

# ONTARIO

## ENERGY

BOARD

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| **FILE NO.:** | EB‑2010-0379 |  |
| **VOLUME:****DATE:** | **Encouraging Electricity Distributor Efficiency** **Stakeholder Conference: "Empirical Work in Support of Incentive Rate Setting in Ontario"****2****May 28, 2013** |  |

**EB-2010-0379**

#### THE ONTARIO ENERGY BOARD

**ENCOURAGING ELECTRICITY DISTRIBUTOR EFFICIENCY**

**STAKEHOLDER CONFERENCE:**

**"EMPIRICAL WORK IN SUPPORT**

**OF INCENTIVE RATE SETTING**

**IN ONTARIO"**

Held at 2300 Yonge Street,

25th Floor, Toronto, Ontario,

on Tuesday, May 28th, 2013,

commencing at 9:30 a.m.

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VOLUME 2

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ROSEMARIE LECLAIR Board Chair

CYNTHIA CHAPLIN Board Member and Vice-Chair

MARIKA HARE Board Member

PAULA CONBOY Board Member

KEN QUESNELLE Board Member

LISA BRICKENDEN Board Staff

DUNCAN SKINNER

AJIRO WINTHORPE

BRIAN HEWSON

LAURIE KLEIN

PETER FRASER

PRESENTERS:

ADONIS YATCHEW Electricity Distributors' Association (EDA)

STEVE FENRICK Coalition of Large Distributors (CLD)

LAWRENCE KAUFMANN Pacific Economics Group

ALSO PRESENT:

GRANT BROOKER Cambridge and North Dumfries Hydro

JULIE GIRVAN Consumers Council of Canada (CCC)

DAVE PROCTOR Cornerstone Hydroelectric Concepts

MORRIS TUCCI Electricity Distributors' Association (EDA)

GIA DeJULIO Enersource Hydro Mississauga

CHRIS COWELL Entegrus

DWAYNE QUINN Federation of Rental-housing Providers of Ontario (FRPO)

CARM ALTOMARE Hydro One Distribution

JANE SCOTT Hydro Ottawa

PHIL MARLEY Midland Power Utility Corporation

JUDY KWIK Power Workers' Union/Elenchus Research Associates

JAY SHEPHERD School Energy Coalition (SEC)

BILL HARPER Vulnerable Energy Consumers' Coalition (VECC)

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NO EXHIBITS WERE FILED IN THIS PROCEEDING

NO UNDERTAKINGS WERE FILED IN THIS PROCEEDING

 Tuesday, May 28, 2013

 --- On commencing at 9:30 a.m.

Opening Remarks by Ms. Hare, Ontario Energy Board

 MS. HARE: Good morning, and welcome to our second day of discussions on the defining and measuring of performance.

 For those of you listening in on the Internet, it's Marika Hare speaking, and we have a different format today. We will have all three experts at the same time being able to field your questions. They may also have questions of each other, and I would like to remind those listening in through the Internet that you can send in your questions through rrf@ontarioenergyoard.ca.

 Before I turn it over to Lisa, I would like to announce a change in process. This is a change from what was included in the letter of May 3rd.

 In the letter -- and this really arose from a question yesterday concerning the expert consultants' reports. Those reports will be due on June 13th, as was listed in the May 3rd letter. However, we have decided to then ask for submissions from all other parties by June 27th.

 This will allow parties an opportunity to review the expert reports, be informed by them, also give anybody that wants to comment on the reports an opportunity to do so.

 All of this will be included in a letter from the Board by Thursday of this week. But just to let you know, that will give an opportunity for the expert consultants' reports to be available first, okay? I turn it over now to Lisa Brickenden.

Q&A Session

 MS. BRICKENDEN: Thank you, Marika. Today, as Marika pointed out, what we are hoping to do is get a dialogue going on in the room and amongst the experts with respect to the issues and options that were raised in the presentations yesterday.

 Perhaps in fairness to our experts, I would ask them as a preliminary matter if there were any questions they had or that they wanted to clarify before we start.

 MR. FENRICK: If I could jump in, I would like to clarify in my presentation yesterday regarding PEG's position in Alberta. I reviewed back -- went back last night and went back through the decision, and I noticed where Dr. Lowry of PEG had that quote where he basically said the double-counting with the inflation and interest rates.

 That was in the I factor section of the decision, so I naturally assumed or concluded that dealt with the I factor, but then Larry informed us that that was actually dealing with the Y factor. So I would just like to clarify that point with my presentation and kind of withdraw my assertion that PEG supported the inflation factor that we are putting forth or recommending.

 MS. BRICKENDEN: Thank you. Thank you very much, Steve. Adonis, is there any?

 DR. YATCHEW: I am not sure that this is the right time, but I had forwarded to you two pages out of Dr. Kaufmann's report, and at some point I would like to comment on those two pages specifically in order to make clearer one of the central points that I was making yesterday. I am not sure that this is the right time, though.

 MS. BRICKENDEN: Well, it might be helpful to the folks participating today if you did clarify that. I can bring them up now for you, if you wish. Let's see if I can master the technology today. Let me know which pages you want displayed.

 DR. YATCHEW: Yes. So I have extracted three pages. The first page is page 47, table 10. Sorry, my mistake. Table 12, page 55.

 I thought it might be helpful to clarify and perhaps provide a more direct explanation of some of the ideas I spoke about yesterday. Table 12 contains the results of the econometric model. PEG has estimated this particular run does not include Toronto Hydro and Hydro One. That's not germane to the points that I want to make.

 The points that I want to make are these. First of all, there are a whole series of variables in this model. Perhaps the most important one is the first one, the WK variable, which measures the effect of the capital price index.

 Then the next three are highlighted. They are the output variables, the number of customers, system capacity and retail deliveries.

 The first point that I wanted to make is that these parameters that are estimated using the econometric model are then subsequently used in the TFP process. So if we move down to the second page, towards the bottom of the second page I have extracted page 61 from the report and I have highlighted, and this is my highlighting in green:

"Output quantity growth is a weighted average of the growth in these subindexes..."

 These are the outputs of indices:

"... with weights equal to each output's cost elasticity share. These cost elasticities are equal to the coefficients on the first order terms of associated outputs in the cost model presented in Table 12. These cost elasticities were 0.295 for customer numbers, 0.093 for kWh, and 0.366 for system capacity."

 So what we see here is that those exact parameters that are being used to calibrate the TFP model have already been estimated in the econometric model. So the first point is that TFP, the TFP exercise, is itself dependent on the econometric model. It's not independent of it.

 Now, in my view, the econometric model is based on very, very sophisticated data. There are few places in the world that you have detailed data at this level on distributors, and so I am inclined to put some faith in these numbers.

 If we go and scroll down towards the bottom of table 12, I have highlighted in green the trend variable. So the trend variable has this value of 0.11, which is translated as 1.1 percent. And what I would like to point out, also, is that this variable is strongly significant. It has a T-statistic of 6.8. Below, you have the constant, which is an enormous T-statistic, but aside from the constant, there is only one other variable that's of equal or comparable -- sorry, of larger statistical significance, and that's the capital variable. It has a T-statistic of 77.

 So the trend effect here is very significant statistically. Here is my conundrum. Let's say the Board wants to rely upon the TFP calculation as it has stated in an earlier decision. I think it's still very important to try to reconcile why it is that the TFP calculation gives you a productivity factor of approximately zero and this model, which also estimates an effect which measures cost trends, which we thought should be negative, why this value is significantly higher at 1.1 percent.

 So it's this reconciliation that I think is -- certainly I would be very puzzled by why these numbers are so different, and I would like to try to understand why that is the case, even if at the end of the day the Board relies on the TFP calculation. So that's the gist of my clarification.

 DR. KAUFMANN: Well, I think I can go part of the way towards reconciling these numbers. And one thing to recognize is that - which I am not sure has been sufficiently appreciated - is that this cost model was designed for benchmarking, and we have a different cost measure for benchmarking than we use for TFP. And in particular, we have one thing that's different, is the low voltage charges. The low voltage charges are added to this model, and the low voltage charges are not part of the cost base that's going to be subjected to the incentive regulation mechanism.

 And if you look at what's going on -- so in other words, we are adding a big chunk of cost to the data, to the cost data that are associated with the TFP, and that is now reflected in this model, and the cost measure in this model and in the coefficients of this model.

 And if you look at what's happening to those low voltage charges over the sample period, they start out extremely low in 2002, close to zero. For a lot of companies they are zero. But then they ramp up quite a bit over the sample period, and they are very high in 2011.

 Now -- so this is a trend rate of cost growth that is not reflected in the TFP data or our index-based estimates for TFP growth, but they are reflected in the cost that we are using for this model and the coefficients that come out of this model.

 And if that growth rate -- if the growth rate in those low voltage charges are unrelated to any of the variables that we are using to predict cost in this model, then that would just -- then that growth rate would be reflected directly in this trend variable, because that is a systematic change in cost that's not reflected in any of the dependent variables.

 And I have a feeling, because these are basically rental charges for lines that have existed before, that the growth rate in those charges is not due to changes in customers, changes in capacity, because that's not what these companies are paying for.

 They are not paying for -- in general, they are not paying for -- to connect new customers or to build new capacity or to underground or to expand to area. These are just rental payments that one company is making to another.

 So I think that goes a very long way to explaining why that trend coefficient is positive. And that also shows why this is not relevant to the TFP analysis and why we are getting this discrepancy between the TFP analysis and the cost measure, because these costs are not reflected and shouldn't be reflected in the TFP measure.

 MR. FENRICK: Larry, if I could ask a question, or...

 DR. KAUFMANN: Yes.

 MR. FENRICK: So to clarify, you are kind of saying to use the cost definition in the benchmarking data set you kind of get a -- you get a different TFP projection, you know, based on this trend variable than if you use the TFP cost definition that you are using with the low voltage charges and --

 DR. KAUFMANN: I would -- I can't prove that, because we haven't done the cost model for the TFP. We haven't done this cost model for the TFP definition of cost, and there is no reason to do that. So I can't prove that, but knowing the data and just knowing the fact that this is a trend growth in the cost that's specific to this data set and not reflected in the TFP data, it's my strong suspicion, yes, that that's what's going on.

 DR. YATCHEW: So I guess the first question is, there should be an empirical exercise that could be done.

 DR. KAUFMANN: We could do that.

 DR. YATCHEW: I guess, let me add to -- a little bit more depth to the earlier comments. This a trend coefficient over time, and Dr. Kaufmann's -- Larry, if I may?

 DR. KAUFMANN: Sure.

 DR. YATCHEW: -- tentative sort of hypothesis is that there are costs here that have been ramping up over time. But if you estimate this model instead of with just a trend variable, but try to identify which of those years the impacts have taken place on costs, so -- which I did do, and I mentioned in general terms yesterday -- what I was surprised was that some of the largest -- larger shocks actually occurred fairly early in this decade.

 So one would have to try to reconcile that particular pattern of this trend -- which is not linear. It's not ramping up steadily. It actually has ups and downs -- with the explanation, the tentative explanation, that we have received.

 MS. BRICKENDEN: Jay, you had a question?

 MR. SHEPHERD: I have two questions. First of all, is it possible to re-estimate the cost model without the low voltage charges?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: Is it a big deal to do it?

 DR. KAUFMANN: No.

 MR. SHEPHERD: So that would demonstrate the impact of that fairly clearly, right?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: Okay. And then the second question is, can you explain why the low voltage charges should not be in the TFP model and should be in the cost model?

 DR. KAUFMANN: Because the low voltage charges are not regulated -- they are regulated separately. They are a separate regulated charge. The TFP calculation is an input to a number of costs that are reflected in the triple-R data that are going to be subject to fourth gen IR. These costs are outside of fourth gen IR. They are regulated entirely separately.

 MR. SHEPHERD: So because the utility recovers that separately, it shouldn't be in the formula for rates because it's not in rates.

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: Okay. Thanks.

 MS. BRICKENDEN: Bill Harper?

 MR. HARPER: Actually, I -- yes, Bill Harper. I just wanted to comment on Larry's hypothesis. I think there is some credibility to it. If you think about what the LV charges are, they are effectively charges from Hydro One, and to a large extent in 2002, when we started deregulation, they'd be based on whatever the LV charges were there, ramping up, and basically consistent with how Hydro One's rate increases went through that period. Sometimes it was cost of service, sometimes it was IRM. Sometimes it was to incorporate more ROE in your overall rate base.

 So I can definitely see there being a sort of a fact that they are totally to disjoint from the cost escalators that are being used, de-escalators are being used elsewhere in your model to de-escalate either capital or OM&A.

 DR. KAUFMANN: Thank you.

 DR. YATCHEW: So just so that I understand, is the prediction then that if we remove these from the econometric version that we would expect a trend variable that's more comparable to the --

 DR. KAUFMANN: Yes, my prediction is the trend would go down, and obviously that's a statistical test, whether we could -- you know, whether there's a statistically significant difference. I would certainly expect it to go down.

 MS. BRICKENDEN: I have a question, related question. As costs were added in to deal with the low voltage, would we be kind of just exacerbating an issue because we are not going to also be trying to test what would happen if we readjust for the HV that we have done, or would that not have an effect on your scenarios?

 DR. KAUFMANN: Well, the HV costs are in the TFP model because the HV costs are subject to -- the triple-R costs are subject to the fourth generation incentive reduction mechanism. So, no, I don't think that's an issue.

 MS. BRICKENDEN: So that's on par. Okay.

 MR. FENRICK: So could I ask, you know, so you are essentially saying that, given the different cost definitions using the econometric model really isn't reflective of what maybe the TFP indexing should show. You are kind of saying, given the different cost definitions they should show different things.

 Do you think -- you know, I don't want to influence your report or suggest anything, but maybe even kind of in your supplemental report taking out the econometric TFP projections, since you are kind of saying they shouldn't show the same thing, they are different cost definitions. You know, what do we kind of gain from having kind of that sanity check type thing, or -- especially since you say the TFP indexing is what should be relied on. I think you are kind of hanging your recommendation on the TFP indexing. You know, should we put any weight in those econometric TFP projections?

 DR. KAUFMANN: I have put almost no -- first off, it's not a projection, it's a back cast, so there is one difference. But I have put almost no weight on that. I have tried to be clear about that from the beginning. My recommendation is it's an index-based recommendation, but it's in the report and, you know, I don't see any reason -- by the end of this week I am going to prepare a new report, and I don't see any reason to take that out, because the new report is just going to update the old report for new data.

 So I would say, no, you know, there is no reason to take out something that's in the original report, and that's going to be my final report, my understanding.

 But I think I have been pretty clear from the beginning that I put almost no weight on the back cast. I think we should use an index-based method going forward.

 MS. HARE: Let me ask a question about that, because I thought from what you said yesterday that you used an index-based approach because that's what the Board's report said to use. So I wasn't sure whether or not if you had the ability to choose you wouldn't have gone with econometric. So could you just expand on that, please?

 DR. KAUFMANN: Yes. I would not have gone with econometric if I had the ability to choose. And, you know, there are a number of reasons for that, but one very simple reason, and it comes out of third generation to some extent. I talked about this briefly yesterday.

 During third generation, up until December 14th, 2007, I was -- my preferred approach was to use econometrics, and there was a stakeholder conference at that day, and this is -- you know, my presentation is there on the website. And at the end of that presentation, Andy Poray said -- you know, and my recommendation was, because there is diversity in the industry, we should use econometrics to predict TFP growth.

 And Andy Poray, who was part of the working group, but I always considered him kind of the voice of experience, said, Larry, what you are suggesting for us is something that no one in this room understands, and no one is going to understand how their rates are adjusted going forward.

 And I thought about that and I thought, you know, he is absolutely right. There is no reason -- I mean, why would I suggest something, just from a policy perspective, that people -- you know, that customers can't understand, that companies can't understand, and I just kind of thought about how that would play out over the next five years and what this consultation would look like. And it just seemed like an absolute chaotic mess.

 You would have this regulatory approach that no one understood, and when it came time to update the model, if it was based on a model, then there would be all kinds of technical debates that the commission -- the Board members would be in a very -- would not be in a good position to resolve.

 So I just thought that that sort of approach, making that the foundation for incentive regulation, is too complex. And I have had some experience in other jurisdictions since then which has just confirmed that opinion.

 I just don't think it's a sustainable foundation for incentive regulation in Ontario, or really almost anywhere.

 MS. BRICKENDEN: Thank you, Larry.

 DR. YATCHEW: So let me put forth my observations which I have already made, and let me try to make them in a slightly different way. The TFP calculations are done after an econometric estimate, and we can still have all of the technical debates about the econometric model. I haven't seen any great difficulties in having that discussion here, but the TFP, while it might seem to be somehow transparent, rests itself on the econometric model.

 So I don't see how you are actually avoiding the problem of complexity, because someone who really wants to understand this has to read your earlier passage, your earlier section of your report. The econometrics precedes the later TFP calculations, because you then feed them into the TFP.

