCOCK:** Understood, yes.

**DR. KLAKEGG:** Exactly.

**MR. HISCOCK:** Is the threshold value for benefit-cost analysis different depending on the density of the population? I would –

**DR. KLAKEGG:** No.

**MR. HISCOCK:** – assume.

**DR. KLAKEGG:** No.

**MR. HISCOCK:** No, okay, no. Perfect.

**DR. KLAKEGG:** But maybe it should be. I only (inaudible).

**MR. HISCOCK:** But it isn’t in Norway, anyways (inaudible).

**DR. KLAKEGG:** It is not in Norway.

**MR. HISCOCK:** Okay.

To what extent does Norway’s oil-enriched fiscal capacity – simply the amount of money from the petroleum industry – enable it to approve projects that are not cost-compensatory?

**DR. KLAKEGG:** This is something that the politicians are discussing, whether or not to touch the oil money for such purposes. I’m not aware that they have been allowed to do so.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** But they do stretch the – we have sort of a rule of thumb how much it’s okay to take out of the oil funds, and they tend to stretch it a bit.

**MR. HISCOCK:** Sure.

Would a project in northern Norway expect more support from the national government than one in the south perhaps?

**DR. KLAKEGG:** Not necessarily.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** But every project that has a need for local (inaudible) decisions need to go to Parliament, so every project is decided in Parliament specific.

**MR. HISCOCK:** How do you evaluate a contractor who has undertaken little or no work in your jurisdiction in Norway? If somebody wants to enter in on a contract –

**DR. KLAKEGG:** They do that all the time.

**MR. HISCOCK:** – (inaudible) yeah.

**DR. KLAKEGG:** Right now there’s a huge queue of international construction companies wanting to come into Norway, so that’s an everyday issue.

**MR. HISCOCK:** Okay.

And are they evaluated in comparison to their work in other similar (inaudible) or other similar jurisdictions or is there –

**DR. KLAKEGG:** I would say –

**MR. HISCOCK:** – is there a consistent methodology?

**DR. KLAKEGG:** – I would say probably because I don’t have insight in the internal discussions that leads to one or the other construction company being chosen, so sorry, I cannot answer that.

**MR. HISCOCK:** In dealing with major projects that require high standards of stability and safety, what design standards apply to certify the quality of engineering design and the quality of construction? If there was a question of soil stability for a bridge for example, or a road or a dam or –

**DR. KLAKEGG:** Mm-hmm.

**MR. HISCOCK:** – what have you, what authority exists that certifies the standards of the engineering and the construction in Norway?

**DR. KLAKEGG:** The road authority – let's use roads as the case –

**MR. HISCOCK:** Sure, yeah.

**DR. KLAKEGG:** – or example. The road authorities have a lot of standards and norms for how these roads are going to be designed, how the engineering is going to be done, but there's always risks that remains. There's no way to avoid that when you start digging, you will find things that are not as you thought it would be. So there's a huge discussion about whose risk is it, anyway. The risk is there. There's no way you can engineer your way out of that.

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** The only thing you could do, of course, is do more today, undertake more analysis in field. But we have this problem that you don't get money for the project before you have the decision and once the decision is made, you have already based that on assumptions of what you will find when you tell them to start digging. So –

**MR. HISCOCK:** Right.

**DR. KLAKEGG:** – we need to do something about this so that they have money to do all the necessary preparations to do a proper analysis.

**MR. HISCOCK:** And in the case of the road and the soil situation, that would be geotechnical work or something like that –

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** – that needed to have been completed at an earlier stage –

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** – to get a better sense of the risks.

**DR. KLAKEGG:** This is one of the things that comes up very often in uncertainty analysis, that there should've been more geotechnical and things – analysis done before we start.

**MR. HISCOCK:** Okay. When independent agencies are reviewing projects being built by

the government owned entities, what measures are put in place to ensure the independence of the project sponsor or champion? And I guess in your case, most of the projects that you're talking about – or all the projects that you were referring to are projects that are put forward by an agency of government, right?

**DR. KLAKEGG:** That is true. The idea might have come locally, but it's put forward from the agency. That's correct.

**MR. HISCOCK:** In our – in our situation, the agencies felt that they needed to run the facts – and needed to in order Nalcor, who is the project's champion, to check the facts, double-check their work and so on.

