

# ONTARIO

## ENERGY

BOARD

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**EB 2010-0379**

#### THE ONTARIO ENERGY BOARD

**Defining and Measuring Electricity Distributor Performance**

**Q&A Empirical Work**

Held at 2300 Yonge Street,

25th Floor, Toronto, Ontario,

on Thursday, May 16, 2013,

commencing at 9:31 a.m.

PETER FRASER Board Staff

BRIAN HEWSON

LISA BRICKENDEN

LAURIE KLEIN

PRESENTERS:

BRIAN HEWSON Ontario Energy Board

LISA BRICKENDEN

LARRY KAUFMANN Pacific Economics Group (PEG)

ALSO PRESENT:

STEVE FENRICK Coalition of Large Distributors (CLD)

MAURICE TUCCI Electricity Distributors

ADONIS YATCHEW Association (EDA)

GIA DeJULIO Enersource Hydro

BILL KILLEEN

CARM ALTOMARE Hydro One Networks Inc. (HONI)

JANE SCOTT Hydro Ottawa

TOM LADANYI Ontario Power Generation (OPG)

JAY SHEPHERD School Energy Coalition (SEC)

DAVE FERGUSON Integrus

BILL HARPER Vulnerable Energy Consumers' Coalition

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No Exhibits were filed in this proceeding

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Thursday, May 16, 2013

--- On commencing at 9:31 a.m.

MS. BRICKENDEN: Good morning, and welcome to our Q&A session with Larry Kaufmann on the report he's done for us on empirical research in support of the incentive rate setting in Ontario.

I am Lisa Brickenden. I will be working with Staff to help moderate this session, and at this point would like to pass it over to Brian Mr. Hewson to make some opening remarks. Brian?

Opening Remarks by Mr. Hewson:

MR. HEWSON: Good morning, everyone, and thank you for attending today's Q&A session. First off, I would like to, given the amount of room at the tables up here, encourage anybody sitting at the back that would like to come forward, please do. It will certainly help, in terms of anybody asking questions, if you are sitting at one of the tables with a microphone, and we certainly have lots of room.

So today's meeting is intended to be a question and answer session with Dr. Kaufmann in order to provide stakeholders with the opportunity to gain an understanding of the research that Dr. Kaufmann has presented in the report. And, you know, I would like to emphasize it is about clarifying questions, in terms of the recommendations, and in order to ensure that all stakeholders are able to be well prepared for the stakeholder conference to be held on the 27th and 28th, at which the Board and stakeholders will discuss both Dr. Kaufmann's reports and we expect other expert proposals, other presenters' proposals for the rate adjustment mechanisms in the context of looking at alternatives, options, and ensuring that the Board is able to develop the right approach for setting these mechanisms out for the next five years.

So with that, we have asked Larry to -- you all got his presentation, or were able to get it? We have asked Larry to focus on four key areas, and he is going to skip through his presentation to these areas. So he is going to start with data, then talk about the inflation factor, the productivity factor, and then the benchmarking and stretch factor discussion in his slides.

So we're going to do that. Each step we're going to stop, ask parties to raise any questions of clarification to try and make sure they understand what is being presented in the data, and then we will move on to the next area.

We do have some questions from certain parties, and I believe Larry is going to be prepared to address those, but I know some of the people that sent those questions are in the room, so if they would prefer to actually ask the questions, you know, please put up your hand and we will proceed that way.

We are transcribing this event, and the intention there is to, again, reflect the fact that this is a discussion of getting -- not a discussion. It is about getting clarification on the PEG report. If there is information that you believe is missing or you would like to understand something of a clarifying nature, please raise those. We want to make sure it is transcribed for all of the other stakeholders that are involved in this consultation, and for the Board's purpose, obviously, to understand better the PEG report.

We will be taking some questions by e-mail. I don't believe we've got it set up for people to actually ask questions over the phone, but you will be able to e-mail to rrf@ontarioenergyboard.ca., if you have a question if you are not in the hearing room today.

I guess from a logistics standpoint for anybody who hasn't been here before, washrooms are just outside the doors. Ladies' is straight down the hallway; men's is around the other side of the elevators.

If the alarm does sound, we will stop any discussions at that point and await further instructions from the building about whether we need to exit or not.

Lisa, as she said, will be facilitating today, and so she will be making sure that we take an appropriate break in the morning at a good time to facilitate discussion, and we'll probably be breaking around 12:00 or so, again depending on where we are with the Q&A.

And with that, I think -- oh, I had one other thing I wanted to point out, just about the stakeholder conference.

We have had a number of people respond back that they are planning to attend; a few people that have indicated they may be presenting something.

We're in the process of developing our plan for how the stakeholder conference will operate, and so it would be a great deal of help to Board Staff if we could get confirmation of not only attendance, but most importantly, who will be presenting or providing a presentation at the conference so that we can start ensuring that we've planned that out appropriately.

I can tell you right now one of the things we are thinking of is that where we have other experts -- and we've had indications that there may be at least one or two other experts filing presentations and proposals -- we are contemplating having a panel of those experts so that parties will have an opportunity to raise their questions with the group of experts and get the different views from the experts all at once.

With that, I think I am done my list of chores from Lisa, and we will hand it over to Dr. Kaufmann to start off with the data questions, I believe.

Presentation by Dr. Kaufmann:

DR. KAUFMANN: Okay. Everyone can hear me?

Introduction

So the -- there are about 10 slides at the very beginning, the introduction, the outline, review of third-gen IR and Board policy direction in the RRF report. This is all, I think, very important for context and overall understanding for the direction of the project, but given the time we have here and the fact that we're really focussed on questions and answers on the empirical work that I actually did, I am going to skip over those first 10 slides and go on to, as Brian said, start with the empirical analysis which starts on slide 11.

And this is dealing with the data sources that we used. There were a variety of data sources that we did use for this project and that we had to bring together in a coherent way, and the main data source were the Triple R filings for the 2002 through 2011 period that were posted on the Board's website.

Obviously this is going to present -- the sample period for the TFP trend is 2002 through 2011. That is also the sample for the period over which we estimate the econometric model.

These Triple R filings provide a variety of data, most of the data that we use for both the TFP and econometric and unit cost benchmarking analyses.

So most of those are in the -- most of the data that we use are in the Triple R filings, but we did gather some other information as part of this project, and we did that for two reasons, primarily.

One was the biggest difference between fourth-gen IR and third-gen IR was that we were incorporating capital into the analysis, and capital, this is a capital-intensive business, so it is very important that we try to get the best measure of capital that we can for each of the distributors and for the entire industry.

So we wanted to go beyond the Triple R filings to get capital-related data, and the main source of information that we relied on for capital-specific data were for a -- they came from a data set called MUD Bank, which stands for the Municipal Utility Data Bank.

And the MUD Bank data are the data on the municipal utilities that the old Ontario Hydro essentially regulated, and we were only interested, though -- we didn't need to look back on all of the variables that we use for TFP. We were only interested in getting data that we could use to construct a capital stock for each of the distributors.

And the reason is -- the reason it is important to kind of go back in time and get data on incremental capital additions before 2002 is that the capital measures that you construct for each distributor are going become more accurate as you base those, those metrics, on booked capital additions over a long period of time, rather than either gross or net value in any given year.

So we can develop more accurate measures by going back in time and getting data on capital, and that's what we did. We got the MUD Bank data, and we could -- the MUD Bank data, obviously, we would like to get as much of it as we could. What was feasible to get for this project were MUD Bank data that went for the period from 1989 through 1998. And for some distributors we only had data through 1997. But the sample period that we had for the MUD Bank data was for '98 through -- or '89 through '98. And again, just the capital data.

Another source of data that we asked for specifically were data on capital additions for smart meters that were made during the 2006 through 2011 period. And this was also important to get so that we had continuity in capital additions over the period, because a lot of companies, or at least some distributors, were booking capital additions but not reflecting them -- or putting in place smart meters but not reflecting them in their capital additions and, instead, were putting those expenditures in a deferral account for recovery at a later date.

And rather than get kind of big surges, and if you just rely on the Triple R data, there was a possibility that that could lead to big surges in capital spending, which didn't really reflect the reality of capital additions over the period, it would have just reflected the reality or the accounting treatment of when those capital additions were recovered, or at least reflected in rates.

So we wanted to get a more accurate reflection of the capital additions that were actually being booked year by year, so we asked for -- we asked the companies to provide data on their actual smart meter capital additions over the 2006 through 2011 period.

So both of those are capital-related issues, and we also looked at data on both high-voltage equipment and ownership by certain distributors and data on the low-voltage charges that are paid by embedded distributors to host distributors. And these were both issues that were raised in the OM&A benchmarking study that was done and incorporated in third-gen IR.

We wanted to get this information and make sure that this was reflected in our benchmarking assessments so that we could have the most comparable apples-to-apples comparisons among distributors as we could, but these data are not reflected -- well, the low-voltage data are not reflected in the TFP study.

Now, there were some data that were missing for Ontario Hydro itself. The MUD Bank data does not include Ontario Hydro, it only includes municipal distributors, so we didn't have any data on Ontario Hydro's capital additions between 1989 and '98, so we had to use the 2002 data as the first year that we had data for Hydro One.

And there were also some data that were made available for the '99 through 2001 period. But these data were not officially recorded and audited by staff, my understanding, and a lot of stakeholders expressed concern over whether those data were accurate. So we didn't end up using those data that had been provided for the '91 through -- or the 1999 through 2001 period.

And I kind of touched on this already, but much of this data, and the reason we wanted to put together a data set that went beyond the Triple R data, was about measuring capital input. And again, this is critical. We didn't want -- anytime you are measuring capital input you have to start with what is called a benchmark year. This is the first year that you have data on the capital stock.

You want to push that benchmark year as far back into the past as you can so that you can build up the capital stock measures, not based on reported net values in a given benchmark year, but on capital additions since that benchmark year.

And theoretically and ideally, the perfect measure of capital would be one where you knew the capital additions that were booked by the company in every year since the company had been founded, and you also had a price index for what those capital additions were in each year.

If you could do that, you could build up, you know, an absolutely perfectly accurate measure of capital stock, assuming that the price indices were correct, based on those capital additions.

You know, year by year you get the capital additions, you deflate it appropriately, and you get a measure of the capital stock, and you can decompose changes in capital spending between -- into changes in the stock of capital and changes in the price of capital.

Now, obviously that is not feasible, but since that is the ideal, pushing all the way back to the beginning, we want to push it back as far as we can. It turned out for this analysis the farthest back we could push the data was 1989, so that's what we used as the benchmark year. And capital stocks then were built up over the 1989 through '98 period using changes in gross capital during those years.

Now, there is -- we've got this data outside the Triple R which goes through '98 through '89, and then we have this data that -- for the Triple R that begins in 2002.

So there is obviously a gap between when the MUD Bank data and the Triple R data begin. We had to infer capital additions between those years, and the gap only matters for capital additions. All the other data begin in 2002.

So in most cases what we did to infer those additions was, we just looked at the gross value between the ending year of the MUD Bank data, which was '97 for some companies, '98 for others, and the gross plant value in 2002. We looked at that difference, we divided by five, and we added in an estimate of what retirements, capital retirements, would have been in those years, and that estimate was .5 percent, and that was based on an estimate, a historical estimate, of roughly how much -- what share of capital was reported as being retired -- excuse me, what share of the gross capital stock was reported as being retired by the industry on average.

So that was the primary approach, but in some instances we noticed that there was a big discrepancy between the gross plant that was recorded in 2002 and what was recorded in 1997, and this is gross plant, so it is not reflecting depreciation.

For a number of companies there were declines of 30 to 40 to 50 percent in gross plant between these years, which didn't seem plausible to us, that, you know, roughly half of the plant would have just simply vanished in those years.

So we learned, though, from the working group process that during these transition years there were some changes in accounting by some companies, and what had been reported -- what companies reported as gross plant in 2002 was actually net plant.

So based on that understanding, we -- and for those companies -- and I believe there are about 20 of them -- we had to infer capital in a different way, the capital additions over that period. And that was a five-step mathematical process which makes two assumptions, and that is laid out on page 33 of the report. And if anybody would like me to walk through that, I can.

But essentially it is defined -- it is just a way to kind of use the information we have, make two minimal assumptions, relatively minimal, and impose those assumptions. If we do that, then we can get an estimate of gross plant in 2002 which is more -- which seems to be more reasonable, and then we can use that estimate, that new estimate, rather than reported plant in 2002, to infer the additions.

Another thing that we did -- and this was relatively unique. I don't recall ever doing this before. But it became clear during the working-group meetings that it was appropriate to develop different cost measures for the TFP work and the benchmarking work, and the reason is primarily because the benchmarking work is designed to lead to accurate inferences on the relative efficiency of distributors.

And to do that, and because there are differences in distributors that are beyond their control and that are reflected in the Triple R data, particularly with respect to high-voltage costs, it was appropriate to subtract those costs out, so that companies that had high voltage, that owned high-voltage transformation, weren't disadvantaged in a sense by those costs being on their books in the benchmarking analyses.

So that was one of the things we did. We used -- we computed different measures for the benchmarking, which began with the TFP analysis, but we took out the high-voltage transformation capital, capital stocks, and then the related OM&A assets that were linked to ownership of high-voltage transformation, to the extent that we could identify those explicitly in Triple R accounts.

Some of these costs were smeared through other accounts and we couldn't actually identify what portion of, say, land ownership or maintenance on land was reflected in other accounts, and since we couldn't identify that, you know, those costs couldn't be extracted out and taken out of the benchmarking cost measure.

We also added in two things to the -- two sets of costs to the cost measure that was used for TFP.

One was the low-voltage charges that are paid by embedded distributors to host distributors. These charges aren't reflected directly in the Triple R, but they're obviously relevant because some companies are -- they're providing the same voltage services, but they're essentially renting it from host distributors rather than owning the facilities themselves. So this was a way to put those -- put all distributors on the same footing with respect to low-voltage charges.

And then the last adjustment was we took contributions in aid of construction and we added that to the capital stock. And why did we do that?

Well, contributions in aid of construction are not reflected in rate base, and therefore they're not going to be reflected in the rate adjustment mechanism that applies under fourth-generation IR.

So since the productivity factor is designed to be an element in that rate adjustment index for fourth-gen IR, it is not appropriate, for the productivity estimates that we developed and that we use as a basis for the productivity factor recommendation, to include CIAC, because that is not part of rate base.

So we had that out of the -- we had that out of the TFP measure, but these -- but these assets still exist, and it is important, again, to put all companies on an even footing, to have -- to account for all of their capital, whether that capital has been financed through CIAC or through the rate base. So, again, this is I way to put all companies on the same footing and to make apples-to-apples comparisons.

Maurice?

Q&A Session

MR. TUCCI: A question. I just wanted a -- that line where it says "added LV charges paid by embedded distributors," at the last PBR working group we agreed on which accounts should be added, and I just wanted to verify that we followed through with what we said.

DR. KAUFMANN: Good point. Yeah, the account that was omitted were the regulatory asset recovery charges -- the regulatory asset recovery charges, because those did not all apply to -- there were a variety of things reflected there. So that is what we netted out when we added those costs in.

MS. SCOTT: Jane Scott from Hydro Ottawa.

It would appear that you haven't used the right numbers, certainly the -- when the utilities we looked at. It looks like you are also adding in the transmission and network and connection charges that we get from Hydro One, as well.

DR. KAUFMANN: Okay. Well, if you can provide that to me, then...

MS. SCOTT: Yeah, we will. We certainly can.

DR. KAUFMANN: Okay.

MS. SCOTT: Which is in -- like, in Hydro Ottawa's case, it is like 19 million versus it really should be about 500 K, so I think it might be skewing things a little bit.

DR. KAUFMANN: Okay. Well, it would be good if you could identify exactly which elements you think should be in there and which we agreed should be in there, and what you think should not.

MS. SCOTT: Yes. Based on the Hydro One dump that you -- update that is on the website. Is that what you're using?

DR. KAUFMANN: Yes.

MS. SCOTT: Okay. Thank you.

DR. KAUFMANN: Okay. Let me see if I am done here.

Well, table 7 actually presents -- kind of summarizes the different cost measures that we developed for the TFP and distribution cost benchmarking studies, so this kind of just lays it all out in both -- for both measures, we used a capital benchmark year of 1989, if we had it. We didn't have that for six companies, which are identified here.

Transmission substations, those are reflected in the TFP number, because for the companies that own those, those are rate-based assets and will be subject to the fourth-gen IR adjustment mechanism. So it is appropriate to keep those in there.

But for benchmarking purposes, that could skew comparisons, so we took them out.

Gross capital, obviously those gross capital additions –- it should say here -- are in for both.

CIAC, I explained that. That is out on TFP, on the TFP fast measure; it is in for the benchmarking measure.

Smart meter is in for -- smart meter expenditures are in for both.

And for OM&A costs, the high-voltage, again, because the high-voltage capital is in, the high-voltage OM&A is also going to be subject to the fourth-gen IR mechanism, so that should be in here, but it shouldn't be in there for benchmarking.

And the low-voltage charges are not subject to -- they're not in the Triple R. They're not subject to the fourth-gen IR mechanisms that are out of the TFP study, but they are in on the benchmarking study.

Now, before I move on to the inflation factor, we got a number of questions from Midland that are related to data, so I will just go through these right now since we're on the data section.

The first questions have to do with bill distribution revenue, and ultimately we didn't use any bill distribution revenue in this study. So none of those questions -- you know, I can't really address them now, but they're not relevant. They're not impacting any of the analyses.

There is a question on table 24. Well, there are two questions.

One there is that there are some discrepancies between table 24 and table 25, and I apologize for that. Table 24 is incorrect; table 25 is correct. I was having issues with table 24, with those numbers being wrong and right throughout the whole project, and we had some kind of a last-minute rush of changes we had to make before we posted this, and somehow the wrong table slipped in at the very end.

So my apologies for that, but ultimately what matters for the efficiency cohorts are table 25, and those numbers are correct.

There was a question about table 24 and how the unit cost average is determined. The unit cost average is equal to the total cost, and these are the total costs in the benchmarking metric. So it is the right-hand column of table 7.

So we divide those total costs by an output index, and I will talk more about this as we go on. But the output index is -- it's an aggregate of four different outputs, customer numbers, a measure of system capacity, kilowatt-hours, and kilometres of line.

And we aggregated those based on the shares of each of those, the cost elasticities associated with those variables in the cost study that we used.

And then we divided -- so we came up with an aggregate output index for each company. We divided that by the average aggregate output for the industry. So everybody was expressed relative as a -- you know, as a bilateral index relative to that.

No, I'm sorry, actually we did not go to the -- we just did the straight index. We did not do the bilateral index for table 24. It was just divided by the total index of their output.

And we did that for three different years, the last three years, 2009 through 2011, and we took the average of that, and that is the unit cost average for each company within a peer group, and then we compared that to the average of all of the companies in the peer group, and that was the peer group average.

MR. ALTOMARE: Larry, could you repeat tables 24 and 25? You said one wasn't correct?

DR. KAUFMANN: Yes. Table 24 is incorrect. And the actual -- what is reported as differences between -- why don't we wait until we get there so we can actually look at it?

But it's basically -- the difference is between a company's unit cost and the peer group's unit cost.

MR. ALTOMARE: One other question, Larry. Carm Altomare, Hydro One.

In the total factor productivity analysis, you didn't include capital contributions; is that correct?

DR. KAUFMANN: Correct.

MR. ALTOMARE: So when a utility constructs and there is capital contributions, it does impact their OM&A in future years. So if your total factor of productivity brings in the OM&A, that OM&A is not just based on the assets that the utility pays for that is included in the rate base, but it also includes the assets that they acquire through a capital contribution.

So the question is: Why in and why out, when both sides affect your OM&A?

DR. KAUFMANN: Well, for benchmarking they're out. I mean, sorry, for benchmarking they're in. So in that sense it is consistent for everyone, you know, so that is picking it up, and that is really where it is relevant when you're making comparisons across companies.

The TFP is just an industry number, and the OM&A that is reported, whether it is for capital that's been financed by CIAC or whether it is rate-based, I mean, those are still OM&A expenditures that are reported on the Triple R and that are going to be regulated by the rate adjustment mechanism. So it is appropriate for both of those to be in there.

MR. HARPER: Larry, maybe this is just -- it's Bill Harper. Often when people are talking in or out, so negative numbers, it is hard to know whether -- what one means, so just to clarify, with respect to CIAC for the TFP, when you say it is no, that means that the value used is the full capital gross expenditure. You haven't reduced it for CIAC for TFP purposes.

