BRITISH COLUMBIA UTILITIES COMMISSION

IN THE MATTER OF THE UTILITIES COMMISSION ACT
R.S.B.C. 1996, CHAPTER 473

and

British Columbia Hydro and Power Authority
2020 Transfer Pricing Agreement Application

Vancouver, B.C.
September 22nd, 2020

WORKSHOP

BEFORE:

R.I. Mason,	**Panel Chair**
E.B. Lockhart,	**Commissioner**
T.A. Loski,	**Commissioner**

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(PROCEEDINGS COMMENCED AT 9:00 A.M.)

MR. SANDVE: So we'll get started. Thanks everyone for making the time and welcome to today's workshop. Welcome to Commissioners, BCUC Staff, intervenor (inaudible) today is on the 2020 Transfer Pricing Agreement filed by BC Hydro with the BCUC.

My name is Chris Sandve and I am a senior manager with regulatory and rates group at BC Hydro. With me today to present today's workshop are Heather Matthews, director of generation system operations with BC Hydro; Mike MacDougall, vice president trade policy and information technology with Powerex; and Mark Holman, managing director with Powerex.

Also with us in the room today are external legal counsel Jeff Christian, Dan O'Hearn, director of trading with Powerex, and Chris Boltwood with the Financial (inaudible) at BC Hydro.

Also observing by Webex today are David Wong, executive Vice President finance technology and supply chain at BC Hydro; Ryan Layton, Chief Accounting officer at BC Hydro; and Fred James, chief regulatory officer at BC Hydro.

PRESENTATION BY MR. SANDVE:

The 2020 transfer pricing agreement

replaces the 2003 transfer pricing agreement, and BC Hydro filed the 2020 transfer pricing agreement with the BCUC under section 71 of the *Utilities Commission Act* on May 29th, 2020.

On July 30th, 2020, by BCUC order number G-204-20, the panel set out the next steps in the process, including this workshop, and identified an initial list of topics. Today's workshop will be transcribed, and the materials that we present will form part of the record. The intent of the workshop today is to help build understanding and bring meaning to the application. We will provide some background information today, especially with regard to Powerex and the markets in which it operates. And in the time we have today we will focus on those questions that the panel identified that are most appropriate for our workshop format in that order. We will answer as many of the initial questions as we can in the time provided, as well as any clarifying questions that may come up as we go along.

A couple of things I want to say off the top in terms of our approach to this workshop. First of all, in order to make things productive and to lend it to a workshop format, we may be generalizing at times, and so I want to make it clear that in terms of the record and what we say in the workshop that we may

want to clarify things later on in information requests, and the written information request responses should always prevail when comparing today's workshop transcript and the written information request responses.

We do expect that there may be questions that are more appropriately addressed through written responses today, and in those cases we will ask you to submit those questions through written information requests.

It is also important to note that myself and the other presenters have not prepared today in the way that we would for a typical oral hearing, so again there may be questions that come up during information requests where we have a chance to clarify or add further details. And in the case of any discrepancies between today's workshop and those written answers, you should defer to the written answers and not the transcript from today's workshop.

Sorry, just get a second here to get the slides working. There we go.

Proceeding Time 9:03 a.m. T2

So just to go over some technical details before we dive in, during the workshop if you can please leave your video off and your line muted and that way Webex will just run as smoothly as possible.

I'll review the agenda for today's workshop in a moment and what we'd like to do today, in terms of how we're going to run things, is at the end of each item on the agenda we'll stop and have time for questions at the end of each section. To ask a question at the end of each section, please use the "raise your hand" function in Webex. If you're not familiar with that function, you can see down at the bottom there a visual of how to do that and your line will be unmuted by the host when you put your hand up.

After a question is asked myself and the other presenters may mute our line temporarily to have a brief discussion amongst ourselves before answering. And then the last note I wanted to make here is please avoid using the chat function, if you can, for asking questions and use audio instead. As you can see, myself and the other presenters don't have laptops in front of us here for the chat functions so we're not following the chat function at all.

So, with that, for today's agenda, after we get through the introduction part here I'm going to start with a section on key concepts. This is mostly just on foundational background information that you may already know from reading the application but we thought it's important to review off the top because it will help frame some of the more detailed

information that we provide further on during the day. Then I'm going to turn over to Mike who's going to provide an overview of Powerex's business and regulatory context. And then Mark is going to provide a Powerex market overview. Then Heather is going to take over and first walk through the challenges that we encountered with the 2003 transfer pricing agreement and then go into details around the terms of the transfer pricing agreement, the 2020 transfer pricing agreement. And then we'll wrap up with a presentation from Mark on Powerex perspective on the 2020 TPA.

So, as I mentioned, I wanted to start today by reviewing some of the key concepts that I think are helpful in understanding what the 2020 TPA actually does and how it fits into the bigger picture. I'm going to review five key things this morning. First, what's the same between the 2020 TPA and the 2003 TPA. Second, what's different and why we believe (audio drop) better for customers. Third, how the 2020 TPA and the activities of Powerex impact BC Hydro's revenue requirement. Fourth, BC Hydro's organizational structure and how information is communicated between BC Hydro and Powerex. And fifth, the relationship between BC Hydro and Powerex.

So starting with what's the same. There's

a few key things I want to emphasize. First, the 2020 TPA does not change the roles and responsibilities between BC Hydro and Powerex or within BC Hydro and Powerex. And specifically

Proceeding Time 9:06 a.m. T03

And specifically what's important to remember when comparing the two agreements is that BC Hydro remains responsible, as it always has been, for the physical operation of the system, for meeting domestic requirements first, for determining whether there is a surplus or deficit and to what extent there is a surplus or deficit, and for determining how much residual system capability, that's the flexibility of the system for (audio drops) activity after any deficit or surplus is met, is available for that trade activity.

Second in terms of what's the same, the 2020 TPA does not impact the revenue that ratepayers receive or the cost that ratepayers pay. Ratepayers continue to receive surplus sales revenue, they continue to receive trade income and they continue to pay the costs of electricity imports to meet deficits.

And third, the 2020 TPA, like the 2003 TPA, is an enabling agreement. What this means is that we are seeking BCUC acceptance of an agreement that will enable transactions between BC Hydro and Powerex to

take place.

And to use an example of what this means, one of the questions the Commission panel identified, and which Heather is going to speak to later in more detail, is the wear and tear procedure and whether it's anticipated that any of the transactions or settlements under this agreement would be subject to the Commission's advanced review and approval. And so as an enabling agreement, the 2020 TPA like the 2003 TPA does not set out actual transactions, and we are not seeking BCUC acceptance of actual transactions. We are seeking acceptance of the agreement that enables those transactions to occur.

Fourth thing that is the same between the 2003 TPA and the 2020 TPA is the TPA is an operating tool and not a planning resource. So what does that mean? We often refer to what we call the operating time horizon and the planning time horizon. Our planning time horizon is where we look out 20 years. Through the IRP we look at what we expect the load to be, what our existing and committed resources can provide and what resources we need to build or acquire to fill in the identified gap.

Our operating time horizon is our current fiscal year, plus the next two fiscal years. And that's where our supply of resources, or resource

stack becomes fixed. And now we have to make sure we have enough supply to meet demand, taking into account variability in load, variability on the system, weather conditions, et cetera.

Another item that the panel identified that would be helpful to answer at this point is how transactions under the TPA are considered by BC Hydro from both an operational perspective and from a planning prospective. So Heather will speak to the operational perspective in more detail later, but from a planning perspective the answer is simple. The TPA has no impact from a planning perspective. It's considered in the operating time horizon only, it does not have an effect on our long-term load resource balance, and it's not a resource that we use to meet load requirements. Rather, it's an agreement that enables BC Hydro to acquire electricity cost-effectively, and use its resources in the operating time horizon regardless of any planning horizon decisions that may have been made and the degree to which those decisions affect how long or short BC Hydro is.

So now understanding what's the same, what's different? Well, what the 2003 TPA did and what the 2020 TPA continues to do, is both set out a mechanism for recording the price of electricity

transfers associated with BC Hydro's energy surplus or deficit, as well as with the residual system capability. That's the flexibility that's left over after meeting any deficit or exporting any surplus.

Proceeding Time 9:10 a.m. T4

Under both agreements the sale price reflects the fair market value at which parties acting on an arm's length basis would be willing to transact. The reason that this is done is to ensure that Powerex's net income represents the value added from Powerex's trade activity and is not conflated with the market value of any surplus or deficit energy in the BC Hydro system.

What's different through between the two agreements is how this is achieved. So under the 2003 TPA BC Hydro could set either a threshold sale price or a threshold purchase price. These threshold prices were then used to allocate transactions one-day-at-a-time to either BC Hydro for the purpose of exporting surplus energy or importing energy to meet a deficit or Powerex for the purpose of making offsetting purchases and sales in different time periods using that residual system capability. Under this one (inaudible) time allocation and transfer pricing approach, the only way that BC Hydro could indicate a need to purchase or sell energy was to set a threshold

purchase price or set a threshold sale price and Powerex would not know until one-day-at-a-time whether, on the basis of the threshold purchase price or the threshold sale price, the net import or net export for that day had been allocated to BC Hydro or allocated to Powerex. And by extension would not know the price that would be paid for that net export or net import and whether it would be the daily Mid-C price or the weighted average price of what was already recorded in the trade account.

As Heather will explain later on, this transfer price risk with regard to transactions using the BC Hydro system became an issue with regards to the forward market. In other words, the one-day-at-a-time allocation and transfer pricing approach was built around the day ahead market but it created transfer price risk with regards to transactions using the BC Hydro system in the forward market. And that became an issue over time due to declining liquidity in the Mid-C market, increased potential for variability in the BC Hydro system and opportunities for premium value in the forward markets.

So how is the 2020 TPA different? First, it takes an annual pricing approach to valuing BC Hydro's surplus or deficit. This removes the one-day-at-a-time transfer price risk that discouraged Powerex

from committing to forward transactions using the BC Hydro system. Second, BC Hydro can now submit a specified quantity request to Powerex, allowing Powerex to go out and acquire or sell that energy over time across all markets instead of relying on one-day-at-a-time threshold price signals. And Heather will speak to both of these concepts in further detail later in the workshop.

The next key concept I want to review is with regards to BC Hydro's revenue requirements, and the Panel identified some questions related to the TPA in BC Hydro's revenue requirements. One was how and which decisions made by Powerex impact BC Hydro's ratepayers, both directly and indirectly. And another was the reason for the change in classification of electricity transactions and whether this change was a result of IFRS guidelines.

So to start I want to take a look at how transactions under the TPA and decisions by Powerex more broadly impact BC Hydro's revenue requirement. First, we have BC Hydro's cost of energy and that is forecast through our monthly energy studies. Purchases of electricity and thermal generation from Powerex by BC Hydro are a cost and referred to as system imports. Sales of electricity to Powerex by BC Hydro generate revenue that offsets BC Hydro's cost of

energy and those are referred to as system exports. Forecasts of system imports and system exports are developed through the energy study and the difference between the forecast and the actual system import and system exports is deferred to the non-Heritage deferral account for future recovery from or refund to ratepayers.

System imports and system exports were previously referred to as market electricity purchases, surplus sales and net purchases or net sales to or from Powerex. Net purchases or sales to or from Powerex was the net amount owing to or from BC Hydro from Powerex trade activity using the residual system capability.

Proceeding Time 9:15 a.m. T05

The change in these categories simply reflects how transactions are classified now under the 2020 TPA. Under the 2020 TPA, all sales of electricity to Powerex by BC Hydro are classified as system exports, and all purchases of electricity and thermal generation from Powerex by BC Hydro are classified as system imports.

As Heather will explain in more detail later, an annual adjustment for the value of BC Hydro's surplus or deficit is made once per year, removing the transfer price risk associated with the

2003 TPAs one-day-at-a-time approach to allocating transactions. In other words, this change in presentation reflects the 2020 TPA and was not driven by IFRS reporting standards.

Second, in terms of BC Hydro's revenue requirement, we have trade income. And trade income consists both of trade activity using the BC Hydro system as well as activities that are completely unrelated to the BC Hydro system. And the transfer pricing agreement it's important to remember, only deals with transactions related to the BC Hydro system.

Trade income offsets BC Hydro's revenue requirements and is forecast using a rolling five-year average of the previous five years. The difference between forecast trade income and actual trade income is deferred to the trade income deferral account for future recovery from, or refund to ratepayers.

Powerex generates net income from transactions related to the BC Hydro system in two ways. First, by using its transmission rights and market access and knowledge they purchase or sell electricity at more attractive prices than the price paid to or received from BC Hydro.

And second, using the residual system capability, Powerex can make offsetting purchases and

sales in different time periods. For example, buying during periods with relatively lower prices and selling during periods with relatively higher prices.

That activity I just referred to, the activity of buying, for example, in relatively lower price periods, selling in relatively higher price periods, is different from the net amount owing to or from BC Hydro captured under either system imports or system exports. This is the incremental difference over and above that amount that Powerex is able to capture by buying and selling in those different time periods.