**DR. KLAKEGG:** Mm-hmm.

**MR. HISCOCK:** Does this undermine the independence when checking facts leads to, effectively, the editing of reports or – particularly when consultants are involved who value future business with – with that big entity as well?

**DR. KLAKEGG:** We always have this consideration. Norway's a small country.

**MR. HISCOCK:** Yeah.

**DR. KLAKEGG:** Newfoundland's even smaller, but Norway is still a small country and so people know each other. People meet each other in different constellations, in different projects, this happens all the time.

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** So there's no way we can avoid, sort of, having this opportunity to influence if you want to. But on the other hand, there's – there's – it's a very open society, it's a very trusting culture. People would definitely not like to break that trust because everyone knows.

**MR. HISCOCK:** Right. So I move – this comes –

**DR. KLAKEGG:** So it comes back to transparency.

**MR. HISCOCK:** – I was just about to say this comes back to the transparency you were talking about earlier and that would be the route to – to maintain the honesty would effectively be the level of the transparency?

**DR. KLAKEGG:** Yes.

**MR. HISCOCK:** Okay.

Does the concept of an independent engineer have a place in European megaprojects? Is there what's called an independent engineer? We had one on this project. What role, I guess, does the project sponsor have in appointing the independent engineer? Are you aware?

**DR. KLAKEGG:** There's – I'm not at all – I'm not aware of what – how you do it here. But I do see several roles that such an independent engineer could have in terms of quality assurance. I mentioned the – the follow – the following quality assurance that is an expert that follows the process on the site, gets all the insights and gets – and gives all his, sort of, indications and experience and suggestions into the system so that they can act on it if they find it appropriate.

It's a little bit similar to the start of the UK system where it was also about finding an expert independently on the project and invite him to go through the plans and give advice to the senior responsible owner.

**MR. HISCOCK:** Okay.

I assume that the project sponsor or the owner doesn't get to review and edit reports by external auditors or engineers, in Norway, before those become public as part of the transparency process. Or would they have that option?

**DR. KLAKEGG:** There is dialogue.

**MR. HISCOCK:** Okay, before it becomes public.

**DR. KLAKEGG:** Yeah.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** There is dialogue in terms of the governance – no, sorry, the government and

the agency give input to the report, basically making the documents available, make – answering the questions, et cetera. There is no – or it shouldn't be much the other way, influence. They should answer their questions, but they shouldn't come up with any suggestions that would be to the – that would not –

**MR. HISCOCK:** They wouldn't want to be seen as leaning on the process.

**DR. KLAKEGG:** No.

**MR. HISCOCK:** No, okay.

In the European context, what role is played by those who finance projects and by investment bankers? Do they have a mechanism to monitor the project regularly to protect their investments? You know, do they rely on the quality assurance officer to protect their interests or –?

**DR. KLAKEGG:** I don't know how they work.

**MR. HISCOCK:** Okay.

In the cases you're looking at, they're entirely internally financed. Is that –

**DR. KLAKEGG:** You know, no –

**MR. HISCOCK:** – correct –

**DR. KLAKEGG:** – not –

**MR. HISCOCK:** – or not?

**DR. KLAKEGG:** – actually not.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** We have, for instance, PPP projects –

**MR. HISCOCK:** Yeah.

**DR. KLAKEGG:** – public-private partnerships. There is one experience connected to that and that is the transparency is not as good in these projects that they will be in the ordinary ones.

**MR. HISCOCK:** Okay.



Would you assume, or do you have any knowledge about the transparency to the owner, not necessarily the transparency to the public but the transparency of the owner or the investor into the project?

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** Are they able to access and use the quality assurance? Does that provide transparency to the investors as –

**DR. KLAKEGG:** They –

**MR. HISCOCK:** – well as to the public?

**DR. KLAKEGG:** – they can use it just as well as the decision-makers, the political side –

**MR. HISCOCK:** Right.

**DR. KLAKEGG:** – yes, they – it's available for them, but they have the same problem in terms of transparency when it comes to – after the contract of a PPP arrangement is actually signed.

**MR. HISCOCK:** Okay.

I'd like to get your opinion on the best balance between the carrot and the stick. And in this case, the carrot is the use of performance targets which make payments conditional on achieving agreed targets; and the stick which is penalties are imposed for when targets are missed.