DR. KAUFMANN: Correct. It is not adjusted in any way for CI --

MR. HARPER: Right. So I think that maybe actually addresses Carm's issue. So like I said, it is just a matter of clarification.

Second thing was, you were talking about the averaging you were doing for -- over the three years, and I must admit I was looking at the various data sheets that were provided in conjunction with your paper on the Board's website, and is there anywhere in those data sheets where I can actually see what are the final OM&A and capital numbers that were used to come up with -- like, what's the final 2009, 2010, and 2011 cost that you have attributed to each utility for purposes of doing the benchmarking, and which tab and which cells are those in? That is maybe something you just do as an undertaking.

DR. KAUFMANN: Yes. They should be in there. You know, if not, you know -- I thought they were in there. If they're not, it is easy enough to...

MR. HARPER: They may well be, because the other part of the problem I had was there were many tabs, like, take low-voltage, for example. There were many tabs reporting low-voltage data. It seems to be some of them reporting different pieces of low-voltage data and so it was hard to understand how those pieces came together, to be quite honest with you, to understand how that worked up to what was actually included, you know, in the actual cost at the end of the day for each utility.

Like I said, I was just trying to follow through LV, because I think, as Maurice was following up, that was the one that was probably the most complicated, and I figured if I could follow that I could probably follow anything else, and I had a bit of a difficult time.

So I don't know if it is possible -- if you could point to us where the final costs are that you have used, like, after you have done all the adjustments, and then maybe where the pieces for that came from, in terms of what tabs you took the pluses or minuses from to come to that final number, that would really be helpful, I think, in terms of me, and maybe to all the other parties, to understand where their data was coming from.

DR. KAUFMANN: Okay. All right. Okay. We will definitely look into that. You know, I definitely sympathize with the complexity of the data that was involved in this. I mean, there is a lot of data here. We tried to make this as user-friendly as we possibly could. You know, it still may not be user-friendly enough, but -- so if you have any questions like that, any things that would help you understand all the elements of the computations, just -- you know that's fine. We want everyone to understand those and to make those as transparent as we can.

MR. HARPER: Okay. Thanks.

MS. BRICKENDEN: Would it be possible, Larry, to have something like a mapping put together perhaps before our stakeholder conference on what Bill is talking about for folks to have a look at before we reconvene on the 27th and 28th?

DR. KAUFMANN: A mapping of different accounts and different --

MS. BRICKENDEN: Oh, no. I think what Bill was talking about is just being able to point back to where the total number is being...

DR. KAUFMANN: Right. Yes. So map the different components of total cost into total cost and to show where those come from in different sheets?

MS. BRICKENDEN: Kind of. A sheet map.

DR. KAUFMANN: Okay. We can do that.

MS. SCOTT: Sorry, Jane Scott. Just on the data issue, if we do identify where there are areas in the data as quickly as possible, would it be possible to rerun things again before the stakeholders...

DR. KAUFMANN: I don't want to promise that we can do that, you know, but certainly they will be reflected in the -- in -- before we do this again with the 2012 data.

And, you know, if necessary -- and I think it is probably a good idea -- we should run the numbers by everyone. You know, you will get a chance to see the numbers at that point, and that is when they matter, because that's when, you know, the actual stretch-factor assignments are going to be based on 2010 through 2012 data.

So there will certainly be a chance to do that. I don't know if we can guarantee that we can get it done before the stakeholders --

MS. SCOTT: Before the stakeholders -- and you raised the issue, so you are adding the 2012 data in --

DR. KAUFMANN: Yes.

MS. SCOTT: -- as soon as --

MS. BRICKENDEN: Perfect segue. We did receive a question on that, and so, yes. Again, Phil, thank you. Send in a question just confirming, will the 2012 data be rolled in prior to the stretch-factor assignments, and the answer is yes.

DR. KAUFMANN: Yes. That is due in August of this year, I believe, that report.

Any other data questions?

DR. YATCHEW: My question relates to the timing of these data changes that will take place, and whether we will have the opportunity to rerun models that we might think would be appropriate as part of this process.

DR. KAUFMANN: Well, I mean, yes. Certainly -- well, I am probably not the person to ask process questions to, but my understanding is that the Board -- we will have a supplementary report coming out in July, July 19th, I believe. And that is also when the Board is going to make its determination, my understanding.

So that report will incorporate any changes to the data that are discovered between now and then. So we will certainly correct anything that we need to correct by July. And, you know, that will be reflected in the Board's recommendations, you know. We will make sure that, to the best of our ability, that the data and analysis we're providing to the Board is as accurate as possible. And in terms of whether, you know, other parties will get a chance to rerun the numbers, I can't speak to that.

MS. BRICKENDEN: Sorry, I am trying to move the mic away from the -- I think it is this adaptor for the laptop that is making the hum, so I do apologize for the hum. It is not me. Yes, it is my static personality.

[Laughter]

I can't speak for all of my colleagues here, but rolling the 2012 data in, I am uncertain if the timing of that would be coinciding with the supplemental report, because that would be done for the 2012.

At that point, that data hopefully will be available, Adonis, in time for you to roll it into your analyses, but if you are looking to make refinements to your models based upon Larry's final recommendations, those will be available in mid-July. Does that help?

DR. YATCHEW: Right.

MS. BRICKENDEN: I just wanted to clarify the difference between final recommendations and 2012 data.

DR. KAUFMANN: Right. The final recommendations are going to reflect all changes to data through 2011 but not 2012.

Inflation Factor

Let's move on to the inflation factor, then. And in the paper we compare two options for the inflation factor, and the Board had said that it wants to use an industry-specific measure of input price inflation for the Ontario electricity distribution industry, and the criteria that it established for this industry-specific inflation factor was that the components of that index that recovered labour prices, inflation and labour prices, would be indexed by what they called a generic off-the-shelf labour price index, but the non-labour prices would be indexed by something that was specific to the Ontario electricity distribution industry, to the extent practical.

Now, within the non-labour component of inputs and input prices, there are two distinct sets of inputs, generally speaking. There is capital, and then there is the part of OM&A that is non-labour. So essentially you have three different buckets of inputs and three associated input prices for each.

We compared two approaches to the inflation factor. One was to have what we call the three-factor inflation factor, which had separate input prices for each of those three buckets, and we also compared a two-factor inflation, which essentially just broke it down between capital and labour.

So we would apply the labour price index for both capital -- I'm sorry, for both labour and for both the non-labour components of OM&A.

And there's some potential reason to do that, because some of those non-labour components for OM&A, what is reported as non-labour, when that includes outsource contracts, a lot of those outsource contracts actually reflect labour costs.

So there is a component of that that is kind of labour-related anyway, but that is only one component. There is obviously a lot of other things within the non-labour OM&A bucket of costs.

And given the fact that if you have a labour price index that applies to both labour -- well, the two-factor inflation factor would have one of those factors for labour applying to both labour and something that is non-labour.

And that kind of blurs the Board's criteria for having distinct labour and non-labour indices.

So given the fact that we thought the three-factor inflation factor was more consistent with those criteria and it should lead to a more accurate measure of inflation, because inflation in a lot of the things that are reflected in non-labour OM&A, like insurance and fuel and some IT software, things like that, a lot of those price changes have nothing to do with what is happening in the labour market, very little to do with that.

So we recommended that there be a three-factor inflation factor, with a capital service price to recover the cost of inflation in capital prices, a labour price to recover the inflation in labour input prices, and then a non-labour OM&A input price.

And the capital service price was a very simplified capital service price where you have two components, essentially. You have depreciation and you have rate of return, and in both of those, in both of those components there is an element of -- well, they both reflect what we sometimes call asset price inflation, which is measured by the electric utility construction price index.

And the -- the EUCPI does reflect prices in materials that are reflected in assets, but it also reflects changes in construction labour, so the cost of actually installing those.

So that construction labour inflation is going to be reflected in the EUCPI.

And this is an index computed by Statistics Canada annually. They do it for the entire country; they don't have an Ontario-specific index, but this is specific to the electricity distribution industry in Canada. So it is very specific to the assets that distributors in Ontario would be using.

This is the most practical sort of construction price index for electricity distribution construction that is available.

So that is what we're using to capture changes in construction cost, installation cost, both the labour and materials components of capital construction.

And then for the rate of return, we're using the Board's approved weighted average cost of capital. And there, we recommend that that be based, you know, directly on what the Board approves for long-term debt rates, short-term debt rates and equity, and the capital structures associated with each of those.

So that is what we use for the rate of return, and then for the depreciation rate, we calculated a constant depreciation rate, which is sometimes called a geometric rate of depreciation. That is laid out in the -- the details of that calculation are laid out in the report, but we calculated that to be 4.59 percent.

So that's the capital service price index.

And this can be updated every year based on two pieces of information, since the depreciation rate doesn't change. The changes in the Board's approved cost of capital, if that happens in any given year, then that can be reflected in the index; and changes in the EUCPI, which is reported by Statistics Canada every year, usually in early April.

The labour price index was supposed to be generic and off-the-shelf, not specific to the industry. We thought the best measure for labour price inflation was average weekly earnings for workers in Ontario. This is generic, it is off-the-shelf, but it is comprehensive. This includes all industries. It includes both salaried and hourly workers. So it struck us as the best and most comprehensive and yet generic index for labour price inflation.

Then for non-labour OM&A, that is such a grab bag of different inputs that it's very difficult to kind of tailor something specific to those sets of inputs.

So we used the -- we recommend using the GDP IPI for Canada. There is a GDP IPI for Ontario, which we had considered using, and in theory these are supposed to be related at the same time, but in practice that is not always the case. Sometimes the Ontario numbers are released much later, so we thought, just in terms of practicality, it is better to go with the Canadian number rather than something specific to Ontario.

For example, these are supposed to be released in February or March of the year and for the rate filing to take effect in May. Yu know, if the Ontario-specific number doesn't come out until July, then you have to use the old number or something like that, you know, so you can't update that.

So just to be safe rather than sorry, we're recommending the Canadian GDP IPI.

This is obviously a very broad-based index that reflects final domestic demand throughout Canada, so it includes just -- just as the non-labour OM&A input bucket includes a wide variety of inputs, this includes a wide variety of goods and services and prices that are associated with those.

So that is the actual -- yes?

Q&A Session

MS. SCOTT: Just related to that, so in the past we had an update for May 1st and then an update for January 1st, but because of the factors that we're using now, you see us just having one for the year; is that correct?

MS. BRICKENDEN: Sorry, Jane. Again a hum. So sorry. Maybe I should move.

At this point in time, I think it is safe to assume that we would continue publishing two numbers, because that's what we're doing now, one for January 1st and one for May 1st. I have not been told otherwise.

MS. SCOTT: But then only updating what is updateable, I guess?

MS. BRICKENDEN: Of course. We do that now.

MS. SCOTT: Oh, is that right? Okay. I thought everything changed for the new one, like... maybe I am wrong, but...

MS. BRICKENDEN: I have to defer to my colleague Keith Ritchie on that, who generally does these updates for us.

MR. HARPER: Lisa and Larry, I guess maybe just following up on what Jane asked, I think the GDP IPI comes out quarterly so you can make a distinction between January 1st and May 1st.

I was curious. The electricity utility construction price index, if you could remind me again, when is that released, and is that just an annual number?

DR. KAUFMANN: It is an annual number. It is usually released in early April, and sometimes it is revised in the fall.

MR. HARPER: So that, I guess, in practicality, for May implementers, if the Board could actually use just the most recent year of they wanted to update for the April release.

DR. KAUFMANN: Yes.

MR. HARPER: But for a January one, you have to -- say for January 1, 2013, you would have to use the escalation observed in 2011 because you wouldn't have 2012 yet?

DR. KAUFMANN: That would be correct, yes.

MR. HARPER: I just wanted to understand the timing. Okay. Thanks.

MR. SHEPHERD: Jay Shepherd.

DR. KAUFMANN: Yes?

MR. SHEPHERD: I have a question about the average depreciation rate.

In the Ontario industry, the revealed depreciation rate -- for the last four years, anyway -- is between 3.7 and 3.8 percent.

Can you talk about the difference between the rate you have calculated and what is actually being charged as depreciation by the utilities?

DR. KAUFMANN: Well, I don't know all of the details of, you know, what every company is doing, but the details are spelled out in table 6 so you can see exactly what we're using.

It is a geometric rate, which is based on declining -- the geometric rate is equal to what is called the declining balance parameter divided by the asset life.

And there are two declining balance parameters that we used, one for structures, one for equipment.

And the asset lives that we use come from the Kinectrics report, what they reported for different assets.

We did that for -- I don't know -- seven or eight different asset groups. We computed the depreciation rates specific to those sets of assets, and then we looked at the share of those assets and overall assets value in 2011 for the industry, and just computed a weighted average.

MR. SHEPHERD: So because it is declining balance it is not going to reflect the depreciation rates that actually find their way into customer rates.

DR. KAUFMANN: That's right. That's right. This is an economic depreciation rate, as opposed to a regulatory depreciation rate.

Okay. One thing --

MR. SHEPHERD: Larry, can I ask a follow-up on that?

DR. KAUFMANN: Sure.

MR. SHEPHERD: If the depreciation rate were lower, what would be the effect on the inflation rate?

DR. KAUFMANN: Well, if it was lower, then the inflation rate -- the change in the capital price would get -- in the EUCPI would get less weight. So, you know, I would think that would tend to reduce the inflation rate.

MR. SHEPHERD: Thanks.

DR. KAUFMANN: I should also mention that one of the important issues with respect to an industry-specific inflation factor -- this was considered in third-gen IR, but it was rejected because of concerns about volatility in the rates. And so the -- we looked at ways to mitigate volatility, and a straightforward but fairly effective way of mitigating volatility is just to, rather than look at inflation in any given year, let the inflation rate that's reflected in the inflation factor be equal to the three-year moving average of the index that we construct as the inflation factor.

So in other words, just compute inflation each year. Take the average of the inflation rates over the last three years. That is your inflation factor, and then that will be rolled forward in each subsequent year.

MR. SHEPHERD: Sorry, can I ask another question? Your weights are based on the -- what you have seen as the costs, right? Have you adjusted that for high-voltage? Have you treated high-voltage as in or out in that?

DR. KAUFMANN: High-voltage would be in.

MR. SHEPHERD: So the weights of companies with high-voltage would typically be higher to capital, right?

DR. KAUFMANN: Well, there's just one industry number, though, you know. We --

MR. SHEPHERD: I understand.

DR. KAUFMANN: -- didn't do this company by company.

MR. SHEPHERD: I understood.

DR. KAUFMANN: Yes. But, yes, but high-voltage is in.

Okay. Now, in terms of just generally our rationale for this, we think that these components are the best feasible price indices to satisfy the Board criteria. We think this approach leads to more accurate measures of industry input price inflation than the alternatives, the two-factor IPI that we considered, and it is relatively easy to implement and update.

Now, here is a table that no one had seen -- I shouldn't say no one, but no one in this room other than staff and myself -- until we released this. And this has values of the inflation factor from 2002 through 2011 which appear in the report and an update for 2012, which we couldn't do for the report because we didn't have the EUCPI or we didn't have the Board's latest adjustments to the weighted average cost of capital.

But those are both available now, and we have in here an estimate of what the inflation factor would have produced in 2012 if it had been in effect.

And you can see that there was a very significant -- this approach would lead to a very significant downward, negative inflation factor in 2012, and that's primarily and possibly entirely because of the reduction in the weighted average cost of capital that appeared in 2012 -- that the Board approved in 2012, I should say.

So because of that, that flows directly into the input prices for the industry, and that flows into the calculation of the IPI.

So without -- if this was just a straight -- if the inflation factor was just based on the annual growth in the index, then that adjustment would have led to a 1.6 percent price decline, all else equal, under the rate adjustment formula.

Because of rate mitigation they're still in effect, but you can see that it is obviously muted. But this is important information to think about, and it does potentially raise issues, which I guess go beyond this session, about whether other potential measures for mitigation should be considered, because, you know, we are still seeing a fair bit of volatility even with three-year moving average.

MR. FENRICK: Steve Fenrick, from CLD. Can everyone hear me on the phone here?

ALL: Yes.

MR. FENRICK: Larry, can I just ask a clarifying question? So for the three-year moving average, which is kind of the recommendation, so even in your 2014, that negative 1.62 would be one-third of the growth rate; is that correct?

DR. KAUFMANN: 2012? 2012, it is a three-year moving average. So it is -- you know, the three-year moving average of 2.44, .7, and negative 1.62 is .51.

MR. FENRICK: So moving forward, you know --

DR. KAUFMANN: Yes, moving forward it will be reflected in, that's right, the 2013 and the 2014 numbers; that's correct.

MR. FENRICK: Okay. And then by 2015, the 2012 number would be out --

DR. KAUFMANN: Yes, yes. That's right.

MR. FENRICK: -- then, no longer in the three-year moving average?

DR. KAUFMANN: That's right.

MR. FENRICK: Okay. Thank you.

MS. BRICKENDEN: Larry, I have a question from Darryl Seal. He is asking if you have done any analysis on the difference between the Ontario and Canada GDP IPI, and is there a consistent difference between the two?

DR. KAUFMANN: Yes. We did look into that, and there is very little difference between the two. They're almost identical. Okay?

MS. BRICKENDEN: On that note, I just wanted to remind folks who are listening via Web to please feel free to send in your questions to the RRF at the ontarioenergyboard.ca e-mail address.

Maurice?

MR. TUCCI: Is there a sense of what the next year might be, roughly speaking? Do we know?

DR. KAUFMANN: Well, you know, like Yogi Berra used to say, nothing is harder to predict than the future, so, no, I don't know what the future holds, but, you know, I will say that the weighted average cost of capital is pretty low right now. You know, I think the prospect for, you know, significant changes like we saw in 2012 -- I mean, who knows, but I would be surprised if we saw continued declines on the weighted average cost of capital similar to what we saw this year.

MR. TUCCI: Yes, because this tracks the change. So if it's not -- unless it is going further down, it sort of stays level and --

DR. KAUFMANN: Exactly.

MR. TUCCI: That's right. Okay.

DR. KAUFMANN: Yes. And if the weighted average cost of capital goes up for whatever reason, then that is going to be reflected in an upward adjustment in the inflation factor.

Okay. Lisa thinks it is time for a break, so why don't we take a ten-minute break and -- or 15-minute break?

MS. BRICKENDEN: Oh, ten minutes. The next topic I think will be quite meaty, so I thought it would be good to stretch now and get ready to hunker down on the productivity recommendations.

--- Recess taken at 10:30 a.m.

--- On resuming at 10:48 a.m.

MS. BRICKENDEN: Hello, folks. I think we should reconvene.

In terms of a plan for the remainder of the morning, I think up until noon we will focus on the productivity recommendations, and break for lunch at noon for an hour, reconvene at 1:00 o'clock and move on to benchmarking.

So I will pass the mic over to Dr. Kaufmann. Larry?

Productivity Factor

DR. KAUFMANN: Okay. So the next issue is productivity, productivity factor.

And in our report, we estimated TFP growth using -- for the industry using two methods. The first is an index-based measure of productivity growth, and this is something that I didn't -- we kind of skipped over these slides, but the Board guidance for this proceeding was very clear that the main focus and the main source of information to be used to inform the productivity factor would be an index-based estimate of total factor productivity growth for the industry.

And in the working group process, we spent much more time on that, as the people were involved in that process know. We spent a lot of time talking about inputs and outputs and some of the details of productivity measurement, and then we kind of got around to the second method, which was the econometric approach.

And the working group discussions on the econometrics were -- started out with: Well, should we do this or not? Is it worthwhile?

And we decided that it was worthwhile, but as a supplement and as a sanity check on the TFP measure, the index-based TFP measure.

We thought that that was valuable, to have that sanity check, because this would be the first TFP study developed for the post-2002 period. We only have nine years of data and there could be, potentially, some issues that are not representative of the future in that period. So we thought that the econometrics could potentially shed some light on that, and the key reason for doing the econometrics was to see whether or not it tended to confirm the index-based number or not.

So that was -- that is just something to keep in mind. There are two estimates of productivity growth. I consider the index-based measure of productivity growth far more important. The econometrics is there, though, as a supplement and a sanity check on the index-based number.