 So while it might appear that one has an understanding of the calculation of the latter part, the foundation is as equally contentious in this setting as it would be otherwise, it would seem to me.

 DR. KAUFMANN: I don't deny that there is still is some complexity associated with econometrics, and it obviously plays a role here. But the role is limited, in my recommendations and in the report. It's limited just to deriving weights for the costs that appear in the output index.

 I mean, that's complicated, but it's not as complicated as making this model the basis for the entire X factor.

 MS. CHAPLIN: Larry, you said that you could rerun it removing the low voltage costs, and your expectation is that that will primarily have an effect on the trend variable. But isn't it possible it may affect the other coefficients, and then doesn't it have implications for your TFP index?

 DR. KAUFMANN: That's possible, yes. And I was trying to avoid unnecessary complexity here. I didn't want to have multiple econometric models, one for the TFP base that I would use to derive coefficients, another one to benchmark the industry. I thought this report was complicated enough.

 So I understand that these are approximations based on a model that -- where there is a bit of inconsistency between that model and the TFP costs, but, you know, that was my decision, just to model -- just a decision in terms of not overwhelming the reader with complexity.

 But, you are right, potentially there could be changes to the coefficients.

 MS. CHAPLIN: And, Adonis, you are sort of pointing out the difference between something that's zero and something that's 1 percent. Is it primarily the difference in sign that concerns you? I guess I'm wondering, if one resulted in 2 percent and the other resulted in three, would that be considered as an alarming difference that needed to be reconciled or is it the difference in sign that's...

 DR. YATCHEW: First of all, I am certainly concerned about the fact that you have a positive sign on this coefficient, and I think it's important that we understand why it is a positive coefficient, and why even TFP the analysis is not coming up with strongly negative coefficients.

 As for the sign versus the magnitude, it's really the precision with which this coefficient is estimated here. It has a very small standard error. It has a very large T-statistic, actually the third largest T-statistic relative to all the other parameters in the model.

 So there is something going on here. It may be that it's a data matter, as Larry has pointed out. But the fact that you have got an estimate that's a tight estimate - it's a fairly precise estimate - if you said to me, Well, I have got -- one estimate is 2 percent, the other one is 4 percent, but my standard error includes zero, that tells me I am not estimating it very precisely.

 What concerns me here is that it actually is being estimated quite precisely in this model, and that warrants an explanation, at least a reconciliation.

 MS. CHAPLIN: Thanks.

 MS. BRICKENDEN: Thank you. If there aren't any further questions on the modelling, this specific issue, I would invite anyone else in the room, or if there are any e-mails coming in with questions... I understand our e-mail server is not up, and Brian Hewson has kindly offered to accept e-mails if you e-mail brianhewson@ontarioenergyboard .ca with your questions, and we will read them out.

 MR. HEWSON: brian.hewson.

 MS. BRICKENDEN: brian.hewson.

 MR. SHEPHERD: Is that like your middle name?

 MS. BRICKENDEN: Adonis.

 DR. YATCHEW: I understand that in the radio business you don't want any dead time, and so I will try to fill.

 MS. HARE: Actually, you don't need to. I have a question.

 DR. YATCHEW: Okay.

 MS. HARE: On quite a different topic. It's the inflation factor. Dr. Kaufmann, you are basing it on three-year average. Now, the actual forecast number could be, of course, higher or lower than the three-year average.

 And this is a question for all three of you, then. Do you think that that results in just and reasonable rates when the actual inflation number is different than what the forecast is for the next year?

 I understand you did this to minimize volatility, but does it result in just and reasonable rates, in your mind?

 DR. KAUFMANN: Well, rate-making is almost always -- you know, sometimes there is are forward-looking test years for one year. But, in general, rate-making relies on past data. So this incentive regulation approach also relies on past data, and I think in that sense, it's consistent, generally speaking, with how rate of return -- rate regulation has been done in North America for decades. And just in general, you know, I mean, I don't know that it makes a lot of sense to rely on forecast for an inflation factor, because obviously forecasts can be wrong, and we are in a period of -- we are still within a period of enormous uncertainty economically and in financial markets, in particular.

 So I think it would be very risky to rely on forecasts about what's going to happen with interest rates, particularly interest rates and return on equity in the future as opposed to what's been observed and what's been approved by the Board.

 So I guess my short answer is, yes, I do think it's just and reasonable, and I think the alternative of going to forecast, there is a lot of risk associated with it.

 MR. FENRICK: I would suggest -- I agree with Larry. Kind of using a forecast can be kind of a tricky thing to do. Forecasts are only as good as the forecast, and you get three economists and you are going to have three different forecasts.

 But I think using the current year inflation factor, the one that we put forth yesterday, which is industry-specific -- and really the only difference is you are taking that cost of capital impact out of that calculation and just using the asset prices in the electric industry.

 In that way, you can just use the current year inflation factor, so it's much more current. You don't have to smooth out over the three-year period. So you have a more current inflation factor that is also industry-specific.

 DR. KAUFMANN: But that is a current inflation factor that ignores the rate of return.

 MR. FENRICK: That's true, because that's where the volatility is coming from. But if you think of kind of traditional cost-of-service regulation, you set the return on equity and you set the cost of capital, and then that's basically embedded in the rates until the next rebasing.

 So there is a precedent in regulation that you set the cost of capital until the next rebasing period, and then you look at it at that point.

 DR. KAUFMANN: But that's also true under this incentive regulation approach. I mean, there is a cost of capital, there is rates that are set at the outside of IR, and then there is a rate adjustment during IR until you get to the next rebasing, and that's when rates are reset to reflect any changes in the cost of capital.

 So, yes, that's true. That's the way it's done in cost-of-service regulation, but in incentive regulation, where you have index-based adjustments between those periods, what you want and what those adjustments are designed to do are reflect changes in target unit costs, and those unit costs reflect input prices and TFP, and obviously a very significant component of the input prices for distributors is what they have to pay on their bond rates and on equity.

 So it's -- you know, it's certainly relevant to how their unit costs are changing between those cost-of-service true-ups.

 MR. FENRICK: I would add, you know, in third generation IR, you know, there was no cost-of-capital adjustment. It was just simply the GDPIPI, and in most jurisdictions -- and actually, I can't think of an example off the top of my head -- where the inflation factor actually is calibrated to the cost of capital. I am not sure if you are aware of any, but typically what is done is setting it to some sort of price index that does not include cost of capital.

 MR. SHEPHERD: Can I ask two follow-up questions of Steve? Do you mind?

 MS. BRICKENDEN: Sure.

 MR. SHEPHERD: Would you use the current year if the Board decided to include cost of capital? You would still feel the current year is better than a three-year average?

 MR. FENRICK: That's a tough trade-off, because you are trading off current, using current versus three years, but then the volatility on that index, if you use the current year, I mean, 2012 was negative 1.6 percent, and then it could go up to -- I mean, if interest rates go up it could go up 4 percent, 5 percent. I mean, that's a trade-off. I'm not sure if I am prepared to actually make a statement on what I would prefer, but I think there is an option here where you can have the best of both worlds.

 MR. SHEPHERD: The second follow-up question is, you mentioned GDPIPPI, and am I right that cost of capital is built into GDPIPPI?

 DR. KAUFMANN: Implicitly. Was this a question for Steve or me? You were looking at --

 MR. FENRICK: I would give the same answer. Implicitly. You know, as interest rates go up inflation tends to increase.

 MR. SHEPHERD: So then the last -- in third generation then we were including cost of capital in our inflation factor.

 MR. FENRICK: Sure, but if that is true, if that is implicitly in there, now we will be double-counting it. If we include a cost-of-capital term and have the general inflation, you're going to be double-counting, which really will cause a lot of volatility --

 MR. SHEPHERD: How is that double-counting if you have percentage weights? I don't understand. You have 11 percent for GDPIPPI; is that right? 11 percent?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: And then you have 60 percent for the capital factor. Are you counting cost of capital in each one, which is correct?

 MR. FENRICK: Correct, but what you are going to have is, as interest rates increase, kind of all the inputs are going to tend to have an upward pressure on inflation as well.

 MR. SHEPHERD: I don't understand why that's wrong.

 MR. FENRICK: Because if all the inflate -- you know, all the inputs, and the inflations are going up because -- and kind of correspondingly with the interest rates, you're counting one, and then you also count the other, you are going to be kind of -- you are going to be kind of doubling up -- not exactly doubling up, but, you know, there is going to be kind of an implicit impact going on, and then you are explicitly also correcting for it, and you are going to have kind of a roller-coaster effect.

 MR. SHEPHERD: Thanks.

 MS. BRICKENDEN: I have a comment that has come in through e-mail. Just ask the gentlemen up here if they could identify themselves if they are jumping in, because over the air you all sound alike, so it's difficult to tell who is speaking -- no, not Marika.

 And before I move on, Adonis, do you feel you had an opportunity to respond to Marika's question?

 DR. YATCHEW: I have nothing to add at this point, thanks.

 MS. BRICKENDEN: Okay. All right. Thank you.

 Julie?

 MS. GIRVAN: Julie Girvan. Just in terms of helping me with sort of what we went through yesterday, I was just wondering if each of you could just take a couple of minutes to sort of summarize what I would call the rate-setting formula that would be used, in terms of what you are proposing for inflation, what you are proposing for an X factor, what you are proposing for a stretch factor. Just summarize. I think I know, but the numbers have moved around a little bit, and we had some updates last week, and there might be some changes going forward depending on Larry's further analysis, so if you could do that, that would be helpful to me.

 DR. KAUFMANN: I can start. It would be inflation minus .1 percent plus a stretch factor. Inflation would be the industry-specific IPI, the three-factor IPI I mentioned. That's going to vary from year to the year. So it would be inflation minus .1 percent plus a stretch factor, which is going to vary from zero to .6 percent.

 MS. GIRVAN: Just on the stretch, can you help me again with that, how that would work?

 DR. KAUFMANN: The X factor is the sum of the productivity factor and the stretch factor, and they are going to be -- that sum is going to differ for the five cohorts of distributors, depending on which cohort a distributor is assigned to.

 So if you are in cohort 1 because of how you do in the two benchmarking evaluations, then you get a stretch factor of zero, X factor of .1, and then similarly for cohorts 2, 3, 4, and 5 you would just add .15 percent to the X factor as you move from one cohort to the other.

 MS. GIRVAN: Okay.

 DR. YATCHEW: This is Adonis Yatchew speaking, for those on the -- outside of the hearing room.

 We have not definitively come to a position on the inflation factor. If we take as given for the moment the proposal by PEG of what would be .5 percent at this point, as I read the evidence so far, I am seeing cost pressures on the order of about 1 percent. That would put us up to about 1.5 percent, and from that one would subtract the stretch factor, which would be between 0 and .6 percent.

 MS. GIRVAN: So you are agreeing with Larry, in terms of the stretch factor?

 DR. YATCHEW: Again, we haven't come to a definitive position on that, and certainly not on individual utilities, but tentatively, yes.

 MS. GIRVAN: So that, in your view, is an acceptable range?

 DR. YATCHEW: It's not unreasonable. I think that the Board and Larry have suggested, as I understand it, that more cohorts are better -- actually, I shouldn't speak for what the Board is thinking. Certainly PEG has suggested more cohorts rather than fewer to increase the ease of migration, and also the smaller steps mean that the costs of mis-classification into a neighbouring cohort or the benefits of mis-classification are smaller. So that's -- I find that to be reasonable.

 MS. GIRVAN: Okay. Thanks. Steve?

 MR. FENRICK: As far as my recommendations yesterday, on the inflation factor, same formula as Larry pointed out, kind of inflation minus productivity factor plus the stretch factor. On the inflation we put forth a three-factor industry-specific inflation factor that uses the triangulized weighted average, TWA, of the electric utility CPI, which is basically asset prices, weighted asset prices, historically.

 So that's the inflation factor. And that's an annual number. Given the reduced volatility, you can -- we believe you can use the current year on that.

 Productivity factor, we think you should include most of the --

 MS. GIRVAN: Sorry, what do you mean by "the current year"?

 MR. FENRICK: Current year, so 2012, use the 2012 number. 213 (sic), you would update it to 213. So kind of the current year, current historical year, the most current historical year.

 MS. GIRVAN: Historical year. Okay.

 MR. FENRICK: Right. Rather than a three-year average of 212 (sic), 211 (sic), 210 (sic), you would just use the 212 number in 212 -- or I guess it would be in 213.

 MS. GIRVAN: Wouldn't you have -- but if you are setting rates before that, what would you use?

 MR. FENRICK: Rates before -- so in --

 MS. GIRVAN: Say you are setting 2014 rates. What inflation factor are you proposing that we --

 MR. FENRICK: That would be the 213 then, when the data's available. Obviously you can't use the 214 (sic) inflation in 214. Is that clear, or...

 MS. GIRVAN: Yeah, it's just that rates -- it depends if rates are set January 1st, then what --

 MR. FENRICK: Right. And I will leave all the scheduling, all the scheduling, to the Board and those types of people, but as far as the inflation factor we put forth, that can be much more current than a three-year average.

 So we put forth the TWA inflation factor. On the productivity factor, we essentially believe you should use an external, external measure that includes most of the industry as much as possible. So there our recommendation is somewhere in the neighbourhood of negative .7 to negative 1.3, is what those external TFP factors indicate.

 And on the stretch factor we put forth a proposed alternative benchmarking model called the unit-cost econometric model, and so we believe that can formulate the sole basis for the stretch factor. On the basis of those rankings that come out of that model, we put forth six -- had a proposal of six cohort groups, the top sixth of the industry in a zero percent stretch factor, and then each cohort adding 0.1 or 0.10 percent to a maximum of 0.5 percent.

 MS. GIRVAN: Thank you.

 MS. BRICKENDEN: I wanted to add something. To let the group know, Steve kindly -- when I asked yesterday if he would provide us with a 2012 estimate of his recommended inflation factor, and he did e-mail that in to me and I will get that posted. And I think for 2012 the estimate is about 2.0?

 MR. FENRICK: Yes, 2.1 maybe, around there.

 MS. BRICKENDEN: 2.16. If you wanted to plug that into the example formulas, you get an idea of what the PCI would be to compare the three options.

 MR. SHEPHERD: Can I ask a follow-up question of Steve's answer? Tell me whether this is right. You and Larry agree on inflation, except you have removed cost of capital. Otherwise, you are identical. And so you are using annual, but you have removed cost of capital; right? Otherwise, you agree entirely?

 MR. FENRICK: I think essentially with the capital service price, if you take just fixed cost of capital and don't let it vary I think -- I believe your capital service price, his recommendation and my recommendation would be very similar. You would have to run the numbers, but I believe that is likely the only major difference, except for the cost of capital.

 MR. SHEPHERD: So if the Board decides that, they have decided between you on that point.

 MR. FENRICK: Yes. If they just decide to fix cost of capital in Larry's recommended approach, that's essentially the main difference there.

 MR. SHEPHERD: And then on productivity, do I understand correctly that the only difference between your proposal and Larry's is whether you exclude Toronto Hydro and Hydro One from the model entirely?

 MR. FENRICK: Yes. We went through Larry's calculations and we agree with their methodology. We think that's being done correctly. So really the only discussion on there or disagreement might be the sample issue, as you mentioned.

 MR. SHEPHERD: And your difference on the stretch factor is more extensive, because you have added more business conditions; right?

 MR. FENRICK: Yes. So there we are recommended kind of an entirely different benchmarking model that has a whole host more variables included and kind of using that as the sole basis for the stretch factor.

 MR. SHEPHERD: It's entirely econometrics. There is no unit cost?

 MR. FENRICK: Exactly, yes.

 MR. SHEPHERD: All right, thank you. I understand.

 MS. BRICKENDEN: Thank you. Are there any further questions? Bill.

 MR. HARPER: Actually, I wanted -- Bill Harper. I wanted to come back to the inflation factor, that discussion that Marika started. One thing, at the very start, Mr. Fenrick, you sort of clarified the comments of Mark Lowry from the Alberta hearing. I just want to save us all going back and looking at transcript.

 There seemed to be an issue from yesterday on what actually PEG had recommended within the context of the Alberta hearing, whether they had recommended a price index that included a cost of capital service component or not.

 And I didn't hear you address that in terms of whether you sort of -- to put it bluntly, whether you agreed with what Larry said or whether there was still a difference of opinion there.

 So I would appreciate addressing that. Maybe both of you or either of you know what actually at the end of the day the Alberta board actually decided they would use -- you were talking about what was recommended, but what the board actually decided they would use in terms of inflation index around incorporating the cost of capital or not?

 MR. FENRICK: At the end of the day, they actually got rid of the capital component entirely. I believe that's -- so they just used labour, non-labour. So they kind of didn't include a capital component.

 MR. HARPER: So they didn't even include a triangularized capital --

 MR. FENRICK: No, they didn't include any sort of capital component. They kind of said the labour and non-labour encapsulates capital and the capital inflation impact. I was looking at the decision, the AUC decision, and in there Dr. Lowry's quote was in the I factor section. And so I concluded looking in there, incorrectly concluded that they were recommending kind of fixing the cost of capital and that that would be double-counting.