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** Is there a balance between the use of these that leads to the lowest cost overruns, in your –

**DR. KLAKEGG:** You also have the information as the third kind of –

**MR. HISCOCK:** Approach.

**DR. KLAKEGG:** – means –

**MR. HISCOCK:** Mm-hmm.

**DR. KLAKEGG:** – in achieving what you want. I'm a believer in the positive side.

**MR. HISCOCK:** Yes.

So –

**DR. KLAKEGG:** I think the positive incentives are stronger than the negative ones.

**MR. HISCOCK:** Okay.

Is there a real correlation between project size and the magnitude of overruns? You had said there was more variance in smaller projects.

**DR. KLAKEGG:** Mmm.

**MR. HISCOCK:** But can megaprojects be better understood and better managed? 'Cause we've heard evidence that megaprojects have a tendency to overrun that isn't true with projects, in general. While small projects may have the higher variance, the tendency of overrun is very high in megaprojects.

**DR. KLAKEGG:** The amount of money is very high in megaprojects. So they really matter. So avoiding overrun on megaprojects means a lot. And we've seen – and you can see that in the reports from the Concept Programme –

**MR. HISCOCK:** Mmm.

**DR. KLAKEGG:** – that one overrun project was enough to sort of take you back to balance, where we actually have the – if that didn't happen, if that one project didn't happen, the statistics would be fantastic. So one falls – or one overrun megaproject means that you need 10 others to outweigh that one.

**MR. HISCOCK:** Yeah, and I don't think we have nine in the pipeline.

But, if Muskrat Falls is a disaster, can – do – I mean, do you feel that we can learn the lessons and enact a process that's going to allow us to successfully execute megaprojects in the future? Or is it simply that a megaproject is a very risky business and smaller projects are the way to go?

**DR. KLAKEGG:** I, only in general – I cannot speak about the Muskrat Falls one –

**MR. HISCOCK:** Yes, yes, no.

**DR. KLAKEGG:** – but I would say: You're not allowed not to learn from this.

**MR. HISCOCK:** (Inaudible.)

**DR. KLAKEGG:** You shouldn't be allowed not to learn from this.

**MR. HISCOCK:** Are the lessons which Newfoundland can learn from large nuclear power projects in Europe, such as the nuclear power plant at Hinkley Point C in Somerset, England, and what would those lessons be?

**DR. KLAKEGG:** I don't know that project.

**MR. HISCOCK:** Okay.

**DR. KLAKEGG:** But I would say, yes, I'm sure there are things to learn, but I cannot point out anything specific.

**MR. HISCOCK:** You're not – yeah.

I think those are all my questions. Thank you.

**THE COMMISSIONER:** Thank you, Mr. Hiscock.

Edmund Martin?

**MR. CONSTANTINE:** No questions, Commissioner.

**THE COMMISSIONER:** Thank you.

Former Provincial Government Officials '03-'15?

Consumer Advocate?

**MR. HOGAN:** Good afternoon. My name is John Hogan. I'm counsel for the Consumer Advocate. So –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – if you're not aware, the Consumer Advocate represents the ratepayers –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – who are paying for the cost of the Muskrat Falls Project.

**DR. KLAKEGG:** Okay.

**MR. HOGAN:** Okay.

If we could just turn to page 11 of your presentation, please. You mention here that reviews are non-political. So I just wanna ask a few questions about that.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** What do you mean by non-political?

**DR. KLAKEGG:** Meaning that we need to keep a strict division between the professional life of engineers and project managements and others involved in planning and executing projects, and on the other side, the people that are set to make the decisions.

These are what I call the political side. They may be politicians. They might also have other roles, but the point is the reviews do not tell the decision-makers what they should base their real decisions on, but they have to clarify what is the basis for the advice they give.

**MR. HOGAN:** So the political side is not just politicians, it would be civil servants and bureaucrats and people working in the ministries and agencies?

**DR. KLAKEGG:** That could be.

**MR. HOGAN:** They could be political?

**DR. KLAKEGG:** Yep.

**MR. HOGAN:** So who would be the non-political people to do the review? And how are they appointed or assigned?

**DR. KLAKEGG:** In Norway, it is very simple.

**MR. HOGAN:** Yeah.

**DR. KLAKEGG:** They are external consultants and they are assigned through a contract with the Ministry of Finance.

**MR. HOGAN:** So the Ministry of Finance does have to – someone political has to make the decision to hire the external review.