And in the -- oh, here is an important point. For the productivity measure that we recommended, we excluded Toronto Hydro and Hydro One from the definition of "the industry." And why did we do that?

Well, the reason is that in incentive regulation, you want to have a measure of the productivity trend that is external to the companies that are being regulated. So in other words -- and the Board RRF report reflects that. They say the productivity factor should be an external benchmark that all companies are expected to perform towards.

And you won't have an external productivity trend if one or two companies in the industry are dominating the industry and essentially setting or having a disproportionate impact on the productivity trend.

And the rationale for excluding them from the industry productivity trend that is the basis for the productivity factor is similar, in a sense, for the rationale that underlies why a generic and off-the-shelf price index is used to measure labour prices.

One of the concerns there was that if you have an industry-specific labour price measure, then the companies will essentially be passing their labour settlements and labour price adjustments directly into the price adjustment formula, which undermines the intent and the effectiveness of incentive regulation.

And it is the exact same idea here. If you have one or two companies that are, for whatever reason -- let's say their TFP growth is lower than that of the industry, and they're large and they're impacting the TFP trend, then in a sense, their productivity performance is rolled into the price factor and helping them to kind of -- their prices, their allowed prices are helping them to recover their own productivity performance and, you know, a difference between underperformance in the sense that their productivity growth is lower than that of the industry. Again, that is exactly what incentive regulation is trying to prevent.

So it is important to have a productivity factor that is, in fact, external.

And what we found is -- when we were doing the econometric work -- is that Toronto Hydro and Hydro One are having a significantly -- a statistically significant and a material impact on the industry TFP trend, and that is reflected in two places.

One, the cost elasticities. The impact of the cost elasticities associated with outputs directly -- flows directly into the measure of output growth because output growth is a weighted average of gross in three different outputs, customer numbers, peak demand, system peak demand, and kilowatt-hours. And those weights are based on the cost elasticity shares associated with those three outputs.

What we found was that Toronto Hydro and Hydro One are impacting those weights directly. And because they're impacting the weights, that means that they're having an impact on output growth, measured output growth.

The other component that we checked for was the industry cost trend. And we can talk about this a little bit more in the afternoon when we look at the econometric results, but we found that after all of the other variables, explanatory variables in the model are included, there is still kind of this time trend. So there is a systematic change in cost that is not associated with any of the explanatory variables.

What we found is that Toronto Hydro and Hydro One are having a statistically significant impact on that trend too, and that is going to flow directly into -- you know, all else equal, that would flow into productivity growth, measure of productivity growth.

So because we found evidence that Hydro One and Toronto Hydro were impacting the TFP trend for the industry -- which I think is intuitively understandable. Everyone understands that those are the two biggest companies in the industry by far, and it is not surprising that if their productivity growth is quite a bit different than the rest of the industry, then the industry number is going to be impacted by that.

And all I am saying here is that that was, in fact, the case. And we tested for that statistically, so there's some statistical evidence that -- to kind of support that intuition, at least in a couple of areas.

So the numbers I am going to show you for tables 14 through 18 exclude Toronto Hydro and Hydro One from the definition of "the industry."

And remember that total factor productivity growth is just equal to output quantity growth minus input quantity growth.

So start with the output quantity growth. And we have here the growth in total, the total output quantity index, and then the three components for that index for the 2002 through 2011 period.

Customers grew at 1.61 percent on average over the period. Peak demand and delivery volumes both grew more slowly, which shows that both volumes for demand and our volumes per customer and demand per customer are declining in Ontario, which I think is probably also not a surprise, given the focus on conservation and demand management in the province.

And when you look at how these numbers vary over the period, you can see a very sharp difference between the experience between the first half of the sample, roughly speaking, 2002 through 2007, and the second half of the sample, 2007 through 2011.

And in fact, the TFP growth for the first half of the sample is about 0.45 percent. The TFP growth for the second half or the last –- it's not quite half, but for the last four years is negative 0.68 percent.

I'm sorry, I jumped ahead to TFP growth. But for the output growth, output grew at 1.78 percent. I am going from memory here. I think that was 1.78 percent in the first five years, and it grew at 0.38 -- 0.48 percent in the last four years. So output quantity growth declined by 1.3 percent.

And part of that is obviously due to the recession in 2008-2009. You can look at kilowatt-hours in particular. Those both fell; kilowatt-hour deliveries fell in both of those years.

So that is part of the reason that output is growing more slowly in the last four years. But then if you look at the two years since the recession ended, you're still not seeing -- you know, I mean, kilowatt-hours declined in 2011 as well. Up a little bit in 2010. But you're still seeing very slow growth in both demand and delivery volumes.

Now, those could be true for a lot of reasons. It doesn't have to be true because of -- I mean, I think CDM is playing a role. Weather could be playing a role. These are not weather-normalized numbers. We didn't want to do that as an additional complication to the analysis.

So there are a lot of factors here, but it is very clear that there's been less output growth over time and less output growth over the last four years compared to the first five years of the sample.

Q&A Session

MR. ALTOMARE: But also, Larry, I think the economy as well -- like, when you travel in Ontario, for example, there's a lot of -- that are down.

DR. KAUFMANN: Yes.

MR. ALTOMARE: Sorry, the other observation I would make is, along with CDM, is the industry. If you travel around this province, there is a lot of places that are shut down. One startling observation is that we don't can fruit any longer in Ontario. It is all done outside.

So we're seeing our load drop as well. And it is not just CDM.

DR. KAUFMANN: You're saying even though the recession officially ended in 2009, it is still a slow-growth province.

MR. ALTOMARE: That's right. You don't notice it in Toronto as much as you do when you get out in the rural. You see a lot of the communities, they're still suffering, and there is nothing to fill in those gaps.

DR. KAUFMANN: I agree, that is another factor.

MS. BRICKENDEN: Hi --

MR. FENRICK: This is Steve Fenrick from CLD again. Is your peak demand numbers there, is that that system capacity peak?

DR. KAUFMANN: Yes.

MR. FENRICK: Not the actual peak demand.

DR. KAUFMANN: Yes, it's the system capacity peak that we developed.

MR. FENRICK: Okay. So that is not actually the billing determinant demand.

DR. KAUFMANN: No, it is not the billing determinant.

MR. FENRICK: Okay. Thank you.

MS. BRICKENDEN: We had a question sent in early from Dwayne Quinn, representing the Federation of Rental Property Owners. He actually has a series of questions on the output parameters selected. So I wondered if I could read that off, and perhaps, Larry, you could respond.

Dwayne notes his primary concern is the choice of parameters, and he has questions with specific to asset vintage.

On page 45 in your report, the drivers list age of assets. And he comments that age is arguably a reasonably efficient measure, but does not completely capture condition. That being said, age of assets has two potential metrics listed. And in his view, plant added in the last ten years is only part of the equation and may in fact be misleading.

And his specific questions in relation to this are, first, was accumulated depreciation relative to gross plant discarded due to concerns about how the 1997 capital stocks were reported?

DR. KAUFMANN: No, it was not discarded. I think these are really more business condition and benchmarking issues and TFP issues, but that is fine. I can answer the questions now.

But, no, we didn't discard that. We tested for accumulated depreciation relative to gross plant as a proxy for plant age, and we found that that was either insignificant or it was having the wrong signs. So in other words, more accumulated depreciation, having an older plant, relatively older plant, was associated with lower costs.

And that could be just, you know -- because this is also reflected in the net plant value to some sense. So this is not an entirely "independent" variable. There is a direct correlation between this variable and what shows up as the cost variable, and that would account for that negative sign.

So we didn't discard it. We examined it, and again, it either was not a significant driver or it had a sign that wasn't sensible.

MR. FENRICK: Larry, this is Steve Fenrick again. Did you look at the actual -- I'm kind of following up on the peak demand question earlier -- on the actual peak demand? Did that have a similar growth rate of the .95 percent over the period, or was it slower or faster? Are you aware?

DR. KAUFMANN: The build peak demand?

MR. FENRICK: The build peak demand, right.

DR. KAUFMANN: Yeah. I'm not sure. Couldn't tell you. We did investigate a number of peak demand variables in the econometric model, though. But, no, I don't know what -- how build peak demand -- I can't tell you how fast that grew.

MR. FENRICK: Okay.

MR. HARPER: Larry, it's Bill Harper. Two questions. One is just a follow-up to the comments you made. I am trying to understand -- maybe you could help me -- why a negative sign is inappropriate. I would have thought that the older your plant was you would expect costs to be less because your capital is actually -- you've got older capital.

DR. KAUFMANN: Well, I mean, and that is kind of a reflect -- you know, that is one way to interpret it, and, you know, that's -- but that is an accounting thing. That's -- see, that is not - what we're trying to impact -- what we're trying to capture in the cost model are business conditions beyond the company's control. And, you know, that is -- simply having a lower accounting value on the right-hand side, you know, on the left-hand side of the cost equation, you know, to me that is not a business condition that is beyond your control. It is just a reflection of the actual accounting of the capital stock.

And, you know, and a lot of companies would argue that having a more depreciated capital stock tends to raise your costs. You know, it raises your capital, your replacement capital cost. It replaces -- it raises your OM&A costs.

So, you know, it really wasn't telling us anything that wasn't obvious in a sense that, you know, that it's going to be reducing the accounting value, but it's not anything that you need to control for on the right-hand side.

MR. HARPER: But that suggests that you are excluding it not because you've got the wrong sign but because you don't think it is an appropriate measure to begin with.

DR. KAUFMANN: That's -- well, that's what that showed us; that's correct.

MR. HARPER: And I'm still struggling --

DR. KAUFMANN: That is the way I interpreted that finding.

MR. HARPER: -- because your logic is an older capital stock means they have to add more capital stock. Well, that means your capital stock would actually be higher, because maybe to add new stuff. I find I'm just having a difficult time with the rationale, to be quite frank about it.

But my second question is more specific to the output quantity measure index that you used in your TFP. And I notice here it is a three-factor index -- customers, demand, and volumes -- whereas when we got to the benchmarking, the output measure that you use there for benchmarking purposes was a four-factor measure, which included the three I have just mentioned plus kilometres of line.

And I was just wondering whether there was a particular reason why, for purposes of the TFP, you didn't include kilometres of line here, when you included it in the benchmarking output measure.

DR. KAUFMANN: Well, there were a lot of issues in the time series data for the kilometres line for a number of companies. There were just some issues. The data didn't appear plausible. You know, I mean, they would go down, then they would go up, and then they would go down again. You know, we saw things like that for a number of companies.

So because we didn't have confidence in the time series pattern for kilometres line for a significant number of companies -- and again, this is what companies are actually reporting to the OEB, because we didn't have confidence in that, we had to use, or we ended up using, the average kilometres of line for each company over the period.

So we've just got an average number that is showing up there in the cost model, and if it's an average number, then it's, you know, it is not import -- it's not relevant to have it in a TFP trend, because it is not changing.

MR. HARPER: Okay. Fine. So really, you didn't use

-- okay. I understand. Thanks.

MR. FENRICK: Sorry, this is Steve Fenrick. Could you just refresh my memory? For a three-gen IR, the annual KM of line was used, right, not the average?

DR. KAUFMANN: No. The three-gen IR did not use kilometres of line in the TFP study. It did use it in the OM&A benchmarking study, but we're talking -- and for the productivity study, which is what we're talking about -- that it was not an element in the productivity study.

MR. FENRICK: For the productivity study it was kind of two outputs, the customers and volume?

DR. KAUFMANN: Yes.

MR. FENRICK: Is that correct? And then for the benchmarking the annual KM of line was used, but not in the TFP?

DR. KAUFMANN: That's correct. I would have to confirm that, but, yes, I am 90 -- you know, I am reasonably certain that is the case.

MR. FENRICK: That sounds right.

DR. KAUFMANN: Okay. So that is the output side. And I think the key takeaway here is that output growth has been slow, relatively slow. 1.21 percent is slow output growth, and it is slowing for a variety of reasons, some of which include policy, conservation demand management, the economy.

I don't know to what extent weather plays a role here, whether it is transitory. I would be surprised if weather is the primary factor that is kind of leading the second half to be quite a bit slower than the first half.

On the input side, we looked at capital and OM&A inputs and the next two slides provide details on both of those.

We've got three columns here. Capital costs, the growth in the total cost of capital, which is going to have two components. One is the growth in the price index for capital. This is the capital service price, and this is the same capital service price we're using for the inflation factor.

Then the other is the growth in the quantity or the stock of capital.

And you may notice that these things decompose more or less evenly, so that capital cost is going to be growth equal to and can be decomposed into a change in -- a growth in the price of capital or in any input and a growth in the quantity, plus the growth in the quantity of that input.

And what I think is interesting here is there was a lot of discussion in third-gen IR about the upcoming need for a surge in capital spending because of replacement and a variety of things, smart meters.

If you look at what has actually happened, the capital input -- the capital quantity grew faster in the first five years than it has in the last four years.

Now, part of that could obviously be due to the economy. I am sure that is having an impact. A slower economy is going to reduce customer growth, reduce output growth and reduce associated capital growth.

So that is playing a role, but I think it is interesting that we're not seeing the surge in capital spending since 2008. It's not showing up in the industry numbers. And that is at least counter to some of the intuition and some of what's -- you know, some of the discussion of what's happening in the industry.

MR. SHEPHERD: Larry, do you have those numbers without smart meters? Because that would exacerbate that, right?

DR. KAUFMANN: Smart meters would exacerbate that. There are no smart meter investments before 2006, so I would think -- unless smart meters are really showing up --

MR. SHEPHERD: These numbers include smart meters, right?

DR. KAUFMANN: -- in 2007 --

MR. SHEPHERD: Sorry.

DR. KAUFMANN: Excuse me?

MR. SHEPHERD: These numbers include smart meters?

DR. KAUFMANN: They include smart meters.

MR. SHEPHERD: Thanks.

DR. KAUFMANN: We could look into that.

But what we're seeing overall is capital quantity of growth of the 1.30, which is -- 1.30 percent. I'm sorry. Yes, 1.30 percent, which is slightly above output growth.

Then for OM&A, again, we've got costs, the OM&A price index and then the OM&A quantity.

OM&A is much more volatile from year to year, and it is relatively -- again, if you compare the first half to the second half of the sample, it is relatively constant between the two periods. It has actually gone up a little bit over -- in the last four years, but that is almost entirely due to this 2011 number; big increase in OM&A quantity in 2011.

We haven't done kind of a forensic of why that is the case, but that is having a big impact on, you know, what's happened in the last four years.

MR. SHEPHERD: Can I ask you a question about that?

DR. KAUFMANN: Yes.

MR. SHEPHERD: These numbers, the growth in OM&A costs, are heavily influenced by the regulatory stance, right? The stance of the regulator?

If the regulator is more easygoing, companies will spend more, and if the regulators suffer, they will spend less; is that right?

DR. KAUFMANN: I think in general, yes.

MR. SHEPHERD: So I am wondering whether this ends up being a bit self-referential, in the sense that the regulator is setting new rates based on its past approach, to some extent.

DR. KAUFMANN: I don't know. I mean, you know, these years also coincide with third-gen IR, which has an OM&A benchmarking component to it, so, I mean, you would think that that is -- you know, that part of third-gen IR has been harder on the companies with respect to OM&A than they have been in the past.

MR. SHEPHERD: All right. Thanks.

DR. KAUFMANN: But on average, OM&A quantity is growing slightly less rapidly than capital, but kind of in line with it, 1.17 percent versus 1.3. The --

MR. SHEPHERD: Larry, remind me again. These 2011 numbers for OM&A cost don't include Hydro One and Toronto Hydro, right?

DR. KAUFMANN: Correct.

MR. SHEPHERD: Okay. Thanks.

DR. KAUFMANN: Table 17 brings the capital and OM&A quantity together in an overall input quantity index. Obviously, the overall growth is going to be, between those two numbers, slightly weighted towards -- because capital gets about 62 percent of the weighted accounts or about 62 percent of the cost in the industry.

So what we find is that it is 1.26 percent overall.

And again, it is actually -- if you compare this number, it has actually gone down a little bit in the last -- it's grown more slowly in the last four years as compared to the first five years.

MR. LADANYI: Larry, can I ask a question? Tom Ladanyi, Ontario Power Generation.

How is capitalized overhead being treated?

DR. KAUFMANN: Capitalized overhead is -- that's capital.

MR. LADANYI: Okay. Thank you.

MR. HARPER: Larry, Bill Harper again.

I think on the input side, I think the weighting -- the index on quantity is a -- the capital and OM&A quantities, that is just the relative costs of each of that -– weightings of costs of each that you've seen.

DR. KAUFMANN: Right.

MR. HARPER: If I flip back to the output quantity index in terms of how the three pieces were weighted to come up with your output quantity index, remind us again what was the basis?

DR. KAUFMANN: That is based on the cost elasticities associated with each of these three outputs.

MR. HARPER: That's from your econometric model?

DR. KAUFMANN: Correct.

MR. HARPER: That is the econometric model that you were using to estimate the TFP, the other --

DR. KAUFMANN: The other components. That's... yes.

MR. HARPER: -- piece of this?

Remember how you talked about the TFP being estimated two ways; one on the index we're talking about here, and the other on the econometric. So it was the cost elasticities from your econometric analysis of the TFP. You then imported into this, to use the weights for the -- to come up with the weights for the output index?

DR. KAUFMANN: Yes. I mean, it is the same costing elasticities from table 12 of the report.

MR. HARPER: And each of these three items proved to be statistically significant in terms of output?

DR. KAUFMANN: Yes.

What this showed was that the biggest driver of cost among the outputs was our peak demand measure, which was system peak demand. Customers was the second-biggest one and kilowatt-hours was the smallest, which is completely consistent with everything I have been hearing in the industry since I have been working in this industry, which is that the biggest driver of cost is peak demand, with customers being second and kilowatt-hours really having little impact on -- you know, distributors will tell you -- on their costs, what is driving their costs.

So I thought it was nice to finally estimate a model which -- where we were able to get distinct and significantly -- significant estimates for both kilowatts and kilowatt-hours. It is difficult to do that because they're so highly correlated that, you know, it's difficult to get statistically significant, independent effects associated with both of them, if they're both in the same model.

What we tend to find is that, well, in the US this issue is skewed by the institutional environment there, and reported peak demand often isn't distribution peak demand. But what we find is that when we have these both in the same model, that kilowatt-hours tends to be statistically significant more often than not.

So that is what we -- you know, why we've used that more in the past.

So I thought this was actually a pretty positive finding, that we were able to get system peak demand and kilowatt-hours in -- estimated as significant cost drivers, and that we got that relationship and the relative magnitudes of those cost drivers.

MR. HARPER: Isn't it fair to say your definition of peak demand is slightly different than kilowatt-hours, because you use that --

DR. KAUFMANN: Yes, it is.

MR. HARPER: -- progressively highest to date, I guess?

DR. KAUFMANN: Yes.

MR. HARPER: If you had typically done the same sort of approach on kilowatt-hours and said: Well, if we use kilowatt-hours as a proxy for demand and just never let the number go down -- we always use the highest kilowatt-hours going forward and estimate equation -- that way that might have given you a similar sort of measure?

DR. KAUFMANN: Maybe. It's -- I don't know, because kilowatt-ours, again, is very -- you know, that's so much more volatile. It is impacted by weather and so many things, so you don't get the same sort of nice relationship that you would get with the system peak measure.

I don't know, but that is just my intuition.

MR. HARPER: I think --

MR. FENRICK: On the topic of that peak demand, is it a concern at all that you're not actually using the billing determinant as the definition of the output? There's a type of ratemaking mechanism here, and customers and the volume are billing determinants, the actual outputs that, you know, customers are charged. You know, why the different definition for peak demand in kind of moving away from the billing determinant out there?

DR. KAUFMANN: Because it is based -- one is, you would use -- there is a certain appeal to using billing determinants for the outputs if you have revenue shares and you're going to weight them by revenue shares. We don't have revenue shares.

So we don't -- so by "revenue shares" I mean the revenues that are associated with each of the billing determinants.

Since we don't have that data company by company, we couldn't use the revenue share weighting anyway. And that tends to undermine, you know, the rationale for using billing determinants.

And peak demand, bill peak demand, really just applies to a small subset of customers. And distributors are constructing these assets to deliver -- to meet peak demand for all customers on the system, whether they're actually billed where they have a demand charge and being billed for peak demand or not.