 And I was unable to actually pull up the transcripts on the AUC website last night and PEG's exhibit, but I trust Larry, that he knows what PEG put forth. And so I don't know if that clarifies that, but I kind of withdraw that assertion that PEG did that.

 I still think our I factor proposal, inflation factor proposal, makes a lot of sense in Ontario, but that's --

 MR. HARPER: I just want to get a clarification in my mind around the background going into this, at least so we know where the differences lie and don't lie. Okay, thank you very much.

 DR. KAUFMANN: Bill, can I just kind of respond?

 MR. HARPER: That's what you are there for.

 DR. KAUFMANN: It's good to know what I am here for. What was proposed in Alberta by Mark did include a weighted average cost of capital on the capital piece. It was a three-factor IPI similar to what we proposed. What the AUC approved was a two-factor, which included average weekly earnings from Alberta, and I believe it was the CPI from Alberta.

 And they did that entirely because of simplicity, just to make it simpler. And what they actually said about Mark, and I guess Mark Lowry's proposal, I think they actually quoted what he said on the witness stand about the triangularized weighted average component, which I think is still part of Steve's proposal.

 Mark said on the witness stand that it would take a PhD economist to calculate or to undertake take that calculation. I don't believe that. I don't think it's that complicated, but that's what Mark said, and they quoted Mark in the decision saying this is a level of complexity that we just don't want to -- that we just don't want to incorporate in our inflation factor so...

 MR. HARPER: Maybe just to finish here, so on the two-factor, how did they decide on the weights for the two-factor?

 DR. KAUFMANN: They were based on cost years.

 MR. HARPER: The cost years, but the --

 DR. KAUFMANN: The cost of labour in total cost for distribution, and then the cost of non-labour.

 MR. HARPER: So non-labour would include capital?

 DR. KAUFMANN: Would include capital, yes, and non-labour and OM&A.

 MS. BRICKENDEN: Paula has a question, and then I understand there are a couple of questions that have come in on e-mails.

 MS. CONBOY: Thank you. I would like to ask a question about this 1 percent. I realize I came in when you were in the middle of talking about it.

 But, Larry, if I understand correctly, the result that you got for TFP, you were saying that, in part, it's because of output declines, conservation and demand management and a slowing down of the economy.

 But you did have a look, if I understand correctly, at capital expenditures and said that there is no evidence that there were increased capital expenditures that would explain the results that you got.

 And if I understand what you were saying, Adonis, yesterday was that you were saying, Hang on, I need to do a little bit more work to see if this 1 percent was as a result of increased capital expenditures over the past few years.

 Have I got the right understanding of the differences?

 DR. KAUFMANN: What you are referring to is my index-based analysis.

 MS. CONBOY: Yes, I think so.

 DR. KAUFMANN: The index-based analysis, if you compare the first half and the second half of the sample, there is a decline in TFP between those two periods, and that's entirely because of what happens on the output side.

 Output growth slows. Input growth does not accelerate between the first and the second half of the sample. In fact, it slows a little bit, too.

 So you are right. If you are comparing on the index-based analysis the first and second halves of the sample, the reason TFP has been declining is because of slowing output growth and not additional investment.

 MS. CONBOY: Okay. And then when you did the sanity check with the econometric approach, were there any conclusions that you drew from that?

 DR. KAUFMANN: No, because the sanity check more or less confirmed the index-based -- the sanity check was kind of a one -- it produced a single number, and that was something that was consistent for the TFP trend over the entire period and not for sub-periods.

 MS. CONBOY: So it was just the outcome. It wasn't really what was happening within the model to produce the outcome that you got?

 DR. KAUFMANN: Correct, yes.

 MS. CONBOY: Okay, thank you.

 DR. YATCHEW: In my case, I am referring to this 1 percent that appears in the econometric model, and that number in and of itself does not allow one to attribute it to whether it's capital expenditures or OM&A or other cost pressures that are -- cost pressures that are not already captured elsewhere in the model. So it's not clear to me what the source of it is, and, in fact, I would expect that that 1 percent is a net number where you would have productivity gains on one hand, and then cost pressures on another, which cannot, given the data we have, as far as I can tell, be separately identified.

 MS. CONBOY: Would that be the interplay, then? If you are saying you are trying to figure out the productivity, and then the increase in costs, you might go and look at an indexing methodology and say, well, what's the output index doing and what's the input index doing, and would it be that there might be some interplay within the input index that you need to tease out?

 DR. YATCHEW: I guess the direction that I was suggesting yesterday is that it may be that there are outputs here, activities that lead to outputs, that are not being captured by our output measures in this exercise.

 Now, keeping in mind again that the econometric model is the foundation for the TFP model, because it actually provides the output elasticities themselves, the TFP model then in turn also depends on defining outputs correctly.

 So my supposition yesterday - and I don't have empirical evidence to document this - is that there are likely activities going on here that are not fully captured by the existing model.

 DR. KAUFMANN: I would just like to say I don't agree that the econometric model is the foundation of the indexing model. It generates information that is a component of the indexing model, but the indexing model can certainly stand on its own. If we had revenue-based weights, for example, if we had shares for each of the outputs and what was the share of, say, customer charges collected by each utility, volumetric charges and demand charges where they exist, we could use that to construct the output models, or the output index that's used then to calculate TFP with the indexing model. So --

 MS. CONBOY: So you don't need the elasticities to calculate the indexing, whereas Adonis is saying one method of calculating the indexing is by using elasticities.

 DR. KAUFMANN: Correct. And that is the approach that we are using.

 MS. CONBOY: Thank you.

 DR. YATCHEW: And that's my point, so it is the approach that's been used here.

 MS. CONBOY: Thank you.

 MS. BRICKENDEN: Laurie, you have some questions from...

 MS. KLEIN: I have two questions from Darryl Seal from Toronto Hydro. The first question is, in Dr. Yatchew's presentation he indicated that cost modelling does not give disproportionate weight to large utilities, page 14. This seems at odds with PEG's view, page 13, which seems to indicate that there is an impact.

 Can the experts comment further to help clarify?

 DR. YATCHEW: Yes, I would be happy to clarify. So in the cost model we have a little bit over 70 utilities, 71 if you exclude Hydro One and Toronto Hydro, 73 if you include them. They are more or less given equal weight. There are separate observations in the estimation process. I won't get into the next order of magnitude of detail, where if there are what are called heteroscedastic residuals you might end up giving different -- slightly different weights.

 That is an order-of-magnitude difference in impact on the results relative to the indexing approach, where the size of the utility matters a great deal. The evidence that the econometric approach gives -- does not give disproportionate weight to large utilities can be seen in the fact that the coefficients don't change that much between tables 10 and 12, whereas when you do the TFP calculation with and without the two large utilities, there is a very substantial difference in the estimate of productivity.

 DR. KAUFMANN: Well, I agree with Adonis in terms of the cost modelling. It's true that we do have controls, and I was going to -- I was curious whether you could answer this question without saying -- without using the word "heteroscedasticity", but we do control for heteroscedasticity, and that is something that does minimize the impact of larger companies on the results.

 But -- and it is true that what we compute for using the index-based method is an average. It's an aggregate for the whole industry. And when you do that, then you have -- obviously bigger companies contribute more to that weight, more to that aggregate, than otherwise.

 We don't have to do it that way. We could have done an average TFP growth, which would have just been -- and we have done that in other places, where essentially what you do is, company by company you just compare the average TFP growth for each company, and then you just take the average over the whole sample. That doesn't weight them.

 So that could have been done. That has been done in other places. We didn't do that here because we were advised not to provide individual company TFP numbers.

 So since we couldn't do that, we had to use the aggregate approach. But it's a well-established approach to use the average TFP growth, so we could do that.

 And there was a question yesterday about, since we are talking about excluding the two companies -- Steve asked me whether we have ever done that before, and as I thought about that on the subway back to the hotel. We had 60 percent of the industry covered in this aggregate, and that's actually very typical. That's not at all unusual for the sort of work we have done in other places where we do TFP estimates. We rarely get a complete coverage for the whole industry.

 So for example, I developed a TFP estimate for Boston Gas for the northeast gas distribution industry, and we had a sample of companies for that, but we didn't have every single company in the northeast US, how we define that, and our coverage of the industry of gas distribution customers covered in that region was about 60 percent.

 So it's not unusual. It's very common not to have complete coverage of the industry as a basis for productivity.

 MR. FENRICK: Another question, though. You have never actually had good data from a utility and excluded them on the basis of them being large, right? I mean, the reason you had 60 percent was, well, either it wasn't good data or there was problems with this utility or that utility. Has there ever been a situation where you had good data, you had the information, but kind of excluded that?

 DR. KAUFMANN: No, because we have always had plenty of flexibility, in terms of, you know, selecting companies with good data when we construct the sample, so we have never had to do that.

 MS. BRICKENDEN: Adonis?

 DR. YATCHEW: I just wanted to add one additional observation. In the econometric model, as I understand the technique that Larry uses, actually assigns less weight to a large company like Toronto Hydro or Hydro One than would be assigned to a median company, because it's -- because the variance of the residual is larger for those firms. Is that fair, Larry?

 DR. KAUFMANN: Potentially, yes. I mean, we do look at the -- that's not to say that the variance will be bigger for larger firms. But, yeah, we do -- we divide -- I don't want to get into the weeds here, but we do essentially deflate, divide through by the variance associated with a given distributor.

 DR. YATCHEW: But at the end of the day the main point is that these utilities -- and this is in response to the question from Toronto Hydro. The answer is that the econometric model weights utilities more or less equally, same order of magnitude. The TFP approach weights utilities by size.

 DR. KAUFMANN: The current TFP approach, yes.

 DR. YATCHEW: Yes.

 MR. SHEPHERD: Can I ask a follow up to that?

 MS. BRICKENDEN: There is another question, I think, from Darryl. Is it a different topic? Is it related? All right. Sorry.

 MR. SHEPHERD: I just wanted to follow up on that, Larry. If I understand, you calculated an aggregate TFP, which is -- if you included everybody it would be equivalent to using a weighted average of the TFPs for the industry, right?

 DR. KAUFMANN: Weighted average of the company's specific TFPs, yes.

 MR. SHEPHERD: Okay. And if you used a simple average, that would be much closer to -- tell me whether this is right -- to the number you would get with a weighted average excluding the two big utilities.

 DR. KAUFMANN: Yes, that is true.

 MR. SHEPHERD: And how big a deal is it to do a simple average?

 DR. KAUFMANN: Not a big deal.

 MR. SHEPHERD: Would that be informative?

 DR. KAUFMANN: Well, like I say, we have done that. That's an established approach. We have done that. In fact, that's -- I believe that's the rule in most -- that is the approach we are generally taking these days. So I think it's informative. It reflects our current practice.

 MR. SHEPHERD: So I think it would be useful if we saw it, if you could.

 DR. KAUFMANN: Okay.

 MS. BRICKENDEN: Laurie?

 MS. KLEIN: The second question by Darryl Seal, Toronto Hydro. Mr. Fenrick mentioned in his presentation yesterday that an Ontario-only model is less appropriate for extreme outliers such as Toronto Hydro and Hydro One, page 39 of presentation.

 Can he please elaborate and also talk about his views on the rationale appropriateness of using US comparators for benchmarking all Ontario LDCs, not just the outliers?

 MR. FENRICK: Was that directed at Larry or to me? To me?

 MS. KLEIN: It is you, but...

 MR. FENRICK: So, yes, that is one thing that I mentioned yesterday, that if you look at Hydro One, Toronto Hydro, some of the other large distributors, and probably maybe also on the opposite end some of the smaller, like extremely small, like Hydro 2000 and those types of distributors, there are some extreme outliers in this data set.

 Toronto Hydro has over 700,000 customers, I believe, whereas the average is right around 30,000, 35,000 in the industry. So any model, any econometric model that you build, is going to be centred around that average.

 So you are kind of developing a model that's estimating coefficients for that 30,000/35,000 distributor range, and then trying to extrapolate through a number of other variables, trying to figure out, Okay, can we predict Toronto Hydro shooting out with our centre of gravity right here at 35,000 trying to figure out what Toronto Hydro's benchmark would be?

 And that's -- it's established economic theory, for translog cost theory, the further away you get from the average, the less accurate your estimation is.

 Toronto Hydro also has the additional fact that - we can look around - it's an urban core they are serving, and there is no other distributor that is actually serving an urban core.

 So we know we are missing a variable there that you can capture with the US data. There is a number of urban cities that distributors serve. So you can capture kind of that impact of: What are the extra costs? What are the added cost pressures of serving that urban -- that densely urban core such as Toronto Hydro?

 And you also have the advantage with the US data of, in the case of Toronto Hydro and some of the large distributors, where that centre of gravity of that model is shifted to 300, 400, 500,000 customers, and so you are much closer to what you are trying to predict.

 So it is going to be a much more accurate prediction than using a model that's basically centred at 30,000/35,000, and then trying to figure out: What is that benchmark for that utility that's 20 times as large and serving a completely different service territory that has really no peers in the Ontario industry?

 DR. KAUFMANN: I think that really exaggerates the sample data that exist in this province. It's not the case that we have 70 companies that are around 30 or 35,000. We have two that are out there. We have a range of data.

 There are two distributors that serve about 300,000 customers. There are a couple of others that serve about 200,000. There are several others around 100,000. Then there is a range that goes all the way down to about 2,000, or so.

 So there is a fair amount of diversity right to around 300,000, but then you do have these two that are out there that are much bigger.

 So I agree in a perfect world - and I said this yesterday - we would have more companies in that range between 300,000 up to 1.2 million. That's not the data set that we have. But I don't think it's fair to say that there are two companies that are out there and everybody else is centred around this.

 There is a fair disbursement of data within this province. So we can go part of the way to reflecting the diversity of business conditions that companies are operating under.

 MS. BRICKENDEN: Paula?

 MS. CONBOY: Unless there is follow-up.

 MR. SHEPHERD: I have a follow-up.

 MS. CONBOY: Okay.

 MR. SHEPHERD: I have a follow-up on that particular question. You said that Toronto Hydro's costs are 14 percent below a comparable group in the United States.

 MR. FENRICK: Yes.

 MR. SHEPHERD: Did you compare the cost levels for US distributors generally to Ontario distributors to see whether your baseline is correct?

 MR. FENRICK: Yes. When we did that analysis, we did a number of ways. One way to include all -- the entire Ontario data set along with the US data set, and that allows us to have kind of control variables to control for the Ontarioness of the data set. So you can kind of -- you know if we did the input prices incorrectly in any sort of way, that variable can then adjust for that. And, yes, we were able to do that.

 MR. SHEPHERD: So are the Ontario distributors generally in the lower cost range in that full data set, including the United States?

 MR. FENRICK: No, when you do that and you include that Ontario variable, it's interspersed throughout. Kind of by definition, if you put a variable in there for Ontario and correct for the input prices, so you kind of have a range, you know, US and Ontario, kind of unbound --

 MR. SHEPHERD: Sorry, you corrected for the input prices?

 MR. FENRICK: Input prices, right. So we looked at wage levels in Ontario compared to US, capital, those types of things.

 MR. SHEPHERD: So it wasn't a straight-up comparison of Toronto to Chicago and Los Angeles and New York?

 MR. FENRICK: No. Toronto was simply an observation in that full model, which included 170 utilities, I believe. When you have all the US data and all the Ontario data, you have is a sample of about 170, and that is just one observation in there.

 MR. SHEPHERD: You are going to make that data available to everybody, that run?

 MR. FENRICK: I believe in our report on June 13th we will be discussing that and provide a model.

 MR. SHEPHERD: Okay, thanks.

 DR. YATCHEW: Could I just add to that? My recollection is that from previous work that the EDA did, the Ontario distribution industry as a whole actually compared quite favourably to distribution costs in the United States.

 I think that says something not only for the distributors, but also for the institutional structure that we have here.

 MR. SHEPHERD: That is what I was driving at, Adonis. If Ontario distributors are generally cheaper than -- or more efficient, if you like, than US distributors, than a comparison of Toronto to large US distributors is not a fair one.

 DR. YATCHEW: I am not sure it's unfair, because Toronto's incentives within this industry, if everybody is more efficient, they are aware of who their comparables are or not, and they are aware of those pressures.

 So I guess the counterfactual that we can't really do, we can't take Toronto Hydro and put it in the States and ask how much higher their rates would be. But I would not be at all surprised if they were higher, and I would not be surprised if Hydro One's costs would be higher if you put them in the US.

 MR. FENRICK: I would like to add to that. So in that, when you are looking at the comparison Ontario/US, we did find that Ontario distributors tend to be more efficient than their US counterparts.

 Then looking at that in the Toronto Hydro context, they are getting that Ontario variable, so they are kind of being set at that higher standard of the Ontario standard, which is just more efficient. That's kind of been encapsulated already, and they are still 14 percent below, because that larger data set allows you to control for the urban core and the other challenges that Toronto Hydro is facing.