As I mentioned, Powerex also generates an income through trade activity completely unrelated to the BC Hydro system. Powerex is active in electricity markets, natural gas markets and environmental products. An example of electricity trade unrelated to the BC Hydro system would be Powerex purchasing energy in the Pacific Northwest and then using its transmission rights and access to sell that energy into California markets. A transaction like this, as you can tell, takes place completely separately from the BC Hydro system.

So now to move on to some other items that the panel identified. I will walk through BC Hydro's organizational structure while providing some details

on the various departments and how they share information with Powerex.

Some of you may be familiar with our plan, build, operate, support organizational structure at BC Hydro. On the plan side, we have our integrated planning business group, which reports to the senior vice president of integrated planning, Maureen Daschuk. And on the operate side, we have our operations business group, which reports to the executive vice president of operations Charlotte Mitha. The integrated planning business group plans the power system, while the operations business group operates the power system.

Within the integrated planning business group we have the energy planning business group we have the energy planning and analytics key business group. This key business unit is responsible for developing the integrated resource plan, the IRP. Within the operations business group is Heather's key business unit, the generation system operations key business unit. Heather's group is responsible for looking out over the next hour, the next day, week, month, year, throughout the operating time horizon, and making sure that we're generating enough energy to meet demand at any given time.

Heather's team is in constant and ongoing

communication with Powerex, and I will provide some details on specific ways that the generation system operations key business unit and Powerex communicate by walking through some of the departments and teams within Heather's group.

First we have the system optimization department. That's the department that is responsible for the energy studies, which is a high level forecast of various parameters such as reservoir levels, what imports and exports might be, as well as price signals for our big basins, the Peace and the Columbia.

Proceeding Time 9:20 a.m. T6

Next, we have our operations planning department. This includes two teams, which I'll talk about in more detail. The Next Day Planning Office, which is responsible for coordinating the operating plans for the system as well as the market activities of Powerex traders and scheduling generation for the next day. They're also responsible for assessing and approving short-term outage requests from generation and coordinating on transmission outages that affect generation. The Next Day Planning Office provides Powerex traders with hour-by-hour parameters that they can use to maximize market opportunity against generation export and import capability.

The operations planning department also

includes the planning, scheduling and operation (inaudible) shift engineers. When you think of this team think of a control centre, individuals in front of a bunch of screens showing what's online and what load is. This team is responsible for optimizing and scheduling hourly generation of the BC Hydro system and IPPs to meet domestic load, electricity trade schedules, treaty and contract obligations, as well as reliability requirements. They identify Powerex trade limits and optimize the system to maximize export and import opportunities. Their communication with Powerex is constant. So constant, in fact, that the members of the team are set up right next to the Powerex trade floor allowing for direct communication in real time between traders and the engineers.

Lastly, I just want to spend some time talking about the relationship between BC Hydro and Powerex. So Powerex is a wholly owned subsidiary of BC Hydro and it's a separate legal entity. The Powerex board is appointed by the BC Hydro board of directors and BC Hydro directors and senior management must always make up at least 50 percent of the Powerex board membership. It's important for Powerex to be set up as a separate and independent company from BC Hydro. This provides regulatory and legal protection for BC Hydro and means that Powerex is the one

engaging in commercial activities in the United States. What that means is that BC Hydro is only regulated within Canada and is protected from U.S. lawsuits as long as it does not engage in U.S. commercial activity.

And with that we've come to the end of this first section. Any questions, happy to take those now. A reminder, if you want to ask a question use the "raise your hand" function, your line will be unmuted and then you can ask your question by audio.

I do hear some background noise, I think someone's line has been unmuted if you wanted to go ahead with the question. Heather or Dale, do we have anyone queued up?

MS. REIS: (inaudible)

MR. SANDVE: Okay, who do we have unmuted for a question? Maybe, Heather, if you can say the name and then they can go ahead.

MS. REIS: We don't have any questions yet as far as I can tell.

MR. SANDVE: Okay, I'll just wait a few more seconds to see if there's any questions on this section. If not, I will turn the presentation over to Mike.

Okay, Mike, go ahead.

PRESENTATION BY MR. MacDOUGALL:

All right. Let me adjust the camera here.

Okay, as Dale mentioned at the beginning, my name's Mike MacDougall, I'm the Vice President of Trade Policy and IT with Powerex. And so in the first section here I'm just going to give you a bit of an overview of Powerex and call out some of the distinctions for us relative to BC Hydro.

So Chris already introduced this portion, Powerex is a separate legal entity from BC Hydro but we do have an exclusive relationship with BC Hydro with respect to these four areas of transaction. And really, this is what the heart of what the transfer price agreement is, is to provide a framework for title transfer and pricing of transactions related to the purchase and sale electricity between BC Hydro and Powerex as well as the sale by Powerex to BC Hydro of natural gas.

Proceeding Time 9:25 a.m. T07

Now, Chris covered what's actually known as the U.S. *Foreign Sovereign Immunities Act*, and that's the Act that provides the protection to BC Hydro against U.S. litigation so long as they don't engage in U.S. commercial activities. Powerex is also subject to that *Act*, but it's not because we are a subsidiary of BC Hydro, it's actually because we perform other provincial purposes such as in relation to the Canadian entitlement and other activities. So,

just because a subsidiary of BC Hydro exists doesn't mean it is covered under that *Act*, it depends on the activities.

But the key element in this is the independence of those activities. If BC Hydro were to engage through Powerex in commercial activities, it would weaken their protections under this *Act*. So the independent action Powerex doesn't step into Hydro's determination of system operations, and BC Hydro doesn't step into Powerex's accountabilities and responsibilities for conducting commercial activity. The one benefit we get even though we are subject to U.S. litigation, is litigation against Powerex must be conducted in Federal Court versus State Court, and really that means you're in a broader regional court structure in front of a judge, as opposed to in a state court in front of a jury. So that's the benefit that is derived by that status by Powerex.

So, just a quick overview of what we do. This was laid out in the application. We have three main commodity areas; electricity, natural gas and environmental products. We operate predominantly in the West, although more North America wide on the natural gas side.

The thing is, we actually conduct a lot of activity wholly unrelated to the BC Hydro system. So

the TPA really is again that framework for setting out the transactional relationships between BC Hydro and Powerex, but Powerex, and as Mark will describe further, conducts a lot of activity beyond the BC Hydro system that never touches the BC Hydro system.

The environment that we operate in is highly competitive. In this framework prices are determined by the interaction of buyers and sellers. And I will talk a little bit more about the regulatory framework in a coming slide. But we have no captive customers, we need to compete for customers and even once we make a sale, the next sale to that customer is the product of competition. And so it's different than the cost of service vertically integrated utility model, and that has some important ramifications in terms of how we conduct our activity.

We are a company that aims to maximize its net income. We turn that net income over to BC Hydro where it is used to reduce the revenue requirements Chris covered earlier.

Just some of the key financial numbers for Powerex. In the context of the B.C. system, we actually have two sources of supply. One is when the BC Hydro system has surplus and we make a payment to BC Hydro for that supply. The other source of supply is the Canadian entitlement for which we make a

payment to the B.C. Government.

Importantly, those are costs to Powerex. So there is a benefit to B.C. from the payment being received, but Powerex has to take those sources of supply at the cost that we receive it and turn around and earn revenues in order to generate our trade income, combined with all the other activity that we undertake. So the trade income is in essence over and above those contributions when you are considering the benefits of trade to B.C. And as stated, it's used to reduce revenue requirements.

So, just a little bit about the company in terms of staff, we are basically run predominantly on intellectual capital. We are 180 employees, and for a trading company, it won't surprise you that the largest segment of our staff is in the trading and analytics teams, that are involved in day-to-day and various trading horizons, as well as the analytics and tools that are necessary to support the decision making in that area.

Proceeding Time 9:30 a.m. T8

What can surprise some people is that our next largest department is IT. We do a lot of work in terms of application development, customized tools, in support of both the trading as well as other functions within Powerex, including the reporting and risk

management which form our next, sort of, two largest groups. And then the balance of the company in the support areas, legal, compliance, trade policy, sum up to give you the 180 employee total.

So just one of the misconceptions that sometimes exists is that Powerex is unregulated. That's actually not true. It's just that the regulatory structure we operate in is different. It is not in a monopoly structure, it's in a wholesale competitive market structure. So within the electricity and natural gas spaces there's a couple of market regulators. That would be the U.S. Federal Energy Regulatory Commission as well as the Alberta Utilities Commission, which regulate competitive markets in the U.S. and Alberta respectively. We also have regulation involved in our cross-border activity for import/exports between the Canada Energy Regulator and the U.S. Department of Energy. There's regulators that we deal with in the clean and renewables space, as well as other agencies, either related to cross-border activities or with related to financial transactions.

So outside of British Columbia, as I mentioned earlier, the regulatory framework is really based on competitive wholesale market structures where the prices are determined by the interactions of

buyers and sellers or by the outcome of market rules from market operators. And the key element here is that the regulators here establish a framework and rules to ensure that you have competitive market outcomes that are still reliable and operate efficiently. And the regulators, when they have a framework like that that is working well, they accept the prices determined as just and reasonable based on the outcome of competition as opposed to a cost-based justification process. They generally don't regulate or review individual transactions or the business of individual companies, with the key exception being if they find that either actions, transactions or behaviour are inconsistent with market rules or competitive behaviour. So there's a lot of emphasis on market structure, competitive behaviour, standards of conduct in that regard in the markets that Powerex operates in.

So a key element to this is to be successful in there markets we have to be agile so that we can actually move to capture opportunities as they arise. You can't take the time to put together a case and, you know, bring it forward for approval, the opportunity is gone. So agility, the ability to kind of see and respond quickly to opportunities is important because the customers aren't waiting. And

the other key element is confidentiality. And that is to protect the commercial strategies. If competitors understand our commercial strategies, they'll be able to move to grab opportunities or undermine our opportunities to make these transactions and that's detrimental to our income and then ultimately detrimental to BC Hydro's ratepayers, to the extent that that income gets eroded if we can't perform in that manner.

Within B.C. there's a different framework. Obviously, BC Hydro is the primary regulated entity in the relationship between the two parties with the BCUC. Back in 2003 the BCUC did look at Powerex in the context of Heritage contract proceeding. They made a recommendation to government at the time that the oversight should be limited to the review of the income statement of Powerex. But then in 2019 the B.C. government chose to exclude Powerex from Part 3 regulation under the *Utilities Act*.

Proceeding Time 9:35 a.m. T09

Now, that doesn't mean that there isn't a nexus between some of the activities going on in B.C. and elsewhere. Powerex files with FERC all BCUC approved changes to the terms and conditions of BC Hydro's open access transmission tariff. That's a requirement because Powerex is granted access to

transmission providers' systems in the U.S., and there is in essence a reciprocal obligation for those entities to have similar access to the BC Hydro high voltage transmission system, The wholesale portion of the transmission system. So when Powerex first got what's called our market based rate authority, we filed a version of the pro forma tariff that BC Hydro had submitted to the BCUC in the day, and every time there is a change to that, Powerex files that as a change of status with FERC. And FERC will look at it and determine whether it remains what they call consistent with or superior to their pro forma tariff.

Now, importantly this does not apply to rates, so the revenue requirement portion of the transmission that goes through the RRA is not something that Powerex is obligated to file to FERC, as well as it does not apply to retail tariffs, because that's not FERC's jurisdiction in the U.S. So it's purely related to the wholesale transmission access as sort of a comparable treatment between the parties, and that's what drives those types of obligations.

And yes, that is my last slide, so I will halt there and so I will try and move the camera back. But give people an opportunity to ask questions.

Heather, do you see anyone who has their

hand up for questions?

MS. REIS: I do not see any questions at this time.

MR. C. WEAFER: It's Chris Weafer, and I have a question.

MR. MacDOUGALL: Okay, go ahead, Chris.

MR. C. WEAFER: Both the first two parts of the presentation you talked of the legal position of Powerex in the U.S., and I just have a question. I'm happy if it gets dealt with in an IR if it's not appropriate for today. But to what extent is the new structure of the new agreement a better structure to protect Hydro and ratepayers and taxpayers from the problems that arose in the early 2000s around lawsuits with FERC and the State of California? Is part of what's going on here an effort to try and mitigate against that? And as I say, I am happy if that gets dealt with at an IR level, I am not trying to drill down on it, but it seems to me it's kind of an elephant in the room in terms of Powerex's dealings in the U.S. and some of the concerns for ratepayers and taxpayers. So could that be addressed today? Or in an IR?

MR. MacDOUGALL: I can address that now. That is not the intent of making this change. The 2003 TPA went through that historic litigation. The findings of BC Hydro as a foreign sovereign, and Powerex with its

status was determined under that, and the changes that we're making do not change any of those facts. The changes that we're making will be for the reasons that Chris has laid out, and Heather is going to discuss.

MR. C. WEAFER: So sorry if I am not catching that, but is the response that the 2003 agreement addressed those risks and issues, and this agreement effectively reiterates those protections?

MR. MacDOUGALL: Yes.

MR. C. WEAFER: Okay, thanks very much.

MR. MacDOUGALL: Okay.