**DR. KLAKEGG:** Yeah, but the political decision was actually installed from the Prime Minister's Office that we should have such a system and after that the Ministry of Finance has been the administrator and gatekeeper of the system, so they do their job. And I think we would not call that political, that I would assume is as a professional function.

**MR. HOGAN:** The Finance Ministry is the one that picks it as opposed to the roads or the Health or –

**DR. KLAKEGG:** Yep, yep.

**MR. HOGAN:** – whoever is the proponent –

**DR. KLAKEGG:** They –

**MR. HOGAN:** – or the owner –

**DR. KLAKEGG:** – they –

**MR. HOGAN:** – of the project?

**DR. KLAKEGG:** They propose the projects.

**MR. HOGAN:** Right.

**DR. KLAKEGG:** So they sort of initiate the whole thing.

**MR. HOGAN:** They don't get to pick the entity –

**DR. KLAKEGG:** No.

**MR. HOGAN:** – that does the –

**DR. KLAKEGG:** Oh, no.

**MR. HOGAN:** – review?

**DR. KLAKEGG:** No.

**MR. HOGAN:** Okay, thank you.

So you mentioned the department of Finance is the gatekeeper, and we've heard that term used here at this Inquiry.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** I get the feeling it might be a little bit different.

**DR. KLAKEGG:** Okay –

**MR. HOGAN:** So what do you mean by gatekeeper?

**DR. KLAKEGG:** For me, the gatekeeper is the one that puts the projects in a row and makes sure that it's ready to go into the process. They can tell you: Sorry, I can see from the documents that you're not ready. This is not going to go through, so you have to go back and prepare better. Or they can say: Okay, I will discuss this with the Ministry and we will find out whether we are – we agree that this should be entered. Or they can say that: Okay, I see this looks good, we'll – good to go. And then they will then give this assignment to their external consultants.

So gatekeeper means that they are the ones that sort of administers the resources within the system.

**MR. HOGAN:** And the decision-making process as you (inaudible)?

**DR. KLAKEGG:** The process but not the decision. The decision-making process is in Parliament or in government. So, they don't impose on that but they decide whether this project will be allowed to enter the process and have its consultants assigned.

**MR. HOGAN:** Again, not the Ministry that is proposing the project?

**DR. KLAKEGG:** They will have a discussion in between them. The suggestion comes from the owner Ministry, for instance, Transport or Health and then the gatekeeper –

**MR. HOGAN:** Is Finance.

**DR. KLAKEGG:** – is Finance. And they together for some – based on some sort of discussion or debate or not, maybe it's obvious, that they will let this project in and start the process, but they're just administrating the process, they're not making the final decision. The decision comes later in either Parliament or in government.

**MR. HOGAN:** Okay. Thank you.

Ms. Muzychka was asking you about transparency, and you said everything was transparent.

**DR. KLAKEGG:** With a few exceptions.

**MR. HOGAN:** With a few exceptions, okay. Well, let's – I want to know if this is an exception. We have a term here that we use, and we use at the Inquiry, called commercially sensitive, which is information that is not disclosed and certain amounts of commercially sensitive information haven't even been disclosed through the process of this public inquiry. So –

**DR. KLAKEGG:** There might be such things.

**MR. HOGAN:** Pardon me?

**DR. KLAKEGG:** There might be such things.

**MR. HOGAN:** Okay, and what would that be? What was a – what would a definition of commercially sensitive be in Norway?

**DR. KLAKEGG:** Oh, I don't have a definition to be honest. This is very often up to the parties involved to decide. I mean, for instance, you would not public – you wouldn't publish the contract with any numbers, for instance. Numbers that the parties agree on will not be published.

**MR. HOGAN:** Even though the overall larger number is published.

**DR. KLAKEGG:** Oh, yes.

**MR. HOGAN:** Yes, okay.

**DR. KLAKEGG:** What – the money that is available will be published, but how much they actually agree on, that's in between the two contract parties.

**MR. HOGAN:** Okay. And who balances this notion of commercially sensitive of what's public and what's not public then? Who makes that decision?

**DR. KLAKEGG:** This follows the ordinary rule all the way. It's the reports from the QA is always open. The exception is if there's any defence secrets, then that would be in a not-published appendix to the report. So they avoid publishing anything that is secret but everything else is open to everyone.