 So they are kind of being held to that same Ontario standard within that model, because of the variable that you are putting in there, but then given the additional variables, that data set allows you to put in they are 14 percent below.

 So it kind of tells a different story, but while still correcting for kind of the Ontario efficiency.

 DR. KAUFMANN: Can I just make one observation? I haven't -- I am not familiar with either of these studies they are mentioning, so I can't say anything specifically. But just in general, we know the institutional structure here is very different than the institutional structure in the US. We are talking, I'm sure, about investor-owned utilities.

 So whenever you make comparisons between Ontario, where the industry is mostly municipally owned, and an industry that is investor-owned, obviously -- I guess it's not obvious, but it's a fact that the returns for the investor-owned utilities are almost always higher than for the municipals, and that's going to are reflected in rate levels and things like that.

 So you have to be very careful and you have to control for that when you make comparisons across the two.

 DR. YATCHEW: Let me just add, and this is related to the Toronto Hydro issue. These cohorts, the previous ones and the ones that are going forward, I constantly hear from individual utilities about their concern that they have now gone down in the ranking, so to speak. They compare themselves constantly. We are talking about relatively small numbers in terms of the actual dollar magnitudes when the step is 0.15 percent.

 So I think a major driver here is this comparison, this yardstick comparison, that utilities engage in. And that driver, my guess, is at least as strong as the monetary driver of changing classes.

 MS. CONBOY: That leads in very nicely to my question. Part of benchmarking certainly helps us with our rate-setting methods, but I would think it's also for distributors to be able to look at where they compare against their peers either in a cohort or overall, and hopefully you will get enough information as a distributor to be able to figure out where you can drive further efficiencies.

 We have seen two different methodologies put forward with respect to assigning the stretch factors. What information do your methodologies give distributors to assess where they can find efficiencies and move up either within their cohort into a different cohort?

 DR. KAUFMANN: I would say just in general the methodology that I am proposing for assigning stretch factors, we have two benchmarking tests, and I believe the unit-cost test is -- the unit-cost evaluation is one that gives distributors some sense of where they are relative to their peers, relative to where they are in the industry. So they can use that as a sense of figuring out just in general terms where they are and how they compare with others.

 Now, in terms of -- and if they like they can go and they can break that down and look at differences. The information is all there to look at cost per customer, cost per kilometre, cost per demand, and those sort of things. So that information is all there in the cost analysis.

 But in terms of actually giving distributors information they can use to kind of manage their own operations, this is not that type of benchmarking evaluation. It's a regulatory evaluation that's appropriate and designed to be appropriate for making inferences on efficiency and setting rates.

 There is a difference, more forensic and more detailed granular sort of approach to benchmarking which companies can use and which they do use to really get down to the operational level and to try to understand very precisely what they can do.

 But that is a different type of benchmarking exercise that's not appropriate for the sort of work we want to do and the information we wanted to find, which was on overall efficiency.

 So really, companies can use what we have done on the unit-cost side to get a sense of where they are, but I don't believe it's the regulator's job per se to go and give -- tell a company exactly what they need to do to manage their operations. Incentive regulation is designed to set the overall framework, given the right incentives, and then they can go forward and do that, and I think that requires different information and a different type of benchmarking study.

 DR. YATCHEW: I agree with what Larry has said. I think incentive regulation is in part premised on the idea that regulators are not in a position to tell utilities what they should do to cut costs, but that there may be the opportunity to cut costs, and this efficiency ranking essentially does that. It may have flaws in it, it may have imperfections, perhaps large ones. There may be good explanations for why Toronto Hydro or Hydro One's unit costs are much higher.

 But once you have done the ranking, then Toronto Hydro, Hydro One, or any other utility can start looking around, whether there are real opportunities.

 The kind of more granular analysis that Larry speaks of, kind of a best practices, for example, analysis, I do not see that to be part of the regulator's role.

 MR. FENRICK: Yeah, I would agree with all that, as far as the regulator's job is not to manage the distributor's business or to really help them find best practices and those types of things.

 I would say the approach that we put forward yesterday does provide more information to managers. It provides kind of the unit cost and how those unit costs, costs per customer, compare across the province, and what you have to do, what is that expected, what is that benchmark unit cost, and then where are we actually.

 So then you have a dollar figure, you know, you have, oh, we're $20 away from our benchmark. If we can cut costs by $20 we can get up to our benchmark, or we are $30 away from that -- the next cohort group. Can we find that efficiency gain? Can we find that?

 And also, what it does is provide information on what each variable is adding to that unit-cost benchmark, so they know, you know, here is peak per customer, and that, given our variable values, this is how much. You know, it's $100 or $200 or whatever it might be. Given our condition, this much is being added to our benchmark.

 And, you know, you can go through all ten variables or however many we have in the model and say, okay, and assign, this variable is adding this much to the benchmark, this variable is adding that much to the benchmark, and so it provides a lot more information that managers can dig into.

 Not that it necessarily prescribes any sort of management changes or process changes or anything like that, because that really is not the regulator's job, but it does provide more detailed information on what the variables are doing and how the benchmark is being calculated.

 MS. BRICKENDEN: Gia, you have a question?

 MS. DeJULIO: Thank you, Lisa. It's Gia DeJulio from Enersource. I know I should be careful what I ask for, because I might not like the answer, but I wonder if I could ask Larry about yesterday's presentation. Specifically, I am looking at slide 26, and it's the table 24 unit costs by peer group. And, you know, the question that we had sort of took me to -- it reminded me of how intuitively I have a hard time understanding the results of this table, and I was comparing that to the sector-review panel findings, which recommended, amongst other things, that we reduce the number of LDCs in the province, you know, take them down to, say, roughly 12 LDCs, and, you know, the rationale was a belief that there would be cost savings due to consolidation in the sector.

 But, you know, if we look at this table and we see groups D and -- group D and group E, for example, which are considered small output, small-area LDCs, one being high growth, one being slow growth, and their unit costs average are relatively low compared to the other peer groups, and that's different from what we had originally seen in your May 16 presentation, where those groups, D and E, were actually quite high relative to the other peer groups.

 And so intuitively I just can't understand, you know, these relative weightings, I guess, of the unit cost by peer group. I wonder if you can help me.

 DR. KAUFMANN: I'm sorry, the relative weightings?

 MS. DeJULIO: Yes, you know, groups D and E have relatively low unit-cost averages, and --

 DR. KAUFMANN: Comparison.

 MS. DeJULIO: Yeah, when we compare them to the other peer groups.

 DR. KAUFMANN: Well, partly it's a function of a few companies. Partly it's a function of, for example, in group A, I mean, you can see there are a couple companies there that drive the average up quite a bit, Hydro One and Toronto Hydro.

 So, you know, if those companies were excluded -- and again, this is a fairly simple exercise. It doesn't control for everything, and all the factors that can impact the cost for these companies. But if you would exclude those companies, the unit cost for this peer group, which is the large company peer group, would decline quite a bit.

 So I think we are seeing just a variety of evidence to show that Hydro One and Toronto Hydro are different from, in some sense, different from most of the distributors in the province, and if these were taken out, then I think there would be evidence that there would be unit cost savings for the larger companies relative to the other five peer groups.

 And, you know, the other small group -- where is Algoma? Not to pick on Algoma, but Algoma is another one. Yes, Algoma is there in group C. You can see they have got the highest unit cost in the province. And if they were out of this peer group, then this unit cost average would be quite a bit -- the mean unit cost would be quite a bit lower.

 So this was -- the reason -- the fact that some companies are distorting the mean in a couple of these peer groups, the outlier companies, was part of the rationale for the suggestion that maybe we should be looking at medians rather than means, and I think that's worth considering. But I think that particularly explains what we see here.

 MS. DeJULIO: So then it is your opinion, Larry, that what the sector review panel has recommended is still valid?

 DR. KAUFMANN: I don't have an opinion on what the sector review panel recommended.

 MS. DeJULIO: Okay.

 MS. BRICKENDEN: Oh, sorry, Laurie, have you got a question? I was going to ask a question of clarification. If there is anyone else in the room that would also be interested to maybe have a little brief discussion on using median rather than mean, I think I would benefit from it.

 Larry, if you could explain that briefly, and then we will move on to a question over e-mail.

 MS. KLEIN: It's not a question. Larry, when you talk, can you speak closer to the mic?

 DR. KAUFMANN: All right. The mic is on the other side of where I'm sitting. Okay.

 MS. BRICKENDEN: Carm?

 MR. ALTOMARE: Before you go to that discussion, I would like to follow up with the question that Paula asked earlier, for the simple reason that when I do research in the other jurisdictions, they think that you shouldn't just be just looking at costs only. You should be looking at performance and a balance.

 Now, I understand what the three economists have said, and I agree that costs should be looked at, but if you look at the LDCs, there is drivers that we haven't discussed here, but they are very evident and very realistic, one of them being reliability, the other customer service and safety, and those are all drivers that are adding to the cost.

 So if you are strictly looking at cost for incentive rate setting, it's going to -- and I am not -- I am just assuming what I have seen in other jurisdictions, is that it may drive the costs down by not doing the maintenance, by not focusing on the customers and maybe not focusing on the safety.

 So what I am suggesting is, if we go forward, we should look at all these areas together. We just don't look at costs, but we look at all the things that are confronting a utility. And when I look at some of the research they have done over in the UK, economists there tend to agree, meaning that you just don't look at efficiencies, but you also look at effectiveness.

 So you look at quality of service that the utilities provide to their customers, and I think if you just stick to cost or focus on cost, it's going the drive the wrong behaviour.

 DR. KAUFMANN: Carm, can I respond? We are looking at that. There is a scorecard which is going to be part of this. It's going to be part of the regulatory framework, and the scorecard is designed to reflect that broader consideration. So there will be reliability. There will be a variety of other indicators that will be reflected there.

 So I agree those are all important considerations and they need to be considered in the overall regulatory framework, and they are, but we -- in terms of incorporating, for example, reliability in this analysis, I have done a lot of work on reliability in this province, as you know.

 And we have examined the reliability data and they are not reliable, and they really can't be used as a basis -- as an input in the model.

 So it wouldn't -- that would actually add more noise as opposed to useful information for the benchmarking analysis.

 MR. ALTOMARE: I agree with that. However, one of the blessings and one of the advantages of reliability is I don't have to go back 20 years. I don't have to go back 10 years. I can start today on reliability, and that's one of the nice things about reliability.

 So I realize what Larry is saying about the data accuracy, the data quality and reliability, but I think it's of the same light that our costs are. I don't see too much difference there between our costs and reliability.

 And the longer we pursue this argument, the longer it's going to take to really understand what reliability impact has on a utility and look at opportunities where we can become more customer-focussed.

 So I know we have had this discussion for several years saying the reliability data is not accurate, but I think we need to get past that. I think we need to look at reliability a little bit more serious, look at the data quality, the accuracy, along with the costs. Like, I don't think we dismiss the costs as being inaccurate. I think there is some opportunities there, as well.

 The other area is customer service and safety. Safety does play an important factor in the operations of a utility. And, again, I agree with what was said by the panel is that there is operational benchmarking that utilities do. However, I don't think the OEB should dismiss those studies or dismiss what those messages or findings are, because they do have an impact on our costs.

 MS. BRICKENDEN: Thank you, Carm. I am noticing the time. We have been sitting here for a while. I didn't know if you wanted to stretch your legs and get back to this, if that would be... Let's break for 15 minutes.

 --- Recess taken at 10:55 a.m.

 --- On resuming at 11:14 a.m.

 MS. BRICKENDEN: Hello. Thank you. We are reconvening.

 Before we broke, we had a brief discussion on -- or I introduced a brief discussion on median versus mean, and I was hoping Larry could briefly provide a discussion on that to go over how that might effect this table 24, the unit cost by peer group.

 DR. KAUFMANN: Okay. I am actually looking at table 24, and just as an example to show how this might work, the mean is just the average. So the mean, what we are computing right now is, we are looking at all these unit costs, and we are just averaging them, so that is the group average.

 The median is a different measure of kind of the central tendency within this group, but it's not a simple average. All you would do with the median is you would -- 50 percent of the observations are above the median and 50 percent are below the median.

 So to look at these to find the median of this group you would just look at, what are our bottom five observations, and that's the lower half of the median, and then the number six observation would be the median, because then there would be five above that.

 So there are just -- so there are -- so I have just been eyeballing this, and I am not sure whether I had this right, but my understanding is that the median in this group would be 40, that would be set by PowerStream, which is -- their unit cost is 43,521,000. There are five companies below that, and there should be five companies above that.

 So what that means is that if we used medians and we compared each company to the median rather than the group average, the median for the group, the group median, would be PowerStream, 43.5, and that would reduce the impact of the outliers in this group on what's computed as the average.

 So what that means -- another way to look at that is that the average for the companies above is greater because there are outliers. The difference between that average and the median is greater than for the five companies below, so those companies are kind of driving up the average disproportionally, and the argument is that when you do that, when you have outliers in the group, it kind of leads to a distorted evaluation of the efficiency of the companies, the other companies in the group.

 So there are one or two companies that are impacting that benchmark and making the others look relatively good because of that. The median is a way to reduce the impact of those outlier companies within any peer group.

 MS. BRICKENDEN: Thank you, Larry.

 MR. SHEPHERD: Can I follow up with that, Lisa?

 MS. BRICKENDEN: Sure.

 MR. SHEPHERD: So what's the reason for using mean then?

 DR. KAUFMANN: It was -- I can give you two reasons. It was what we used in the OM&A benchmarking analysis, which doesn't mean it's right, but it was what we had done in the past, and it was -- you know, so it seemed reasonable going forward.

 We just had a lot of things to think about, and this was one issue that, frankly, I just didn't have enough time to kind of think through the options, so we just kind of -- I guess we just went with what had been done in the past.

 MR. SHEPHERD: It sounds like you are saying now that median's better.

 DR. KAUFMANN: I -- better? Yeah, I mean, I do -- I guess I am starting to prefer the median, because it does reduce the impact of the outliers.

 MR. SHEPHERD: And then do the other panellists have a comment on that? Assuming you have some sort of peer grouping, is it better to use the median in the peer group or the mean?

 MR. FENRICK: I would preface that by saying my preference would certainly be to get rid of the peer grouping. You know, you are kind of losing or ignoring certain information that the econometric models can pick up, and you are kind of arbitrarily -- in some sort of way arbitrarily putting utilities in the same group, and that has the effect of trapping a number of them into that peer group, depending on who they are with, whether you use the median or the mean.

 Given your actual question, assuming -- assuming there is a peer-group approach, then I would -- I think the median makes more sense than the mean. I think I kind of agree with what Larry said, assuming -- assuming a peer-group approach.

 DR. YATCHEW: Again, I, as I expressed yesterday, I am not that in favour of the peer-group approach, because I think the data that we need are already in the predicted versus actual, the other efficiency comparisons.

 Having said that, I think, in answer to your question, medians do prevent outliers from having too much of an impact, and I even recall back in the electricity journal paper that I wrote almost 15 years ago talking about something called quantile regression, which is essentially this idea of avoiding extreme observations from having too much of an impact, so --

 MR. SHEPHERD: So are you saying we have to learn quantile regression?

 DR. YATCHEW: No, no --

 MR. SHEPHERD: Because I am not going to.

 DR. YATCHEW: -- but think of quantile regression as best practices, identifying top-quarter performers.

 MR. SHEPHERD: So then the follow-up question is, one of your problems in TFP is that whether you use the weighted average or the simple average will produce substantially different results, and you might have to take out outliers to make the numbers right.

 Is there a use of a median in that context that would make any sense? Does the same logic apply?

 DR. KAUFMANN: I don't believe so. With TFP what we are trying to do is we are trying to get an industry average, TFP growth. And again, in this context it's the industry -- it's a measure of TFP growth that would be appropriate for most distributors in the province, the ones that are under fourth gen IR. So that is what we are looking for here, and it is an industry average TFP growth, and --

 MR. SHEPHERD: Yeah, but that is sort of begging the question, though, Larry. I mean, it's an industry standard, is what you are looking for, and you are equating average with standard, right?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: The question is whether the standard could be the median and whether that would be reflective of the industry.

 DR. KAUFMANN: So you are saying look at -- kind of line up all the company TFP numbers, trend numbers, from top to bottom, take the median, and make that the basis for the recommendation?

 MR. SHEPHERD: Is there some value in thinking about that?

 DR. KAUFMANN: I don't think so. That just doesn't strike me as a very sensible way to go about this.

 DR. YATCHEW: I think it would be difficult to try to develop a TFP approach that accommodates this. But the econometric model can actually accommodate this device of avoiding large-impact outliers.

 MR. FENRICK: And I would just add to that, if you did go down the median or even the average road for TFP, I think then you would probably have to separate out the different sectors in Ontario and look at, okay, large distributors, small, northern distributors. You know, if you start taking the average, I mean, that is going to be the average at the average, or the median is likely to be the median at the median, which is right around the 30, 35,000 customer level, and so you are really measuring that, as opposed to the aggregate. You are kind of looking at the whole industry and saying, okay, as a full industry here is our outputs, here is our inputs, and here is the ratio. If you start going down the median or even the average road for TFP, you know, there probably could be an argument made for, well, let's segment out the utilities.