MR. C. WEAFER: Chris Weafer, one other question, just a curiosity question. The involvement in the natural gas trading, I'm more -- Burrard Thermal was clearly a large gas generation facility. Are there a lot of gas generation facilities in the BC Hydro system that sees them purchasing significant volumes of natural gas that sort of justify Powerex being in that market? Or is it more just that's another market that Powerex sees opportunity to trade in?

MR. HOLMAN: Good morning, it's Mark Holman here. There are three natural gas facilities in the BC Hydro system, and I think your question is more to Powerex's trading activity in natural gas. What I would say at a high level is there is a lot of natural gas generation in the western U.S. and so natural gas

markets are very related and very tied to wholesale electricity markets.

Proceeding Time 9:40 a.m. T10

As Mike MacDougall described, we are active in the wholesale electricity markets, in the natural gas markets and in related environmental products. That includes activity entirely unrelated to the BC Hydro system. It enables us to generate net income and those three areas are also very complimentary to one another. Understanding in each of those markets is critical to success in the other markets, and so we're active in all three of those. Again, with a lot of that activity in natural gas occurring outside and separate from BC Hydro's needs for gas to fuel those three plants.

MR. C. WEAFER: Thanks for that. So just order of magnitude, if you looked at BC Hydro's energy generation, what percentage is natural gas driven? Just at a high level.

MR. HOLMAN: I'm going to let Heather answer that or BC Hydro could take it in an IR.

MS. MATTHEWS: So I think your question is how much is the BC Hydro gas purchases relative to our system. So, as Mark said, there's the three gas plants that BC Hydro either owns or dispatches. The largest one of those is (audio drop) generation on Vancouver Island.

And it's capability is about 2,000 gigawatt hours a year. And our system load is more like in the (audio drop) 55,000, 60,000 gigawatt hours (audio drop). So the amount of gas that Hydro uses to meet our load is really quite small. Like the number that we're often putting out is that we're 98 percent clean in our generation.

MR. C. WEAFER: Thank you.

MR. MacDOUGALL: Looks like there might be a hand up from Melissa Davies? Are you able to unmute yourself Melissa?

MS. DAVIES: Hello?

MR. MacDOUGALL: Yeah, we can hear you.

MS. DAVIES: Okay, thanks. Melissa Davies with AMPC. I was just curious about the environmental products that you guys have spoken on, like what exactly that includes and how new that area is, where you see it going. Or if you're talking about it later, I couldn't get back to the agenda. I just wanted to get a bit more background on that item.

MR. HOLMAN: Thanks, Melissa, it's Mark Holman here. I am going to touch a little bit on environmental products later, so hopefully it'll give you a bit of a high level of that area. In terms of how new it is, I would say that really the early days were back in, off the top of my head, kind of 2006 and it has been a

growing area for our business and I'll touch on a little bit of what that looks like and where the key opportunities are today.

MS. DAVIES: Okay, thank you.

MR. AUSTIN: It's David Austin speaking, can you hear me?

MR. MacDOUGALL: Yes, David, we can hear you.

MR. AUSTIN: The question that I have is that BC Hydro transferred its transportation rights for natural gas on the Enbridge system over to Powerex. What's BC Hydro doing with those -- excuse me, what's Powerex doing with those transportation rights?

MR. HOLMAN: So let me just say this at a high level. Not here to talk about natural gas and how we transact specifically in the market. Obviously, getting into the details of our commercial activity is a difficult area to discuss. If you have questions about natural gas, again, I would suggest that perhaps an information request to BC Hydro would be the better path.

MR. MacDOUGALL: I don't see any other hands. Give a minute in case there's any other questions, otherwise, Chris, is it a 15-minute break?

MR. SANDVE: Yeah, we had scheduled for a 15-minute. We are running a bit ahead of time so we might make sense to say 20-minutes and come back at five after 10:00, does that -- I'll just wait a second to see if that

works.

Okay, we'll see everyone back here 10:05.

(PROCEEDINGS ADJOURNED AT 9:46 A.M.)

(PROCEEDINGS RESUMED AT 10:05 A.M.) **T11/12**

MR. SANDVE: Okay, welcome back everyone. We'll going again. The next item on the agenda is a Powerex market overview from Mark.

So, Mark, over to you.

PRESENTATION BY MR. HOLMAN:

MR. HOLMAN: Thanks, Chris. Just one moment.

So good morning, my name is Mark Holman. I'm a managing director at Powerex. I manage the wholesale electricity trading and marketing functions at Powerex. Before I begin I wanted to just give you an overview of what I'm going to discuss in this section. This morning I'm going to cover three key areas of wholesale electricity markets in the western U.S. and Canada.

First I'm going to provide a high-level overview of wholesale electricity markets, including the four distinct geographic regions that wholesale purchases and sales transactions take place, as well as the three different timeframes that these transactions occur in and how these timeframes apply in each geographic region.

Second, I'm going to briefly discuss the

highly competitive environment that Powerex operates in. And finally I'm going to turn our attention to two key trends we are witnessing in wholesale electricity markets in recent years, namely resource adequacy and state environmental policy, objectives and associated programs. Importantly, both of these trends are expanding sales opportunities in the forward wholesale electricity markets, not only in terms of volume, but also in terms of premium prices for sales.

So hopefully you can see up on the screen now a map that shows what is referred to as the Western Interconnect. So that broader region you see there, which is predominantly comprised of two Canadian westernmost provinces and eleven states, and then small parts of three others, is what we refer to as the Western Interconnection. And in Powerex business we often call this western markets. And the reason it's comprised of this region is that there is substantial high voltage transmission connections between generators and load throughout this region, but very limited transmission connections connecting this region to the rest of North America, primary the Eastern Interconnection that comprises most of the rest of Canada and the U.S.

So when we talk about western wholesale

electricity markets or the Western Interconnection, we're talking about this footprint where purchases and sales occur across this region and energy is delivered from generators to loads.

Now, wholesale electricity transacts in four somewhat distinct regions in the west: the Alberta market, the Northwest market, the California market and the Southwest market, which we often include the Rockies region.

Proceeding Time 10:08 a.m. T13

Wholesale electricity in these four different regions in the Western Interconnect, transact under two different market structures at a high level. One market structure is what we refer to as bilateral markets. Bilateral markets are really quite simple. It's where an individual purchaser and an individual seller transact electricity and a physical delivery takes place. In contrast, and what you can see there that I just brought in is what is referred to as organized markets or sometimes called structured markets. These markets in the west exist in Alberta and California, and they operate quite differently from bilateral markets. How are they different? There is a centralized counter-party where all potential suppliers offer their energy through

submitting bids into software, and the centralized counter-party seeks to dispatch or award the lowest price offers to meet the demand. And so really you have a clearing process with bids being submitted and a market operator clearing supply against the needed demand.

Now, I just talked about four different regions, but when you take a look at the next level down, I thought I would provide a little bit more context about the number of different locations that Powerex transacts in, as well as the volume of deliveries. And so we went back and we looked at our 2019 data, and these numbers I am showing you here are kind of high level round numbers of what we saw, really to give you a sense of the scale of Powerex's activity in western wholesale electricity markets.

So what you can see here on the map are actual locations of transactions, and Powerex buys and sells electricity at over 80 locations across western North America. So I'm sure you can see that dark blue dot at the B.C. - U.S. Border, and also that circle connecting B.C. to Alberta, where Powerex is an active participant selling power to Alberta and also importing in some hours. But what you will also see on that map, I will turn your attention to is those four purple circles, the larger ones. Those are most

commonly, the four most prominent trading hubs in the west. So that one up in the north, in central Washington is the Mid-C trading hub, you can see in Northern California what is referred to as the NP15 trading hub or northern California trading hub. In Southern California there is a trading hub, and then there is one in the southwest, referred to as Palo Verdi.

The green circles identify import and export locations to and from the California market. So in each of those green circles you can inject power into the California organized markets, or make a sale to the California organized markets, or make a purchase from the California market. And in the blue circles are where bilateral transactions (inaudible). So we thought this was a good representation to give you a general sense of the number of different locations where Powerex is transacting energy.

So how about volume? Well, in 2019, when we took a high level look at our data, we executed approximately 110,000 separate physical deliveries. Those physical deliveries include transactions that could be hourly, daily, and even monthly, quarterly, and entire summer seasons as well as annual. And it includes transactions not only where we are exporting from the BC Hydro system, surplus energy, or using the

residual capability, importing energy to BC Hydro. But as previously mentioned, Powerex also has a lot of activity where we are moving power from one location to another entirely in the U.S. to generate trade income using our transmission rights, and moving power to customers from generation to load.

Now, how do we do that? Well, we took a look at how many different distinct transmission paths did we utilize. And I am going to talk a little bit more about that, but using transmission paths we utilize 2500 distinct transmission paths to move power to and from the BC Hydro system, and also to and from locations entirely in the U.S.

Turning our attention to competition, so as Mike touched on, Powerex participates in a highly competitive environment. So who do we compete with? Well, we compete with banks and hedge funds, energy service providers, international energy companies and utilities. And we thought we would just throw up a few of those entities up on the screen to just give you a sense of the diversity of the entities that we're competing with.

Proceeding Time 10:13 a.m. T14

Entities such as Morgan Stanley, Direct Energy, Shell has a very active trading arm of Shell Energy, TransAlta, entities like Avangrid who are heavy in the

wind and renewable space, and so quite a diverse group.

What is also interesting in the wholesale electricity industry is many of your competitors, in fact most of your competitors, are also your customers. And what I mean by that is that in some hours or some days, weeks, months Powerex may be looking to sell energy and an entity on this list might also be looking to sell and we're both competing to get the sale to purchasers across the western markets. But in other periods one of us might be looking to purchase and the other entity is looking to sell and we'd become each other's customers. So our customers are our competitors and our competitors are often our customers.

Where do we compete? So of course we compete in wholesale electricity products, we're competing to purchase energy when it's lower priced and seek out those opportunities where we can acquire wholesale electricity at least cost. We're also competing to make sales of wholesale electricity to where the demand is the greatest across the western interconnect.

But importantly, transmission, it's not just the wholesale electricity we're competing in, we're also competing for transmission rights. And

what we mean by that is, Mike MacDougall touched on this open access transmission framework where entities participating in the market compete to acquire transmission rights. And when you acquire those transmission rights through competition it's only once you acquire those transmission rights that you are then able to move power from one location to another and execute on purchases and sales in different locations.

We touched on natural gas. So, similar to wholesale electricity products and transmission rights, we also compete for natural gas purchases and sales in the wholesale space and for gas pipeline transportation to move gas from one location to another. And then in an environmental products and services, and I'll touch on this in a little bit more detail on a future slide.

But also beyond the wholesale electricity products and transmission, natural gas products and transportation and environmental products and services, there's also competition for commercial staff. As Mike touched on, our people are our greatest assets and commercial staff are often highly sought after throughout the industry because it's a very -- it's a skill that is developed over many years. And then we also see quite active competition

in market design and regulatory forums where entities will participate in those forums seeking to see new or modified market rules that position them better to be successful in the competitive markets. So, again, the key takeaway is that we operate in a highly competitive commercial environment.

Okay, trading timelines. I'm going to warn you, this slide's a little bit more dense, so I'm going to bring back up the four regions and I'm going to talk about, as you see in the application, the three general timeframes of wholesale electricity markets and go the next level down and talk about how these timeframes apply in each of those four regions. So those three timeframes are the forward timeframe, the day-ahead timeframe and the real-time timeframe.

I'm going to start from the left. So in the forward time frame the products that we typically see, the duration of sales, durations of purchases are a balance of month. So if we were to execute a transaction today, September 22nd, for the balance of September that would be for deliveries from September 23rd through the 30th. Monthly, quarterly, season. So a season might be three months, four months, five months, six months. For example, May through October or November through March are our common seasonal products that we see out there for the summer and

winter seasons respectively. And then a year or multiple years.

The day-ahead market is a market for the next day. Sometimes it's the next two days. And the reason it's in the next two days is often because of weekends and holidays. So for example, on a Friday you transact power for Sunday and Monday, because trading does not occur in the day-ahead market on weekends.

Proceeding Time 10:17 a.m. T15

And then there is the real-time market which is intra-day. Real-time market trades in different time steps, there are often transactions for the next hour. So if you are trading at say 11:15 A.M. you execute a trade for one hour, that will often be for delivery from 12:00 P.M. to 1:00 P.M. We also see transactions for blocks of consecutive hours. So often you could have customers seeking to purchase energy for the afternoon, let's say from 4:00 P.M. to 9:00 P.M., and they are executing that transaction in the morning as a purchaser seeking supply to meet their evening peak. And then we also see very short duration transactions, as short as 15 minute and 5 minute transactions.

Now, I'm going to talk about each of these and how they apply both the bilateral and organized

markets in each of the four regions in each of those time frames.

So, in the Northwest region, in the forward timeframe, the most commonly traded duration we see is each of those durations, balance a month, monthly, quarterly, season, yearly, in a bilateral structure where the delivery is typically in on-peak or off-peak periods. And so I will describe the on-peak so that you can get a better understanding.