So this measure does reflect that reality, that companies put this infrastructure in place, and even if the demand disappears, you know -- for example, a large industrial customer goes bankrupt and it is not there any more -- the assets are still there, almost always. They usually don't decommission those assets, and they're still on the books.

So, you know, we thought that that reflected -- and I believe it reflects the reality of the industry and what they're doing when they're constructing these networks to serve peak demand for other customers, as opposed to just the ones that have billing -- demand charges.

MR. FENRICK: If I could just follow on to that. Then using that kind of, that same rationale, wouldn't maybe reliability be considered an output as well? You know, utilities size their systems and build their systems to kind of hit a certain reliability level, and that has costs associated with it as well. What is the rationale then to not have reliability as an output?

DR. KAUFMANN: Reliability -- the reliability data in Ontario are not reliable.

[Laughter]

So we couldn't use them.

MR. FENRICK: So if they were reliable, then, you know --

DR. KAUFMANN: Possibly. There are real complexities when you get into kind of modelling, reliability, and costs simultaneously, and I have always thought of this as kind of a simultaneous equation issue, without getting into the weeds in that.

I mean, I think the way to think about it is, the companies choose a reliability -- you know, when they're looking at designing their systems, they're balancing costs and reliability. So you've got cost as a function of reliability. You have reliability as a function of cost.

So these things are kind of determined simultaneously, and that is a complicated thing to benchmark and analyze. Nobody has really done it, to my knowledge, but that to me is the way to think about that issue, and, you know, what comes out of that analysis and whether companies should include -- or, you know, whether reliability metrics become an output based on that I think is an open question.

MR. FENRICK: Okay. Thank you.

MR. ALTOMARE: Larry, Carm Altomare, Hydro One. Have you considered assets as an output?

DR. KAUFMANN: No. Assets are not an output. Assets are capital. That is an input.

MR. ALTOMARE: Okay. That's interesting, because the peak demand -- I think what I'm seeing from our discussion is a utility -- basically, the peak demand represents the capacity. And regardless if there is energy or not energy, those assets or that capacity has to be maintained.

DR. KAUFMANN: Right.

MR. ALTOMARE: So --

DR. KAUFMANN: I think that is what we're saying, is that it is a cost driver.

MR. ALTOMARE: Right.

DR. KAUFMANN: But it's not an output per se, and that's what we're trying to -- we're trying to reflect that reality in the system, you know, what we use as the proxy for capacity.

MR. ALTOMARE: And so -- and what's your conclusion with using demand and delivery? Like, you've got kilowatt and kilowatt-hour. Is that necessarily a duplication, or is that just one is a subset of the other?

DR. KAUFMANN: Well, they're different because the peak demand really reflects the peak and it reflects the system peak. So it reflects the fact that historically if you've had higher peaks than you have now and you've built assets to serve those higher peaks and those are still on your books, then that is really the appropriate measure of your output, once you provided to serve the highest peak demand you have ever had to serve. And that is different than what you are delivering to your customers this year, in terms of kilowatt-hours.

MR. ALTOMARE: Okay. Thanks.

MR. LADANYI: Larry, Tom Ladanyi, Ontario Power Generation. You said these were not weather-normalized?

DR. KAUFMANN: No.

MR. LADANYI: And the reason for that is it would be too hard to do on a --

DR. KAUFMANN: No, no, we could do it, but there was already a lot of complexity in this project. We thought that was one more level of complexity, and frankly, you know, we were -- there was an extraordinary time crunch. I didn't know if we, you know, could even possibly add that in and still get this done on time.

MR. LADANYI: And you don't have any concerns about that, do you?

DR. KAUFMANN: I wouldn't say "concerns". You know, a case could be made that, you know, perhaps these should have been weather-normalized, and that could give you more input on whether or not the TFP trends we have are, you know, are being distorted by weather patterns.

I don't know. I mean, you know, I mean, the weather obviously fluctuates from year to year, and over a nine-year period you would think that there is nothing systematic impacting the trend, but... Well, that is a whole other discussion.

So, no. I'm not concerned per se. And again, just for practical reasons, we just didn't have time, and, you know, I thought -- and I thought that that would be one more layer of complexity to add on to this, and it was probably, you know, a bridge too far.

MS. BRICKENDEN: Larry, I just wondered, I wanted to note that CLD had pre-filed a number of questions, and before we move on to specific topic or subset topic, we were talking generally about kind of trend questions. I didn't know if you wanted to -- wanted to ask -- it looks like maybe the first trend question submitted has been answered, but I would defer to the folks with CLD, and if the other questions wanted to be addressed at this point or -- how would you like to proceed? Just while we're on topic, while we're...

MS. SCOTT: Steve, did you want to ask any other questions on behalf of the CLD at this point?

MR. FENRICK: Would this be a good time to ask them?

MS. SCOTT: I think what Lisa is saying is on the TFP trend issue.

MR. FENRICK: On the TFP trend issue?

MS. SCOTT: Yes.

MR. FENRICK: And the indexing in particular?

MS. SCOTT: Mm-hmm.

MR. FENRICK: Sure. I will go ahead.

As we mentioned, number one was kind of answered, that we pre-submitted.

The second one is just simply -- and you've touched on this, Larry, but do you think the conditions, the kind of the five years moving forward, are going to be more similar to the more recent time period, kind of 2007, 2008, 2011, you know, with the CDM programs and the industrialization and those types of things? Are we looking at a time period moving forward that is going to be more reflective or more representative of the recent years in your sample, or is it more representative of 2002 to 2011, kind of, in your opinion?

DR. KAUFMANN: Well, like I said in the report, I do see CDM playing a role to slow the potential growth of output in the industry. So I do think that is playing a role in keeping output growth slow.

Now, whether it is going to be as slow as what we saw in 2007 to 2011, I am far less certain of that, because obviously that includes the biggest recession in the last 70 years, which is probably not going to repeat in the next five years. So, you know, you have to kind of consider that as an exceptional event, which is distorting things.

But as I said in the report, I do think that I would

-- I think everyone here expects that output growth is going to be slow because of CDM policies and perhaps because of the economy as well.

MR. FENRICK: Thanks. And then my next question would be, you already answered kind of the rationale for excluding Hydro One and Toronto Hydro, and if I heard you correctly, it is basically, you're looking for an external measure of TFP for the industry. Do I kind of have that right?

DR. KAUFMANN: Yes.

MR. FENRICK: And so did you kind of examine the TFP trends? Did you just take out one distributor at a time and exclude them from the analysis and then look at the industry TFP trend minus that distributor, what those trends would have been and what kind of range we're talking about in the TFP trend?

DR. KAUFMANN: Yes. We did report what it would be if they were both excluded, and the TFP trend would have been negative 1.24 percent.

MR. FENRICK: So kind of industry-wide if you include all the industry, Toronto Hydro and Hydro One, and looking at minus 1.24 percent.

DR. KAUFMANN: Correct.

MR. FENRICK: Did you look at -- what if you just take out Toronto Hydro and kind of make an external measure just for Toronto Hydro, if you take out Toronto Hydro's data --

DR. KAUFMANN: I believe that number -- I would have to double-check -- is negative 0.71.

MR. FENRICK: Okay. Is it a similar story if you just take out Hydro One and provide an external measure for Hydro One, is it kind of a similar story there? Because of negative --

DR. KAUFMANN: I'm not sure what you mean by "a similar story." I mean, we're talking about numbers here.

And, you know, I mean, the number would be similar, but again, I mean, the point is and the reason that both were excluded is that both are impacting -- both can be shown to have a statistically significant impact on the industry TFP trend.

MR. FENRICK: So if you individually take them out, do they individually impact the TFP trend?

DR. KAUFMANN: I don't know. We didn't test for that.

MR. FENRICK: This kind of gets into the next question.

If you take -- you know, we kind of looked at your data and tried to do some calculations here.

If you take, like, Brant County Power, for example, if you just take their data out, the TFP, the industry TFP becomes negative 1.23 percent.

And then, like you mentioned –- now I am looking at this -- if you take out Toronto Hydro's data, the TFP goes to negative 0.95 percent.

I guess the question we're trying to wrap our heads around is: Why, in your opinion, is it kind of fair or accurate to recommend a negative productivity factor when, if you look at the externalized TFP industry factors, if you take out one utility at a time and you make them all external, you know, you're talking about in the ballpark of negative one, negative 1.24 percent -- how is the zero productivity factor fair or a more accurate depiction?

DR. KAUFMANN: Brant County Power is not having a statistically significant impact on the industry trend. The only two companies that are, are the two dominant companies.

The issue -- the idea -- I mean, ideally you want to do a trend for the entire industry; you don't want to exclude anyone.

But we have a relatively unique situation here, in which we have two companies which are dominant in the industry, and they are having -- their TFP experience is very different from the rest of the experience, for whatever reason. And it is impacting -- it would impact the number if it was in there. And that is -- that's the sort of outcome that you don't want to have happen in a TFP trend. You do not want to set a TFP benchmark that reflects the TFP growth of two companies that are exceptionally low for whatever reason, and therefore establishing a benchmark that is -- unreasonably lacks for the rest of the industry where you don't see that sort of experience.

To do that would be unfair to customers for all those companies. They would be experiencing rate increases because of the impact of two companies themselves.

That is not the way incentive regulation is supposed to work.

MR. FENRICK: Just as a follow-on there, does it kind of give you pause or have you looked at -- you know, so we're talking about the two largest distributors in the province and, you know, essentially they are impacting the TFP trend because they have much lower TFP growth than the rest of the industry; correct?

So does that kind of give you pause, that maybe large distributors themselves have slower TFP growth? You know, the two largest are impacting the trend, so is there maybe exhaustion of the economies of scale or whatnot that is causing that slower TFP growth?

DR. KAUFMANN: No. And I think we're kind of getting off topic here. I mean, we're really trying to deal with the -- you know, what is in my report.

This is getting into some policy issues, so unless you have any sort of specific questions on the report, I would rather not have this discussion just because we have -- you know, there is a lot in the report and a lot of specific details in the report that I think is the focus for today.

MS. BRICKENDEN: I think it would be good -- it is Lisa speaking. It would be good to have this type of conversation at the stakeholder conference. That is where I would like to have this discussion.

MR. HARPER: Larry, reflecting more back on the why – it's Bill Harper - you were excluded, is it because there - I am trying to struggle with this. Is it because their TFP growth is different? Or is it because both their inputs and their outputs are so large that when you put them in the numerator and denominator, they materially change the ratio that you get there? Whereas I could have a small utility that's materially different, but when I add their values to the numerator and denominator, it doesn't make a lot of difference?

So is it the difference in the TFP, or is it really a difference in the fact they are really large and therefore they impact on the numerator and denominator significantly?

DR. KAUFMANN: It is the latter.

MR. HARPER: I was just wondering, because we seem to be focussing on the difference in TFP and I wanted to clarify that in my mind.

DR. KAUFMANN: That was not the issue. The issue is just we have two dominant companies, and when they're in there, then suddenly the TFP looks very different.

So it makes a difference, and, you know, they are impacting the TFP trend and that is not the way -- that is not the way to design an incentive regulation plan.

There is experience from this in California. California, the companies out there are obviously huge, and the private utilities, and when they were filing PBR plans they would never -- they would never use a regional definition of the industry because they would dominate it. You know, PG&E and Southern California, I assume, which have over five million customers each, more or less.

Even if you define it as the whole western US, they're going to have a huge impact on the TFP trends. So they always presented national numbers, precisely for this reason.

Whereas if you go to, like, the northeast US and there are a lot more companies concentrated in a smaller space, you know, it is easier to do regional TFP numbers, and you have seen more of those there, as opposed to the west.

So it is really not controversial that you shouldn't have one or two companies dominating what you present as the estimate of the industry TFP trend.

MS. BRICKENDEN: Thank you, Larry.

Should we move on to the next?

DR. KAUFMANN: Yes. Then table 18 is the -- this brings the output and input quantity growth index together.

Again, you can see that it is a negative 0.05 percent, slightly negative, and there is more decline in the last four years -- well, TFP is growing much more slowly in the last four years than the first five years. In fact, it is negative.

And this is entirely because of what is happening on the output side.

The decline in output between the first five years and last four years is 1.3 percent, and I believe the decline in TFP between those two years is less than that, because input quantity growth has actually slowed in the last four years.

So what we're seeing on the declining -- on the observed slower growth in TFP is 100 percent because of what is happening on the -- without the quantity.

So we didn't talk about the back cast, and there are some issues, some questions about the back cast.

Lisa, would this be a good time to load that other presentation?

MS. BRICKENDEN: Sure, if you wanted to.

DR. KAUFMANN: I don't know how to do this.

MS. BRICKENDEN: I will do that.

DR. KAUFMANN: Let me just explain the issue.

I am going to deal with -- some of the CLD questions, they have a whole block of questions called "TFP back cast questions."

What I did -- because this is an important issue and it is a very significant misunderstanding of our work. And I am going to deal with question 4 here, and I decided to write this up as a supplemental presentation last night because it involves a little algebra. Not too bad, but just because it involves some algebra here it's very difficult to do that, so I decided just to write it all out so everyone could see it.

But question 4 asks -- their question 4 of the TFP back cast set of questions says: "In the PEG report there is a statement that cost theory requires a well behaved cost function to be homogenous in input prices."

It is actually homogenous degree one in input prices, and they said:

"Can you explain in layman's terms what this means?"

Then there are a number of questions which ask whether or not this condition holds for our cost projections that are presented in table 19, which is the econometric back cast table.

And the answer is that what homogenous in input prices means is that when input prices increase, by say, 100 percent, then your cost function, your predicted costs should also increase by 100 percent.

So that is what that means, that there should be a proportional increase in predicted cost and input prices.

And there was a -- the question was whether this condition holds for the cost projections on table 19, and the answer to that question is yes.

And this algebra shows why that is the case.

So we start with -- and I am not going to go through every element on the -- in the cost function, but what I have here for the second bullet on this first slide is we've got the log of cost and we've got -- in our model, we have two input prices; we have capital prices and we have OM&A input prices.

So we've got here a coefficient, you know, we've got a constant, and then we've got a coefficient multiplying the log of capital and the log of the OM&A price, and we've got the log of cost, because that is what we specify. These are all in log terms. And then there is a bunch of other stuff in the model, but we don't have to worry about that stuff.

So we've got these input prices. Cost is a function of input prices. Now, linear homogeneity, what this means, very simply, is that when you look at these two cost -- these two coefficients on these two prices, these two coefficients should sum to one, okay? So that is the linear homogeneity condition.

Now, let's just go through -- and this is fairly simple algebra, but I just want to kind of go through step by step exactly what is happening here. You've got the log of cost you kind of divide through. First you substitute for the coefficient on the OM&A price, A2. A2 is equal to 1 minus A1. We substitute that at the top of the second slide.

And then we just start collecting terms. We just simplify this thing. And because this is logs, whenever you have the log of one variable minus the log of another variable, that is the same thing as the log of those two variables being divided by each other. So that is just the log, you know, algebra.

So what you get is, when you kind of make that one substitution and then simplify it - and again, this is our cost model - what you wind up with is, you get a dependent variable, which is equal to the log of cost divided by the price of OM&A inputs, and on the right-hand side you have the constant term, and then you have this A1 coefficient, and that is multiplied by the log of the capital price divided by the log of the price of OM&A inputs.

Now, I know this sounds kind of technical, but the bottom line is that this equation here, this last equation that I am showing, is equal to this first equation. These are mathematically equivalent.

In this first equation, this is -- because of linear homogeneity, this first equation will be -- it will satisfy the cost function -- economic theory about how a cost function is supposed to behave, and if you do get a 100 percent increase in prices, then it will lead to a changing cost of 100 percent.

This is -- that function is mathematically equivalent to this last function, and that's what PEG estimates. What PEG estimates is the log of cost divided by the OM&A input price, and then we also have the capital price, which is our other input price. We divide that by the price of OM&A.

The reason we do it this way -- believe me, that is very technical. I don't want to get into it, but we can if you want to -- but this makes sense. This is what we do, and it is what we have to do if we're going to estimate a system of equations. There is no way that we can have both input prices as dependent variables in the model and to do a system of equations.

So this is what we do, and it includes this. And what this -- so it mathematically incorporates the same information as the first equation, and this is homogeneous of degree one in input prices. In fact, it's imposed -- this is effectively imposed on the cost function.

So two takeaways from this. One is that the cost of each distributor is deflated by its OM&A input price, and what we do -- the OM&A input price that we use -- and we can talk about this when we talk about benchmarking too -- it is levellized, so it reflects differences in labour prices throughout the province for different companies.

So if some -- so if in Toronto, if they're paying higher prices for labour, that is reflected in the OM&A price that we use to levellize their cost. We're effectively deflating cost by OM&A prices, and then we're running that deflated cost on all the other independent variables.

And when you do that, you're automatically -- in each year cost is going to be going up, but this OM&A input price is also going to be going up by inflation and OM&A inputs. That is how it reflects the inflation in OM&A input prices. And this is -- this cost function is consistent with the theoretical property of being homogeneous of degree one in input prices.

I know that probably sounds incredibly dry and dull and not relevant, but it has potentially been raised as a concern, so I just wanted to head that off right now. That is not a concern. There is no foundation for the claim or the idea that our cost function does not conform with economic theory. And this is also true, we use this cost function for the back cast predictions. So again, OM&A input prices are reflected in the back cast. We are picking that up in the cost function as well.

So that deals with question four in the TFP back cast sets of questions. There are some other questions there, like question five --

MR. FENRICK: Would now be a good time to jump in? Could I --

DR. KAUFMANN: Let me just finish this thought.

MR. FENRICK: Okay.

DR. KAUFMANN: Question five and question three, those deal with -- basically, that's a request for additional work, which, you know, which is not in my report, and which is not in my report for a good reason. You know, there are very good reasons why I did what I did, but today is not the day to have that discussion.

The reason -- if there are concerns and there are debates about the approach we took, then we should talk about that at the stakeholder conference. I mean, this is just -- today we're just talking about questions about what is actually in the report, as opposed to requests for work that -- or questions about work that is not in the report.

MS. BRICKENDEN: Larry, in fairness to folks who haven't had the opportunity to review the questions, Steve, do you mind if I just quickly paraphrase on --

MR. FENRICK: No. That would be great.

MS. BRICKENDEN: Question number three was the request for estimates, additional estimates, on the work that PEG did. I know I am summarizing this too swiftly, but the document will be -- it is available in the WebDrawer.

And in question five, the question is in relation to cross-checking the back cast projection with work that was done by PEG in June of 2007 for the rate adjustment indices for Ontario natural gas utilities.

So those were the -- there were questions in relation to that. And if you wanted to add anything, Steve...

MR. FENRICK: Yes. Thanks, Lisa.

Question five -- and it's kind of, I guess, did you cross-check? I guess that is kind of just a yes or no, if that is kind of just possible, to provide us -- whether it's just, did you use the same calculation that PEG used in 2007, and did you cross-check this back cast with how PEG did it in 2007 for the gas distribution?

DR. KAUFMANN: The answer -- the yes/no question about, is it the same, the answer is no. The reason is what was done in 2007 is not appropriate for this exercise. I can explain that at the stakeholder conference.

So since it wasn't appropriate, there was no reason to cross-check it.

MR. FENRICK: And could you elaborate why it is not appropriate? I mean --

DR. KAUFMANN: No.

MR. FENRICK: -- there it was basically a TFP projection --

DR. KAUFMANN: That is not for today. That is for the stakeholder conference.

MR. FENRICK: Okay. But, so you're kind of saying it is not the same method on different calculations, if I heard that correctly.

DR. KAUFMANN: Yes. It is a different application of the cost model.

MR. FENRICK: Okay. And so you wouldn't be surprised if there was different results that came from --

DR. KAUFMANN: Again, we are not talking about results that are not in the paper. We are talking about the results that are in the paper. So if you want to talk about those, we will talk about those on the stakeholder conference.

MS. BRICKENDEN: Actually, I am hoping that this kind of comparison and contrasting will be part of the stakeholder conference, Steve. It's -- at this point we are just looking at trying to provide clarification on the material that we have out in the ether right now.

MR. FENRICK: Okay. Thanks. So moving on to question four then, let me ask you, Larry, would you mind moving back to slide 3, I guess it was, on your...

DR. KAUFMANN: Yes.

MR. FENRICK: So you kind of mentioned that the cost model conforms with economic theory, and, you know, question four, we really didn't mean to deal with that. We completely agree, the econometric model conforms to economic theory. That is not the issue we're trying to raise here. The issue we're kind of raising is specifically on table 19 of your report.