**MR. HOGAN:** The agencies and ministries, I asked you about them and I, you know, I put it to you and you agreed that there is some political element to those people in those groups, I guess, in the agencies. So who would lead a ministry?

**DR. KLAKEGG:** Who would ...?

**MR. HOGAN:** Who would be in charge of a Ministry? Would it be the minister of Finance, minister of roads, minister of Health? Is that how it works?

**DR. KLAKEGG:** That is correct.

**MR. HOGAN:** And can you just describe, maybe briefly for the Commissioner, who would work beneath the minister in terms of civil servants and who is in charge?

**DR. KLAKEGG:** In the next level beneath the minister is the state secretaries and they are also political.

**MR. HOGAN:** So they are appointed?

**DR. KLAKEGG:** They are appointed.

**MR. HOGAN:** By who? By the minister or by the prime minister?

**DR. KLAKEGG:** By the minister.

**MR. HOGAN:** Mm-hmm.

**DR. KLAKEGG:** How – well, to be honest, I'm not sure if the prime minister is the one that has the last word, but they are political and they come and they represent political parties. Then you have the administration which is non-political which would be the civil servants.

**MR. HOGAN:** Okay. So these – what would – what did you call them below the ministers?

**DR. KLAKEGG:** The state secretaries.

**MR. HOGAN:** State secretaries. So do they come and go when there's a change of government?

**DR. KLAKEGG:** Yeah.

**MR. HOGAN:** They do?

**DR. KLAKEGG:** Yeah.

**MR. HOGAN:** And then there is some sort of normalcy below them that stays, the civil service?

**DR. KLAKEGG:** Yeah, yes.

**MR. HOGAN:** Okay.

**DR. KLAKEGG:** Very stable.

**MR. HOGAN:** Very stable.

At the QA1 stage when you're evaluating concepts on how to solve a problem, I think is how you put it.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** Is there a typical number of options that will be presented at QA1?

**DR. KLAKEGG:** Yes, the requirement is two different alternatives and then the zero alternative. That's the minimum requirement.

**MR. HOGAN:** Minimum requirement of two.

**DR. KLAKEGG:** Two plus the zero alternative.

**MR. HOGAN:** Okay.

And what's a typical number that is before the QA1, can you speak to that? Is it usually limited to two or is it more than two?

**DR. KLAKEGG:** In – if we look at – again, we come back to Transport, which is my major area, there is often more, but these are actually variations; they are going this way around the mountain or that way around the mountain or over the mountain and that sort of thing. It's a –

conceptually, the same thing, it's a road from A to B, but there are variations along the –

**MR. HOGAN:** It's all trying to solve the same problem.

**DR. KLAKEGG:** It's solving the same problem, and that is a part of the definition of a concept; they need to be part of solving the same problem, if not then they are different projects, different –

**MR. HOGAN:** But would you agree the more options that are put forward at QA1, the more likely you are to find one that's going to pass QA1 and be seen as a successful project?

**DR. KLAKEGG:** I have no proof of that, but I would think that if you put forward many alternatives, among them you would find good ones.

**MR. HOGAN:** Right.

If we could just turn to page 17, please.

So I just – I don't think this was asked – and I apologize if it was – the allocation to cover uncertainty –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – how and who determines that amount?

**DR. KLAKEGG:** It has become sort of a standard rule that we do it the way shown on the right-hand side of this illustration, that the difference between the approved cost limit, which is in the parliament – approved in the parliament – and the expected cost – that difference is – resides within the ministry –

**MR. HOGAN:** Right.

**DR. KLAKEGG:** – the owning ministry. That's a – sort of a general rule. Then, below that, the agency is allowed to do what it finds best for this.

**MR. HOGAN:** What about above the cost towards the proposed cost limit thought? Where does that number come from?

**DR. KLAKEGG:** The number comes from the S-curve. We – you can –

**MR. HOGAN:** Okay.

**DR. KLAKEGG:** – easily read that from the result of the –

**MR. HOGAN:** So –

**DR. KLAKEGG:** – the analysis.

**MR. HOGAN:** – based on the inputs?

**DR. KLAKEGG:** Yeah.

**MR. HOGAN:** Okay.

And Ms. Muzychka or Mr. Hiscock did talk to you a little bit about this, but this would be an approved maximum amount that can be spent without parliament approving more. Is that correct?