 MR. SHEPHERD: So I guess I am trying to understand, there is something intuitive about saying that all utilities should be held to the standard of the utility that is neither the best nor the worst, which is the median, right?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: And I am wondering why that intuition is wrong.

 DR. KAUFMANN: I think that intuition is right. The mean -- I mean, I think the mean is --

 MR. SHEPHERD: Well, see, that's the median.

 DR. KAUFMANN: Hmm?

 MR. SHEPHERD: That's the median. Neither the best nor the worst is the median.

 DR. YATCHEW: They are both measures of central tendency. The real distinction is that the mean is --

 MR. SHEPHERD: Is weighted.

 DR. YATCHEW: -- is affected by outliers. The median is not.

 DR. KAUFMANN: And again, maybe we are going beyond the specific question, but, you know, I keep going back to the fact that what we are doing here is we are talking about a productivity factor for fourth gen IR, which is supposed to set a productivity factor that is appropriate for most distributors in the province.

 And if you take out the two outliers and you have 71 companies, that is most distributors in the province. No one has disputed and no one is disputing that the TFP numbers that I get for that aggregate and that definition of the industry is appropriate. No one is disputing that that's an accurate number.

 And I keep going back to the fact that I think that is the best, most transparent and actually the fairest way to go about doing this. If we didn't do that, if for whatever reason those two companies were in there, then we know that that reduces the industry TFP trend by about 1.2 percent.

 So if both of those companies are in whatever TFP measure we use, then what that means is that 71 companies are going to be paying -- the customers of 71 distributors are going to be paying 1.2 percent more each year not because of anything happening at those companies, not because of anything that's happening industry wide, but entirely because of the experience of two companies that are an outlier. To me, that doesn't seem --

 MR. SHEPHERD: Is the converse also true, that the TFP for those 71 distributors is not fairly applicable to Toronto Hydro and Hydro One?

 DR. KAUFMANN: It could be, and if that's the case, they have options.

 MR. SHEPHERD: Thanks.

 DR. YATCHEW: I should add that perhaps I misheard, but I am actually -- I won't say disputing, but I am actually putting forth a question of: How do we reconcile the calculations that you have done with TFP, for TFP excluding Toronto Hydro and Hydro One, and the results of the econometric model?

 DR. KAUFMANN: Fair enough.

 MR. FENRICK: I would add to Larry's comments that when you are putting together a TFP index and looking at the industry, which I believe the RRFE document does call for an industry TFP measure, you are always going to want to do that out of sample. So you take the utility out and what is happening in the industry, and that forms the basis for incentive regulation plans of the productivity factor.

 So it strikes me, sort of arbitrarily excluding 40 percent of the industry, and that's external to 71 other distributors. What's going on at Toronto Hydro and Hydro One? They are part of the industry just as much as anyone else is.

 And so you look out a sample, what's happening in the industry except for my own utility, and that's the external TFP trend going on. In incentive regulation plans, that's how it's specifically done is looking at the external TFP trends within the industry.

 So it kind of strikes me as a little arbitrary and kind of a slippery slope. We are going to throw out this sector of the industry. Why not northern distributors? Why not GTA distributors? You know, at what point does it stop where you start excluding distributors that maybe have different TFP trends and kind of on the basis of their own TFP trends excluding them? When you get to the case, say, in the future where there are 10 to 12 distributors in the industry and things are consolidated down to that point, can we not do TFP trends anymore because each one is going to impact the TFP trend?

 It's kind of a slippery slope we are going down arbitrarily excluding a large portion of the industry.

 DR. KAUFMANN: I don't think it's a slippery slope. I think -- in fact, I think your company-by-company data really make my case. When you look at what's happening when you eliminate the impact of one company, you have a very tight band for TFP growth for 71 companies of about -- I don't know. It varies by about ten basis points, but then there are two companies where you see very significant growth, very significant impact on the average TFP trend.

 We know what those two companies are. So I think that analysis actually identifies there are two companies that are having a material impact on this growth, on the industry growth, and both of those companies should be out. Neither -- no single company should be impacting the TFP growth trend for -- that's reflected in the rates of the rest of the industry.

 MR. SHEPHERD: The models that you are using don't capture the effects of cost increases in one company on another company; right? So, for example, if Hydro One and Toronto Hydro's lesser productivity affects wage rates in the industry or affects the prices of goods, then that would tend to reduce the productivity of everybody else.

 So if everybody else is still much better, then they are much better despite that impact; is that right?

 DR. KAUFMANN: Not with respect to wages, because we use an external wage measure. We are not using the companies' own wages to deflate.

 MR. SHEPHERD: Okay, all right.

 MS. CONBOY: Would we be having the same discussion if the TFP sign was positive? I mean we have got Toronto Hydro and Hydro One who are on one side of the bell curve, if it is a bell curve, and what kind of conversation would we have been having right now if they were on the other side of the bell curve?

 DR. KAUFMANN: I would be having the same conversation. It's not about the magnitudes. It's about what's consistent with the right way to do incentive regulation.

 MR. FENRICK: Could I ask, what if Toronto Hydro and Hydro One did not impact the TFP trend? Would they then be included in the sample?

 DR. KAUFMANN: Yes, yes. They are not -- the idea is you want to include as many as you can, but if there are one or two companies that are going to ratchet the TFP trend up by 1.2 percent for the rest of the industry, then that -- you know, that's not the way to design an incentive regulation plan.

 MR. FENRICK: So really on the basis of what you are observing in the industry, you are excluding them on what you are finding, on the TFP finding? Isn't that kind of begging your question and, in a way, cherry-picking.

 DR. KAUFMANN: No.

 MR. FENRICK: Given that these two utilities impact the TFP trend, we are going to throw them out and ignore that information, but it's really no other basis than the fact that you are observing a TFP trend that's different.

 DR. KAUFMANN: Our objective is to estimate and recommend a TFP trend that is appropriate for most distributors in the industry. If we use 71 of the 73 distributors in the industry, we get a TFP trend of just north of zero. If we include two companies, the experience of two companies, we ratchet that down by 1.2 percent. That's not cherry-picking.

 That's the right -- in my opinion, that's the right approach and that gives you the right result for what it is we are trying to do, something that's appropriate for most companies.

 These companies are having a material impact, and that's not the way incentive regulation is supposed to work. It's similar in a way to what the Board decided with respect to wage rates, why they wanted to use a generic and off-the-shelf measure for labour price inflation.

 They didn't want companies' own labour price settlements to be rolled in and reflected in their costs. This is somewhat analogous to that. It is kind of like having -- you know, you want that number to be external on the input side, and you don't want companies just to have their rate formula reflecting their own costs.

 You also don't want companies' TFP performance to be kind of reflecting their rates and recovering their own costs because of the impact they are having on the X factor in addition to what they might have on the inflation factor.

 MS. BRICKENDEN: Thank you, Larry. I think maybe to some extent we may have to agree to disagree on the issue of how to treat outliers in statistical analysis, if we subordinate it to just simply that.

 May I move on to other questions? Dwayne?

 MR. QUINN: Yes, thank you. Jay asked part of my question before, so I am comfortable with that. I think we got onto this topic when Gia was pointing out the difference between small and large output.

 So if you go to group A and D that are at the top, if we just go to median, not to get back into that debate, but you still end up with the median of group D being considerably lower than the median of group A. And I am still trying to get my head wrapped around: Is this telling us anything or is it just diseconomies of scale?

 DR. KAUFMANN: Well, I don't believe it's diseconomies of scale. We don't see any evidence of that in the data. You know, one thing I can say is that these are unit costs. So they don't deflate and they don't reflect changes, differences in labour prices. And these are not partial factor productivities, in other words. These are unit costs.

 So we are not adjusting for and we are not incorporating differences in labour rates and other prices across the utilities. That could partially explain why the larger utilities, which are mostly in the bigger cities, have higher unit costs.

 This is what -- you know, we could make this a PFP measure, but we used unit costs for the OM&A benchmarking, as well. That's one possible explanation.

 MR. FENRICK: I would also mention this kind of illustrates I think one of the weaknesses of kind of the unit cost indexing approach, as well as the econometric model that PEG put forth, in that there is two standards here.

 In this case, the small distributors are being held to a higher standard in this peer grouping approach than the large distributors. So there are two different standards here, that now we are comparing distributors against two different standards, where our argument is, Let's make that level, let's make it flat.

 In this, group D is going to have a tougher threshold to hit than the large distributors in group A, and that doesn't strike me as quote-unquote fair.

 MR. SHEPHERD: But surely if the reason for that is that the distributors in group A, their employees live in more urban areas and it's more expensive, if the explanation of why they are more costly is a reasonable one, then shouldn't the distributors in group D have a lower standard to meet? Isn't that the right answer?

 MR. FENRICK: If we believe everything has been corrected for in those peer groups, yes, but I think I would submit that we are quite a ways away from that.

 MS. BRICKENDEN: Paula?

 MS. CONBOY: Could we, Steve, turn to your slide 32, please, where you have got "keep it simple", and you have got the linear equation that you presented yesterday. And I believe it was Jay that pointed out the assumption of constant returns to scale and sort of yelled "aha", but I am wondering if we could get comments from the other two experts, please, on the approach that's being proposed in this slide.

 DR. KAUFMANN: Why don't you start? I always start.

 DR. YATCHEW: Fair enough.

 This is an econometric-type model, and I believe they are highly informative of not only the effects of variables, but they can better identify where the source of change is coming from.

 It's customary in this literature to estimate models and log forms. That might be intimidating for the reader. Logarithms were something that was complex, like trigonometry was unpleasant, and logarithms might have been unpleasant.

 Be it as it may, we think of these models as multiplicative models, rather than additive models. That's the essential difference. So the logarithmic form is a much more common standard in this industry.

 The nice thing -- the nice feature here is in one sense the impact of a change in a variable can be intuitively interpreted, but for logarithmic models the advantage is that we think of coefficients as elasticities. Those are also intuitive.

 So I guess those would be my immediate comments.

 DR. KAUFMANN: Well, I would say first this model imposes an assumption on the entire industry, which is that the entire industry is subject to constant returns to scale, and I think that is completely inappropriate. You should not impose that assumption on a cost function. You should let the data tell you the extent of economies of scale and how they differ among companies for different size groups.

 So I think it's just -- it's simply inappropriate to impose that assumption and then apply that as a basis for benchmarking. And I believe -- and in fact I am certain -- that this leads to incorrect inferences on efficiency, because when you are not controlling for economies of scale, you are comparing two companies or you are comparing, for example, the merged company before and after the merger, what you are reflecting there is a change, any changes, in unit cost due to economies of scale and efficiencies and other factors. You have to control for those things if you want to make the right inference on how efficiency is changing, which is what we're supposed -- which is the purpose of the stretch-factor analysis.

 So I think this is just -- there are a number of reasons why I don't think this is an appropriate model. I think that's a sufficient reason. We know that there has been so much attention to economies of scale in this province for the last 30 years, and this model just assumes that all away, as if that's not an issue, and I think it is an issue.

 DR. YATCHEW: But I think that this kind of model can be modified relatively straightforwardly to incorporate scale effects.

 DR. KAUFMANN: Sure. I mean, we could -- I mean, we would have to go in the direction of the model we used, which is, you know, having quadratic terms, having interaction terms, things like that.

 MR. FENRICK: If I could add to Adonis's point, certainly, you know, you could put natural logs there and kind of modify the model in that way, and it really wouldn't change the flavour of the model in any sort of way. It would just -- I just said A1, A2, those parameters would change to elasticities rather than additive variables, which is fairly intuitive as well.

 So you could make that change without sacrificing kind of what the thrust of the argument is. It's just what Larry said. This model is imposing a restriction. It's assuming constant returns of scale, and that's intentional. Simply because the way the current model is being done, or Larry's model that he is putting forward, you are holding distributors to all 73 -- there is 73 different standards going on here, and so you have one standard over here, one standard -- there is a number of standards that, you know, distributors are not getting the benefit of economies of scale and realizing scale economies through mergers and those types of things. The model is essentially pre-judging those scale economies and saying, okay, given the size, we would assume this much scale economies.

 And I know Larry is making a distinction between, you know, efficiency and scale economies, but when it comes down to it, customers don't care. They care about lower costs. And both of those act in the exact same way, in that if you realize scale economies, unit costs go down. You realize efficiencies, costs go down.

 And so at the end of the day, yes, there are two different sides of the coin, but you get to the same spot: Lower costs in the province for distributors. And we just feel a model that does impose that restriction is a fairer way to do it, and also provides incentives, the proper incentives, for distributors to find those cost efficiencies and scaled economies.

 MS. CONBOY: Did you run the regression through natural logs? Did you run the -- you have got it linear, and you have given us the statistics that you achieved through that run. Did you run it again through a log?

 MR. FENRICK: No, we haven't done that.

 MS. CONBOY: Okay.

 MS. BRICKENDEN: Adonis, you had indicated you wanted to add something.

 DR. YATCHEW: I will park it for a moment.

 MS. BRICKENDEN: I did get a comment through the e-mail. If you could make sure you speak into the mic when you --

 DR. KAUFMANN: Okay. Well, there was -- can I just briefly respond? Yes, it's true, we have 73 different standards, because there are 73 different companies, and the model is tailored for the business conditions of each company. That's appropriate. That is what you should be doing. And you do not have to assume away the scale economy issue to create the right incentives for companies to merge.

 Those incentives exist under our plan. They exist under incentive regulation. And if you think about it, it's the standard incentive regulation incentives. If a company -- if the day after an incentive regulation plan is approved a company merges with another company and their unit costs go down by 15 percent, you add the customers of that company to your existing tariffs, which reflect your prices at the cost-of-service rebasing, then you are going to get those -- you're going to be charging rates that reflect the old cost structure, and you are going to be retaining those savings during the five years of the plan.

 And then when it comes to time to rebasing, then there is an issue of how much of the remaining cost savings you are allowed to keep at that rebasing, and I know that there's -- that's always an active issue for companies that merge here during the rebasing applications, because there are costs associated almost always upfront with a merger, but then there is a time stream of benefits, and the rebasing application is sensitive to making sure that the benefits that have been received so far are at least commensurate with the cost.

 So there is nothing about the way we are benchmarking companies that discourages mergers.

 MR. FENRICK: Could I add a little bit to that?

 MS. BRICKENDEN: Jay had a question, actually. I'm sorry to interrupt.

 MR. SHEPHERD: Go ahead, and then I will ask the question afterwards.

 MS. BRICKENDEN: Okay. All right.

 MR. FENRICK: I would say, you know, yes, that that's probably -- what Larry said is true, but that still shouldn't persuade us from developing kind of the best benchmarking framework that we possibly could develop to provide the right incentives to the distributors.

 And I would also add, you know, Larry mentioned that - correctly - his model is correcting for scale economies and making those adjustments. What it's not doing is -- you know, our model, by making that constant return to scale assumption, we are able to get five more business conditions in that we are controlling for through this modelling technique.

 And so, you know, whereas his current model only has five variables, which I believe he said yesterday, we are actually correcting for ten different variables, and we have a much tighter range, which means -- to me that means we are doing a much better job, this model is doing a much better job, at predicting what those unit costs are. You know, we don't have those huge outlying, you know, plus 60, minus 60 observations.

 So, yes, we are not correcting for scale economies, and I would say that's actually appropriate, but even if it's not, we still have five new business conditions that are making those adjustments for the distributors.

 MR. SHEPHERD: So my question was -- this is this debate about scale effects is happening in the context of benchmarking, and I assume that means there is winners and losers. If you take out the scale effects, the winners are the larger utilities in terms of how efficient they are ranked, and the losers are the smaller utilities; right? That's the effect of this change.

 DR. YATCHEW: That's assuming scaled economies go in one direction continuously, yes.

 MR. SHEPHERD: Sure. Fair enough, but is that generally right?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: So it's really an issue of whether a utility, because they are smaller, should be treated as being less efficient and that because they are larger they should be treated as being more efficient?

 DR. KAUFMANN: Exactly, which is why I said I am certain this leads to incorrect inferences on efficiency, because it does make that sort of -- just like you say, that sort of distributional -- there are distributional implications of scale, of assuming away scale economies.

 MR. FENRICK: Or I would say another way to look at it would be that's a management decision. You know, in the long term, which is the long-term total cost model, the size of your distributor, obviously there is exceptions here, but that's in the long-term a management decision. So then it shouldn't be in the modelling framework.

 MS. BRICKENDEN: Bill, and then Julie and Dave.

 MR. HARPER: Actually, I had this question before I heard the discussion, but I think the discussion to some extent just sort of adds to it.

 I was curious. I noticed you were adding five business conditions, but, interesting enough, some of the business conditions you were adding were ones that when Larry, on his formulation using the logs as opposed to linear, basically proved they weren't relevant; they were insignificant, and, therefore, he excluded them. It wasn't that he didn't test them. They were excluded from the model.