DR. KAUFMANN: Yes.

MR. FENRICK: And there, as you mentioned in kind of that bottom equation, where cost is divided by the OM&A input price, we don't see any adjustment for O&M input price inflation in your cost projection --

DR. KAUFMANN: There is no reason to have it. There is no reason to have it. It is reflected -- it's reflected in the cost equation itself.

There are two dimensions to this answer. It is reflected in the cost equation itself. It's reflected in the parameters of the cost equation.

And there is no reason to -- it is not an independent variable. It is not something where there is an independent variable that's adjusted, or that is estimated in the model. If you go and you look at -- I think what you have been focussing on is just the left-hand side of this equation.

You're seeing -- you think that you're seeing the growth in cost minus the growth in OM&A input prices and that is not reflected.

But if you also look at where the price of capital appears on the right-hand side of the equation, and you look at those coefficients and you add them up, you will see that they cancel themselves out.

The bottom line is OM&A prices are reflected in the cost equation. Therefore, OM&A input price growth is also reflected in the cost equation.

MR. FENRICK: Maybe you could walk us through --

DR. KAUFMANN: I just did. It is reflected in the algebra.

MR. FENRICK: So the A1 coefficient, what does that equal in your model?

DR. KAUFMANN: The A1 is the coefficient on the price, the price of capital divided by the price of OM&A.

MR. FENRICK: So that coefficient, if I am understanding your model correctly, is 0.59? Is that correct?

DR. KAUFMANN: I don't know. I don't have it in front of me.

MR. FENRICK: Does anyone have a PEG report, table 19, kind of that the coefficient? If you could verify that -- I am looking at 0.59 right here.

DR. KAUFMANN: Okay. I will accept that, subject to check.

MR. FENRICK: You mentioned on the right-hand side where the capital price has been divided by the O&M price, that has a 0.59 coefficient; correct?

DR. KAUFMANN: Yes.

MR. FENRICK: We're -- assuming we have that right.

But on the left-hand side, there is no coefficient there. It is essentially a parameter of one?

DR. KAUFMANN: Exactly. Steve, if you keep -- you have to keep looking at the rest of the equation.

The price of capital appears several times in that equation.

Add up the coefficients. You will see that they come to negative one, negative 1.022, to be exact. And on the right-hand side it is negative one.

Again, this is going beyond the scope of this report.

I know that this has been raised as an issue. It is not an issue. I can absolutely guarantee you this is not an issue.

There is no -- there is no validity to the idea that we're not accounting for OM&A input prices. They're reflected directly in the deflation of the cost number.

MR. FENRICK: Could you explain or maybe walk us through table 19, then?

You know, in a prior slide in your prior presentation, you had a growth rate of OM&A of 2.3 percent per year.

Could you just walk us through, simply, table 19 and kind of say where that enters in --

DR. KAUFMANN: Steve, it doesn't enter in explicitly. The reason it doesn't enter in explicitly is because it is not an explicit variable in the model. It's implicit.

MS. BRICKENDEN: Larry, is this an example of -- I don't want to minimize the difference of view here, because I don't understand it. That is why I don't know if I can help a lot. But maybe in terms of process, I can help.

Earlier today, Bill asked for some help mapping some of the data used in the model and how things ended up.

Is this something that perhaps you two could explore further off-line?

DR. KAUFMANN: Sure. We can do that.

MS. BRICKENDEN: Or something that can be -- I am looking at others in the room, and I can only speak for myself, but the outcome will be meaningful. The discussion right now, I am not getting it. So...

DR. KAUFMANN: I agree.

MS. BRICKENDEN: I see some heads nodding.

DR. KAUFMANN: I mean, this is a fairly technical area and we just have a lot of issues to go through, so I would rather take this off-line.

MS. BRICKENDEN: Does that work for you, Steve?

MR. FENRICK: It would work for me. I attempted to take it off-line prior to this.

So yes, if Larry wants -- kind of has the map and can walk us through and explain it to us, we would be more than willing to look at that.

I would say that this is a very significant issue that does impact the TFP trend or the back cast forecasted TFP trend significantly.

So I do want this -- we should kind of have this addressed at some point.

DR. KAUFMANN: It would be if it was an issue.

[Laughter]

DR. KAUFMANN: But as I said, it is not reflected --

MS. BRICKENDEN: Larry. Larry.

DR. KAUFMANN: We will deal with this off-line.

MR. FENRICK: Yes. Thank you.

MS. BRICKENDEN: Moving right along.

[Laughter]

DR. KAUFMANN: So the productivity factor, the final recommendation was a productivity factor of zero.

Again, the index-based estimate was negative 0.05 percent. Again, that was the focus of the study, consistent with Board direction.

That was our index -- so the index-based estimate was slightly negative. The econometric back cast was a check on the sanity of that index, and what we found was that it was almost the exact same, negative 0.03.

Since both of those numbers are very close to zero, my recommendation is that the productivity factor be set at zero.

And I know that that could be a surprising result for both customers and perhaps companies, as well, but I think it is reasonable given the environment in Ontario, and in particular, the -- what we see is that the slow growth in industry TFP is due overwhelmingly to the fact that output growth is slowing, and I think that is expected to continue.

I also think, looking at the data, that a negative productivity factor isn't warranted.

If we go back to table 18, I think that is true for a number of reasons.

One, we're only seeing negative productivity growth in the last four years of the sample. In general, four years isn't a long enough time to kind of reflect all the ebbs and flows of productivity growth over time.

So you don't want to rely on a four-year sample to set your productivity factor.

And that sample period has also been distorted by, again, the recession that occurred and perhaps the slowing economy. And the recession, at least, is not going to be something -- we hope -- that is going to be repeated in the next five years.

So I don't think the experience of the last four years is necessarily representative. And I think there is a possibility -- and I did consider this -- of weighting the last four years, giving it disproportional weight, as opposed to just relying -- you know, relying on it.

For incentive regulation in Ontario, there is precedents both ways on that.

The first generation IR plan did put more weight on the first four years -- or, I mean, on the most recent years than on the overall trend.

But then in third generation, that idea was proposed again, and the Board didn't choose to do that.

So the most recent precedent is the Board is not weighting different periods in the sample differently. And if you look at the Board's rationale for why they did that, they said -- they used an 18-year productivity trend, and they said one of the benefits of using a long productivity trend is that it helps to kind of utilize all the productivity information that is available, and it's not trying to kind of weight certain information more than others.

Now, I think for a nine-year trend that rationale is potentially -- you could make a case that that is less warranted, that rationale.

But on the other hand, there is something to be said for having a consistency in regulatory treatment, and I think, you know, going -- I think in the long run, the Board does not want to be in the position of doing a TFP study and then looking at the TFP information in different periods and then deciding: Well, okay. So we have this trend. Now how are we going to use the TFP in different years, and how are we going to weight it to come up with what we really have as the X-factor?

I think that is what the Board was indicating in third generation, when it decided not to adopt that approach.

It said it wants to rely on long-term TFP trends.

I think if you go back to weighting certain years rather than others, then you really are -- you know, you're not moving in that direction of where I think the Board wants to go, and, you know, it would be kind of backtracking on a precedent too.

So I don't see the case for weighting. And, you know, it's not -- that sort of approach is potentially open to some parties trying to cherry-pick the data and just looking at the TFP experience in certain years and say: Let's focus on this; this is what is relevant.

You know, on either side.

So again, I think given the circumstances over the last four years and given these concerns and kind of the history with weighting different years more than others, in my opinion a negative productivity factor isn't warranted by the nine-year trend.

There is potentially a concern about whether a zero productivity trend is consistent with the Board's objectives of encouraging efficiency and ensuring that customers benefit from efficiency gains.

And I think that objective is still going to be satisfied, because remember, the productivity factor is just the external benchmark. The part of the X-factor that is supposed to reflect efficiency gains and make sure that customers share in a benefit of those efficiency gains that they -- yes, share in part of those efficiency gains is the stretch factor.

And for most of the companies I am recommending positive stretch factors, so that will mean for most of the companies, most of the distributors, that would still be real declines in prices for most customers.

So I think that is again consistent with the Board's objectives of ensuring -- promoting efficiency gains and ensuring that customers benefit from those efficiency gains.

So given all that, I think a productivity factor of zero is reasonable, and that is the basis for the recommendation.

MS. BRICKENDEN: I see it is just about noon, but I want to ask -- first canvass in the room if there are there any further questions in relation to the productivity recommendations.

MR. FENRICK: Larry, this is Steve Fenrick again. Did you give any consideration to recommending, you know, maybe symmetric stretch factors, given that this will be fourth-generation IR and distributors have been under IR for, you know, a number of years now, kind of make it more symmetric, or even, like, the most efficient firms actually have a negative stretch factor.

DR. KAUFMANN: No.

MR. FENRICK: Would that --

DR. KAUFMANN: No, I don't favour negative stretch factor. I mean, that is actually for the end of the day, but I don't favour those, because remember, the rationale for a stretch factor is to share -- it's for customers to get a share of the incremental efficiency gains, and efficiency should not be going down for any company under incentive regulation.

So since -- you know, even for the most efficient companies, I mean, if they're right there on the cost frontier, the so-called cost frontier, you know, that means zero efficiency gains, but it doesn't mean negative efficiency gains.

So, no, I was against negative stretch factors in third-generation. I am against them now too.

MS. BRICKENDEN: Are there any further questions? Sorry, Steve?

MR. FENRICK: I was just going to follow on there. You know, would you agree in your research here, or maybe whether you looked at this or not, but, you know, those cost frontier firms, well, they don't necessarily have the ability to hit that average TFP trend, right, so we are basing the average productivity trend on kind of the industry average.

DR. KAUFMANN: There is no evidence of that. There is no evidence -- I don't --

MR. SHEPHERD: I don't see how this is useful today.

DR. KAUFMANN: It's not.

MS. BRICKENDEN: Thank you.

MR. SHEPHERD: This is a debate we have to have later.

DR. KAUFMANN: Yes, thank you.

MS. BRICKENDEN: The 27th and 28th. Thanks, Jay.

Are there any further questions of clarification? If not, I propose we pause for lunch and reconvene at one o'clock to get working on the benchmarking. Thank you.

--- Luncheon recess at 12:00 p.m.

--- On resuming at 1:02 p.m.

MS. BRICKENDEN: Good afternoon. We're getting together again to start up shortly after one o'clock.

And as discussed, we will start off with Larry's discussion of the benchmarking models and his recommendations. Larry?

Benchmarking

DR. KAUFMANN: Okay. Thank you.

So the afternoon is going to just deal with benchmarking, and we have two benchmarking models and two sets of benchmarking assessments. One is econometric, and one is based on the unit cost peer group approach. And I am going to start with the econometric benchmarking.

And that began -- the focus of the econometric work is to try to identify business conditions or conditions that are beyond companies' -- distributors' control that are impacting their cost, to identify those conditions, to quantify them, put them in the econometric model, and then estimate the impact of those conditions.

And once you have that, then -- once you have those estimates, then you can make an inference on the companies' costs by comparing their actual costs to the costs that would be predicted, given the actual values of those business conditions variables that they experience, and the coefficients which represent the impact of those different values of those business conditions on expected cost.

So that is kind of the purpose of the econometric analysis.

So business conditions analyses are central to that. We did a fair amount of consultation during the working group process on business conditions: What are the relevant business conditions for distributors? Which of these are feasible? Which are less important? We even had a two-hour webinar as part of one of the working group meetings, where various members from the industry listened in and also participated.

Based on that, we developed a set of variables that we examined and we looked at a lot of different variables in our econometric work.

What we found were that there were seven variables that were statistically significant drivers of costs or statistically significant business conditions. And we used those directly in the econometric model to predict cost, and we also used those in the unit cost analysis to identify peer groups. And the peer groups were based on similarity in those business conditions.

So in other words, if you were relatively large and output was a business condition driver, then you tended to be grouped with other large distributors.

So this is all keyed off of the econometric analysis and what the econometrics found for significant business condition variables.

So I briefly explain the econometric model. The econometric model estimates the main drivers of electricity distribution costs, and then we use that model to predict costs by taking those coefficients, multiplying them by the variables that apply to each company, and then we generate a cost prediction for the company. And then we also look at the difference between the actual and predicted cost, and we generate a confidence interval around the cost prediction. So we actually compare where the company's actual cost is relative to the cost prediction, plus or minus an interval, which reflects just the inherent uncertainty of predicting costs.

And then that analysis, where we looked at the difference between actual costs and costs plus or minus -- predicted costs plus or minus the confidence interval, allowed us to identify what we call statistically superior, statistically inferior, and average cost performers.

We define an average cost performer as one where -- where they're within the confidence interval, where you can't reject the hypothesis that their predicted cost is equal to their actual cost.

That is what it means to be in the -- within the confidence interval.

If you are outside of the confidence interval and your costs are lower than what is predicted, your actual costs are lower than predicted costs, then we say that you are statistically superior. There is a statistically significant difference between actual minus predicted, because, again, you are outside of the confidence interval.

The same thing on the other side. If your costs are greater than the predicted costs plus the confidence interval, then you're statistically inferior.

So that's the econometric model.

The unit cost/peer group model, what that does is that -- that looks at each distributor's unit costs, where unit cost is equal to their total cost divided by an index of overall output.

We compare that -- and this is a computation that is done for the last three years and then that is averaged. So you look at the average unit cost for each distributor over the last three years, and then you compare that to the average unit costs for the companies who have been identified to be peers for each distributor.

And that is done just by looking at the average of the unit costs for all the companies in the peer group, and again that would be done for three different years and averaged.

So what were the drivers that we found to be significant?

Well, for outputs, we found -- and I should say that there is a -- input prices, as well. Capital price, the capital price was an explicit variable in the model. The O&M input price was an implicit variable in the model; it was implicitly used to divide the cost measure for each company.

So that was one of the variables, and there were also outputs. The three outputs we found were customer numbers, measure of peak capacity, which we have talked about, which is the system peak capacity, and kilowatt-hour deliveries.

And the other business conditions, we have talked about some of these already, but one was average line length, and this is kind of a measure that reflects the location of customers in the company's territory and the spatial distribution of customers.

So for example, if, you know, two companies serve 20,000 customers but one does it with twice as long -- twice as many kilometres, then that's an indication that the territory of the company that has more kilometres of line is less densely populated, and that has implications for costs.

So kilometres of line are picking up kind of the spatial distribution of customers within the territory.

And we also looked at the territory itself as being a cost driver. We found that even -- even when you have this other proxy for distribution of customers, the territory itself is a significant driver.

So that suggests that even when you are serving territory where -- that is unpopulated, there are still cost consequences associated with that. They're not huge in terms of magnitude, but they are statistically significant.

And then the two other variables were underground, the share of lines that were underground. Underground lines are more expensive, typically, to install, less expensive to maintain. But we found that there was a significant impact of having more lines underground and costs.

Carm?

Q&A Session

MR. ALTOMARE: Larry, it is Carm Altomare, Hydro One.

If earlier you said that the data for kilometres was not reliable, why would a share of lines underground be reliable?

By "underground" I don't just mean underground, but also submarine.

DR. KAUFMANN: Mm-hmm?

MR. ALTOMARE: So, like, on one hand you're saying data is not accurate for kilometres of line, but then on the other hand you're saying share of lines underground is accurate?

DR. KAUFMANN: Yes. Well, that is a good point. You know, if the errors, you know, if the randomness is kind of distributed evenly among the underground and overhead lines, then, you know, the share could still be accurate even if the total is wrong.

You know, in general it looked much more reasonable. We weren't seeing huge swings in that, you know, where they're kinds of oscillating up and down, which we did see with the -- you know, the total kilometres.

MR. ALTOMARE: Thank you.

Because in Hydro One's case -- and I am not sure if Hydro One's included in this, but in Hydro One's case we have a lot of submarine cables, and it has always been a real challenge to estimate what the kilometres are for the underground.

DR. KAUFMANN: Okay. Good to know.

MR. HARPER: Larry, one other question. You said the average line length and the size of the service territory were both significant. I'm just curious, did you look at whether those two variables were -- I mean, they could both be statistically significant but highly correlated with each other. Did you look at the correlation between the two of them, whether there was a degree of -- high degree of correlation?

DR. KAUFMANN: I am sure there is a degree of correlation, but that would be reflected -- you know, I mean, when they're highly correlated like that it is typically harder to get both of them to be statistically significant.

MR. HARPER: Not impossible, but --

DR. KAUFMANN: Not impossible, but -- right. But, I mean, we actually found that -- even given that correlation we found statistically significant independent effects for average line length and service territory.

So, you know, they're telling us that there is information in the service-territory variable that is not in the average line-length variable.

MR. HARPER: You -- sorry, you'd agree, though, that, I mean, if they were highly correlated both, but disentangling the effects of the two isn't necessarily shown by the coefficients, if they're highly corr -- they create a problem there.

DR. KAUFMANN: Actually, I mean, that is what it is doing. I mean, it's -- the -- when they're highly correlated, what that means is that you tend to have very large standard errors around those variables, and they become statistically insignificant. So that is the impact of having correlation among the independent variables.

So, I mean, what we're showing is that even given that, even given that that is the case, these are statistically significant and independent.

MR. HARPER: Okay. Sorry.

MR. SHEPHERD: The actual metric used for 2011 service territory is square kilometres or something like that?

DR. KAUFMANN: Yes.

MR. SHEPHERD: Coming back to Bill's question, there is some way you can actually measure the level of correlation, right?

DR. KAUFMANN: Yes.

MR. SHEPHERD: Have you done that?

DR. KAUFMANN: It would be -- we haven't done it explicitly. It is easy enough to do.

MR. SHEPHERD: It is not a big deal to do, though, right?

DR. KAUFMANN: No. It is easy to do.

MR. FERGUSON: Hi, Larry. Dave Ferguson, Entegrus. Focusing on table 23 specifically about the geographic service territory size, Entegrus serves 16 non-contiguous communities in southwestern Ontario throughout that region. We are noticing -- we are grouped in group E, which is small output, small area, below-average customer growth.

We're certainly seeing a lot of our peers in group C, and when we did some comparison we have noticed that for Triple R purposes we have always reported just the area of the -- just the actual kilometres of the area served, not the area between the communities that we serve, and so we're seeing a bit of a disconnect where it appears that others may have actually kind of drawn a square or a triangle around all their communities and reported that area.

For example, we have been reporting 96 square kilometres of service territory, but if you take our non-contiguous area and draw a shape around it, it's 3,300 square kilometres, which might change our group allocation if that were considered. I just want to raise that.

DR. KAUFMANN: Yes. No, I think that is a great point. I mean, I don't know what we could do to change the data, you know, I mean, unless we -- we would have to get that kind of disaggregated data for all 73 companies.

But, I mean, certainly I look at these, the peer groups, as being, you know, generally reasonable, but that doesn't mean that they can't be modified.

So between now and July, our final report, I am certainly open to changing where companies are in the peer groups if they're -- you know, moving from one peer group to another if there are good reasons for doing that, and, you know, if your square kilometres are being measured differently than the others, that could be, you know, one reason to, you know, say, change Entegrus.

MR. SHEPHERD: Can I follow up on that, Dave? Dave raises two different questions, and the first is, is the appropriate measure the area served or the physical area around the area served, including all the interior stuff that you don't serve. And I take it you've taken the approach that it is the area served that is the appropriate area, right?

DR. KAUFMANN: We used what the company has reported, and I think that the issue is that companies have not reported that consistently --

MR. SHEPHERD: No, that is the second issue, that is the second issue, is, is have they all reported actual area served, but that is something you can presumably clean up in the data.

DR. KAUFMANN: Well, we would need data on -- you know, we would need to kind of disentangle, you know, which companies are kind of taking the big-box approach and which are, you know, taking the squares within the box. So we would need that information if we are going to clean up the data.

MR. SHEPHERD: I guess what I am trying to drive at is that the second question, is everybody reporting the same way, has to be fixed. The first one is a policy question, right?

DR. KAUFMANN: The first one, in terms of the service -- yes. Well, I mean, that's true. And I think related to -- correct me if I'm wrong, but I think partly, part of what your question is is whether a different variable or another variable related to that is to have, you know, area served, but also have kind of non-contiguous service territory as being a significant variable.

MR. SHEPHERD: Yes, and then the policy question is whether that is something outside -- that is a business condition or that is something you have chosen.

DR. KAUFMANN: Exactly. That's right.