**DR. KLAKEGG:** Yes. Exactly.

**MR. HOGAN:** Okay. And it is possible to go back to parliament, is it?

**DR. KLAKEGG:** It is possible.

**MR. HOGAN:** Okay. But since you've instituted this new system, is that not likely to happen or has it not happened?

**DR. KLAKEGG:** It – it is much less likely to happen than before.

**MR. HOGAN:** Okay.

And what did the contractors, then, know about this idea, possibility or unlikely possibility of going back to parliament to look for more money?

**DR. KLAKEGG:** Everything.

**MR. HOGAN:** They do? They know it's unlikely?

**DR. KLAKEGG:** They know it's unlikely, but they know it's possible.

**MR. HOGAN:** Okay.

And the public then know this proposed cost limit and can have comfort in this is a very good chance that this is the most that's going to be spent on this project?

**DR. KLAKEGG:** Our statistics from having this in place is – it is actually very precise.

**MR. HOGAN:** Okay.

And a politician can confidently go to the public and say the purposed cost limit is the maximum amount that would be spent on this project?

**DR. KLAKEGG:** Yes. But, of course, then you have the exceptions – then you have these one out of how many that actually goes over –

**MR. HOGAN:** Yeah.

**DR. KLAKEGG:** – so that's still happens. There's no guarantee. There's still a 15 per cent risk uncertainty, and in one occasion or another it will actually happen.

**MR. HOGAN:** Is there ever a situation where projects are proposed at the QA1 level, for example, where there's a shift or a change in the project? And I'll give you – I know you haven't studied the Muskrat Falls Project, but the original plan was to develop two hydroelectric dams –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – one at Muskrat Falls and one at a place called Gull Island. At some point in time, the decision was made to do Muskrat Falls first and then do Gull Island second.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** So, there was a change in the project plan.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** I'm just wondering if you could comment on whether that happens and, if it does happen, what do you do with the process?

**DR. KLAKEGG:** Similar things happen. It's kind of – for me, that is a part of the normal process. There's nothing in particular about that.

We would not do anything particular except we would consider these things at QA1 and at QA2. The rest we would leave to the agency.

**MR. HOGAN:** It will be considered as a new project, if there's shift like that or –?

**DR. KLAKEGG:** No. I wouldn't think so. That depends – no, I don't think so. It depends whether the ministry redefines it.

**MR. HOGAN:** Yeah.

**DR. KLAKEGG:** If they define it as a new project, it might be considered a new project, but the risk is that then would Ministry of Finance require it to go back and do it again. That's in their power to –

**MR. HOGAN:** Right.

**DR. KLAKEGG:** – to – because this is mandatory. So, if this is a new project, they might say that you need to go back and do QA1 again because this has never been through QA1.

**MR. HOGAN:** QA – right. Okay. Thank you.

And you said, earlier today, too, if you were asking the road authority, they're going to say they want more roads.

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** So, in terms of a ministry promoting a project publicly – I just wonder if we can get your comments on that – whether it's done in Norway and whether it should be done. Whether a ministry –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – should publicly promote a project. I'm asking because you –

**DR. KLAKEGG:** I don't know if I have a good – or an opinion that is based on anything else than my own feelings about that. I'm not too sure. I'm not sure.

**MR. HOGAN:** Is it not done in Norway? And I would think it (inaudible) because –

**DR. KLAKEGG:** It's unusual – unusual – it always comes from the bottom up, and it always is promoted by the agency or by local authorities. So, I cannot think of a case where that was the situation.

**MR. HOGAN:** Thank you.

You spoke a little bit about demographics and GDP and –

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** – issues like this. So, we have a, you know, 500,000 people spread out over a large geographical area.

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** And this was an expensive project for not a lot of people.

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** Put it that way.

**DR. KLAKEGG:** Yeah.

**MR. HOGAN:** So where did that sort of analysis fit in to whether or not a project should proceed at either QA1 or QA2?

**DR. KLAKEGG:** This is one of the things that I mentioned that I think will always be a challenge for you as a very small society with few people to divide the cost of. I am sure that you will struggle with finding only socio-economic projects with a positive outcome in terms of being sufficiently good economic. I think you can probably struggle with doing that.

**MR. HOGAN:** Okay, thank you.

**DR. KLAKEGG:** I think we do as well, just to mention that. We do that as well, especially in the rural areas in the north.