On-peak is Monday through Saturday for delivery 6:00 A.M. to 10:00 P.M. So, remember I talked about that making a balance a month transaction today, for September 23rd through the 30th, well if you made that balance a month transaction for the on-peak hours, it would be for every day, Monday through Saturday for the rest of the month, for a delivery from 6:00 A.M. to 10:00 P.M. And of course off-peak also trades. Again, these transactions are bilateral, where a purchaser is executing a transaction with a seller.

In the day-ahead market, it is very similar. It is 16 hour and 8 hour blocks, it is bilateral, but it's for the next day, or next few days.

And then in real-time it gets a little more interesting, where it's bilateral for one or one to

four, or four to six, any number of hours that the purchaser and seller agree to through negotiations. This is also where the western energy imbalance market resides, which is a relatively new organized market where 15 minute and 5 minute transactions take place.

It's important to note, however, the western energy imbalance market is a relatively small market, because you are just transacting 15 minute or 5 minute power as you move through the hour.

Alberta, Alberta is quite a bit different, and I am going to talk about it from Powerex's perspective. Our participation is really predominantly Alberta hourly transactions that are imports and exports that occur in real time, in one hour blocks, one hour at a time. And there is actually very limited physical transactions in the day-ahead and forward time frame.

Turning our attention to California, California in the forward time frame is similar to the Northwest. Bilateral transactions most typically in 16 hour or 8 hour blocks, but again, could we balance a month for an entire month? Multiple months? A quarter? A season? A year or longer?

In the day-ahead time frame, you can have both bilateral transactions in that 16 hour, 8 hour. We see that predominantly in those white areas you see

on the map in California, where some areas of California, most notably, Sacramento, Sacramento Municipal Utilities District, and Los Angeles Department of Water and Power, are not inside the organized market, so they often are transacting in 16 hour and 8 hour bi-lateral transactions. Where as what's referred to as the CAISO, the California Independent System Operators organized markets. There is transactions that are imports and exports, in hourly duration that occur day ahead. This market actually operates seven days a week. So there is actually transacting occurring on Saturday and Sunday for the next day.

And then in real-time, we see bilateral transactions again, most typically with that white area that you see in California. The Sacramentos, the Los Angeles, and a few others. But also California imports and exports hourly.

The southwest is really virtually identical to the northwest. It is a bilateral market in the forward and day ahead time frame for 16 hour and 8-hour blocks. It is bilateral in real-time for one or more hours. And this is where again, the western EIM, energy imbalance market resides for transactions, 15 minute and 5 minute blocks.

Now, that's a lot that you can see up on

the screen, and these are just the most common transaction durations in each region in each of the three different time frames. There are also custom transactions that take place, where a customer can be seeking certain non-standard hours a day, maybe a six hour strip for a month and a half, or for a particular four month strip of energy, and we are very active in those transactions as well. So a very complex environment.

Proceeding Time 10:23 a.m. T16

Again, I take you back to the previous slide, 110,000 transactions through a mix of these different predominant timeframes and regions, but also custom transactions.

Two final points I want to make is that the forward and day-ahead markets generally transact greater volumes. So the real-time market is a smaller market by volume, and that is of course understandable because the real-time market is transacting one or a few hours. The real-time market is also the last market and many entities are transacting to meet their needs, whether they have surplus power or they're looking to purchase to meet a deficit or to displace their own internal resources, they often transact those needs in the forward and day-ahead timeframes.

And then the second point I wanted to make

is that resource adequacy and environmental policy objectives are increasing opportunities in the forward timeframe, both from a volume perspective, but also a premium price perspective for sales opportunities.

So I'm going to touch on each of those next. So the first one I'm going to talk about is what is resource adequacy and how does it create expanding opportunities, particularly in the forward markets. So a resource adequacy program — the only one of which currently exists in a formal way is in the State of California — is where the load serving entities -- so this might be a utility, such as Pacific Gas and Electric, Southern California Edison, it may also be a community choice aggregator who is a smaller entity who serves load, it can also be a direct service provider, someone who is providing retail access supply to a relatively small group of customers. All of those load serving entities are required under the CP -- under the California Public Utilities Commission's Resource Adequacy program to secure sufficient capacity, or alternatively forward firm energy that provides that capacity attribute, to meet their peak demand and that of course includes a planning reserve margin to ensure that they have sufficient supply to ensure reliability.

As I mentioned, California has the only

resource adequacy program in the west. However, Northwest entities may soon have their own resource adequacy program. There is a actually an initiative underway at the Northwest Power Pool to develop a resource adequacy program in the Pacific Northwest. The market implications of these resource adequacy programs is that entities again are required to acquire forward firm energy supply or forward capacity to meet this need. So it means in the forward markets, they will pay a premium all else equal, particularly for the summer season in California, perhaps the summer and winter season in the Northwest, to acquire the same supply that they might otherwise have acquired in the day-ahead or real-time markets because it meets this additional need of providing resource adequacy to ensure reliability and to demonstrate that they have met the requirements of the resource adequacy program.

But what it also means is to the extent that entities seek to acquire forward-firm energy and/or capacity in the forward markets, they may have less need to acquire it in the day-ahead markets because they've already taken care of their needs, reducing day-ahead market liquidity.

Now, I thought I would share a quote from the California Public Utilities Commission that kind

of hits this point home that as we're seeing the western grid tighten with the retirement of coal generation in the desert southwest, some retirements of coal in Alberta, and some really extensive retirements of natural gas generation in California, that the need for imported power to meet resource adequacy is growing, and growing quite rapidly in recent years. So here's a quote from the California Public Utilities Commission back from November 2019. One thing I wanted to note is that although the California Public Utilities Commission administers this program, it really originated back from a legislative requirement many years ago. So,

> "We also encourage LSEs to explore options for forward contracting of frim imported power with counterparties with available power to commit."

Proceeding Time 10:28 a.m. T17

So the California Public Utilities Commission is encouraging the load serving entities, the utilities, the community choice aggregators, the retail service providers, to contract for firm imported power to meet this resource adequacy need as they continue to retire their thermal resources.

The second part I want to highlight is that firm forward contracting for clean imports, so not just any imports but entities that have clean

generation, will improve the reliability situation for California in the short-term. And we at Powerex have really seen the resource adequacy program become more important in terms of opportunities to sell clean power sourced from the BC Hydro system, whether that be BC Hydro surplus power using the residual system capability, become a much more important opportunity in recent years, which we expect to continue in the years ahead.

The second expanding opportunity that I wanted to talk about in the forward markets, and there was a question earlier about this, is State environmental policy objectives. So the first thing to note is that State level environmental policy programs are fragmented and constantly evolving. There are numerous environmental policy programs that affect the wholesale electricity markets and create opportunities, but they are fragmented, they're at a State level and they're constantly changing.

Generally speaking, they create premium value for clean and/or renewable supply that qualifies to meet the applicable program that is delivered to the applicable State. So typically the premiums for clean and renewable supply originate from meeting an environmental policy program or objective and where that power qualifies to meet that and is delivered,

through those transmission rights I previous talked about, to the applicable State.

California currently presents the largest sales opportunity. And I just highlighted three key areas where those opportunities exist in the California environmental policy program. So they have a renewable portfolio standard where wind, solar, geothermal can qualify to meet that renewable portfolio standard and create premiums for wind, solar, geothermal, other qualifying renewables that are able to be delivered to the State of California or are actually located within the State. There's the Green House Gas Cap and Trade program that went live in 2013. And then there's the Power Content Label, which is a program in which the load serving entities need to report in a transparent manner the different technologies of the source that is being provided to serve their demand, including imports.

All of these three create increased opportunities for forward sales. In Washington there is the *Clean Energy Transformation Act* that is under development and there are also Oregon programs under development.

The most important takeaway from this though is that most of the sales opportunities to capture those premiums, both in terms of selling in

the forward markets and earning that premium price, are in the forward markets. And that's largely because entities are seeking to meet a need generally on an annual basis and they're not desiring to wait until day-ahead or real-time to meet that need but often looking to contract multiple months ahead of time, sometimes for the upcoming season, the upcoming years or balance of year, to meet that need.

That's all I had. So then we will pause there and see if there's any questions.

MR. AUSTIN: David Austin speaking. I've got a number of questions. And the first question relates to BC Hydro's most recent service plan or annual report. I'm not exactly sure why they put the term "service plan" in there, but I'll just report to it as the annual report. In the annual report in note 25 it says,

> "Powerex has energy purchase commitments with an estimated minimum payment obligation of 1.72 billion extending to 2034."

It then goes on to say,

> "The total Powerex energy purchase commitments are estimated to be approximately 512 million for less than one year, 1.19 billion between one and five years and 24 million for more than five years. Powerex has energy sales commitments of

473 million extending to 2031, with estimated amounts of 314 million for less than one year, 147 million between one and five years and 12 million for more than five years."

Proceeding Time 10:33 a.m. T18

And the question that I have is how many of those commitments or what value are those commitments directly relate to the BC Hydro system?

MR. HOLMAN: So, David, I'm not familiar with what you're referring to on the Powerex side. I would really suggest that if you have a question that's related to something that is filed, that perhaps that would be best suited to an information request submitted to BC Hydro.

MR. AUSTIN: I appreciate that answer, but a lot of times what happens when questions are asked in BCUC regulatory proceedings about Powerex, the answer comes back that Powerex is not regulated by the Utilities Commission and no answer is given. So I just thought this might an opportunity to understand what the relationship is between Powerex and BC Hydro in relation to energy purchase commitments that are listed in BC Hydro's annual report.

MR. HOLMAN: I'm not sure that this workshop is the best place to answer questions related to the annual report. I think as Chris described, we really came

here to discuss and answer the questions put forward associated with the 2020 Transfer Pricing Agreement. Again, I think that that question is best put forward in an information request to BC Hydro where the right people can take a look at the question and see if they can give a response.

MR. AUSTIN: Well, let's put this another way. When I look at the Transfer Pricing Agreement, I don't see limits on the term of transactions between BC Hydro and Powerex. And I see on the annual report commitments of Powerex up to 2031, so that's an 11 year commitment. For the purposes of making sure that the BC Hydro system is not overcommitted to export markets, whether they be in Alberta or United States, shouldn't there be some sort of limit on any commitment in the purchase agreement that BC Hydro makes to Powerex?

MS. MATTHEWS: So as we've said, this is a question for the IR. So, David, if you could -- want to submit it to IR, that's -- you're welcome to do so.

MR. AUSTIN: Thank you. And just also in relation to the actual terms of the agreement between Powerex and BC Hydro, the former agreement was executed back in 2003 and is now being revised today, so that's 17 years. And this evening Elon Musk is going to do a presentation in terms of battery technology and where

it's going.

Given that batteries represent storage in the same manner that reservoirs between -- behind BC Hydro's large hydroelectric dams represent storage, wouldn't it be a good idea to have a fixed term for this agreement between Powerex and BC Hydro so that as technology advances and markets change, the BC Utilities Commission could, say for example in five years, go back and look at whether the relationship between Powerex and BC Hydro as set out in this agreement makes any sense.

MS. MATTHEWS: So it sounds like a lot of what you're saying is comment on the terms, and so we can answer that in a IR, but certainly we need the transfer pricing agreement between BC Hydro and Powerex, and it's having it so that we know that we're able to keep transacting and we don't think that the need for a term makes sense. But we can provide more information on that in an IR.

Proceeding Time 10:38 a.m. T19

MR. AUSTIN: The final question is that you were alluding to opportunities in the California market because of the need for California to import. And I didn't really catch this very clearly. Renewable or green energy. What is the status of electricity produced from large hydroelectric facilities with

storage reservoirs in the California market?

MR. HOLMAN: David, what I would say at a high level, I take you back to I think it was my last slide that state environmental policy programs are fragmented and constantly evolving. So there isn't one program. So for example, under their renewable portfolio standard, certain resources qualify while others do not, yet under their cap and trade program, instead looking at particular technologies they are looking at greenhouse gas emissions. And then yet again under their product content label, different load serving entities may have a preference for different technologies to be reported as the source. So it's not a single answer, because it is not a single program and they are constantly evolving.

What I would say is that clean, firm power such as that that can be provided from the BC Hydro system is very well situated to meeting the demand in California for both resource adequacy for upcoming summer seasons, and for those environmental state policy programs. And that's really one of the reasons I highlighted it today, is this is an expanding opportunity in the forward markets where we are seeing transactions increasingly occur.

MR. AUSTIN: Although it may be well situated, are the Californians wiling to purchase electricity generated

from large hydroelectric facilities in the context of the programs as you know them today?

MR. HOLMAN: The short answer to that is yes, absolutely.

MR. AUSTIN: Just my final, final questions is that is anybody actively planning or building new transmission between British Columbia and the markets in -- or more to the point, potential markets in Northern or Southern California?