MR. FENRICK: Larry, this is Steve Fenrick. On the non-contiguous variable, was -- did PEG attempt to get that in the model, or was --

DR. KAUFMANN: No, we didn't, because we discussed that in the working group, and the consensus of the working group is that that is not a business condition beyond company's control. Most of the companies that have non-contiguous service territories have done that through mergers, so it directly reflects management decisions.

MR. FENRICK: Thank you.

MS. BRICKENDEN: Larry, there were a couple of questions that I erroneously started on this morning that Dwayne had filed. I wondered if you could address those now, please.

DR. KAUFMANN: Okay. Well, Dwayne has a couple other questions related to business conditions, and he was asking about accumulated depreciation relative to gross plant, and I addressed that one earlier.

He also said his other questions were, were there other metrics considered to address the issue of vintage of infrastructure; e.g., weighted average by age of infrastructure.

Well, essentially, you need a lot of -- we tried to do that in the capital cost measure to the extent that we could. When we build up the capital cost measure based on gross capital additions, we try to control for the age, that the reason we do that is we try to make sure there is an appropriate weighted capital measure by age of the company. That is one of the ways that -- you know, that is an important way to do that.

So to the extent that we could do it, that's reflected in the cost measure. But beyond that, to include that as a right-hand side business condition variable, I believe there was some discussion of that in the working group, but we didn't know of any sort of objective information that we could use for all -- you know, that was industry-wide that was available and that we could use as a right-hand side independent variable. So we considered it, but we didn't think it was practical or feasible.

Dwayne's second question is, was there discussion in the working group that talked about asset condition correlated to maintenance costs, was there discussion about these factors that can be correlated to performance; e.g., SAIDI/SAIFI.

Yes, we did talk about SAIDI and SAIFI, and again, we didn't think the data on SAIDI and SAIFI were reliable enough in Ontario, so we ruled those out on those grounds.

And asset condition correlated to maintenance cost. You know, again, that gets into this whole whether we can get objective measures of asset condition for each company in the industry, and we just didn't -- we just weren't aware of any sources of that kind of information.

So I guess the answer to that, there was discussion, but again, we didn't think it was feasible.

MR. FERGUSON: Thank you, Larry.

MS. SCOTT: Can I just -- for the record, I don't think it was a consensus at the working group about the non-contiguous being under our management control. So I just -- just for the record.

DR. KAUFMANN: Okay. Yes, I mean, you may have noticed that -- I mean, for one -- you know, the report obviously reflects my opinion. And I was at all the working group meetings. It was my -- and when I say -- in several places in the report I talk about a consensus of the working group. That doesn't mean unanimous.

You know, even when there was consensus on an issue, there were always, you know, potentially there were differences of opinion. It is my recollection at least that, you know, that at least a majority of the members of the working group seemed to think that the non-contiguous variable was something that was not beyond management control.

MR. ALTOMARE: Just on that point, Larry, in the presentation it says that "agreed with the stakeholders". I'd go with Jane's point as well, that the working group also agreed.

So when you have stakeholders I am not sure who are the stakeholders you're referring to, but in some of those cases you could substitute the working group. And I could identify that for you later on.

DR. KAUFMANN: Okay. That would be good.

MR. ALTOMARE: Because I wasn't sure what you meant by stakeholders. Was it the OEB stakeholder group, or...

DR. KAUFMANN: I'm not sure what you're referring to.

MR. ALTOMARE: Well, in the presentation you said also the stakeholders agreed.

DR. KAUFMANN: Did I? In this presentation?

MR. ALTOMARE: Yes, in this one. I could...

DR. KAUFMANN: Okay. Well, in that case, I am not aware of saying that, but if I did, I am sure I meant working group.

Because, I mean, that was -- you know, those were the representatives of the stakeholders.

MR. HARPER: Larry, I'm sorry, I am just trying to piece this together, when you talk about the accumulated depreciation.

Maybe you can remind me. I apologize. I don't recall from the report.

When you were defining -- for this purpose, you're trying to explain cost, and you've got cost as both capital -- capital-related cost and the OM&A cost. I understand the OM&A cost part.

On the capital-related costs you apply return and depreciation to, is that -- is the value of capital you are applying that to, that is the replacement value of capital?

Like, I am trying to remember what the value, how you... what the value of capital was, how you actually valued capital in this. We had this discussion earlier because you were saying you weren't using an accounting value of capital when you were doing this analysis.

DR. KAUFMANN: Mm-hmm.

MR. HARPER: When we were talking about this earlier today, and I was just wondering if you could remind me what was the value of capital you did use. Was it sort of replacement value of capital?

DR. KAUFMANN: There were two components to capital cost. There is the capital quantity, and then there is the capital service price. When you multiply the price of capital by the quantity, that is when you get the capital cost.

MR. HARPER: Right. What I'm wondering about is the quantity you're using. Is that just reflective of the actual dollars spent when they were spent?

DR. KAUFMANN: Yes. Essentially that is correct.

MR. HARPER: So effectively it is sort of an accounting historical. So if somebody spent a million dollars in 1960 and hadn't spent a dollar since then, you would be using a million dollars as the capital quantity, then?

DR. KAUFMANN: Well, yes. In that example, yes, but, I mean, more generally what we did was we started -- for all companies, we started with a benchmark year.

And for most companies, that benchmark year was 1989.

So we took the net plant value in 1989, and then from that we -- then we deflated that by a price index, which actually reflects, you know, a series of price indexes for the previous 40 years.

MR. HARPER: That is what I was trying to get at, whether it was a dollar spent or whether it was some price adjusted, which, as I was using, is sort of a real, you know, sort of current day --

DR. KAUFMANN: It is price-adjusted.

MR. HARPER: Okay.

DR. KAUFMANN: So the net capital value was price-adjusted. That is the benchmark year, which is net plant in a given year. And then in each year after that, we looked at gross additions, but we deflated gross additions by the change in the EUCPI.

MR. HARPER: So you basically -- so all of the capital dollars are based on that sort of cost as of that benchmark year, sort of thing?

DR. KAUFMANN: No. There are two components. There is the benchmark year, and the benchmark year, that's the starting point.

Then you take that dollar value and deflate it by a price index. So now you have a real value of the starting point. And then you start adding capital additions to that, but the capital additions that you add are also deflated each year by the change in the asset price index, which is the EU -- the electric utility construction price index.

So there are two pieces, but they're both expressed in real or price-deflated terms.

And it starts with a value in a benchmark year. Then we build it up based on capital additions since 1989 through 2011, and that is your capital stock.

MR. HARPER: But all of those capital additions, you say, are price-deflated back to sort of some lower value reflecting -- so that everything is stated in a common year's prices?

DR. KAUFMANN: Yes. That is true. That's correct. They all deflate --

MR. HARPER: I was probably articulating it poorly. Okay. Thanks.

DR. KAUFMANN: No, I wasn't sure because -- I thought you were just talking about, you know, the price index for the benchmark year.

But yeah, we deflate year by year by inflation that was observed in those years.

MR. HARPER: Okay.

DR. KAUFMANN: So that was the capital quantity. Was that your question? Or did you --

MR. HARPER: No, that was it. Thanks, Larry.

DR. KAUFMANN: Yes. The final --

MR. SHEPHERD: Can I just ask another question on this?

DR. KAUFMANN: Sure.

MR. SHEPHERD: The first five of your business conditions appear to me to be all essentially size-related, whereas the last one is growth and the one before that is sort of complexity.

I guess line length is maybe sort of density, as well, but basically they're size-related.

Is there a problem with having a whole bunch that are size-related? A whole bunch of business conditions that are basically different descriptions of the same thing?

DR. KAUFMANN: Well, I don't think they are basically the same descriptions of the same thing, because there are various elements of size, and this is, you know, even -- I mean, obviously I think size is important. That is an important cost driver.

But these are multi-product firms. There are a lot of different aspects of the product that they deliver to customers, how many customers they have, what are the peak demands for those customers, you know, what are kind of the load factors associated, because, you know -- and how often are they delivering kilowatt-hours to the customers? Where are they located in space?

All those things reflect size, but they're different dimensions of kind of the size issues.

I think the fact that we're getting significant estimates on all of these things suggests it is not a problem to have them, because they're all, you know, identified, statistically independent effects on cost.

MR. SHEPHERD: So that -- I understand. I'm still concerned about it, but I understand.

The one that isn't a size thing that is -- that I wonder about and I assume you tested for - I can't remember from the working group -- is customer mix?

DR. KAUFMANN: Yes.

MR. SHEPHERD: Because that is the one that is most commonly talked about as being a major driver, a major comparator between the two?

DR. KAUFMANN: Right, yes.

MR. SHEPHERD: You tested for customer mix?

DR. KAUFMANN: We did. We tested a number of different customer mix variables. We looked at, say, indexes of customers, where we weighted customers by their revenue shares.

That wasn't significant.

We looked at, you know, the share of deliveries to residential customers, the share of deliveries to residential and commercial customers, things like that.

None of them were coming in significantly.

MR. SHEPHERD: Okay. Thanks.

MS. BRICKENDEN: Before we move along, are there any further questions with respect to business condition variables, whether in the room or in the ether?

MR. FENRICK: Yes. I am from the ether here, I guess. This is Steve Fenrick again.

Larry, just asking on either the line length or the share of lines underground, was there any adjustment made for those embedded distributors where the host distributor's line length was added back in? Or their key capacities, so kind of the costs would match the cost drivers? Was that done in this?

DR. KAUFMANN: We just use the recorded line length.

MR. FENRICK: Is it your understanding those are just those of the embedded distributor in the -- in that case?

DR. KAUFMANN: For every distributor in the sample. We used whatever they reported as their kilometres of line.

MR. FENRICK: Okay. So there was no adjustment, no explicit adjustment for those assets of the host distributor?

DR. KAUFMANN: No.

MR. FENRICK: In the case of an embedded distributor?

DR. KAUFMANN: No. I don't remember that being discussed during the working group, and I am not sure whether there would be any way to quantify that anyway. I am not aware.

I am not sure -- because in is a new -- I mean, this is a -- to the best of my recollection, this is a new issue, I don't remember any discussion about whether that would be a feasible adjustment to make, whether we would have the data to make the adjustment.

MR. FENRICK: So the data might not be available to make that...

DR. KAUFMANN: Yes.

MS. SCOTT: We did not discuss it in the working group, but I think if we're –- because we do get charged per kilometre, so there's -- within the HONI data, that should be there. I mean, I don't know how easy it is to extract, but it could be gotten to, if it was felt it was necessary to add back in.

DR. KAUFMANN: Okay. Any other questions?

Okay. Well, those were the -- that's just a very brief discussion of the econometric model and what we found in terms of significant drivers.

In terms of the results, what we found were that nine distributors were identified as being statistically significant or significantly superior cost performers, at the 90 percent confidence level, and five of those were statistically superior at the 95 percent confidence level.

There were more distributors who were identified as being statistically inferior, 17 at the 90 percent confidence, and 12 of those were statistically inferior, at 95 percent confidence.

Now, I have to say that I wasn't aware of the issues with the LV data. You know, this was something that we checked very carefully early on, and then, you know, a lot of things happened at the end, and evidently something went wrong.

So we want to get this right. And if there are serious problems with those data, this probably would change.

MS. SCOTT: Can I ask a question? You may want to hold off until after we have done the peer benchmarking. But I guess I just can't understand how, like, distributor five is the most efficient under the benchmarking, and yet when we go to the peer it is like 46 or something, and I --

DR. KAUFMANN: That is unusual. If you look at, you know, at overall, there is a high correlation between the two.

MR. TUCCI: Except for a couple.

MS. SCOTT: Except for a couple, yeah. Yeah.

DR. KAUFMANN: There's always going to be -- you know, for whatever reason, you know -- I just think that is kind of the nature of the game when you are doing statistical analysis like this. I mean, there are going to be companies that, you know, pop out for whatever reasons, you know, it --

MS. SCOTT: But what would be -- so I guess I can't understand --

DR. KAUFMANN: But you -- let me just put it this way. It would be more surprising if there was 100 percent correlation between the two. You would not expect to see an exact correlation between, you know, between two different benchmarking studies. It would be good if you saw a high correlation, and that is what we're seeing.

MR. TUCCI: But we just found it unusual that it is the top two that are not the ones that in the peer group indexing look good. I found it weird that there is something going on there, and --

DR. KAUFMANN: There could be something going on there. I mean, there could be something going on with the low-voltage data.

MS. SCOTT: And that's -- yeah, and we'll see what -- yeah, a low-voltage -- and I just -- because we're on this topic, and one of our questions -- and I will ask it instead of Steve -- is, do you feel we have enough confidence in just the plain benchmarking to go just with that, as opposed to using the two methods?

DR. KAUFMANN: Well, I don't know if that qualifies as a policy question or -- I will answer that --

MS. SCOTT: Yes, thank you.

DR. KAUFMANN: -- since you asked it. I mean, I think there is value in both the benchmarking and the unit cost, so, no, I do not want to go with just the econometric benchmarking. I think there is value in using both, both from, you know, kind of an empirical standpoint and from a policy standpoint. I think the unit cost -- I know people have made this point during working group discussions, is that when you have 73 companies in an industry, people will compare the companies. And the peer group analysis is a way to kind of at least make more informed comparisons.

So I think, given that, there is some value there. It does kind of use some criteria for identifying peer groups. So I think there is value there, and I think there is more transparency. I think it is something that managers at Hydro Ottawa and other companies can look at and say, Here is a number. Here is where we are, here is where our peers are. We want to be here, for example. I mean, there is value in the unit cost peer group -- assessments for all those reasons.

The econometric analysis is more powerful. It controls for more variables. So that is the benefit. But it is much more opaque, and, you know, managers can't always understand exactly why they're 17 percent under, as opposed to, you know, particular costs.

So, you know, I think when you look at the big picture, I think there is value with both.

MS. SCOTT: Just to continue on to that, so if you are looking at what to control, you would look more at the peer groupings than at the --

DR. KAUFMANN: I didn't -- I am not saying. I'm just saying that --

MS. SCOTT: Okay. Well, this has always been one of the questions, is, it is hard to tell what we need to do to improve, and --

DR. KAUFMANN: I am just, I am not -- I don't have any opinion on how managers -- what they should be looking at to try to control. I am just saying that that is -- I mean, I know from discussions and from, you know, in the industry that, you know, that there are companies that are looking at that, and they're focussing on the actual metrics, the actual unit costs. Those matter. I mean, those do matter, in terms of management decisions.

So, I mean, I don't know the best way to do that. But given that it is being done, I think there is value in putting those benchmarks out there.

MS. SCOTT: I guess if I was distributor five, I would say, what do I have to do to those other people in my peer group to get them -- or it's just very -- they're the most efficient in the province, yet they're in the fourth group, in terms of --

DR. KAUFMANN: Well, again, there are problems with some of the data, you know, potentially, so --

MS. SCOTT: Okay. So we will wait until -- okay.

DR. KAUFMANN: I think we should all --

MS. SCOTT: Wait.

DR. KAUFMANN: I apologize, but we should --

MS. SCOTT: No.

DR. KAUFMANN: -- we should withhold judgment on kind of those correlations.

MS. SCOTT: Okay.

MR. TUCCI: Do you know when you will have that revised with the better data?

DR. KAUFMANN: I would like to get it done as soon as possible, so that is going to be a priority. I'm going to try to get it done next week. I will see what I can do.

MR. ALTOMARE: Larry, Carm Altomare, Hydro One. I think as a manager, I just wouldn't look at unit costs. I would be doing myself a disservice, because as a manager I would be trying to run all the areas to a manageable level.

So I would be looking at reliability, regardless of what your point is. I would also be looking at safety. I would also look at the condition of the assets and also looking at other parameters. So this is the fallacy, and actually one of the gaps or one of the concerns, in just looking at unit costs.

DR. KAUFMANN: Well, remember we've got the balanced scorecard? So I think those sort of concerns are reflected generally in the approach that's being developed for the Renewed Regulatory Framework.

You know, I mean, the Board is going to put together a more balanced sort of -- and maybe we dropped the word "balanced", but the scorecard. They are going to look at a number of different indicators, and not just unit cost.

So this is just one element, one element of a bigger framework.

MR. ALTOMARE: So maybe in fairness to that point, Larry, I think you should position your report that way. But your report says that you have covered all the areas of the new regulatory framework.

DR. KAUFMANN: I don't remember saying that. I'm sorry. I don't remember saying that.

MR. ALTOMARE: Yeah, it says --

DR. KAUFMANN: I mean, this is just empirical research in support of incentive ratemaking. You know, this is not the whole kit and caboodle.

MR. ALTOMARE: Well, I can identify that later on, you know, because what you're doing is just one small objective of all the objectives of the total framework.

DR. KAUFMANN: I understand that. I agree. This is not the whole framework.

MS. BRICKENDEN: Yes. And in fairness to Larry, he was retained by staff to do the empirical work that we had been planning to do with the creation of our third generation.

We wanted an Ontario-specific TFP, what would it look like. We wanted to provide a more Ontario-specific adjustment factor, let's look at making inflation more Ontario-specific, et cetera.

So that is why he's focusing on those elements, and at this point to focus these consultations to be -- have product ready for the 2014 rate year, we have kind of split the path, as you know, and we're focusing now on this data work, and then we will actually be continuing our work on the scorecard, Carm.

So we won't lose sight of the broader scorecard picture. But we need this for the rate-setting in 2014.

DR. YATCHEW: As long as you are on this slide, so the statistical estimation that you have done provides for a certain allocation into groups or cohorts based on the statistical significance.

Did you try any other specifications, and did you see how robust these kinds of allocations were when you changed specifications?

DR. KAUFMANN: We tried a lot of different cost driver variables. So, I mean, that's a difference in specification. We didn't change the fundamental formula of the cost function. They were all trans-log cost functions, so I am not sure if that is what you mean by specification, but we did try a lot of -- you know, we examined a lot of different cost driver variables. We found that there was a high degree of correlation in different models, in terms of who -- particularly in terms of who did not do well. It was a little bit more fluid, in terms of who did well. But there was a lot of consistency, in terms of who the, you know, the inferior cost performers were.

DR. YATCHEW: This is a little bit more technical, so I apologize to everybody.

So you have a panel data set up.

DR. KAUFMANN: Yes.

DR. YATCHEW: And the way that you are modelling the relationship of the data across data points and over time is using a heteroscedasticity- and auto-correlation-type correction.

DR. KAUFMANN: Right.

DR. YATCHEW: In panel data settings there are also sort of standard estimators based on random effects, individual effects, sort of, and I am wondering whether you tried those or whether you discarded those for some specific reasons?

DR. KAUFMANN: I am trying to remember. The random effects, is that the within estimator?

DR. YATCHEW: So the random effects model, you have a random term that is constant over time for each firm?

DR. KAUFMANN: Right. That is the within estimate; correct? That is sometimes what is called the within?

DR. YATCHEW: I won't --

DR. KAUFMANN: They have within and between estimators.

MR. FENRICK: The effect is the within. Random effect is within estimator.

DR. KAUFMANN: Yes. Okay. We have done that in the past. We found that the panel data set approach -- I mean, I would have to go back. It's been years since we have done that.

But we have run within, we have done between. What we have is actually a weighted average of the within and the between estimators.

You know, so we have actually done that work and responded to data requests on this in the past. I can try to dig up those responses.

So -- but there are pros and cons of using within and between estimation.

And again, I know we looked at this. It's been a while since we re-examined it, but I could try to find that and let you know what our assessment was at the time of the pros and cons of each.

DR. YATCHEW: I ask because this type of estimator is standard in the literature. In fact, you refer to Wooldridge's book. He has a whole book on penalty analysis, and that is one of the standard model he is settings, and that is why I am curious you would not have used it.

You must have reasons, and I would be curious what they are. Thanks.

DR. KAUFMANN: Yes. I will definitely look that up.

MR. SHEPHERD: So this is going to seem like a stupid question, but if it is, it is your fault because my head has already exploded.

[Laughter]

MR. SHEPHERD: The unit cost numbers that you show in the tables, I am trying to relate those to something in the real world and I can't.

Before, we had unit costs that were sort of OM&A per customer, and I can get that.

I understand the math you used, but these dollar figures or whatever -- I think they're dollar figures -- do they actually relate to something in the real world that I can conceptualize?

DR. KAUFMANN: Probably not, because, you know -- the numerator does. Those are costs.

It is the denominator. It is what we're dividing it by.