 I was originally wondering whether or not the fact that you have different business conditions coming in and out was based on the fact that you used a different model, a linear versus log forms, which I think Paula was question, did you test one versus the other, sort of thing, and whether it's possible to comment on -- and the suggestion now is perhaps the five are in there because they explicitly excluded size as a business condition, and whether we know for sure whether either of those two conditions are driving why we have different business conditions in there, or probably it's a function of both.

 And I would just like a comment in terms of: To what extent does the model structure end up picking impacting on what business conditions they end up and picking up and finding a significance within this whole benchmarking process.

 MR. FENRICK: I would say I think the main reason why this new model is able to get five new business conditions is PEG, Larry, is doing the translog cost function, which has a number of variables. You have the quadratic terms, interaction terms, and that's all trying to drive at getting that proper evaluation of economies of scale.

 And so you are using a number of degrees of freedom, a number of variables to try to drive at that answer. And so, you know, if you strip all that away and kind of treat size as a business decision, and kind of assume constant returns of scale, you no longer have to have all those variables, and now you can use the explanatory power of the model to drive at other business condition variables.

 Like I said, I haven't tested the natural log, so I wouldn't really want to comment on what this model does when you do that. I will do that, you know, in the upcoming week or two, but -- and kind of provide that, but -- yeah.

 DR. KAUFMANN: First, the translog is not focussed on identifying economies of scale. The translog -- and I don't want to get into the weeds here, but the translog was designed to be a flexible-form cost function, which means it's appropriate for any underlying technology for the industry.

 So this is an extremely general form. It's not imposing any sort of restrictions on the underlying technology here. It's letting the data speak for itself. So it's not driving at anything. It's really just trying to identify what the underlying cost structure is, and there is something called exact and superlative indices.

 And, you know, I mean, the translog is considered -- you know, there a class of cost functions that's kind of considered best practice, and I don't know whether Adonis would agree with this or not, but the translog is within that class. It's been around for a long time. It's still used quite a bit, but it's really not focussed specifically on any -- on economies of scale per se, but just getting the best underlying and least restrictive specification for the cost function.

 And Adonis yesterday talked about our estimation procedure, and it's much more sophisticated than this. And that's important, because we add that complexity not because we want to, but because it gives you better estimates of the underlying parameters.

 He talked yesterday about we have a system of equations, including the share equation, and he said yesterday that that enhanced the accuracy of our parameters, and I agree.

 So this model is simple, that's true, but the reason you use the more complicated models is because they are better. They are more general. They give you better estimates of the underlying parameters, and the fact that there are things that are coming in on the simpler model which are not coming in on the more -- the more complex, but more powerful model, doesn't mean that those are really significant.

 DR. YATCHEW: I would agree with Larry on most of the things he said. I might not use the term the "most extremely flexible", because there are more flexible forms.

 DR. KAUFMANN: There are, there are.

 DR. YATCHEW: Having said that, I would like to point out that there are variations in the results when you modify even these models slightly.

 DR. KAUFMANN: Correct.

 DR. YATCHEW: So even minor variations lead to sometimes material differences. What I tell my graduate students is that if you want to publish a paper that is going to be cited 20 years from now, publish a paper that no matter what you do to the data you still get that result, no matter what you do to the model you still get that result. So you want robust results.

 And so the idea of estimating using data, different models that still lead to more or less comparable conclusions is a good test of robustness.

 DR. KAUFMANN: I agree.

 MS. GIRVAN: I had a question on a completely different topic, but it's about inflation. And, Steve, you presented on slide 26 yesterday, if we could pull that up. Oh, it's not the same as this -- it's the summary of inflation factors in -- it says 26 on mine but...

 MR. FENRICK: It's 27.

 MS. GIRVAN: Okay, yes. Great, thanks. I am just looking at what I see as the large variability in these inflation numbers, and, in particular, looking at, Steve, your three-factor with TWA annual. Can you explain to me why it's always -- anyway, I am just trying to understand the different approaches, and I am just trying to understand why that particular approach in each year the inflation factor is that much higher than the other approaches?

 MR. FENRICK: I don't know, Lisa. Do we have the updated one I sent you or...

 MS. GIRVAN: You said it was 2.1 percent.

 MR. FENRICK: 2.16 for 2012, which means the standard deviation does go up to 0.39 percent, so it matches exactly the GDP-IPI, just a side note.

 That index is going to be much more stable, because essentially on the capital component, it still has the same -- the other two factors are exactly the same as what PEG is putting forth. It's done on a capital component, and that is going to be much more stable, because it's basically taking a weighted average historically.

 So it's looking at your rate base and essentially making assumption of how much assets you have left kind of historically and what builds up that rate base. And so that index isn't going to move too much one way or the other, because it's got 40 years of history into it, and then all you are doing is changing the current year, and then reweighting it a little bit.

 So obviously if you are in 2011, if you go back 40 years, you are in 1971. The next year, that 1971 is out of there and all the weights kind of shift forward a little bit.

 So that's going to be a much more stable index for that reason, so you are always going to kind of be in that probably 2 to 3 percent range.

 It looks like it's kind of gone down in the last couple of years as inflation has dropped, so it's going be a much more stable index, because it's looking at the rate base and the assets and the price of assets in the rate base.

 MS. GIRVAN: I guess I understand why it's more stable, but I am not sure why it's always that much higher. And it might be a silly question.

 MR. FENRICK: Well, it's higher simply because -- kind of higher compared to PEG's or compared to --

 MS. GIRVAN: The other approaches really, consistently.

 MR. FENRICK: Compared to both? I think the simple answer is because it's assets, you know, electric utility assets over time have risen faster than the GDPIPI, kind of that growth rate. If you look at the EUCPI, that growth rate tends to increase faster than these other indexes, and that's what's kind of embedded into the capital structures of utilities.

 So it's kind of more accurately portraying that than GDPIPI. And then for PEG's -- you know, you have a -- that period has a -- is a period of declining interest rates. I think that would be essentially the reason why that's dropped below -- you know, the PEG three factor, that could go up substantially. I think Larry -- I won't put words in his mouth, but I think you would agree if interest rates turn around and start going up, I mean, that could substantially be higher in future out years than any of these indexes.

 MS. GIRVAN: Okay. And just to follow up, I guess I'd like, Larry, your view on the approach put forward by Steve with respect to interest -- inflation, sorry.

 DR. KAUFMANN: Well, it excludes cost of capital, which is -- it has to be in there. You know, every inflation factor that I have seen in every TFP study for a utility industry and -- is going to include the cost of capital. We know how important that is to this industry. You simply can't assume away the cost-of-capital issue when you are trying to estimate the impact of input price changes on the industry.

 So I couldn't accept this because of that reason. I think it has to be there.

 MS. GIRVAN: And in your view that's why it's higher consistently?

 DR. KAUFMANN: I think so, because it's missing the impact of the declining-interest-rate environment which we have seen since 2006. Interest rates we've known have fallen quite a bit over the last six years, and that matters. That matters for companies in their cost structure, and their allowed returns, but that's not reflected in this number.

 MS. GIRVAN: So I guess just an observation, I would say that, I mean, looking at this -- the inflation factor is very significant, the choice, in terms of moving forward, in terms of the variability, and I think it's a challenge.

 DR. KAUFMANN: I agree.

 MR. SHEPHERD: Am I right in understanding that your weighted average includes in the calculation increases in the cost of capital from 40 years ago, and 39, 38 --

 MR. FENRICK: Yes, yes, because, you know, the assets -- the capital assets of an electric utility will have -- I mean, some assets are more than 40 years old, so you kind of cut it off at some point. But, yes, so it's looking at the asset prices, you know, 40 years ago, but it's weighting that. That has a very small weight. Like, it's like .12 percent --

 MR. SHEPHERD: Well, I know, but it's also, for example, looking at ten years ago --

 MR. FENRICK: Yes.

 MR. SHEPHERD: -- which is weighted 30 over 40, right?

 MR. FENRICK: Mm-hmm.

 MR. SHEPHERD: And ten years ago, if we had high inflation, then that would be included in the current inflation number that you are using.

 MR. FENRICK: Right, because that was the price of the assets at that point in time of the electric utilities. And so the rate base is essentially made up of that series of investments, going back in time, and so it's just simply weighting those asset prices up historically, which is exactly what Larry's proposing in his capital-service price index that PEG is putting forward, except now he is including the cost of capital on top of that, so this is just kind of a subset, in essence a subset of the PEG recommendation.

 You know, I believe if you take the cost of capital out you would -- and we should probably actually look at that, but if you took the cost of capital out of the PEG recommendation, I believe you would arrive at these numbers, or close to the numbers.

 MS. BRICKENDEN: I have a question of clarification, and I apologize to others in the room if I am the only one that might be misunderstanding this. But when you say rate base, you didn't actually construct a series based upon all utility-specific? It's still the price from StatsCan, but you are going back 40 years; is that correct?

 MR. FENRICK: Yes, yeah, that's --

 MS. BRICKENDEN: And you're not -- that number, what I guess the question would be, does that number reflect regulated returns awarded over the last 40 years for the entities that are built into that series? Is that what you are getting at, Jay? I'm sorry if I misunderstood you.

 MR. SHEPHERD: No, no, no. It seems to me maybe the other difference is that Larry used a perpetual inventory model, right, and so that adjusts for the amount of capital in each year, as well as the cost of it, right, whereas yours doesn't. Yours takes one-fortieth of the current capital and treats it as being 40 years old. It doesn't reflect growth over that 40 years; is that right? Or am I just off base?

 DR. KAUFMANN: Let me just explain briefly what we do. The triangularized weighted average only appears once in our study, and that's for the benchmark year. So then the reason -- what you are doing there is, you know you have this benchmark level of assets, and you don't know the pattern of investments and capital additions that got you to that net asset value, so you have to kind of assume something when you are going to deflate that and turn it into a real value. That's what the triangularized weighted average does. It's an assumption on past inflation rates. They're reflected in a stack of assets at a given point in time.

 But beyond that we use a capital service price that only reflects changes in -- to compute capital costs that only reflects changes in current asset prices and depreciation, net rate of return.

 I think -- so -- and it's not true that this -- if they added cost of capital that we would get the same numbers here, because we are not applying the triangularized weighted average formula each year going forward.

 And I think this sort of discussion we have right here explains why the AUC, when they were confronted with this proposal, was just -- they were just too confused, and they thought it was too confusing. It's why I didn't recommend it. I wanted to keep this simple, and something that, you know, could be implemented fairly straightforwardly.

 DR. YATCHEW: I would like to add an additional observation here. One of my concerns is that at this point it's actually relatively easy for a regulator, and certainly from the point of view of public and stakeholder acceptance, to deal with an inflation rate of half a percent, substantially below current rates of the consumer price index, let's say.

 It's not at all inconceivable, perhaps not even unlikely, that as we go forward, all of a sudden, because of the role that capital plays in distributing utilities and in these indexes that the computed industry-specific inflation rate could pop up to 4 percent. Then what do you do? How do you explain that to the stakeholder? Well, you benefited from the lower rates before, but now we are two percentage points above the inflation rate. And I just think that that's one of those things that one has to be mindful of.

 MR. FENRICK: I would add, you know, Larry mentioned that, you know, you have to include the cost of capital in the inflation factor, but as we mentioned, none of us are aware of any jurisdiction that's actually done that up to this point, where the inflation factor actually is adjusted with the changes in the cost of capital.

 DR. KAUFMANN: Sure there are. There have been a lot of plans. They've been approved in California. They have cost of -- you know, they have capital service price adjustments, industry-specific -- industry-specific inflation factors that include a cost of -- a specific cost-of-capital component, a service-price component. So there are precedents.

 MR. FENRICK: But that changes per year in the interim of the plan?

 DR. KAUFMANN: Yeah.

 MR. FENRICK: Based on the actual conditions?

 DR. KAUFMANN: Yes.

 MR. FENRICK: Which one are those?

 DR. KAUFMANN: San Diego Gas and Electric, Southern California Gas.

 MS. BRICKENDEN: Our first generation IP did too in Ontario. Sorry.

 There are a couple of people who haven't had a chance to ask questions. Dave?

 MR. PROCTOR: Thanks, Lisa. Dave Proctor, Cornerstone Hydroelectric Concepts. I work with approximately 20 percent of the LDCs in Ontario, and the comment that Steve made earlier sort of struck a nerve, that the smaller utilities are held to a higher standard than the larger utilities, and I wondered whether that's a common result of this type of analysis or -- I don't know if the Board would have been aware of that, that these kind of results would come out of a study like this, that those smaller utilities would be held to a higher standard.

 When I said I worked with almost 20 percent of the utilities, they are generally the smaller utilities in the province. I just wondered if I could hear from the panel on that.

 DR. KAUFMANN: Can you briefly explain why -- or the evidence for why you feel the smaller utilities are being held to a higher standard?

 MR. PROCTOR: Actually, it was based on the comment that Steve made. I wasn't aware of that until he made that comment, that in this report the smaller utilities are being held to a higher standard than the larger ones, and that was a concern to me.

 MR. FENRICK: Yes, I recall making that comment, and that was in reference to table 24 of PEG. I guess it was slide 26 of Larry's presentation yesterday where given group A and group D, you have different group averages.

 And so that's essentially two different standards that -- in this case, whereas the econometric model is the opposite. You know, the larger distributors are held to a higher standard or more difficult standard than the smaller distributors in the econometric model.

 In the peer group, we have flipped that, switched that around, and now the small distributors are held to a higher standard than large distributors, whether you do the average, or Larry also calculated the mean for us kind of at the start of this session here.

 So you can have two different group averages or group medians, in this context, that maybe isn't all that intuitive. We are kind of hard pressed to provide an explanation for why that is, but the reality is there is two different standards going on with this peer group approach. In this example, and probably if you went through another group there would be other example, where the smaller utilities are held to a more challenging benchmark than the large distributors.

 MR. PROCTOR: So if that in fact is the case, is there some empirical evidence that shows that they should be held to a higher standard? I think Jay mentioned earlier that maybe because they live in a smaller town than living in Toronto, maybe this is correct, but...

 DR. KAUFMANN: Just to respond, I think the terms "higher" and "lower" standards are not appropriate, and they are actually somewhat inflammatory. It's not that we are having different standards. It's just we have different costs to reflect different conditions that apply to different utilities, and, you know, these companies that have lower unit costs, there could be good reasons for that.

 It could be they have -- in general, for those companies, if they are rural and they are not paying urban prices for labour and things like that, then you would expect that to be lower.

 So just because the numbers are higher and lower doesn't mean that the standards are different or that they are unfair, which is kind of what "higher" and "lower" implies to me, that somehow they are being different and unfair standards.

 The econometric model is designed to be very flexible and to reflect the specific business conditions of each company, which to me is fair. The peer groups are designed to identify companies that are similar to each other, and I know that's a difficult process, but that's what we were trying to do. And in that sense, I think it's also fair.

 So I don't think there is any difference in standards in terms of one being high and one being low. The numbers differ, but conditions also differ.

 MR. PROCTOR: Adonis, do you have a comment on that?

 DR. YATCHEW: I don't at this point.

 MS. BRICKENDEN: Thank you, Dave. Carm, you had one point a few minutes ago. You had a question you wanted to ask?

 MR. ALTOMARE: Yes, thanks, Lisa. Going to slide 31 in Steve's presentation, you brought in more business conditions than what Larry had, and I understand that Larry did look at other conditions and basically dismissed them based on his analysis, his assessment of the data.

 But in yours, Steve, we talked about this a little bit yesterday. I was intrigued by your condition on wind variable, and if you look at a utility with a large service territory, how does that play into the equation, for the simple reason that you could have high winds in a certain part of your service territory unlike your other parts?

 And we is seen that with the Colorado lows and the Colorado highs over the years, and that has a major impact on how many major events we have that in some cases are very significant to our costs and to our reliability, and even though they are not of the same magnitude that we see like Sandy, but they are significant, especially for a utility that has very low density.

 So, you know, I always believed in benchmarking, that you should always look at your data and let the data tell you what the message is. So for wind variable, and similarly distribution transformers per customer, these other ones, percent single-phase lines, how did you bring those forward? Like, what was the driver?

 Even age, age is a very -- I like to consider a very interesting parameter, a very interesting business condition for a utility, but age is impacted by the maintenance that a utility does. And you could have plants that are quite old and poles -- for example, like, if their normal life is 50 years, we have plants out there that's greater than 50 years, but it's the maintenance that a utility does, similar to if you take this to your personal situation of a car.

 If you maintain your car, properly maintain it, it lasts longer than if you just leave it, and then rely on breakdown maintenance, et cetera. So could you maybe elaborate on these business conditions that you have brought forward which are over and above what Larry has presented?

 MR. FENRICK: Sure. So the process we tend to take in the benchmarking department that I lead is I will sit down with the engineers -- sit down with the engineers and say, Okay, here is the data we have available. What would you expect to actually impact whatever it is we are measuring, whether it's costs, reliability or safety, whatever we are benchmarking? Would we expect this specific variable to impact, given their industry knowledge, given kind of their engineering background and what sort of magnitude, what sort of sign would you expect that variable to have?