MR. HOLMAN: I think I'm going to answer that this way, David, is that when you come back to one of those earlier slides, you saw the number of distinct transmission paths that we schedule power on. So the first part of the answer is no, I'm not aware of any transmission line that provides a new single path from B.C. to California. Having said that, again, the connection between B.C. and California, or the Northwest and California, is clearly not a single path, and we do see different transmission project upgrades, as well as new lines under development, as well as some under consideration, that could increase the power flow from the Northwest of that Western Interconnect region I described to the southwest. So, the transfer capability may increase in the years ahead, depending on how these upgrades and new projects play out. But unfortunately, it's not as

simple as a single line.

Proceeding Time 10:43 a.m. T20

MR. AUSTIN: I appreciate it's not as simple as a single line, but in the last 20 years it doesn't seem as if there has been much investment in transmission that it would allow exports from British Columbia to the markets in California on a cost-effective basis.

MR. HOLMAN: It sounds like a statement. I'm not sure what the question is, but I would say this. You know, coming back to the presentations this morning, the 2020 transfer price agreement is in the operational timeframe. And there is surplus energy that arises in the operational timeframe, there are deficit needs and there is residual capability that between BC Hydro and Powerex we are collectively seeking to maximize the value of that.

Now, Powerex does have significant investments in long-term transmission connecting BC to California and uses those rights to make sales to California, including from the BC Hydro system, in support of that over-arching objective.

So I'm not sure if that helps you, David. I'm not sure there was a question in your statement. Did I capture what you were looking for?

MR. AUSTIN: I think that you said in terms of this agreements, I'd like to confirm it, that we're

dealing, in terms of this agreement, with the operational timeframe only. Is that correct?

(Multiple voices in agreement)

MR. AUSTIN: And how long is the operational timeframe?

MS. MATTHEWS: So I spoke to this a lot in the RRA, so we talked about it from zero to three years or more specifically it's the current fiscal year plus the next two fiscal years. So that's the timeframe that I have accountability to make sure that we have generation on to meet load. And it's not, and Chris talked about this a bit, it's separate from the IRP, the integrated resource plan, that looks at longer term new acquisitions. In the operation timeframe I basically have what I have to operate the system to meet load. And one of those tools is imports and exports of surplus and importing when we have deficits. So the TPA is in that operational timeframe and it's under my accountability for implementing this.

MR. AUSTIN: So this transaction would not cover -- excuse me, this agreement would not cover any transactions that go beyond the operational timeframe, which appears to be a maximum of two years, is that correct?

Is anybody still on the line?

MR. SANDVE: Just one moment.

MR. HOLMAN: I think the way to answer your question is set out in the application. The transfer pricing agreement covers transactions between BC Hydro and Powerex in that operational timeframe that Heather just described. It is not covering transactions between Powerex and its customers in wholesale electricity markets.

MR. AUSTIN: But I'd just like to confirm that the operational timeframe is a maximum of two years, is that correct?

MS. MATTHEWS: So the operational timeframe is the rest of the fiscal year plus two additional fiscal years. And that we've talked a lot about in the RRA application.

MR. MacDOUGALL: David, I do see other hands raised, so I think we've given you a good opportunity and I think we can come back if there's continued questions. But I do see Aidan Kehoe has his hand raised so I'd like to give some other folks an opportunity to get questions in?

Proceeding Time 10:48 a.m. T21

MR. AUSTIN: Certainly, go right ahead.

MR. MacDOUGALL: Hi, Aidan? You are muted?

MR. KEHOE: Hi, I am Aidan from the -- Yeah, can you hear me?

MR. MacDOUGALL: Yes.

MR. KEHOE: Hi, Aidan Kehoe of the BCUC here. So I just had a question on the slide about the adequacy requirements. That statement there that said that it creates premium values of clean and renewable supply. And one question I had here was about how that supply from a clean or renewable resources is guaranteed, and kind of the mechanisms or the markets that's in place that guarantees the power delivered by Powerex to California, for example, is from a renewable resource. Just a bit of background on there if you could, that would explain?

MR. HOLMAN: Aidan, I'm not sure I fully could hear that, it was a little bit faint. Were you asking about resource adequacy or about the second slide on environmental state policy and renewable and clean programs?

MR. KEHOE: Yeah, the clean side of things I was asking about. So one of the things was about the value from clean and renewable supply, but I wanted to know how that market, when you sell supply into California, how that guarantee and the mechanism to guarantee that that supply is from a green resource, as it were?

MR. HOLMAN: So, unfortunately there is not a clear and straightforward answer, because as I described before, there is different programs, and each of those programs has its own rules and regulations that apply.

So for example, the Cap and Trade program has a series of rules and regulations to determine how you determine the greenhouse gas emissions with imports into the States. Whereas the Renewable Portfolio Standard program has a different approach and actually has different categories within that program to determine which category you qualify for and what the requirements are to meet it. So there is no single answer in terms of it's not a single market, and it's not a straightforward single set of rules. Unfortunately it's quite a bit more complex, and it varies by program.

Having said that, Powerex is very active, both in those markets to seek out and acquire that premium value, and also in the development of those rules and regulations as they are shaped as an active stakeholder advocating for B.C. resources to qualify towards those programs, to open up those opportunities to acquire those premium value for the clean resources in B.C.

MR. MacDOUGALL: Are there any other questions? Or Aidan? Did you have a follow-up? Oh, I see James has put up his hand.

MR. WEIMER: Yes -- can you hear me?

MR. MacDOUGALL: Yes.

MR. WEIMER: Okay, just in regard to that resource

adequacy, you did say I think that it was basically in California that that's applied, is that correct?

MR. HOLMAN: Yeah, maybe I will describe it this way, James, is that California is the only State with a formal resource adequacy program right now, where there is requirements on an annual and month ahead timeframe for load serving entities to meet. And if they don't meet those requirements, they face penalties, as well as backstop costs. There are no formal requirements in other regions, although the Northwest Power Pool is exploring a resource adequacy program for the northwest, but there are also what I would call loosely speaking informal resource adequacy demand, where entities that are seeking to ensure that they have enough supply on a forward basis to meet those load -- meet their load, are doing so to protect their reliability outside of a formal program. And we are seeing demand in other regions outside of California continue to grow over recent years and we expect that to continue as the western grid gets tighter on capacity, as retirements of thermal generation continues to occur.

Proceeding Time 10:53 a.m. T22

And I believe there's a table set out in the application that describes those retirements.

MR. WEIMER: Yes, okay. So you said that in California

the requirement goes out to annual. Does it go beyond that?

MR. HOLMAN: California's resource adequacy requirements at a system wide level are year ahead and month ahead. They are examining whether they go as much as three years ahead in the future. Again, with all of these program the rules are often evolving over time. But in terms of how the program that imports into California qualify for, that generally takes place on a year ahead for the bulk of the (inaudible) with some remaining amount being able to be procured, I think it's 45 days prior to the delivery month.

MR. WEIMER: So, so far it's not going (audio drops) longer than one year but possibly it goes into three.

MR. HOLMAN: Sorry, I couldn't quite hear that. Do you have volume, Mike?

MR. WEIMER: Is my volume not adequate?

MR. HOLMAN: If you could try increasing your volume a little bit.

MR. WEIMER: I'm not sure how to do that but I -- I'll try it again.

So far I understood that the California requirement was for up to one year but it could extend to three years, they were looking at that. Doesn't every utility, say even in the northwest, have some kind of reserve margin requirement that it has to

(audio drops)?

MR. HOLMAN: I think there's a good analogy to what we talked about earlier, which is the integrated resource planning process being separate and distinct from the operational timeframe. So not only in California is there an integrated resource planning process that goes out many years, but also in other states and other jurisdictions there is an integrated resource planning approach. The resource adequacy program in California and what we often see in other regions is in that shorter term timeframe that after the integrated resource plan has taken place and the applicable entities have executed on it, it's a program that attempts to ensure that on kind of that year ahead, sometimes, you know, up to three years ahead timeframe there is enough capacity committed to meet load with the planning reserve margins.

So it operates more in that operational timeframe of one to three year space and it operates in that space after the integrated resource planning process has taken place and been executed.

MR. WEIMER: Okay, it sounds like a bit of a belt (inaudible) suspenders. But anyway, I had a question was, where in the TPA document that we have does it show that limitation to just the operating time horizon? Do you know offhand where I could find that

in the document, the TPA?

MS. MATTHEWS: So the TPA lays out the mechanisms for the transfer price and how that transfer price is occurring between the two companies as they take place. And so in the later part of the discussions and presentations that I'll make later we'll go into that in detail about what that transfer price is and how it's executed as those imports and exports occur.

MR. WEIMER: I'm not sure that quite answers my question. I was just wondering how (audio drops) confined to a (audio drops) three year period?

MS. MATTHEWS: The transfer pricing agreement doesn't need to have that. What the one to three year limit is my accountability within the BC Hydro organization. So perhaps your question is actually more getting into the overall governance organization structure of BC Hydro and between BC Hydro and Powerex. But I think if you want to explore that more, perhaps ask an IR on it, because I think we have addressed the question as we can here.

Proceeding Time 10:58 a.m. T23

MR. WEIMER: Okay. I guess one of David's questions earlier was that -- referring to the fact that Powerex has commitments that go out 11 years, that it seems to have been able to make those commitments without this TPA. So I would presume then that means Powerex has

some exposure or risk out to 11 years because the TPA wasn't in place, or will this TPA now absolve it of any risk in the future?

MR. HOLMAN: I think there's two different things there that you're touching on and I'm only going to touch on it at a high level from Powerex's perspective and I think any follow-up really should be an information request to BC Hydro. But the first thing that Heather and I have both discussed is -- as has Chris, is that the transfer pricing agreement is in the operational timeframe. It is not a supply resource, as I understand it, in the IRP or demand in the IRP, it's the outcome of that. Do we have surplus energy as a result of operational conditions, a deficit, and how much residual capability do we have? So that's kind of piece one.

Piece two is Powerex is active in western wholesale electricity markets, purchasing and selling wholesale electricity to and from the BC Hydro system and also entirely within the Western U.S., generating net income that it returns to BC Hydro that ultimately benefits ratepayers. That includes, as an example, Powerex making investments in long-term transmission rights to ensure that we can maximize our net income, sell BC Hydro surplus, meet deficits, and those transmission agreements, just as an example, can

extend out in time as transmission rights but get utilized in the operational timeframe as physical deliveries occur.

I think that's as far as we want to go today. Again, I would suggest anything further is perhaps best to an information request submitted to BC Hydro.

MR. WEIMER: Okay.

MR. MacDOUGALL: Okay, thank you, James.

Tom, you have your hand up.

MR. HACKNEY: Yes. The Bill 17 defines a Clean Energy Project. Can you reflect a bit on how that affects Powerex's trading activities and whether the clean energy definition that would be created if in the future this legislation comes back, how it would get recognized in the region and if that would be -- how that would all work?

MR. MacDOUGALL: I think right now, because that legislation has not passed, and in fact we don't have a government as of yesterday, that would be a hypothetical, we're going to have to wait and see how that develops and I don't think we can answer that now.

Now, I don't see any other hands raised. So shall we switch over to Heather, then? Let me just get the camera.

Proceeding Time 11:03 a.m. T24

PRESENTATION BY MS. MATTHEWS:

MS. MATTHEWS: Good morning, my name's Heather Matthews and I'm the Director of Generation System Operations at BC Hydro. And Chris spoke earlier about what my group does, but really the function of the group is that within the operational timeframe, which we just spent some time on, I need to make sure that we have enough generation on to meet our load in every given hour of the day. And so it's my group that really implements the transfer pricing agreement with Powerex.

So in this first part of the presentation or this section that I'm going to talk to you, I'm going to talk to you about the challenges with the 2003 TPA.

So first, the TPA, the 2003 TPA, relies on a one-day-at-a-time allocation and this is an after the fact allocation. Now, in each hour of the day we either have net imports and exports and these would be either allocated to BC Hydro – and we used to call these domestic purchases or sales – and that would be for when BC Hydro is selling or when we're needing to import to meet our deficits. Or they would be allocated to Powerex and under their responsibility for trade.

Now, I spoke at length in the revenue requirements process about how this allocation was done in terms of that BC Hydro, so me and my group, would be setting threshold purchase prices if we wanted to import or threshold sales prices to export. And this is described in section 4.1.3 of the application. But if we were, let's say, had a threshold sales price set at, let's say, $30 per megawatt hour and the Mid-C price was at 40 megawatt hours per hour, in that hour when there's sales going those exports would then be allocated to BC Hydro. And then if the Mid-C price was less than that $30, assuming that's our threshold sales price, then they would be allocated to Powerex.

So this is the mechanism that BC Hydro had to sell our surplus or purchase to meet our deficit. And it was really the only mechanism we had. So if, like in 2018, we needed to buy larger volumes, then it would mean increasing our threshold purchase price. Likewise, if we have more volume that we're needing to sell then we would be decreasing that price so that we would be selling more.

So this allocation mechanism, together with the day-ahead price index, created what we call transfer price risk. And Chris talked a little bit about this in his presentation, and there's really two

parts to this risk. And it's that we don't know, Powerex doesn't and BC Hydro does know, who that import or export is going to be allocated to until after the fact and as a result also doesn't know the price that the import or export would be charged at.