It's an amalgamation of four different outputs, which is hard to kind of wrap your head around.

MR. SHEPHERD: That I understand. I guess the value of these numbers, then, is only in their relative size to each other. There is no -- they have no explanatory value of their own?

DR. KAUFMANN: Well, I wouldn't go that far. I mean, you know, these are all identified to be statistically significant cost drivers.

So all it is doing is it is aggregating all these things into a comprehensive measure, which makes it more comparable.

That is really the value in doing this. It's like if you just focus on customers, for example, and you look at OM&A per customer or total cost per customer, then, you know, the companies will tend to look bad. The companies that will look bad are the ones that have, you know, high-demand customers and things like that.

MR. SHEPHERD: Yes.

DR. KAUFMANN: So there's -- you know, partial indicators like that that are very intuitive can sometimes be misleading.

The ones that are -- and the ones that are more comprehensive are less misleading, but they're not as intuitive.

So I think that is just kind of the inherent trade-off.

MR. SHEPHERD: I am not saying there is anything wrong with the numbers. I am just trying to understand them.

If I see a number like 39.75 million, that 39.75 million is only useful in comparing it to the 41.48 million for the next distributor.

The 39.75 million is not what the distributor spent, not what they spent per customer. It is none of the things that I would understand, or that a customer would understand. It is just a way of comparing them.

DR. KAUFMANN: It is, yes. It is -- I think that is fair. I mean, this is a benchmarking exercise that is supposed to be -- that's supposed to lead to accurate inferences, and because of that it is probably less intuitive than the sort of simple comparison.

MR. HARPER: I think this builds on the question I asked earlier about the capital costs, because you said the numerator was cost. That is a yes, but the denominator is a construct.

To some extent, I guess I just want to follow up on that, because it seems to me the numerator is half yes in terms of the OM&A, but in seems to me, as per our previous discussion, the capital is really somewhat of a construct relative to what somebody looking at their books and saying: What did I actually spend -- what were my actual capital costs during the year? This number here won't bear much, if any, relationship to that, because of some of the issues we talked about earlier in terms of how the capital quantity was constructed?

DR. KAUFMANN: I think that is true.

MR. HARPER: I think that sort of jibes with what Jay was asking you, too.

DR. KAUFMANN: Right.

MR. SHEPHERD: I have another question on this.

Your grouping -- maybe I am jumping the gun in asking about this. Tell me if I am. Is it important that if you look at the unit cost averages, that they be relatively closely bunched? Is that reflective of whether that is a homogenous group or not?

DR. KAUFMANN: No.

MR. SHEPHERD: No, it's not?

DR. KAUFMANN: No. What matters in terms of the group is not the cost, because, you know, I mean, you can always find -- I mean, if that was the case, it would be easy; just compute the cost and find whose costs are closest.

It is what drives cost, you mean.

You really want to find similarities in terms of the things that, you know, that are really driving your costs and that differentiate one company from another.

So that is what is fundamental, and if you want to make an inference on how companies are managing their costs, then you can't just look at the cost number.

MR. SHEPHERD: Thanks.

MS. BRICKENDEN: The slide looks at how you establish the peer groups?

DR. KAUFMANN: Yes. Well, these next few slides talk about how the peer groups were actually selected.

MS. SCOTT: You should have a question there about business conditions and average length? I can ask it. Someone sent it to me.

Average line length has been used as a business condition because of anomalies in the data, and so our understanding is that actually the information requirement has been tightened in the last few years.

So could you use the most recent current line length instead of average line length for the benchmarking?

Because it should be reported on a consistent basis now, as opposed to the previous history, which was back and forth, so...

DR. KAUFMANN: Yes. We could do that. Yes.

Well, on the construction of the peer groups themselves, what I wanted to do, because I know there was - there was - this was done for OM&A, the OM&A benchmarking project. There was a certain amount of disagreement about how the peer groups were selected, and it wasn't clear how the peer groups were selected.

So I wanted to make this as transparent as I possibly could, which –- you know, it still may not be transparent but I wanted to make it clear how we were moving from cost drivers to peer groups, and how we finally settled on the peer groups that we did.

So the fundamental factor that is used to identify peer groups is similarity in cost drivers. Again, because these are the external business conditions that are impacting costs, and you want to compare companies that have highly dense service territories with other companies that have highly dense service territories, not with companies that have very sparsely populated territories, for example.

That is what we did. We looked at the -- we started with the seven cost drivers that were identified in the econometric analysis, and there are a lot of ways that you can slice and dice those seven cost drivers. I wanted to do this in a way that we could bring it down a manageable number of peer groups and do it in a kind of transparent way.

So we have these seven cost drivers, and the first step was to notice that four of these cost drivers directly relate to output, and those are customer numbers, system peak capacity, kilowatt-hours, and the average line length.

So I aggregated those four outputs into a comprehensive output index, and that was one, so suddenly those four drivers became one driver. It is a comprehensive output.

I looked at that and I compared that to -- then that was expressed as a bilateral index, just to kind of normalize it across everywhere. So the bilateral index is each company's overall output index divided by the average output index for the industry. So that is a way to standardize it, is are you above –- is your average output, your average comprehensive output, above or below the mean.

If this number is greater than one, that means your output is above the mean. If it is less than one, that means it is below the mean.

MR. HARPER: Larry, before you go on, a small trivial question. I'm sorry, but in the slides here you use average -- actually, a couple places in the report you use "median", i-a-n, as opposed to "mean", and I think "mean" and "average mean" are the same thing, but "median" isn't, and I just wanted to clarify. It was average all the way through that you were using?

DR. KAUFMANN: Well, it was average on output. I'll get to -- I am going to talk about service territory in just a second. Service territory was median.

MR. HARPER: Okay. Because I think even in some other places you linked the word "average" with "service territory" as well, and I just...

DR. KAUFMANN: Okay. Yes. Well, I am not sure about that, but I think there may have been one typo, actually, in this presentation, which hopefully I can identify, but, yes, in the report the four -- all of these are compared relative to the mean, with the exception of service territory.

MR. HARPER: Okay. Thanks.

DR. KAUFMANN: And so let's move on to service territory right now. And what we did -- so we've got the

-- we've got these four outputs aggregated into a single output expressed relative to the mean for the industry, and we took that value for every company, every distributor in the industry, and we also looked at its service territory, and we plotted that in a two-dimensional graph, and we divided that graph up into quadrants, where on the output side we looked at whether you were above or below the average output, the mean output, okay? And that was just a horizontal line across the graph.

For service territory, there are two companies who have service territories that are much bigger than everyone else, and those are Algoma and Hydro One. So if you take the mean service territory and you compute it, everyone will be below the mean except for Algoma and Hydro One.

So that's not a very meaningful sort of measure of kind of the central point for that variable. So we used the median instead. So that is the one place where we use the median, and we've got the median service territory for the industry.

So we've got these two lines, and now the industry is divided into four quadrants. One of those quadrants is actually empty. So only three of the quadrants are populated by firms, distributors, in that quadrant.

And we've got two remaining cost drivers. One is the percentage of lines that are underground, and the other is the share of customers in 2011 that were added in the last ten years.

And there are only four options. If you think again about how each of these variables compare relative to the mean, there are only four options for values that they can take. You can have -- a company could have above-average customer growth only, or it could have above-average undergrounding only, or it could be above average on both, or it could below average on both.

So if you look within these three populated quadrants, which pick up the five cost drivers, and we've got these two other cost drivers out there -- and again, if you want to think about where companies are below, you know, relative to the mean on these variables driving costs, here are the four options.

So we just characterized where companies were on each of these four options in each of the three quadrants. So in other words, every company is going to fall into one of these groups on these two variables, and they're already in one quadrant, so we gave them -- essentially gave them a symbol saying where they were, and here are the four symbols.

And based on that, you've got three quadrants with four different options of these variables, so you've got 12 different groups of distributors, potentially. You can kind of cut down the seven variables into 12 groups of distributors.

And here's kind of what they look like. Here is one way to depict that, and here is another graph. This is the chart that actually appears in the report. Here is another chart which in some way is -- kind of shows you more of the dispersion, but it is not centred around kind of, you know, means for both of these, you know, a zero point.

But anyway, this is the way the data kind of stack up. Here you've got quadrant 2, you've got -- these are companies that are above average in output and also above average, above median, in territory.

There are no companies that are above average in output and below the median in territory. That is the quadrant that is empty. And there are only 11 companies that are above average in output. Everyone else is below average, below the mean.

So these are the companies in quadrants 3 or 4. And they vary depending on whether or not they're above or below the median, in terms of the size of their territory they serve. And then you've got these four other options for each of them.

So we've got 12 different groups, and here are those 12 groups. And one of the criticisms that was made about the OM&A benchmarking study was that some of the peer groups were just too small. Some only had four companies or so.

And it was claimed that if you have a very small number of peer groups, then the average for that peer group is potentially highly sensitive to an outlying observation, which is a good point. I mean, that is a relevant point. And you want to correct for that sort of problem in a peer group-type analysis.

So we made the decision to try to make the peer groups bigger than that, and it is fairly straightforward to consolidate these 12 different companies into six companies where -- or, I mean, 12 different potential groups into six peer groups, where each peer group has at least ten companies in it, ten distributors.

So the first one is -- just to take groups 1 through 4 here, these are the four groups that are above average in output. There are 11 companies there. We just grouped those all together as one group. That becomes peer group A. A couple of these groups already were big enough to stand alone as peer groups. That would be group 12, down here in the corner. That is peer group E, and peer group C, which is the one right above it, group number 8.

And the others were essentially using adjacent groups to -- which are -- the groups that are adjacent, either in columns or rows, are actually similar, you know, they just differ in terms of one of the drivers, but they're common on the other three.

So we grouped those together, like it says on this slide, groups 6 and 7, which are these two in the middle, those were grouped together into peer group B. And group 10 and 11 were grouped together in peer group D.

So these were the six peer groups that we identified, and again, we -- it's kind of driven by trying to identify similarities in business conditions and bringing the groups together so that they're above a critical size, and the critical size here was ten distributors.

MR. HARPER: Larry, just a couple of clarification questions. I guess, they're two different aspects of it. One is that at the end of the day you are -- we're coming up with -- we're using this to come up with unit cost measure, so at the end of the day you're dividing by output to come up with a unit cost to compare a unit cost.

So I guess I was wondering if you could explain why, since we're comparing unit costs, which means you're dividing through by output, it would be necessary to distinguish those who had high output from low output, since at the end of the day the benchmark is dividing through by the level of output.

DR. KAUFMANN: Well, that is a good question, but economies of scale means that unit cost vary with size.

MR. HARPER: So that basically what you're saying is the unit costs aren't linear with size. There is some non-linearity involved.

DR. KAUFMANN: Yes. That's right.

MR. HARPER: Okay. The second thing was, is you mentioned this earlier, about the concern people had about, you know, small numbers and outliers sort of perhaps distorting the result.

I guess the question is, did you look at all when you were combining these groups, in terms of whether, let's say in the case of five and nine, you are pulling one utility into a group which has a number, whether that one utility, it actually has different cost drivers, whether its costs were reasonably similar to the other ones, or it would be an outlier within the newly formed group? And the same thing with the other ones. I guess when you were pulling small group in with a bigger group, whether you were pulling in people who would -- to the extent those people you're pulling in were all outliers, whether they sort of - or - and so you were to some extent creating a sort of problem that you were trying to avoid originally.

I just ask that as a question. I haven't looked at the results.

DR. KAUFMANN: No, no, there's -- I mean, the ones that are grouped together are still similar in most of the drivers. So let's look at five and nine.

MR. HARPER: I guess I was more concerned about, not in the drivers. I was concerned about the results that you get, 'cause we're --

DR. KAUFMANN: Oh, the actual cost --

MR. HARPER: The actual costs, because that was where the -- the concern people had was if somebody with an outlier in costs, it distort -- you know, distorts the actual calculation, and I was worried about, not the drivers, but the actual costs, and whether you are pulling somebody into a group who, when you pull them in there, is going to be -- is demonstrably well above or well below the average of the other group you have defined.

DR. KAUFMANN: No, we didn't focus on the values of the unit costs themselves.

It was designed to kind of group together companies on similarities and the drivers, and not their costs.

MR. HARPER: Okay. But at the end of the day, we're sacrificing some drivers here?

DR. KAUFMANN: Well, I mean, we're putting together -- I mean, for example, 5 only has one company, group 5. I mean, that is not a peer group.

So, you know, we have to make -- there are certain things that you have to do to kind of make these sensible.

And you don't have to make too many -- too much of a sacrifice in terms of the drivers, as you say, to kind of bring -- to get 12 down to six.

MR. SHEPHERD: Larry, I am wondering about the inclusion of Hydro One in group A and Algoma in group C, and whether -- I mean, I understand how you constructed the groups, but I'm wondering whether, since we already know that they're significant outliers on a number of their metrics, whether they will skew the results for everybody else in their groups. And how do deal with that? Have you looked at how to deal with that?

DR. KAUFMANN: That's a good point. It certainly is an issue. You know, I mean, we could -- it's kind of the question. If you only have two companies and you pull them out of the groups they're in and you put them in a group with themselves, I mean, it is possible. But I guess I'm not quite sure...

MR. SHEPHERD: No, I am not asking the question about Algoma and Hydro One. I am asking the question about, for example, Bluewater in the same group with Algoma, which would then be put at a lower standard, in effect, because Algoma skews the standard.

DR. KAUFMANN: Right.

MR. SHEPHERD: Have you looked at ways to deal with that?

DR. KAUFMANN: We haven't looked specifically at that, no. Again, these -- I wanted to put together a peer group, a set of peer groups that were sensible.

I don't consider these peer groups set in stone. I am open to ideas on changing the composition of these peer groups, you know, if there is something that is missed -- I tried to make this transparent and I tried to make it based on some sort of empirical analysis, but it is not perfect. There is never going to be a perfect way to kind of select peers.

So if there's ideas on what to do with Algoma and Hydro One, you know, I am open to those.

MR. SHEPHERD: My follow-up to that is: You talked about having to use median for line length -- or, no, for area.

DR. KAUFMANN: Yes.

MR. SHEPHERD: Because of those two, but you used mean for everything else.

DR. KAUFMANN: Right.

MR. SHEPHERD: Did you test whether you could use median for everything, and whether that would give you a different result that was more intuitive?

DR. KAUFMANN: No. I haven't checked that.

MR. SHEPHERD: Is that something that is worth doing?

DR. KAUFMANN: Possibly.

MR. SHEPHERD: Again, to follow that up, when you are comparing the unit costs, you're comparing them to a mean for the group, right?

DR. KAUFMANN: Yes.

MR. SHEPHERD: Could you compare them to median and solve the problem of outliers?

DR. KAUFMANN: Well...

MR. SHEPHERD: What would that do?

DR. KAUFMANN: That would help, yes. That is a good point.

MS. BRICKENDEN: I think Jay and Larry should tag team a presentation on the 27th and 28th on this.

[Laughter]

MR. SHEPHERD: My head already exploded. Sorry.

MS. BRICKENDEN: No, but I think these ideas, it would be really good to explore them at the stakeholder conference.

DR. KAUFMANN: Mm-hmm.

MS. BRICKENDEN: I don't know if the question was answered because my head exploded too, Jay, so bear with me, folks, if this question was dealt with and I missed it.

One of the questions that Steve had with respect to the peer group benchmarking questions -- number 2, Steve -- whether we tested the peer group results for distributors, are they correlated with the external business condition differences found within each peer group?

Has that been discussed, or is that another thing maybe for the 27th? I just didn't want to miss the question, because I don't understand it. I had to repeat it.

DR. KAUFMANN: I don't understand it either.

MR. FENRICK: We're touching on it right now, but, simply, are the peer group results influenced by the differences, the cost driver differences within the group? Is there a correlation there, and has that been tested?

That's the gist of the question.

MR. ALTOMARE: One of the things that comes to light in looking at that point is that, if you take a look at some of these utilities, they have a huge number of seasonal customers versus year-round customers. We found that over the years there is a different driver for costs for those two groups.

For example, when it becomes warm weather, you get bombarded with requests, because a lot of cases, those cottages are out of power. And there is no way of knowing that they have power unless they go to the cottage.

And also the system, I mean, you're talking about underground a lot, but -- I would have to go back and check our numbers, but does the underground include submarine?

Because a utility like Hydro One -- and there are LDCs on here, as well, that have a fair amount of submarine cable.

And that adds to your cost. Whether those costs are higher or lower, it depends. It depends on the age of the assets.

DR. KAUFMANN: Yes. Well, I mean, that is a -- assuming those data are reported, that is a relatively easy fix, in terms of --

MR. ALTOMARE: Right. And to Jay's point about using median or using average, in the benchmarking world, if you do have outliers you quickly go to a median for the simple reason that you don't want to skew your overall results, so...

DR. KAUFMANN: I think that is potentially a good idea.

MS. BRICKENDEN: Table 24 is kind of large.

DR. KAUFMANN: Table 23, here are the peer groups, which I assume everyone has already looked at.

Table 24, again, table 24, I am not sure how this happened but -- there are problems with these data, with what is reported here, but the idea is that the benchmark unit cost comparison looks at the unit cost average for the distributor relative to the group average, and expresses that in a percentage term.

MR. SHEPHERD: Larry, when you said table 24 was incorrect, it is incorrect in the presentation but it's okay in the report?

DR. KAUFMANN: It is correct -- the numbers that appear in table 25 are correct, and these are the ones that matter, but they are not consistent with the numbers that appear in 24.

So, again, I was having trouble getting -- this table kept fluctuating for reasons I don't understand every time I looked at it, and we had it right and then somehow it went wrong in the final version.

MR. SHEPHERD: So in the report, it is also incorrect?

DR. KAUFMANN: Yes.

MR. SHEPHERD: And have you given us a new one?

DR. KAUFMANN: Not yet.

MR. SHEPHERD: You are going to --

DR. KAUFMANN: We will. We will correct it.

MR. SHEPHERD: Thanks.

MR. FENRICK: Larry, this might be a good time to get a follow-on with my question 2 so that we have this up here.

Take group D for an example, and distributor 5, which was brought up earlier. They're actually above the group average.

Is that being caused essentially because there's lost information that the econometric model is picking up, but that the peer group approach is kind of missing, in a way?

Could that be a cause of distributor 5 having costs above its group average, even though it is number one in cost efficiency?

DR. KAUFMANN: I wouldn't say that, because again, you know, there are some issues with the -- there's still some issues with data we want to explore. So I don't want to draw any conclusions on any particular company right now.

MR. FENRICK: Okay.

DR. KAUFMANN: Any other questions on table 24?

MR. HARPER: Would it be your recommendation, as well, Larry, that, in terms of this process, one uses a three-year average going forward, when doing the peer group sort of average weighting and analysis each year going forward?

DR. KAUFMANN: I think three years is -- you know, kind of strikes a good balance between being current and reflecting the fact that costs will fluctuate a bit from year to year. Whenever you look at efficiency, you want to look at a multi-year period.

MR. HARPER: No, I -- and I can see the merits in using an average, because things do move around. I was just thinking one of the other things utilities were struggling with, I heard today and earlier about: What do I have to do to change my -- where I am?

Obviously, using a three-year average means to change where I am takes a lot longer, as well. I have to do more, sort of thing. That is the only thing that struck me.

DR. KAUFMANN: We are making record time. I can't believe this. We are almost done. I thought this was going to take all afternoon.

Well, here are the unit cost evaluations, and again, this is -- this is taking the numbers, the numbers, the correct numbers, which are not the numbers that actually appear in 24, but the numbers that appeared in the correct version of 24, and ranking them from 1 to 73 in terms of difference, how far below you are of the -- relative to the group average, unit cost group average, for your peer group, and divided that up into quintiles.

Obviously there's the quintiles themselves -- they go 15, 14, 15, 14, 15. So that is kind of how I drew the lines there, because, you know, it is not a perfect quintile for two of those. So, and that is kind of how they stack up on this benchmark.

And then both the benchmarking assessments, I recommend that both of those be used to establish the efficiency cohorts and to set the stretch factors that apply to companies.

Now, compared to third generation, I am recommending that there be five efficiency cohorts, the main reason being that when you increase the number of cohorts and you have fewer kind of companies that you have to move beyond to get to the next cohort, it is easier to move from one cohort to another. And I think we want to create incentives for companies to actually cut costs and to benefit from doing that.