 So I will sit down there and will have a number of conversations with our engineers kind of going through those variables, and these are types of variables that come out. If they say windy conditions, just like you said, the more wind you are dealing with on your system, the more outages you are going to have, the more lines that are going to get knocked down because of trees and the restoration costs.

 And just as far as construction, the engineers even say, you know, given the different variance of wind in your service territory depends how you construct certain assets.

 Load factor, the same thing. As you are less peaky, there is going to be cost savings that come along with a higher load factor relative to needing to build a system that hits that one hour a year, and then the rest of the time it's, you know, 40 percent of that peak.

 So kind of on and on. You know, the percent single-phase lines, I went to the engineers, like, How much more does it cost to construct three-phase lines versus single phase lines? And that's significant. That's a significant cost to do three-phase versus single-phase, and then we put the variables in and test: Do we get the proper sign, what the engineers would expect? Is it significant, and then we kind of go about it in that way, kind of a bottom-up approach. What variables do we think, from an engineering perspective, make sense? Now the economist gets a hold of it and says, Okay, now we put that into a model and tease out what the cost impact or reliability impact, whatever it is that we are measuring. Can we tease that out and put that into the model? I hope that helps.

 MR. ALTOMARE: Well, on your point about single phase versus three phase, I agree that capital costs are different, three phase versus single phase, but your OM&A costs are marginally different, because a lot of the OM&A costs are vegetation, and it doesn't matter if have the single phase or a three phase.

 So I am curious, and you have answered the question. So any comments from Larry or Adonis?

 DR. KAUFMANN: I would say, you know, there is an intuitive sort of appeal to these things, but ultimately it's an empirical issue. And we did test load factor. We tested percent single-phase lines and didn't find they were significant.

 DR. YATCHEW: I would agree it is an empirical question. I remember in the past including variables for customer mix which, surprisingly, didn't seem to kick in the way I thought they would, and I think that's been reiterated with more recent data.

 MR. ALTOMARE: And the other last question I leave you is that I realize that forestation variable wasn't considered, but will you have it considered as part of your report, Steve?

 MR. FENRICK: No, there is not time, simply put. I mean, we put that variable together. We have it put together for the US utilities around the country. We don't have it put together for Ontario. The data is there. Given more time, we could. Not in two weeks we can't.

 MR. ALTOMARE: Okay, thanks, Lisa.

 MS. BRICKENDEN: Dwayne.

 MR. QUINN: Yes. Just following up, I had some discussion with Steve in terms of the age and the two impacts of age, and I guess my question for Larry is, based upon the response that Steve gave and the fact that they are significant in his model, have you had any thoughts about a different way of looking at age that may incorporate the two effects that we are seeing so that it could be brought into your model?

 DR. KAUFMANN: It could be.

 MR. QUINN: Would you be able to assess that and determine if there is a benefit?

 DR. KAUFMANN: You know, we captured it in a different way. We captured it kind of looking at it from the other perspective, which is what we found to be, you know, a significant driver in a number of different applications and jurisdictions, so we are incorporating age, but we are just doing it in a different way.

 MR. QUINN: Could you elaborate? Maybe I am not as familiar with --

 DR. KAUFMANN: It's the customer growth variable. So as you have in general, if you have added more customers recently, then you are going to have a newer system, and that's -- and that's going to reflect -- age -- capital investment and the age of your assets has a number of different offsetting impacts on costs. In general, as you, you know, as you are putting more assets in a place, that's going to be driving your costs up, just because they are new and they are reflected, you know, and you are servicing those, you just paid for those, as opposed to aged assets, which are out of the rate base, are declining, having a decreasing impact on your costs, and then there is the maintenance aspect too. So there are a lot of different things going on.

 And our estimates -- our variable is proxying kind of the newness of the system as kind of the inverse of the oldness of the system, because a lot of times when you are trying to get at the age of the system and you are looking at the depreciation data and the net asset data and things like that, you know, there are just a lot of differences among companies, in terms of how things have been accounted for, issues of that nature.

 So, you know, so given all that, we've kind of focused on addressing age from the opposite perspective and looking at the newness, as opposed to the oldness, because -- in part because it's easier to measure.

 MR. QUINN: Okay. Thank you.

 DR. YATCHEW: I would add that in earlier work that I had done age was a material -- was material and statistically significant. I did not have customer growth figures in that model.

 MR. QUINN: Okay. Thank you.

 MS. BRICKENDEN: Jay?

 MR. SHEPHERD: In the working group we talked about the age issue, and you, Steve, use accumulated depreciation over gross assets, right, as a proxy for age.

 MR. FENRICK: Yes.

 MR. SHEPHERD: And one of the things that concerned us in the working group was that in the earlier data -- that is, the early 2000s -- not every utility was accounting for gross assets in the same way, with the result that the figures weren't comparable to each other.

 Have you in some way adjusted for that in your age variable?

 MR. FENRICK: No, I mean, you do what you can with the data you have. I would say if that is true, if these gross planned accumulated depreciation are not accurate and we can't trust them, that throws pretty much this whole exercise into question, because that forms the basis of the benchmark -- of the capital quantity benchmark moving forward and the TFP analysis and in the cost measures themselves.

 So, you know, I am not sure if that actually is the case, whether we would question those or not. You know, we took them as accurate and --

 MR. SHEPHERD: Surely when you are looking at aggregate data, the effect of certain utilities having -- for example, moving their net plant in instead of their gross plant when they became incorporated would be minimized, especially if they are small, but it would affect you in your unit cost model, right?

 MR. FENRICK: Correct, but just as much as it would affect PEG's model if those underlying data for a number of distributors are "off" net plant versus gross plant.

 MR. SHEPHERD: All right. Does anybody else want to comment on that?

 DR. KAUFMANN: Yes, well, as you know, we spent a lot of time trying to make sure that this wasn't an issue. And the way to minimize this as an issue and the inherent problems with the data is to push -- the only place that accumulated depreciation shows up in our model is in the benchmark year. Beyond that point we construct capital based on capital additions or changes in gross plant.

 So it appears one time in the benchmark year, and we wanted to make the capital stock depend as much as possible on gross additions to that base, as opposed to that base. That's why we went back and got the blood bank data, and we tried to push that back as far as we could. The farther in time you push that back, the less you have to worry about those issues.

 So, yes, there are problems with the data, but it's not true that our -- that the fact that the accumulated depreciation data are suspect or not comparable throws our whole study into question, because our study was specifically designed to minimize the impact of that issue and to build up the capital stock on the basis of gross additions which, you know -- an estimate of gross additions which are accurate.

 MR. SHEPHERD: So your method in effect works backwards and sort of calculates what the gross plant and accumulated depreciation should have been in 2002, for example, not what they actually were, not what was reported.

 DR. KAUFMANN: Not exactly. I mean, we do start -- you have to start with some benchmark level of capital, but what we tried to do was push that benchmark back as far as we could, and for most companies we pushed it back to 1989 for all but six companies.

 So you do start with that, but then since 1989 we have got 20-plus years of capital additions. That is going to create most of our capital stock that exists during the sample period.

 So -- and it's -- yes. So that's how to deal with the issue. It's an issue. You know, the data are what they are, and they are not perfect, but you can minimize it that way, as opposed to using it directly.

 MR. FENRICK: But to clarify, you're saying you build up this capital stock, but you are using the gloss plants to derive those additions.

 DR. KAUFMANN: The gross plant, right. The problem is not the gross plant, it's the accumulated depreciation.

 MR. FENRICK: So you believe there is a problem in the accumulated depreciation?

 DR. KAUFMANN: Yeah, I mean, the accumulated depreciation in 1989 or in 2002 for the companies is going to reflect just a whole host of issues and differences among companies, and you can't control for those. So, yeah, that's where the problem is.

 MR. FENRICK: And I would say if we are convinced there is a problem there, then maybe that variable should be taken out if that data is not reliable.

 MR. SHEPHERD: If you take out the age variable, you have to take out the age squared variable too, right, because --

 MR. FENRICK: Sure, yeah, both are the...

 MR. SHEPHERD: Okay.

 MS. BRICKENDEN: Thank you.

 Are there any further questions? I see we are getting close to 12:30. Oh, you have a -- sorry, there is a question that came in on e-mail. I apologize.

 MR. HEWSON: This question is from Phil Martin at Oshawa PUC, and it's for the entire panel. Should the cost of capital associated with capital spend be subject to the deemed debt-to-equity ratios for the utilities?

 DR. KAUFMANN: Could you repeat the question?

 MR. HEWSON: Should the cost of capital associated with the capital spend be subject to the deemed debt-to-equity ratios?

 DR. KAUFMANN: The cost of capital appears in our model and in the TFP model, not with -- it's not associated with and it's not reflected with the capital spend, the capital expenditures. The capital expenditures are deflated each year by the EUCPI, so when you build up the capital stock you don't go and stick the cost of capital on it.

 But the capital stock that exists in any given year, that's where you apply the weighted average cost of capital to come up with a cost number. And yes, we used the deemed equity cost, you know, the deemed equity and debt structure, so I think that's appropriate. That reflects reality in the province.

 DR. YATCHEW: I would agree.

 MS. BRICKENDEN: Thank you, Larry. Thank you.

 Any further questions?

 MR. SHEPHERD: I have two, but I don't want to -- I can go ahead if you want. The first is a simple one.

 MS. BRICKENDEN: Sure.

 MR. SHEPHERD: One of the controversial issues is the selection of peer groups, and you are trying to do it in an empirical way. You are trying to say what are the cost drivers that make them different from each other.

 And sitting around last night talking about this, which is sad in itself, the suggestion was made that many utilities have their own perception of who they are compared to. In fact, internally they sometimes compare to other utilities.

 Is it possible -- would this work mathematically -- to ask everybody to give a list of ten utilities, every utility, a list of ten utilities, that they are comparable to, and then take that entire list, the 730 answers you get, and derive from that what the industry as a group thinks are the groups? Would that work?

 DR. KAUFMANN: I would think in general that might work, but, you know, there is no -- I suppose there is no guarantee that -- there might be companies out there that are not identified as a peer of anyone else. So there is no guarantee of what -- that all companies -- everybody might say -- well, I am not going to try and give an example.

 But, you know, you don't know what's going to come out of that, and you don't know how many times one company is going to get mentioned relative to another. I am not sure. I kind of like that idea. I like that approach to -- this is a non-economist speaking, but I kind of like the approach of soliciting information and seeing what you get.

 I think you can learn things that way, but I am not just sure that you will get something -- what you will get will necessarily identify a sufficient number of peers for every company in the sample in the industry.

 DR. YATCHEW: Or the more similar ones necessarily, because you might want to pick peers who are not quite as efficient as you are. Having said --

 MR. SHEPHERD: But the problem is they are all going to choose, as well.

 DR. YATCHEW: Absolutely. And your question was: Mathematically is it possible? There are algorithms, matching algorithms, of this type. We use them at the university when we have TAs wanting to be a TA for this professor or that professor, so there are matching algorithms out there.

 MR. SHEPHERD: Okay.

 MS. GIRVAN: Jay, what would it be based on? Just qualitative, like, they are sort of like us?

 MR. SHEPHERD: Yes, sure. Each of the utilities in this room has a list of other utilities that they think they are comparable to. They don't necessarily share it, but they do have it internally.

 MS. GIRVAN: Based on customer number, geography?

 MR. SHEPHERD: Whatever they think is right.

 MS. GIRVAN: Curious.

 MR. SHEPHERD: My second question is a more complicated one, and it is sort of following along what Julie was asking earlier. The whole concept here is that you are taking a set of past data and you are saying, if future cost pressures are the same as that past data, then here is the formula that produces the right rates. In essence, that's right; right?

 So that means that you're assuming that future spending patterns are going to be the same as the last ten years, roughly?

 DR. KAUFMANN: I wouldn't say I am assuming that, per se.

 MR. SHEPHERD: I wasn't saying you, I was saying you.

 DR. YATCHEW: We all have to agree.

 MR. SHEPHERD: Because this whole underlying concept of IRM that the future is going to be the same as the past is fundamental to this debate. So my general question is: What adjustments have each one of you made to your formula to reflect what you think are ways in which the future will not be the same as the past?

 Are there any adjustments that you have made for that purpose?

 DR. KAUFMANN: One explicit adjustment we made was we didn't include taxes in the analysis, because taxes have been declining, and my understanding is they are not expected to continue to decline and they might go in the opposite direction.

 MR. SHEPHERD: Well, we wish.

 DR. KAUFMANN: So given that, we took taxes out of the cost analysis. We also took bad debt out. The reason we did that is because bad debt ran up -- we have noticed that bad debt has run up near the end of the sample period because of the severe recession, and that's probably a one-time event and it's probably not expected to be repeated. And if you have a big load of costs at the end of the period, which is kind of a one-time cost, then that can distort the trend.

 So those are the two things that we have done to kind of reflect elements of the past that we think are appropriate for the future going forward.

 MR. SHEPHERD: So you took one cost out, taxes, that would have improved productivity?

 DR. KAUFMANN: Yes.

 MR. SHEPHERD: And another, bad debt, that would have undermined productivity?

 DR. KAUFMANN: Actually, the taxes, technical issue, it wouldn't have impacted productivity. It would have impacted the input price, and the other one would have reduced productivity.

 MR. SHEPHERD: Adonis, did you make any adjustments for --

 DR. YATCHEW: The idea that I put forth back in the last proceeding in 2008, and is implicit in some of my comments yesterday, is that the recent past is more relevant than the distant past for forecasting the future.

 And the fact that we are observing this trend variable that's now going to be revisited, I think that it's very different from -- the far more distant past or the US experience suggests to me that there have been changes and we do know that there have been changes in the policy environment in this province that will have an impact on cost.

 So, in short, I think the recent past is -- I have argued before should have greater weight in informing at least the judgmental component of the decision.

 MR. SHEPHERD: But have you made any adjustments to the data other than weighting the --

 DR. YATCHEW: Not the data.

 MR. SHEPHERD: No. So, for example, you would have included all the bad debts?

 DR. YATCHEW: I have so far worked only with the data that Larry has been working on.

 MR. SHEPHERD: So his adjustment are in yours, too?

 DR. YATCHEW: Implicitly, yes.

 MR. FENRICK: Same answer. So Larry's adjustment, we used the exact same data in our analysis and same calculations, in fact.

 MR. SHEPHERD: Except you had the added adjustment for the cost of capital?

 MR. FENRICK: For the inflation factor. For the productivity factor we used the exact same calculations, same data. I am interested now in the bad debt impact of productivity, but -- so, yeah, we used the same thing.

 I would say, I mean, your point is accurate that we don't know what the future looks like. If we knew what the future looked like, we could really do a good job on this thing.

 MR. SHEPHERD: You are implying that you are not, collectively.

 MR. FENRICK: Well, I mean, let's be honest. This is -- there is some element of unknown in here.

 MR. SHEPHERD: Sure.

 MR. FENRICK: So we are essentially saying 2002 through 2011, those changes are essentially what's going to be the next five years, which is why with the recommendation we put forward, kind of that negative 0.7 to negative 1.3, I am even more comfortable with that, because productivity has even slowed down further in more recent years.

 And like Adonis said, the more recent past is likely to be more reflective of the future. We are not recommending using the more recent past. We prefer to use the longer trend, 2002 to 2011, but, actually, you use what the industry is saying in that period.

 MR. SHEPHERD: So I have two particular adjustments I want to ask about. One is regulatory stance; that is, how the utilities are regulated.

 You will agree with me that tighter versus looser regulation will affect costs, right, and how many utilities spend, and that will affect your TFP? Did you adjust in any way for that, so, for example, things like the third tranche of ROE and things like the change from first generation to second generation to third generation IRM, any of that stuff? Did you adjust for any of that?

 DR. KAUFMANN: No. It would be very difficult to identify a specific cost associated with those things.

 MR. SHEPHERD: It could be material; right? You just don't know?

 DR. KAUFMANN: It's possible, yes.

 MR. SHEPHERD: Adonis, you agree?

 DR. YATCHEW: I made no adjustments of that type.

 MR. SHEPHERD: Do you agree it could be material?

 DR. YATCHEW: Yes, it could be material, but that's an empirical question.

 MR. FENRICK: Same answer.

 MR. SHEPHERD: There is no way of testing that; right?

 DR. YATCHEW: Very difficult, yes.

 MR. SHEPHERD: My last question related to this is smart meters. We see that over the last six years gross assets and net assets went up by 44 percent across the industry, which is a big jump. And a chunk of that is smart meters, which presumably is not going to be repeated.

 Have any of you adjusted for that? That would drive down productivity; right?

 DR. YATCHEW: No, I have not, but we are taking a closer look, a more careful look, at when the productivity shocks have been, what the trend pattern has been over the last ten years. And our initial results, as I mentioned yesterday, were that some of the large productivity, adverse productivity shocks' values occurred prior to the period of the smart meters.