And so this transfer price risk is described in section 2.5.1 of the application in a lot more detail. But the overall result of this transfer price risk is that it discouraged Powerex from making forward sales so we couldn't sell BC Hydro's surplus energy in the forward market. Likewise, it discouraged the ability to buy in the forward market to meet BC Hydro's energy deficits and it also discouraged Powerex's ability to use the residual system capability of the system for trade purposes. And I'll be speaking more about what the residual system capability is later on.

So the first challenge is the declining liquidity in the day-ahead market. And this was an issue that was discussed in the 2018 and 2019 letter agreement (audio drops). These graphs are the same ones that were shown there an I'm going to walk through them in a bit more detail to explain what these are.

Proceeding Time 11:08 a.m. T25

So, hopefully I'll use the mouse here as a

pointer, but the top graph is for peak load hours. And so as Mark said earlier, this is the 6:00 A.M. to 10:00 P.M. on Monday to Saturday. And the bottom graph is for off-peak hours.

Now, the horizontal axis here is time, and it goes from 2011 to 2018. Now these graphs are actually from public information that Bonneville Power has published, and so each bar actually represents one quarter. Now, since it's Bonneville's graph, they have also based the quarters on their fiscal year, so the first one is actually -- and their fiscal year starts in August 1. So the first start of this graph is actually 2011, August 1, through to the end of 2018.

So, on the vertical graph, what this shows is the daily average volumes, and it's in megawatt hours per day. And there was some confusion in the 2018 letter agreement proceedings about this data and actually what it meant. But if you wanted to know, let's say the volume of transactions in 2018 for on-peak, on-peak, so this first figure, what you do is you take the average of these three, four quarters, and just eyeballing it, that's about 30, maybe slightly under 30 gigawatt hours today, per day, and then you multiply that by the number of high load hours in the year. So what that turns into is that

it's about 9,000 gigawatt hours of trading volume in those peak hours for that year.

Now, the main conclusion, and why we are showing these graphs, is to show the decline over time. So you can see that both for the peak and for the off-peak there has been a decline over time. And that has been one of the challenges that we are facing.

Now, as well as the decline over time, there is also a lot of variability within -- about how much is actually available on any given day. So what this graph shows, it's a narrowed in version of just a couple months. So it shows from July 2018 to September, and it's showing daily numbers. And you can see this line here, is the average for that period. And how it turns out is that there's actually 60 percent of the days that are below getting the average transactions. And what this really means is that if BC Hydro is needing to move volume, if we have a lot of surplus, then we don't know in any given day how much energy is going to be able to move. And let's say like this summer when we were actually had a lot of water, and needing to move it to be avoiding spill, having some certainty in being able to know how much volume can be moved and not wait for the day-ahead timeframe really helps in terms of getting the

volumes.

So, this is one thing the new TPA helps overcome, and we will come to that in terms of how later on here.

So, the second challenge is that our system has changed actually a lot since 2003, and as a result of that there is a potential in any given year for greater exports. Now this is because the system, the non-dispatchable generation has increased, and so I mean really what had happened over the 2000s is that Burrard was a dispatchable resource, and it has been replaced with a lot of non-dispatchable resources.

And I talked a bit about this again in the revenue requirements for our variability has been increasing. And we used to think of the system as having a plus or minus 5,000 gigawatt hours a year, that now (inaudible) be more like plus or minus 7,000 gigawatt hours a year. And there might be some uncertainty that we are still not capturing in those numbers.

Proceeding Time 11:13 a.m. T26

Then the third challenge, and this is something that Mark has already spoken to, it's that some of the best opportunities are in the forward markets. And he's talked already about this, that this is really driven by the resources adequacy and

the environmental policy objectives. And so I'm not going to go into that again, but this premium in the forward markets, that applies to both, you know, when BC Hydro is trying to sell our surplus, and then also when Powerex is using the residual system capability to make trades and trade revenue.

Now, the 2020 TPA addresses these challenges so that it's better for ratepayers. And one of the main benefits that I see is that now what BC Hydro can do, and this is what my group does, is that we can stipulate the volumes of imports and exports needed over different periods. And this is what's called a specified quantity request and its section or its clause is 4.5 in the agreement. But what this really does is it provides better certainty that if we have deficit that we'll be able to import, and that when we have surplus that we'll be able to move those volumes.

And this, so this is especially important when we have those large volumes, such as in 2018 when we had the letter agreement. And really, though, this is an improvement over the letter agreement and the new TPA replaces the need for those letter agreements. And one thing, that it's similar in that it allows us to purchase -- or it allows to make sure we can have imports for deficits, meet them in the forward market,

and obtain those volumes. But what it also enables us to do is then sell the surplus in those forward markets. And this has actually been — and I alluded to this already — actually really important for this year. This year has turned quite wet across the summer period and it has been extremely useful, the new TPA, for moving the volumes in the summer.

The other advantage of the new TPA compared to the letter agreements is that it's easy to adjust these requirements as the system conditions change. And 2019 was an example of that where we actually started very dry and we used the 2019 letter agreement to be making forward purchases. Then it got -- later in the summer, in August it turned quite wet and across to fall and we were lucky at that time that we were able to cancel those transactions. But under the new TPA it allows us to be changing these specified quantities as the system evolves, and to me that's what's -- it's the real benefit and it makes it a lot more dynamic and easier to adjust than the letter agreements.

So the other thing that the new TPA, the 2020 TPA, also does is it addresses the transfer price risk that was in the 2003 TPA and it does this by removing the one-day-at-a-time allocation. And so this now means that the TPA unlocks really those

forward markets and so that the surplus can be bought or sold in the forward markets, the deficits can be bought or sold in the forward markets by Powerex, and it also allows Powerex to be doing the same with the residual capability. Now, that doesn't mean that there can't be and there will definitely continue to be both day-ahead and real-time markets that there's transactions in, it just removes and unlocks that potential.

Now, that is the end of this section, so I'll stop for questions there. All right, let us see if we can figure out the --

(inaudible)

MS. MATTHEWS: So, Heather, if there's any questions?

MS. REIS: We do have a question from Thomas Hackney.

MS. MATTHEWS: Thanks. Thomas, please go ahead.

MR. HACKNEY: Hello. Is there a simple way to describe where the residual system can (audio drops) stop and the surplus deficits start?

Proceeding Time 11:19 a.m. T27

MS. MATTHEWS: There's a couple slides later on when I'm going to talk more about the residual (audio drops) so I think that will help answer that question then. And I might leave that until when I get there in the presentation and try to address it.

MR. HACKNEY: Okay, thank you. That's all I have.

MR. MacDOUGALL: James, your hand is still up. Is that from last time, or do you have a new question?

MR. WEIMER: Sorry, I just probably forgot how to turn it off.

MR. MacDOUGALL: Okay, not a problem. Just click on it again and it will go away.

Are there any other questions?

MR. SANDVE: Okay, so with that, we had planned to break for lunch from 11:45 to 12:45. We are running about 25 minutes ahead of that. So what I'd suggest is that we'll break for lunch now and come back at 12:30. All right, we will see everybody back at 12:30, thanks very much.

(PROCEEDINGS ADJOURNED AT 11:20 A.M.)

(PROCEEDINGS RESUMED AT 12:30 P.M.) **T28**

[TECHNICAL MALFUNCTION - AUDIO UNAVAILABLE]

MS. MATTHEWS: -- to give everybody a chance to understand that -- so first, non-flexible imports. And we were asked for a typical example. So non-flexible imports, or an example is when it is in the middle of winter, let's say it's on the Friday, and on Monday it's forecast to get really cold and be at peak. So three days ahead like that, there's a lot of unknown about how big that peak might be. And depending on what outages we might have, we have got some of the units forced out, we may be concerned that

we don't have enough capacity to be making that load. And enough diversity in that capacity to handle things. So this is a situation where my team, BC Hydro might ask Powerex to make an import. And really what this import is about is capacity, it's about meating that winter peak demand. So the timing of it is not flexible. So this is one of the examples, and probably the main example of a non-flexible import.

Now what I am going to do is step through the 2020 TPA and the 2003 TPA and compare them in terms of what is the same and what is different. And although some of these terms weren't used in the 2003 TPA, the concept and what actually happened, like that example that I described, are the same.

So, in these situations BC Hydro, and that's for my team, would stipulate what the needs are for the coming up day or for the next day. Like in the example I gave, with it being Monday, if we are making the request as Mark talked about earlier, that's trading on Friday morning, and so this is really the same. And the way that we do it is the same under the (inaudible) 2003, and the 2020 TPA.

Now, for the price of that non-flexible import under the 2020 TPA, it's based on the Mid-C day-ahead index price. And that's the same as it was under the 2003 TPA.

Proceeding Time 12:37 p.m. T29

Now, under the 2003 TPA what happens is if we may or may not have had a threshold price set for energy but when we're making a request like this it's set at the maximum for the desired quantity.

Now, the volume of this import does not go through the transfer volume account, so it does not increase the balance that's in that account. And likewise on the 2003 TPA the volume did not increase the trade account balance. And so under the 2003 it's only Powerex's purchases or sales for the trade that were going through the trade account. That's different in the 2020 TPA and I'm going to be explaining the differences and changes between the transfer volume account and what was the trade account. And you can see that we've deliberately changed the name because it is different, what it does it different, even though some of the concepts are similar.

Now, the other point is that in the 2003 TPA we did not explicitly call these non-flexible imports. Where it would show up is the market electricity purchase, that's in the RRA when we show our imports, it would have shown up there. And so we didn't differentiate between when a purchase was made for energy versus when it was made for capacity in

this way. Now, in many ways the 2020 TPA is actually more transparent because we are breaking it up into these different non-flexible imports.

So now I'll go to non-flexible exports. And this concept is similar but, imports and exports, there's some differences. So an example of this is in the springtime when the minimum generation on the BC Hydro system is greater than load. And I talked about this quite a bit in the RRA, in that what the minimum generation is is that we've got the BC Hydro system backed off as much as we can but the generation being produced is still greater than the load. And so there are minimum fish constraints, like for example out of Revelstoke, that there has to be a certain amount of minimum generation on. And in the springtime when there's lots of inflow coming both to the IPPs and BC Hydro's facilities that are run-of-river, don't have much storage, we get into this situation. And we've often -- and I think in the RRA I would sometimes call those forced exports because we can't store them, we're already backed off as much as we can, and it has to be generated. So under these situations there's no ability to utilize the storage to decide if we export. We're either going to be exporting it or spilling it, that timing is not flexible and so hence why it's called the non-flexible export.

So similarly I'm going to step through and talk about the differences and similarities between the 2020 and 2003 TPA. So the first one is similar in that BC Hydro stipulates the need for that applicable day. And this is what we do now. So one of the things my team does in the freshet is that when we know that we've got too much generation we're providing Powerex that information in terms of so that they know how much needs to be exported. So there's no change there in terms of what my team does and how we're interacting with Powerex.

Now, the price for these exports under the 2003 was based on the Mid-C threshold or the Mid-C index price and that's the same under the 2020 TPA. So when there's no choice about when the export can be made, it's just based on the daily price. And similarly, that the threshold sale price would be set to a minimum at this time because any of the exports are forced and they were going to, what we called at that time, domestic.

Proceeding Time 12:42 p.m. T30

And similarly to what I talked about for the imports, the volume is not going to decrease the transfer volume account. Just like in the 2003 TPA, this isn't a Powerex import for trade, and in the 2020 TPA, it is also not going through the transfer volume

account.

Similarly, this term, non-flexible exports, is new, it's not the term that we have used before, but the concept is the same and really what in the RRA and in other places we have probably called it as forced exports.

So now moving on to the use of the residual -- of the residual system capacity, and I am going to come back later and have another slide on residual system capacity, that I'll talk about how it's calculated. But this is where of course imports can be made in one period, to be offset by exports at another time period, and the differential between those prices is used to generate trade income. So that's the main example of what residual system capability is used for.

Now, for both the 2020 TPA and the 2003 TPA, this is Powerex's activity, it's their imports and exports, but it's BC Hydro who is always responsible for defining what the system can and can't do.

Now, in the 2003 TPA, these imports would increase the trade account balance. Similarly in the 2020 TPA, these imports increase the transfer volume account. And likewise, exports decrease the trade account, and exports now decrease the transfer volume

balance.

Now, for pricing, and the pricing actually switches when the volume account or the trade account is positive, so for the case where it's positive, the exports are priced using the weighted average price of the volume account. And then imports are priced at the applicable day-ahead mid-index price. And the vice versa happens when those accounts are negative.

Now, how this works in the transfer price agreement is all described in section 5.1.4. Again if this is the first time you are seeing this, it can be a bit to take in, and you need to take some time almost thinking it through.

So I am going to give a summary so far, because generally everything that I've said so far is really fairly similar between the 2003 and the 2020 TPA. So as a summary, we've got the non-flexible exports and imports, and these are priced at the Mid-C daily index. We've got the non-flexible exports, which are also priced at the Mid-C index, and then the use of the residual system capacity, and this is to be generating trade income, the imports and exports will cause the change in the volume account to change, and when that volume account is positive, the exports are priced at the weighted average price and the imports are priced at the applicable Mid-C index.