**MR. HOGAN:** If we could please turn to page 19?

So, I mean, I guess what this graph is showing, that since you've implemented this system, the success is that there's less overruns.

**DR. KLAKEGG:** Yes.

**MR. HOGAN:** Correct, right?

**DR. KLAKEGG:** But I also mention that it is not only due to the QA system.

**MR. HOGAN:** Okay.

The question I want to ask, though, I mean, the red bars –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – show that there's plan changes; I assume that means changes to the project.

**DR. KLAKEGG:** Yeah.

**MR. HOGAN:** So what I really see is that that number has decreased drastically. You had –

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** – a big problem with plan changes throughout the '90s and the early oughts, and now there's no more plan changes.

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** So I would suggest – and you tell me if I'm wrong – that the real success of this QA system is that there's better analysis done, better estimates done, better planning done –

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** – at the time of sanction so as the result is that you do not need to change the project because you had a perfect project when you start.

**DR. KLAKEGG:** Perfect is a little bit –

**MR. HOGAN:** Well, you have a –

**DR. KLAKEGG:** – strong, but, yes, it –

**MR. HOGAN:** – an accurate assessment of the project to start.

**DR. KLAKEGG:** – it is mature as a concept and it's well-planned and it's well estimated, so yes, after QA2, it actually runs quite smoothly.

**MR. HOGAN:** Okay.

**DR. KLAKEGG:** And in average they come in below expected cost, not just below the cost frame but below the expected cost, so they are really well controlled.

**MR. HOGAN:** Okay. And you were asked a bit about checks and balances.

**DR. KLAKEGG:** Mm-hmm.

**MR. HOGAN:** So what sort of checks and balances do the – does the public have as a project goes along, that they're aware of that's being done and publicly disclosed to say this is where we are with the project, this is –

**DR. KLAKEGG:** Mmm.

**MR. HOGAN:** – the cost, this is the estimate?

**DR. KLAKEGG:** This is – after the decision in Parliament, this is down to the agency, or ministry if you like, but they will always use the agency as their – to do the job. They will, at least annually, openly report their performances, and in most cases they will openly disclose where they are in terms of cost and progress and other issues concerned with each project. This is normal procedure.

The new road builder, Nye Veier, they even do this, I think, at least every half year.

**MR. HOGAN:** So that's just part of the transparency –

**DR. KLAKEGG:** It's part of the transparency and it's part of how we deal with these issues.

**MR. HOGAN:** That's all the questions I have.

Thank you.

**DR. KLAKEGG:** Thank you.

**THE COMMISSIONER:** All right.

Redirect.



**MS. MUZYCHKA:** (Inaudible.)

**THE COMMISSIONER:** I just wanted to ask a couple of questions.

So, in your system, in Norway, if I were to look at page 17 of the report, when a project reaches a stage of the allocation to cover uncertainty, is the government made aware of the fact – if it's the project owner – is the government made aware of the fact that you're actually using that money?

**DR. KLAKEGG:** Yeah.

**THE COMMISSIONER:** Okay.

**DR. KLAKEGG:** Definitely.

**THE COMMISSIONER:** What about – if we go down the next step to contingencies –

**DR. KLAKEGG:** Mm-hmm.

**THE COMMISSIONER:** – and the use of contingencies, does the government know that –

**DR. KLAKEGG:** (Inaudible.)

**THE COMMISSIONER:** – are they made aware of the fact that the contingencies are being utilized?

**DR. KLAKEGG:** I think that would remain within the agency.

**THE COMMISSIONER:** Would remain within the agency.

So it would only be if it goes over and above the contingency level?

**DR. KLAKEGG:** Yeah.

**THE COMMISSIONER:** Right.

**DR. KLAKEGG:** I would assume that.

**THE COMMISSIONER:** Okay.

**DR. KLAKEGG:** It is down to the agency what they want to report. They might enclose more details, but I think they would keep that to themselves.

**THE COMMISSIONER:** Okay.

All right. Okay, good.

Thank you very much, Professor Klakegg. I really appreciate –

**DR. KLAKEGG:** Thank you.

**THE COMMISSIONER:** – your time this afternoon, and we'll adjourn now until tomorrow morning at 9:30.

Thank you.

**DR. KLAKEGG:** Thank you.

**CLERK:** All rise.

This Commission of Inquiry is concluded for the day.