 MR. SHEPHERD: Understood. I am just asking the question. The smart meters were a big number, right, billions of dollars?

 MR. FENRICK: Mm-hm.

 MR. SHEPHERD: And I assume that you are not -- you are assuming that that's going to happen again, in effect?

 DR. YATCHEW: I would not be surprised if there are other expenditures on this side. As I mentioned earlier, actually yesterday, and, again, I do not have data at the distributor level, but if you take a look at costs and residential prices in jurisdictions that have ambitious renewables agendas, they just diverge relative to those that don't.

 So I wouldn't be surprised if there were forthcoming costs that we have not yet anticipated.

 MR. SHEPHERD: But you admit there is no distribution data in those jurisdictions. So the information from those jurisdictions is not relevant to this discussion, is it, because it's not distribution data?

 DR. YATCHEW: I think it -- I certainly would not use "not relevant", that expression, for the simple reason that at least at a qualitative level it would seem to me that expenditures on the generation side and the transmission side in these renewables programs also involve advances on the -- let me give -- the whole smart grid stuff, that descends down into the distribution level, very much so.

 Now, do I expect these big productivity gains from the smart grid? Let's look back at what happened into the '80s, when the information revolution began to take hold, and everybody was expecting these huge productivity gains from computerization. It took a very long time. Everybody was talking about the productivity slowdown instead of acceleration. The realization of productivity gains from information technology took much longer than anybody anticipated.

 MR. SHEPHERD: Here is what I am driving at in these questions, what I am trying to understand. You haven't corrected for smart meters. I assume that the formula you each come up with -- and you disagree on what the formula should be, but each of you thinks that the formula that you come up with should cover capital spending, including smart meters, at the same levels the past ten years. I mean, it's inherent in the math, right?

 DR. KAUFMANN: Well, it's not that specific, though. I mean, what it's -- there is -- you know, it's designed to reflect and recover -- be consistent with the recovery of a pattern investment overall that's reflected over the last ten years between 2002 and 2011, which includes smart meters.

 MR. SHEPHERD: Including capital.

 DR. KAUFMANN: Including capital, yes, absolutely including capital. And, I mean, what we found, even with that smart meter investment in the later years there was not an acceleration. This is something I mentioned. There was not an acceleration in overall capital spending. Why that is the case I don't know, but we haven't done a detailed analysis.

 But, you know, smart meters are a very interesting issue because, like most investments, you do incur the cost upfront, and then you expect a stream of investments going forward, and just as Adonis said, and I agree, the IT revolution and the impact on productivity did take a while for that to materialize, but it did materialize. That was noticed in the '90s and into the 2000s, right up until the recession. In fact, the 2000s had some very significant growth rates in productivity.

 So I think it's relevant to the impact of those, and whether they could lead to productivity trends in the future that are different than the past, because the costs have already been incurred, and now we could potentially see the benefit.

 So that's -- I agree that's a live issue. That's something that the Board should consider. But it's a very difficult thing to quantify.

 MR. SHEPHERD: Understood. Do you agree?

 DR. YATCHEW: Yes.

 MR. SHEPHERD: Thanks.

 MS. BRICKENDEN: Thank you.

 It's getting on. I think we should -- I would like to test if there is anything after lunch you would like to continue to discuss on, or whether at this point we break for lunch and we reconvene. I am asking the group if there is anything they in particular would like to continue discussing in the afternoon.

 Adonis is just saying that there are a few comments he would like to share with us, but I would also like to remind folks that they are invited, if they would like to share some comments with the room, not necessarily a question, to the panel this afternoon, let me know, and we will reconvene for lunch -- or after lunch. Otherwise, I didn't know -- the questions have been dwindling, so...

 MR. HARPER: I think, Lisa -- it's Bill -- there may have been a hesitation to stand between people and lunch at this point in time in the process, and I think you had set it up where -- in the agenda where there were issues you may want to raise with the panel as well as more general discussion afterwards. I know I had sort of tried to parse my sort of questions and observations accordingly.

 MS. BRICKENDEN: Good. Let's break for lunch, and we will come back together at 1:30 -- sorry? A full hour? A quarter to 2:00?

 --- Luncheon recess taken at 12:39 p.m.

 --- On resuming at 1:46 p.m.

 MS. BRICKENDEN: Good afternoon. I think we can start up again. We have asked our experts to join the discussion around the table. This afternoon I think we will switch gears a little bit. We will start which asking if there are any further questions of the experts, but I would like to encourage just a more general discussion, and if there are any general comments you would like the share with us on any of the options that have been discussed and any of the discussions that we had yesterday and this morning.

 So we will open it up for a broader discussion this afternoon. Carm.

Data Issues & General Implementation Considerations – General Discussion

 MR. ALTOMARE: So based on this morning, is it safe to say that by June 13th each of the economists will have their reports either updated or issued to the greater group so we can review it?

 MS. BRICKENDEN: Yes, we have asked for the experts separate expert reports to be filed on June 13th. Larry will be providing an updated PEG report Friday.

 MS. HARE: While we are on that, there will also -- we will expect to have a fourth report from an expert, and that will be from a Mr. Cronin representing the PWU, so we expect to have four reports.

 I was going to save this for closing remarks, but since we are there, there were also some commitments from the experts as to making available models and data sets. It would be very helpful to have those by this Friday, and they will be posted. Then what we are thinking, if people have questions about that material, if those questions could be sent to rrf@ontarioenergyboard.ca, that way others can see the questions and the responses.

 And we would ask the experts to use their best efforts to answer those questions.

 MS. BRICKENDEN: Yes.

 MR. COWELL: Hi. My name Chris Cowell. I am with Entegrus. My question is for Dr. Kaufmann.

 My understanding is that some estimates had to be used for capital additions in the period from 1998 to 2002, and it appears that there is three LDCs where option 1 was positive and option 2 was still chosen.

 And if you were to look at the capital additions resulting from option 2, a rough estimate would show that those capital additions are double what they were historically.

 My question is: Were other methods considered for such circumstances where the resulting option 2 created such a difference in additions for such LDCs?

 DR. KAUFMANN: Well, it's hard for me to really reply to that, specifically, because I am not sure what utilities you are referring to or which data, and I haven't seen the alternate calculations. But we did look at -- the utilities that we did go to the alternate approach for were ones where it's identified very clearly that they had very significant changes in there between 1997 and 2002.

 So that's documented. But other than that, I am not sure what to say. I mean, we used two options. We tried to do the main option for everyone, but when we had very significant discrepancies between the ending capital stock in '97, and then the beginning stock in 2002, that's when we went to the alternate method.

 MR. COWELL: Okay. I would just like if there could be some consideration to reviewing a third option or another methodology, because it appears that option 2 creates a significant difference versus the historical norm for the LDCs.

 MS. BRICKENDEN: Sorry, would you have any further questions? Well, if there aren't further specific questions to the expert panel -- oh, Jane. Just a general question?

 MS. SCOTT: Yes, this is more a process question that follows up on that one. Jane Scott, Hydro Ottawa.

 If there are data anomalies that we identify, is there a process -- it's hard to know -- because there are some, and putting the low voltage aside, when I look through the data there is zeros where obviously zeros shouldn't be for Hydro Ottawa.

 It's hard to know whether or not they are material or whether they have an impact, but is there a process for identifying those and having them corrected?

 MS. BRICKENDEN: Are the errors in the PEG data set or in the ones that we provided to PEG?

 MS. SCOTT: The ones that came out on the 24th, the PEG data set.

 MS. BRICKENDEN: Then I think you should make us aware of that so that we can check to make sure that -- if it's an error that is coming out of the material we provided to PEG, then, yes, there is a process and it would be through the RRR, but if it's the PEG data set itself, please let us know.

 MS. SCOTT: Okay, thank you.

 MS. BRICKENDEN: Are there any further -- Bill?

 MR. HARPER: Actually, I had one general question to the panel, and it falls around I guess the earlier conversations at the very beginning that, Adonis, you had about sort of talking about the difference between the coefficient on the trend variable and the productivity value that Larry was coming up with, and then Larry basically saying, Well, I can explain that difference, and undertaking to redo the analysis with the LV data out to see what the trend variable would be there.

 Clearly hopefully we'll see the results of that at some point in time, but I was just wanting a couple of questions to say, once we get the results of that, maybe to Adonis, in your mind, is that a -- whatever that variable comes out as, you know, is it reasonable to say that's probably in your mind a reasonable approximation of what you would think the historical productivity has been?

 Then I guess maybe to Larry, whatever the number comes out as, would you feel comfortable that that coefficient, when corrected, is a reasonable way of doing a cross-check on your indexing method?

 And maybe to Steve, you know, who has used the coefficients in another way to come up with productivity, is: Looking at a trend variable, to what extent is that a reasonable first-order of approximation of what you would think the historical productivity would be if you were trying to estimate it from an econometric method?

 So I guess I had a general question, because I was trying to see, as we get those results, is there a general consensus among the panel of experts that that's going to give me some -- by itself, is going to give me some valuable and useful information, I guess?

 DR. KAUFMANN: Well, I would say, no, I wouldn't favour using that as a basis for the TFP trend. The reason is that that trend variable can reflect so many different things. It doesn't have to just reflect technological change, which is what it's supposed to reflect. It can reflect any systematic changes in anything that's unmeasured that's happening during the period.

 And, you know, this is a very -- this is a new data set. A lot of things have been happening, and there is certainly -- you can't rule out the possibility that there are things that we are not reflecting that are showing up in that trend variable?

 Another issue is just we are using external wage data. And, for example, the wage settlements that have actually been passed through to customers and that are reflected in the actual labour prices that companies are paying, if those have been increasing more rapidly than what we are using to predict, then that would show up in the trend variable. That's just one example of something that could be going on which, since it's not been reflected 100 percent accurately in the variables that are used to explain costs, any discrepancy would likely show up in the trend.

 So the trend is -- it just captures too many variables and too many potential influences, and given all that I wouldn't want the rely on that. The indexing method is much more transparent. It's what's typically used, and I would recommend that. That would be my recommendation --

 MR. HARPER: I appreciate that is where you were coming from.

 DR. KAUFMANN: Sure.

 MR. HARPER: I was...

 DR. YATCHEW: As you might expect, I have a different take on it, and let me use the following analogy. I think of the econometric model more like the MRI. It's a diagnostic device that has a great deal of resolution in it because it captures the effects of many variables.

 The TFP process is widely used, but it's more like an X-ray. There will be things that are showing up in the MRI that won't be captured in the X-ray.

 So Larry speaks of the various effects that are captured in the trend coefficient of the econometric -- the more detailed model. Well, these things -- many of these variables that are in the econometric model aren't even modelled in the TFP setting at all.

 So at a minimum, if somebody comes along and says to you, well, the X-ray is showing this and the MRI is showing this, you would at least like to try to understand why they are getting different results.

 And if you have a slipped disc, it's going to show up on an X-ray only once you start having bone damage. It will show up much more clearly on an MRI.

 So I appreciate that this Board has taken the path of total factor productivity, but I think that the econometric model cannot be ignored.

 One would ask -- and Larry mentioned that TFP is broadly used. Well, I think one of the reasons for that is that you're one of the fewer -- few regulators who has bought into an MRI. You have actually assembled this very detailed data, and you actually have a large enough collection of patients to deal with, whereas many other regulators have only a few, very few, so they have to try to benchmark externally.

 So I think that if there were many jurisdictions with this level of data collection, this kind of effort and this many observations, you would see much more of the econometric approach elsewhere.

 I tend to prefer econometric model, but at a minimum I think it can't be ignored. I would like to understand the differences.

 MR. FENRICK: As far as my views on that, you know, I kind of take a, probably a middle ground between Larry and Adonis. I think both are worthwhile. You know, I probably -- the basis of my recommendations have been on the TFP indexing and the external -- the externalized TFP indexes. So I would probably tend to lean more towards that.

 Now, with that said, I think the econometric model is telling something, is telling a story and will tell a story, as far as the trend coefficient, and what that is, you know, that's essentially, you know, like Larry said, that's wrapping in a number of variables, not just the technology trend, it's a number of variables that the model is not necessarily capturing, and so that's cost pressures above and beyond inflation and output and those types of things.

 So I think it does tell a story that we should be listening to and should be looking at. And, you know, I agree with Adonis that, using that trend coefficient, that does have merit, and using that, you know, right now it's 1.2. You know, if it goes down with this -- the LV change, you know, that is telling kind of a productivity story, at least on what we are measuring, is what we are calling productivity. It is telling that story, and so that's kind of where I would stand on that.

 MR. HARPER: Thank you.

 MR. SHEPHERD: Can I follow up with that? So I didn't hear, and maybe I am just dense, the answer. If the number is whatever it is, would you, Adonis, for example, would you say -- right now you want to use 1.1. Would you say, well, if it's zero it's zero, that's what we should use?

 DR. YATCHEW: If the two numbers are close to each other, I would be reassured that we are sort of heading in the right direction, yes.

 MR. SHEPHERD: Which two numbers?

 DR. YATCHEW: The TFP number and the econometric number. I am not suggesting that the TFP process is uninformative, so I would want to take both into account.

 MR. SHEPHERD: But right now you are proposing to use the trend variable instead of the TFP number.

 DR. YATCHEW: And I would suggest that the number that I have been using is around 1 percent. The actual TFP number -- the actual trend coefficient is somewhat higher and, in fact, substantially higher in some of the estimates.

 MR. SHEPHERD: So I am asking the question, if the new run without LV charges produced zero, you would still -- you would think that was the right number then?

 DR. YATCHEW: I would feel much more comfortable that zero is a reasonable number here, yes.

 MR. SHEPHERD: And would you agree, Steve?

 MR. FENRICK: I would still lean kind of -- again, my recommendations probably wouldn't change all that much, because I have, like Larry, put more stock in the TFP indexing approach. You know, I just think that should be more of the industry as much as possible. So that really wouldn't probably change -- I mean, it would -- you know, say, for instance, it went down to zero and that trend coefficient did decline down to zero. You know, to me that would imply a TFP projection or back cast around zero then. And so that would be kind of one element that I think should be weighted in.

 I would tend to lean more towards the indexing, just like, form the basis for the recommendations, but I think it would be informative, and would be, you know, it would - I would lean more towards the zero side, if that - you know, I mean, kind of move towards that.

 MS. BRICKENDEN: Thank you, Jay.

 Are there any more general questions? Are there any questions with respect to -- we did mention on the agenda that we wanted to touch on not only the theoretical basis for this work but perhaps a practical implementation of these various models. Are there any questions that might have been raised out of discussions so far with respect to that?

 MS. HARE: Well, since I raised this, maybe I will explain what the question is, and you will have an opportunity to comment in writing.

 What the RRFE report says is that this will be for a five-year term, but not all distributors will start in year one. Some won't rebase until year two or year three. The question then is, when the numbers are then rerun after five years, do you stay with the numbers that you will start with -- let's say it's year three -- or do you change in year six to the new number?

 That's the implementation issue that I'd be interested in hearing what people think. The one gives you certainty that whenever you start you know what the numbers are. The second way would be that you have got the updated numbers, whatever they are.

 MS. BRICKENDEN: Thank you. Are there any views on that? Okay. All right.

 MR. HARPER: Well, actually, I was more just trying to get a clarification, if you wouldn't mind, Marika, because we are dealing with two things. There's a -- were you talking about update on the base TFP number or an update on what the stretch factor would be that would be applicable to a particular utility? Because they're really -- I can see five years from now there being an update on the TFP. Is that what you are referring to?

 MS. HARE: I am referring to the TFP.

 MR. HARPER: Right. Okay.

 MS. HARE: If we compare to third generation, the stretch factor changed every -- well, the cohort the distributor was in changed every year, not the actual number, but the TFP stayed the same.

 MS. BRICKENDEN: Are there any further questions or comments to be shared? If not, we really may not have -- we may as well wrap up the day. I don't know if there is anything you would like to close with, or Adonis, you had said -- you indicated you -- no, you are good?

Closing Remarks by Ms. Hare:

 MS. HARE: Well, I would then, on behalf of the Board, like to thank our three experts, Mr. Fenrick, Professor Yatchew, Dr. Kaufmann for spending the last day and a half with us. I think on behalf of the Board members that have been here, we found the discussion very, very useful and helpful in understanding what really is a complicated set of issues.

 We would also like to thank all the participants for your questions and discussions. Again, it helps us understand what the issues and concerns are. I mentioned this morning about the change in date for submissions to June 27th and that there would be a letter coming from the Board so that all participants understand the change in dates.

 With that letter, there will also be some questions that are of particular interest to the Board. Now, your submissions are not limited to those questions, of course, but you might give those some thought. For example, the issue that came out yesterday about the LV charges, if you have thoughts about what should be included, what shouldn't be included, that would be helpful. So that letter we hope will come out by Thursday, okay?

 And other than that, thank you all very much for your attention and participation.

 --- Whereupon the conference concluded at 2:08 p.m.