So five efficiency cohorts, we'll tend to encourage that. I have discussed this, but I think there is value with both the econometric benchmarking model and the unit cost benchmarking model. So I am recommending that both be used. And a slight change in the range of the stretch factors, and the kind of -- and the centre point for the stretch factors.

Right now the stretch factor values are .2, .4, and .6. My recommendation is that when we go to five cohorts, the top stretch factor remain .6, the bottom stretch factor be reduced to zero, the median stretch -- or the mean and the median stretch factor be reduced from .4 to .3, and that there be, for cohorts 2 and 4, that those be .15 and .45 respectively.

And the reason for that is that the reduction in the average value for the stretch factor is designed to reflect the fact that on average you would think it becomes more difficult to achieve incremental efficiency gains as you go forward in time.

So if that is true, you would think kind of the mean value for the stretch factor should decline -- tend to decline over time. So that is why I have recommended to go from .4 to 0.3.

I think zero is the lower bound for what a stretch factor should be. I -- we have talked about this too. I do not recommend or support negative stretch factors, but I think zero can be an appropriate stretch factor for companies that are already highly efficient.

And .6 was the maximum stretch factor last time. I think, you know, to me it is reasonable to keep that there, as opposed to raising that, unless we have some good reason to think that the least efficient companies have more opportunity to achieve higher incremental gains this time than in third generation.

MR. SHEPHERD: You're still using the cohort approach. And going to five helps, but is it possible to combine the econometric measure and the unit price measure so that you had basically an analogue approach, so you go from zero to 60, but you can move up or down on the whole list, on the list of 73.

Is that possible to do? Mathematically, is it possible?

DR. KAUFMANN: I am not sure. I'm not sure exactly what you are suggesting. You're talking about kind of combining the two in a way so that each company has its own individual sort of average?

MR. SHEPHERD: So everybody has basically a rating between zero and 60.

DR. KAUFMANN: Okay. And everybody's stretch factor -

MR. SHEPHERD: And so you could move up or down, and so you don't have to jump a quintile to --

MS. SCOTT: Each company would have --

MR. SHEPHERD: Actually, you don't have to improve both econometrically and in unit cost to move up or down.

DR. KAUFMANN: That is an interesting idea. I mean, that would be complicated.

MR. SHEPHERD: But it is possible?

DR. KAUFMANN: Something like that is possible, yes.

MR. SHEPHERD: Possible.

MR. HARPER: To some extent the simplistic edge, you can rank -- you have ranked your utilities 1 to 73 on unit cost. You can rank them 1 to 73 on your econometric model as well, just in terms of how much they vary.

DR. KAUFMANN: Sure, yes.

MR. HARPER: And you can then decide how much weight you want to give to each of the rankings and come up with a ranking for each utility. I don't know how that works, but that is --

DR. KAUFMANN: You could do something like that, yes.

MR. HARPER: -- at its most simplistic level.

DR. KAUFMANN: Right. You could do, you know, if you wanted to, say, put 60 percent, if you wanted to do just a 1 through 73 rank like that, and you wanted to, say, put 60 percent of the weight on the econometric ranking and 40 percent on the unit cost, you could do that, and you could come up with just ranking, 1 to 73.

MR. HARPER: We could have great debates on what the weightings should be, but that is for another day.

DR. KAUFMANN: That's right. You could do that too.

MS. BRICKENDEN: Another heading for topics on our -- at our stakeholder conference, the approach to assigning stretch factors.

MR. FENRICK: Larry, in the cohort rankings, just a clarification. Are you using the full econometric model results for that, or the restricted between Hydro and Hydro One?

DR. KAUFMANN: Restricted.

MR. FENRICK: Restricted? Okay. And then how does Toronto Hydro and Hydro One get put into the cohorts, just --

DR. KAUFMANN: Well, there is the unit cost. They are in a -- there are peer groups, there is the unit cost, and they can be benchmarked -- even though they're not in the sample, they can be benchmarked out of sample econometrically.

MR. FENRICK: Is that what is being done?

DR. KAUFMANN: Yes.

MR. FENRICK: Okay. You're using the restricted model, but then it is an auto sample prediction for those two utilities?

DR. KAUFMANN: For the econometric prediction for those two, yes, and, you know, obviously the unit cost is still -- you know, that is based on their unit cost --

MR. FENRICK: It's the same, right. Okay.

DR. KAUFMANN: -- within the peer group.

MR. FENRICK: Thank you.

DR. KAUFMANN: Okay. And slide 44 actually shows the -- my recommendations for the stretch factors. And this is a modification of what's being done in third generation. It is not that different from what I proposed the first time in third generation, where I actually proposed five cohorts and stretch factors that went from zero to .6.

The rationale for being in one cohort versus another is a little different than what I proposed then, but that approach was considered too complicated for third-generation IR, so the staff asked me to simplify it, and we did, and that is ultimately what was approved.

But there has been a desire to kind of increase the number of cohorts and create stronger incentives to migrate from one cohort to another.

So it is not like I am going back to what I did in third generation. It is just, I mean, I do think that it makes more sense, and it kind of fits the needs of this consultation, compared to third generation.

So I just have two wrap-up slides, and then maybe we can deal with any final questions, including any that I haven't dealt with in the submitted questions.

But just to kind of step back and think about where we are right now with generation -- the third-generation IR and where we're moving to with fourth-generation IR, and this is just obviously one component of the overall framework. This is not the whole thing.

But if you look at what was done with third generation for the inflation factor, the productivity factor, and the stretch factor, in a sense, all three of those elements were kind of reflected information or studies that were done outside of third-generation IR or information.

The inflation factor was just an aggregate inflation number, the aggregate inflation in Canada. The productivity factor was based on a proxy study that PEG had done for the U.S., so that was kind of imported from the U.S.

And the stretch factor was based on a study that PEG was doing for -- on OM&A benchmarking, but it was not explicitly designed for regulation, but it was there, and there was an interest in benchmarking, and, you know, we thought it made sense.

This time we've kind of made the whole focus -- well, the Board certainly wants to make fourth generation much more Ontario-centric, use Ontario data to set the inflation factor, productivity factor, and stretch factor, and to make it more comprehensive.

So that is what we've done. I mean, within this consultation we've developed information that's specific to the industry for the inflation factor, so we have an industry -- a price index, which should reflect input price trends for the industry much more closely than the GDP IPI.

We have a TFP trend that has been estimated for the Ontario distributors, and based on that we recommend a productivity factor of zero.

And the benchmarking analysis has been moved from OM&A benchmarking to total cost benchmarking.

So just as kind of an overview, I mean, that is -- this is the direction the Board wanted to go for incentive ratemaking, and this is the analysis that we have provided to kind of -- to set the empirical parameters of this incentive ratemaking approach.

And in conclusion, I believe that our recommendations here are consistent with the Board's policy direction, and that was important to us. We wanted to be -- we wanted our recommendations to reflect what the Board's direction was in the RRF report.

I think an Ontario-specific inflation factor is possible. Volatility is never going to go away; there is always going to be more volatility in an industry-specific inflation measure than an economy-wide inflation measure, but I do think it can be mitigated in a relatively straightforward way.

The productivity factor is low. Zero is about as low an approved productivity factor as you will find in incentive regulation plans, but I think it is reasonable here, given the environment and the slow growth in output quantity in particular, which is probably going to continue.

But the benchmarking -- and again, this is subject -- this conclusion is subject to revision after we change the data, but based on the work we've done so far, the benchmarking suggests that there are distributors out there who can still achieve significant efficiency gains through cost cutting. Both the unit cost and the econometric benchmarking certainly show that there's very significant differences in unit cost here, and those differences can't be entirely explained by differences in business conditions.

So there does seem to be a potential to achieve efficiency gains, and we have changed our recommendations for the stretch factor and the cohorts to increase incentives for companies to pursue those gains.

So that is a big picture overview of what we tried to do and our recommendations.

Any other questions? Anything I didn't get to in the submitted questions?

MR. FENRICK: Yes. This is Steve Fenrick. I just have just a few. I think we have covered quite a number of these, and pardon me if I maybe took bad notes and missed a couple here.

Kind of going back on to the econometric benchmarking model, you mentioned earlier in the presentation that you levellized the OM&A input price. So it varies according to distributor; I think you mentioned Toronto, for instance, has higher wage levels and so it gets a different input price.

Is it correct that you did not levellized the capital input price?

DR. KAUFMANN: I am glad you mentioned that.

What we actually levellized was the entire OM&A price, so it wasn't just the labour price component of OM&A. We actually took the levellization factors that we applied -- by "levellization" we're just talking about differences in price levels -- and we took -- at various cities and distributors in Ontario, but we took levellization factors that we applied for OM&A and we applied that to the entire -- I mean, yes, for the OM&A benchmarking, we applied that not just to the labour component of the OM&A price, but to the entire component.

So it is true that we did not adjust and we did not levellize the capital prices, because we didn't have information on differences in capital prices.

But this is -- about 11 percent of total costs are non-labour OM&A, and we are upping those to reflect differences in the labour prices.

So implicitly I think we are picking up any changes in prices that are paid for construction labour that are reflected in capital costs. That is being reflected in what we're applying to the OM&A levellization factor.

MR. FENRICK: That is helpful. So you essentially are levellizing the whole OM&A budget.

DR. KAUFMANN: Right. Yes.

MR. FENRICK: Then leaving the capital not levellized?

DR. KAUFMANN: Yes, because we really don't have the information that we need either on the share of costs that are related to construction. We don't have that company by company, and we just don't have enough labour data in particular.

But we don't have that and we don't have enough construction costs differentials across Ontario either to do an explicit levellization of the labour price for capital, the labour price within capital.

MR. FENRICK: Did you explore any ways to levellize that? The RS means, for instance?

DR. KAUFMANN: No, because, again, we need to go beyond that. We need data within Ontario.

MR. FENRICK: Okay. For the record, that does have 20 Ontario cities, but I understand your point. That is helpful, that the whole OM&A...

I move now to the next question. This might partially be explained once the data is corrected and new models come out. I kind of suspect that that might be your answer, which is more than valid.

But from CLD's perspective, there appears to be some sort of a bias against the large distributors, where, you know, those utilities with 100,000 customers and above kind of have an average econometric score of 13 percent above cost.

We're just kind of wondering why that is. Could you help us kind of explain why the results tend to show that?

DR. KAUFMANN: I think that is a stakeholder conference issue, but I would just say that "bias" is a loaded term. We want to be very -- that obviously has a specific meaning in statistics and econometrics. So I think we should be careful before we start throwing around terms like "bias."

MR. FENRICK: Can we take out the word "bias" and insert that the average score appears to be 13 percent above, and the --

DR. KAUFMANN: Well, again, that's --

MR. FENRICK: -- and should the model be correcting for that somehow, or...

DR. KAUFMANN: I think this is a stakeholder conference issue.

MR. SHEPHERD: Could I ask a follow-up question on that? Did you test for a business condition that relates to an urban environment?

DR. KAUFMANN: Yes, we did. We used -- well, to some extent, percent underground reflects urbanization. To some extent.

But we had more explicit urbanization variables. We had the percent -- what is it? The percent of urban territory -- or, no, the percent of the urban population over municipal territory? How does that work?

Basically, we had -- there were data that are reported on the PBR parts of the Triple R for urban population that divide up the population, the customer base, between urban and rural and the territory between urban and rural. We took the urban portion of the territory, divided it by -- and we -- the urban portion of the customers divided by the urban portion of the territory, and we got kind of an urbanization measure.

And we used that, and that was significant in a number of variables, or in a number of runs, but in our final run it dropped out. You know, in the run that we eventually went to.

MR. SHEPHERD: Thanks.

DR. KAUFMANN: We did test for that.

MS. DeJULIO: This is Gia DeJulio with Enersource.

How do you define what is urban population?

DR. KAUFMANN: It is what the distributors report on the Triple Rs.

MS. DeJULIO: And which they're no longer reporting --

MR. FENRICK: Those runs for the percent urban, did it have a positive coefficient when it did come in?

DR. KAUFMANN: I don't remember. I think so.

MR. FENRICK: Okay.

MS. BRICKENDEN: Are there any other, Steve?

MR. FENRICK: My only other one, we just -- we did touch on it a little bit. The contributions in aid of construction, and including those costs into the benchmarking.

Was there any other exploration of variables -- that these costs may be out -- partially, at least, out of the control of the distributors? Any kind of exploration on variables? Or was there kind of consideration that these kind of all are costs that are primarily out of the control of distributors, and should they be included in the benchmarking?

DR. KAUFMANN: Well, I definitely think they should be included because, you know, just to take an extreme hypothetical example, I mean, if you had a company that had 100 percent of its capital that was financed by CIAC, there wouldn't be any rate base, and they would look extremely good on, you know, an econometric evaluation of their costs.

Now, obviously that is an extreme example, but as companies finance more and more stuff outside of the cost base, and if you are not capturing that, that's -- you want to capture that. What matters is the capital you have and not how it is financed.

So I definitely think it should be in there.

Whether it is beyond the control of them, I don't even know that that matters. I mean, does that... you know, I mean, is there a cost consequence associated with the fact that you have more CIAC as opposed to rate base?

It seems to me that how it is being financed really doesn't have any impact on the costs of installing assets; that has to do with the customers, where they are, et cetera, all those fundamental drivers of costs, and not whether it is a developer paying for it or it is in rate base.

MR. SHEPHERD: Let me follow up with a broader question, because that was just dealing with contributions in aid of construction.

But the concept that you used, you didn't look at whether specific costs -- tell me if this is correct -- you didn't look at whether specific costs were under the control of management. You looked at whether business variables were under control. The costs are the costs.

DR. KAUFMANN: Correct.

MR. SHEPHERD: Okay. Is there an option of going to which costs are under control and which costs are not? Is that a valid way of looking at these comparisons?

DR. KAUFMANN: Well, we did that to some extent. We did take out the high-voltage transformation, for example. So, I mean, that is one very obvious hunk of costs that would impact the evaluations that we -- you know, which are beyond the control of the company, is they have inherited these assets or they haven't.

So, you know, we did control for that. I mean, beyond that I don't know. If -- if there are big, significant, explicit items like that that are going to have a material impact, then a case could be made for removing them.

MR. SHEPHERD: Thanks.

MS. BRICKENDEN: Adonis?

DR. YATCHEW: Larry, could I just ask you to back up one slide, please. Thank you.

So in third-generation IRM, we base the productivity factor on this .72 percent, which was itself a long-term average of productivity growth at 69 or so U.S. utilities, and now we have moved to Ontario data.

I am wondering whether you have looked at what has happened to the productivity in U.S. LDCs since that study, which I think went through to year 2006.

DR. KAUFMANN: That's correct. We have done some work on that. It is not zero. It's --

DR. YATCHEW: Is it positive, is it negative?

DR. KAUFMANN: It is positive. It's not negative. I don't have a precise number for you right now, but we have been doing some things.

DR. YATCHEW: Okay.

DR. KAUFMANN: And I think some of that work is actually underway as we speak. So I don't want to say anything prematurely.

DR. YATCHEW: Thank you.

MS. BRICKENDEN: Are there any further questions in the room?

I have a general question. It is not a question maybe that Larry need answer, that came in across the wire here, and I think we -- I think we had this at the webinar too, and the question is with respect to the IFRS issue, and it is a general question: Will going to total cost benchmarking eliminate any impact that IFRS might have had on stretch factor assignments, cohort assignments, under the partial cost benchmarking?

And the answer we have been discussing and giving is the expectation is, yes, that we are assuming that total cost benchmarking should somewhat -- since we're going total costs and no longer benchmarking just partial, that there should not be a specific impact, but I defer to other experts in the room.

MR. SHEPHERD: Sorry, do you have an explanation for why that is?

MS. BRICKENDEN: Going to total cost.

MR. SHEPHERD: I know why you're going to total cost. Why it means there is no IFRS impacts?

MS. BRICKENDEN: Because now you are basing your analyses on capital and OM&A. It doesn't matter which bucket it is in.

MR. SHEPHERD: It doesn't change your depreciation rates, though. Your depreciation rates still change with IFRS, so -- well, mostly.

MR. HARPER: You know, maybe the more clearer thing is, is while over the long period of time you end up paying it through a capital charge or OM&A charge and so total costs over 50 years, it won't make any difference if your assets last 50 years. Over a very short period of time, the fact that if it is OM&A I pay for it all in one year, if it's capitalized I pay for it over 50 years, means that going to total may help address the issue, but I don't think it -- personally, I don't think it totally eliminates the issue. It may -- it would be moderated minorly, but it won't eliminate it, in my view.

MR. SHEPHERD: In the context of today's discussion, has anybody done any empirical analysis of this? I mean, it is something you could do, right? You could look and see -- we have the applications now for most people. We see what the impacts are. Presumably you could determine on average what their impact is, in terms of benchmarking? Is that something worth doing?

DR. KAUFMANN: I mean, I think it would be worth doing. It would be probably outside the scope of this, because it's -- I would think that would be, not a huge assignment, but it would take a certain amount of time.

MR. SHEPHERD: Understood. Okay. Thanks.

MR. FENRICK: Larry, I have one more question. We've brought this up earlier about the, kind of the embedded distributors, and then, you know, that their costs are being added back in for kind of the host distributors' costs, and then those assets from the host distributor are not in and the cost drivers are not being analogously put into the explanatory variables.

Would a variable of how kind of the kW embedded, for instance, make sense to kind of correct for how embedded a distributor is, and that some of those assets are being missed in the explanatory variables?

DR. KAUFMANN: We did look at kilowatt-hour deliveries to embedded distributors. That was one of the variables that I recall that we explored.

I don't think there is information on -- I could be wrong -- on kilowatts, the demand of embedded distributors.

MR. FENRICK: So you did try the kilowatt-hours?

DR. KAUFMANN: Yes. And that wasn't significant.

Nothing else?

MS. BRICKENDEN: No further questions? I see nothing coming across the wire neither. So if there aren't any further technical questions or general questions -- I see Phil waving goodbye -- we can wrap up for the day.

I want to thank you for all of your questions, and note that the next key step for this process will be the stakeholder conference, coming up on the 27th and 28th.

There will be some to-dos, as we discussed today, between now and then. I think Larry indicated he would like to take a look at the LD data issue that has been put into the model and reproduce some results with corrected data, and also table 24.

I won't hold you to it, but we will say that you were hoping to get this done next week, correct?

DR. KAUFMANN: I am hoping to, yes.

MS. BRICKENDEN: Also, we would appreciate -- looking forward to the worksheet mapping that might help us track what data is being used and what sheet and how it sums up for the costs going into the models.

DR. KAUFMANN: Yes.

MS. BRICKENDEN: Is there anything else that I have missed? I am looking to the room.

MR. FENRICK: Lisa, just the -- I think it was mentioned, the -- instead of using the average KM of lines, kind of using a more recent measure of KM of line?

MS. BRICKENDEN: That is a model change.

MR. FENRICK: It is.

MS. BRICKENDEN: Let's think about that. Good for having questions for clarification, but I am a little reluctant to go with change specifications at this late time.

MR. TUCCI: Can you just check to see if there is some changes there going on between the current data and the other one that are noticeably different, just to see if there is something dramatically changed between what they reported before and what they're reporting now?

DR. KAUFMANN: So just look at the -- I mean, that could be simple enough. You could just take the 2011 value minus the mean value, relative to the mean value.

MR. TUCCI: Yes.

DR. KAUFMANN: Yes, we can do that.

MR. HARPER: Are both those values in the spreadsheets that you have distributed?

DR. KAUFMANN: Yes.

MR. HARPER: Larry, is that something that -- I mean, that's something that, I mean, once we get the mapping and we know what the definitions of these pieces in the spreadsheet are --

DR. KAUFMANN: Yes.

MR. HARPER: -- we could even look at it, because that seems to be something that's --

DR. KAUFMANN: No, that's -- I would certainly think that all that data is in the spreadsheets.

MR. HARPER: It is.

DR. KAUFMANN: Yes.

MR. HARPER: So I think maybe the mapping would help.

DR. KAUFMANN: Yes.

MR. HARPER: -- be able to identify where that is if one wanted to look at it too. Okay.

DR. KAUFMANN: Okay.

MS. BRICKENDEN: This just illustrates how we had such a good set of questions, not only for clarification, but I've also identified topics that I think we need to explore in more detail on the 27th, and I look forward to that and hearing from you then. Thank you very much.

--- Whereupon the hearing adjourned at 2:40 p.m.