And then as an import comes in, or an export comes in, the volume in the account and the price in that account is also adjusted. So so far everything is similar in concept between the two.

Flexible imports. This is now where things start to change. And so an example of an import, flexible import is when BC Hydro is needing to import energy over a longer time period to meet an energy deficit or to manage some operational risk. And so the 2018 was an example of this, that led us to using the letter agreement, but there was a need for us to be importing energy. Exactly what hour that energy was imported in, didn't matter. And so this is what makes it flexible. Because we can use the system storage, and system storage I am referring to the large reservoirs in the BC Hydro system, so it is really the Peace and the Columbia. And there is flexibility using that system storage to decide which actually hours those imports are going to occur at.

Proceeding Time 12:47 p.m. T31

So for the 2003 TPA — and here I'm just going to be walking through the 2003, I'll come back to the 2020 TPA in a bit — we do not explicitly call it flexible imports. Instead what we do is we would set a threshold purchase price at the level to achieve the desired quantity of imports over the time. And so

I had mentioned this earlier, if we needed to achieve more, the threshold purchase price would have to be increased.

Now, the transfer price for those imports was based on the applicable Mid-C index price on that day. Volumes to manage the energy deficits did not go through the trade accounts and, again, back in 2003 the trade account was only used for Powerex activity for trade, not what we called the domestic imports or exports. And it was this combination of the threshold purchase price and the Mid-C index price that would really be jointly determining which hours of which days those imports were then allocated to domestic. And as we talked about earlier, this creates the transfer price risk for Powerex because that's only occurring in the day-ahead timeframe.

The concepts for flexible exports are very similar to the concepts on the flexible imports. So similarly, the exports are when BC Hydro has a surplus energy and we're needing to export that energy, it's more than what we need to serve load, but exactly when we make those exports is -- there's flexibility. And, again, the flexibility comes from the large reservoirs in the system, Columbia and Peace, that can help give a choice and flexibility for when to actually make those exports.

So under the 2003 TPA these were not explicitly called flexible exports. We would set a threshold sale price that was set at a level to achieve the amount of total exports over time at the expected market price. And it's the transfer price for the exports and the -- sorry, it's the threshold price that is set and the day-ahead price that then determines when those exports are allocated to domestic. Now, the volumes of these exports, again, did not go into the trade account balance. And it's the threshold price and the mid-index price that is determined, it's actually which days and hours are allocated to domestic and, again, this creates the transfer price risk to Powerex until we're into the day-ahead market time.

Now, there were flexible imports and exports under the 2003 TPA, they just weren't called that. So what has really changed in the 2020 TPA is that these components that were part of the 2003 TPA have been eliminated and those things that have been eliminated is this one day at a time approach and what it means is that I'm no longer setting threshold purchase prices and threshold sale prices, and so the transfer price is no longer based on the day-ahead Mid-C price. That's the things that are changed. Now instead what happens is that the TPA applies an annual

pricing approach to the surplus or deficit.

So first I'll talk about the annual flexible surplus. It is added to the transfer volume account balance at the end of the fiscal year. And now at the end of the fiscal year, we know exactly what it is, because it's occurred, when it goes into the account. And then the price that it goes into the account at is based on the annual Mid-C index times a multiplier, and I'll come back and talk about the multipliers later. This then adjusts both the volume that's in the account and the weighted average price that's in the account.

When there's a deficit that BC Hydro has, it acts in the same way. So the deficit is subtracted from the volume account at the end of the fiscal year. It's priced at the annual Mid-C index price times the multiplier and, again, that adjusts with the volume in the account and the price that's in the account.

Proceeding Time 12:52 p.m. T32

So one thing with this is that when we -- thinking about an annual surplus, what it's really doing is that from an economic perspective BC Hydro is still selling our surplus energy to Powerex but it's being sold at that annual basis and at the annual price. And so what this really does then is it does ensure that BC Hydro is still financially accountable

for the surplus or for our deficit.

Now, the actual payment under the 2020 TPA occurs when the exports occur. So when the export occurs, and for this example it's given when the transfer volume account is positive, it will occur at the weighted average price of that volume account. And this is going to apply to both what is BC Hydro's surplus that is in the trade -- or in the transfer volume account and to the use for Powerex of the residual system capability to generate trade income.

And similarly when it's an import, and in this case the example is when the volume account is negative, it occurs the price is at the weighted average price. And again this applies both to BC Hydro's deficit or imports that are being made for the deficit and using the residual system capability for trade income. Now, again, these details are in section 5.1.4 of the application.

Now, in this slide I'm going to summarize graphically the trade account and the transfer volume account how and what they are depicting. So under the 2003 TPA the trade account was used for the residual system capability. So if there was an import that was allocated to Powerex, it would come into an account. And an export that was allocated to Powerex would come out of the trade account. And then the price of that

transaction would be based on the weighted -- well, depending on whether it's positive or negative, the weighted average cost or the Mid-C price.

Now, for 2020 the transfer volume account, similar concept but it is different. So it's used for the annual flexible surplus and deficit. So as I mentioned before, at the end of the fiscal year the annual surplus or deficit gets put into the account at the mid-c average price times the multiplier. Now, whenever there's a flexible -- and that's this line, blue line, going in.

Now, whenever there's a flexible import that is also going into the account and a flexible export is coming out of the account. So what is different in this is that the, I call it the energy that is in the account or the volume is now a blend between what we used to call domestic versus what we call this trade. And so once that's happened there's no differential between an import being for Powerex or being for BC Hydro.

And this actually goes back to the question from the panel of why we changed the terminology. So we used to have the terminology of surplus sales or market electricity purchases or net purchases and sales from Powerex, that's now gone. Because once it's in here we can no longer differentiate -- we're

no longer differentiating what is the sale for Powerex or for BC Hydro, it's just a system export and a system import.

Now, I'm going to stop there for questions. That's the end of this section, which is really just all about the flexible imports, flexible exports, non-flexible imports and exports, and how all that comes together with the transfer volume account.

So I will open it up to questions.

Proceeding Time 12:57 p.m. T33

MS. BIENERT: Kristine Bienert from the BCUC, can I ask some questions if possible?

MS. MATTHEWS: Yes. Sorry, can you repeat who it was again? It was a bit muddled when you started to talk?

MS. BIENERT: Sounds good. It is Kristine from the B.C. Utilities Commission.

MS. MATTHEWS: Okay, thanks.

MS. BIENERT: Okay, some of these questions might be basic, but I would just like to confirm a few things. First of all, can you talk a little bit about what exactly is meant by allocated to domestic? And I guess I just would like to better understand that there is a mechanism that is (audio drops) energy that's going back and forth, but there's also (audio drops) transactions flowing through that same account? Is that correct, in regards to exports?

MS. MATTHEWS: Yeah, so under the 2003 TPA, what happened is that BC Hydro had set -- let's talk about imports. So we set a threshold purchase price. And so let's just say that is at $20 per megawatt hour. If -- and the allocation was after the fact. So at the end of the day, we know how much the net imports or exports are in every given hour.

So let's say in one hour that the import is coming in and the Mid-C price was $15. So because we had a purchase price set at $20, that import was allocated to what we call domestic and BC Hydro. Now, if that price let's say was $21, so it was above the price that BC Hydro had set, then it would be allocated to Powerex as a trade. And in that case, under the 2003, it would go into the trade account.

Now, the 2020 TPA is quite different, because it blends the two together. So BC Hydro's needs are really around when we have a deficit we need to import to meet that deficit, and when we have a surplus we need to sell that surplus. And instead of doing it one day at a time, by setting a threshold sale purchase price, or sale price or purchase price, that happens annually.

MS. BIENERT: Okay, that's helpful, thank you. I've got a few more questions that I wouldn't mind asking if there is time.

MS. MATTHEWS: Yes, please go ahead.

MS. BIENERT: I would also -- maybe I didn't grasp this from your earlier presentation, but could you speak a little bit about the circumstances within which flexible imports happen?

MS. MATTHEWS: Right, so flexible imports, there could be two types of them. So like in 2018, when the BC Hydro needed to import to have enough energy to meet our domestic loads, so that's an example of when a flexible import that BC Hydro needs to make, and it's flexible because the timing of when that import actually occurs, doesn't matter. What mattered was that we imported let's just say 3000 gigawatt hours across a three month period. So it's flexible from when it occurs. Now, that's the part that is about BC Hydro's need.

In this diagram here, when I've got the 2020 TPA and the flexible import coming in, that can also include what under the 2003 TPA would have been an import for trade for Powerex.

So let's just take an example of, let's say in a given year that BC Hydro's surplus deficit is actually right around zero, that we are actually forecasting that you've got exactly what we need. Now, Powerex could still be importing and exporting from the system for trade. So you would still have

flexible imports coming in and flexible exports going out. But again, under the 2020 TPA, and this is what is depicted in the diagram there, the domestic versus trade doesn't exist, and it all just gets blended together in this account. And what we have is a flexible import, flexible export.

Proceeding Time 1:02 p.m. T34

MS. BIENERT: Okay, that's very helpful. Can I ask, if it's possible, before we commence our first round of information requests, are we able to get some actual example calculations that demonstrate maybe how things would have worked before and how they'll work under the new agreement to demonstrate on a numeric basis, maybe on a journal entry basis, the difference between (audio drops) look like?

MS. MATTHEWS: Yes. So it's probably easiest to ask it in the IR. And I know there was some questions in this try to give an illustrated example, but that's probably easier for us to do in a written form as opposed to walk through numbers. But yes, we can provide an illustrative example.

MS. BIENERT: Okay, that would be helpful. I have one last question on this and it's more just a general understanding question. So in your workshop, the activities undertaken, there appears to be instances where BC Hydro employees are making decisions to

support trade activities as well as assist them to use BC Hydro's storage access, possibly to allow for maximized profitability and (audio drops) any other agreement that exists that transfers costs from BC Hydro to Powerex for support activities or for asset usage? Or is the TPA here the only agreement that exists that relates to the energy from -- the use of energy and supporting capacity or supporting (audio drops) BC Hydro to make that (audio drops)?

MS. MATTHEWS: Yes, so the TPA is the only agreement that is around the transfer for the energy and the costs related to that energy transaction. There isn't -- I mean, we did have the 2018 and '19 letter agreement which were the additional agreements on top of the 2003 TPA, but that got cancelled or terminated when the 2020 TPA came into being last April. So there's no other agreement.

MS. KRISTINE: Okay. And just to be very clear (audio drops) allocation (audio drops) related to the energy as well, is that correct? So if there was no allocation of those FTE time or assay value of some sort --

VOICE: (audio drops)

MS. KRISTINE: Okay, thank you.

MS. MATTHEWS: Okay, so there is -- I was going to speak to this on a later slide, I'll come back to it a bit,

a bit more on the residual capability. And I know there was a question there because there is a clause in the TPA that allows for Powerex to ask for BC Hydro to increase that capability and a mechanism, a provision in the TPA that would allow BC Hydro to, if we did that, for Powerex to pay for it. So that is covered under that provision. That provision was actually similar -- it was in the 2003 TPA and it's also in the 2020 TPA. And that's the mechanism we would use for anything like that.

But that's hasn't actually been used, from my knowledge, for a long time, not while I've been the director here. And it's not -- I'll come back and talk to that a little bit later in terms of how we operate, the decisions that I make and how we're interacting with the Powerex team.

MR. SANDVE: Chair Mason, I see you have your hand up. Do you want to unmute and ask your question?

THE CHAIRPERSON: Yeah, thank you. And you can hear me?

MR. MacDOUGALL: Yes, we can.

THE CHAIRPERSON: Thanks. Ms. Matthews, thank you for that presentation. That was very informative. I wonder if I could ask you to help me characterize the meaning of a balance in the transfer volume account. And the specific example I'm thinking of is at the end

of the year when you've applied your annual flexible surplus, let's say, before going into next year how would you characterize a positive balance in the transfer volume account? For example, is it the total amount of energy that Powerex has available to sell in the following year? Is it the balance that Powerex must or is expected to sell in the following year? Or something completely different? Thanks.

Proceeding Time 1:07 p.m. T35

MS. MATTHEWS: So it is the volume of energy, that is certainly the way to see the volume account. The volume accounts can go up and down throughout the year and that annual amount that is going in just adds to the balance. So perhaps let's say the -- if there had been a number of exports across the year, it may have gone negative. Adding in an annual surplus may have brought that back to positive. So there's not a -- there's no explicit requirement for anything to be done in a time period, but both BC Hydro and Powerex would be making the decisions and Powerex's decision about importing and exports based on the economics of deciding that it's best to import or export.

Did that address your question?

THE CHAIRPERSON: No. And I'm certainly not disputing anything that you said, but I still am not left with a characterization of what the surplus volume in this

transfer volume account at a point in time actually means, if anything?

MS. MATTHEWS: So I'll maybe try it this way and then we'll see if we can describe (inaudible). It is an energy amount and the energy in there, it is -- I'll say it's tied to our system, our reservoirs, although we don't say that a certain volume account, you know, translates into this reservoir elevation, but there is a physical connection on that because it is a volume of energy that's represented in that account. Any --

MR. HOLMAN: I'll try another way, which I like the way Heather characterized it. So it's Mark Holman here. I think of it as Heather described, rather than taking a particular snapshot, at any point in time what is in that account is -- when we first started the TPA we had a small, relatively small balance transferring over from the past TPA that's set forth in the application.

But putting that aside for a moment, what's in that account at any point in time, and let's just deal with surpluses, it would be all of the annual surpluses that have occurred so far, plus all of the flexible imports that Powerex brought in, let's say for trade purposes, minus all the exports with exports drawing down that balance that's comprised of the surplus plus the import. So it's an ongoing tracking

account where exports draw down surplus energy that's added to the account once per year once the surplus is known, plus flexible imports that may come in for trade, and that's the surplus scenario.

So with surpluses it's this ongoing account balance, and as Heather described, the annual flexible surplus continues to be BC Hydro's financial responsibility and it gets priced at the annual price times the multiplier. The flexible imports that occur using residual system capability are Powerex's responsibility. Help?

THE CHAIRPERSON: Okay, thanks very much.

MR. MacDOUGALL: Okay, I see Melissa, you have your hand up? Melissa Davies?

MS. DAVIES: Yeah, thanks. I have two questions, hopefully clarifications. The first is in respect to non-flexible imports.

MS. MATTHEWS: Non-flexible imports, okay.

MS. DAVIES: Yeah, so when BC Hydro needs capacity. You know, under normal operation I'm assuming there's multiple things that BC Hydro could do to try to either reduce its capacity requirements or purchase imports, and previously setting up price point, wouldn't that provide some sort of signal or ceiling, so if the price is going to be above that, BC Hydro doesn't really want the import? Do I have that

correct?

Proceeding Time 1:12 p.m. T36

MS. MATTHEWS: No, not entirely. And this is where we get into energy versus capacity.

MS. DAVIES: And I'm just talking capacity, like the non-flexible, like you needed a specific moment.

MS. MATTHEWS: Right, so when it's needed, we are not -- like we're not setting a price on that need, we're basing it on what the system needs are. So at the moment and in general, BC Hydro plans its system to have enough capacity. And so that's more the long-term planning part, so that when I get to operate the system in real time, we generally have lots of capacity available. But different things happen on the system with outages, that might mean that we do need to import for capacity.

So what we do on this is we are just -- and the other thing about often when we are doing it is when we're coming up to a peak day we are also sometimes looking for a bit of diversity to cover off potential transmission contingencies as well. So, you know, having some coming in on the intertie, having -- you know coming from the interior on the BC Hydro system, running Island Generation, those all give us different diversity of that. So, we're really looking at what that need is, and then making the request to

Powerex to import that.

We wouldn't be -- we're not putting a price on that capacity. Where we do put prices is more related to our energy study. Our energy and our basin prices of our big storage, and that's all related to the energy studies.

MS. DAVIES: Okay, so it sounds like with the 2003 TPA there would be a price put on it, whereas now you are more just communicating the need. So I'm just worried that there is no -- kind of like blind adherence to need over what that might actually cost, in the end, the ratepayer?

MS. MATTHEWS: Yeah --

MS. DAVIES: Where there are other options sometimes rather than just importing.

MS. MATTHEWS: Yeah, and I think there is no difference to the 2003, 2020 in terms of a price being put on that. When we are making that request of Powerex, we are also fully aware of, you know, we don't know what the price will be on that day, but we know how it's been. And have a bit of an idea. I mean, I think perhaps, and I know there is a lot of interest from customers about load curtailment, and previously we did have the pilot. So if I use that as an example, that was then another resource that, you know, was decided on in more the planning context that BC Hydro

would have. And then in any given time, when we were looking to make those choices, we'd be making those choices based on the costs of making that curtailment, or the cost of the imports, the cost of (inaudible) so nothing changes in that part of it. And again the full -- you know, what is that resource stack that should be available to me in the operation timeframe. That gets set up from the planning perspective. And then what's in operations, I have those, and we are looking at the cost of those.

MR. MacDOUGALL: And just -- it's Mike here. When Heather before lunch went through, in the 2003 TPA, when it was non-flexible, there was a price set basically at the maximum with a specified volume. Under the 2020 TPA you basically specify the quantity, and you don't have to set the price. But effectively the price under the 2003 TPA was the maximum price of the market.

MS. DAVIES: Okay, what Powerex actually paid for, got that power for would not be higher than that maximum price?

MR. MacDOUGALL: It would have been what the Mid-C price was, up to that maximum threshold price that was set.

MR. HOLMAN: A good way to think about it is maybe with numbers, is from my perspective when Heather's calling

me, as an example she gave, and we're talking about a Friday for Monday and it's cold, and the BC Hydro load is forecast to be 10,000 megawatts over the evening? But because there are forced generation outages on the system, there's only 9500 megawatts of available generation, and so 500 megawatts is needed to serve demand, whether you're under the 2003 or 2020 TPA, we're going out and acquiring and importing that 500 megawatts at the day-ahead Mid-C index under both.

Proceeding Time 1:17 p.m. T37

It's not a decision to say, "If it's below this price let's not import it," because it's a capacity need, it's a one-day need based on a capacity need on the system, it's really not about price, it's about what is the need that BC Hydro is communicating to Powerex and we go out and make sure that those imports occur.

MS. DAVIES: Yeah. And, I'm sorry, I'm drawing this out. I was trying to get at the distinction because under the 2003 agreement if it costs more than that set price it would go into Powerex trade income, which, you know, was protected by government, which had a ceiling on it, so losses wouldn't go to ratepayers. Whereas if it was under it would go to market purchases which is then a line item on Hydro's income statement. So I was just trying to differentiate between where that cost risk goes to.

MS. MATTHEWS: If I can go back -- so in this case it's a non-flexible import and I think you'll see that in both cases the price that BC Hydro pays is the Mid-C price, so there's no change in that.

MR. HOLMAN: In both cases it's not going to the trade account or the transfer volume account either. It's both being done for BC Hydro needs at that day-ahead Mid-C index, not under the 2003 TPA allocated to Powerex for trade.

MS. DAVIES: Okay. Then, sorry, next question, hopefully a way quicker question. In terms of the weighted average price that is being proposed to kind of eliminate the transfer price risk that Powerex has, is that a lagging indicated or is that set? It just kind of sounds like it's fully being transferred onto BC Hydro then.

MS. MATTHEWS: So that account really works similar as the 2003 TPA and 2020. So let's just take a hypothetical example where it starts at zero or it happens to be at zero and then an import is made into it of 10 gigawatt hours at a certain price, let's say $10. That volume that’s in there is now exactly that, it's 10 gigawatt hours and it's at that $10 price. So the weighted average price is a reflection of -- or the weight average price that's in the account is a reflection of everything that has happened to that

point where, you know, transfers have been made in and out of it.

Now, what's different under the 2020 TPA, compared to the 2003, is before that would have just been imports and exports for trade, but now at the end of the year that whole annual flexible surplus or deficit gets added in at that price. But it's always a reflection of everything that's happened up to that point.

MS. DAVIES: That's just for reporting purposes?

MR. HOLMAN: I'm wondering if maybe here we'll maybe try a numeric example like Heather gave. So if you look at on the left under the 2003 TPA, if Powerex for trade purposes imports over time 1,000 gigawatt hours at different day-ahead Mid-C indices for trade and the weighted average price is $30, then the trade account, if all those imports occurred, would be 1,000 gigawatt hours at $30.

Proceeding Time 1:22 p.m. T38

Then when Powerex later exports that energy, we would pay BC Hydro the weighted average price of $30. And that way the imports and exports are not only offsetting in volume, but BC Hydro paid us $30 when we imported it and charged us $30 when we re-exported it, that way Powerex is fully financially accountable for those offsetting imports and exports

for trade. And the idea would be that hopefully we're buying it in the market at lower prices and selling it in the market at higher prices and generating that income.

Under the transfer volume account, if there's no surplus or deficit, the exact same thing would occur, 1,000 gigawatt hours would come in at $30, and then then we go to export the weighted average price would be 1,000 gigawatt hours at $30 in that account and we would be charged that for the exports.

So the same thing is occurring with the residual system capability, but now on top of that we're bringing -- and let's use the surplus example, we had 1,000 gigawatt hours of trade imports of $30, if we had 3,000 gigawatt hours of annual surplus, let's say at $40, then we're going to have a weighted average price in the transfer volume account of 4,000 gigawatt hours at 37.50. And when we export all 4,000 we will be changed the 37.50 times that 4,000 gigawatt hours and the net outcome of that is that BC Hydro receives from Powerex payment for the surplus at the annual price times the multiplier, and Powerex continues to be accountable for the flexible imports that are offset by flexible exports for trade purposes.

And so you maintain the financial accountability, but now, as Heather describes, two things are going into that account, flexible surplus or deficit and flexible imports, and then flexible imports are coming out and the weighted average price is tracking that to maintain that financial accountability.

MS. MATTHEWS: And one thing, because I am wondering if your question, because you talked about the reporting, and you might be referring to, like in an RRA, how this is reported and how the numbers look. Because Chris talked about at the start that the categories are different, but we'll -- in the RRA and I think there's an appendix in the application that includes this information, we would still be similarly forecasting basically what the value of the cost of energy is. The TPA is just a mechanism to allow that to happen.

And so in the RRA when we're forecasting what the value of, you know, sales exports or imports are, that stays the same -- sorry, it changes. The categories are different, but you'll see that that's where we'll be reporting on the costs of energy like we do now in the RRA.

MS. DAVIES: Okay. My question was just a bit more towards that I thought I had read that it was an

annual calculation, that average price?

MS. MATTHEWS: That's correct. So it's --

MS. DAVIES: And clearly in your example, those imports and exports aren't just happening at the end of the year, so there's going to be a transfer price risk kind of assumed by BC Hydro over the course of the year until it's like cleared up at the next time.

MS. MATTHEWS: What might help is if we in the IRs give a numbered example, an illustrative example, which was what was requested previously. Because you're right that the imports and exports will be happening all the time, and then the annual amount only goes into the account once a year. But that annual amount will also be being forecast throughout the year.

MS. DAVIES: Right, but aren't exports priced at that annual amount as they're happening in real time?

MR. HOLMAN: So the exports are priced at the weighted average -- well, depending if the account is negative or positive, the weighted average costs of the account. So, I mean, I'm not sure --

Proceeding Time 1:27 p.m. T39

[inaudible/overlapping speakers]

MS. MATTHEWS: Yeah, and I think when we provide an illustrative example with the numbers then that might help.

MS. DAVIES: Yeah, that's great. If you could try and

clarify in that illustrative example. It just seems to me like there's a little bit of asymmetry there in the price risk between a lagging value to price exports in real time versus an actual market price for imports. So it seems like just a bit of imbalance.

MS. MATTHEWS: Okay.

MR. SANDVE: I think one area of the application that might be helpful to review is section 5.2. In that section we have a comparative example. It talks about transfer risk and what it looks under the 2003 versus 2020.

MS. DAVIES: Yeah, that's exactly what I read where I got confused in the first place. So, thank you.

MR. SANDVE: Okay, so maybe we'll be able to clarify that further in the information request then. But I think, you know, and some of this goes back to, I think, the original question from Commission Mason. It's really that weighted average price that helps with the risk. Because if you know the volume of energy that's in the transfer volume account or previously the trade account and the weighted average price that that volume of energy is at, that really allows for transactions to occur with that weighted average price being known. So, and I think that speaks to the issue you're bringing up.

(audio drops)

MS. MATTHEWS: So we notice that there was some other questions here, so we wanted to make sure that we had a chance to address those. I think it's --

MR. MacDOUGALL: Tom Hackney had his hand up for a while. He's dropped off, I don't know if he gave up on us.

MR. HACKNEY: I think you answered my questions.

MR. MacDOUGALL: Okay. Charlene?

MS. de BORE: Hello, Charlene de Bore, I'm new with the BCUC staff. I just wanted to start by thanking you for the opportunity to give some additional background on the 2020 TPA.

In the context of the high demand for green power in the U.S. you mentioned earlier in your presentation, is there or are there any mechanisms in the 2020 TPA, or elsewhere for that matter, that protect ratepayers or their interests from over exporting? You know, drawing down BC Hydro's energy reserves?

MS. MATTHEWS: Yes. So, this is really about the specified quantity request. So BC Hydro still maintains the responsibility and accountability of operating the system and can put constraints on what those imports and exports can be. And over that time period that’s done by those specified quantity requests in terms of setting what the limit can be.

MS. de BORE: Did the threshold price serve that function

in the previous TPA?

MS. MATTHEWS: Yeah, so what the threshold price -- I mean yes and no, I would say. Like, BC Hydro always has the ability to be constraining the system. And under the 2003 TPA what the threshold purchase price was, that was only for domestic purchases or sales. So it was meant to -- we wanted to give Powerex the flexibility of buying that energy, but what we were really doing is if we set a purchase price is we're giving an indication of what price we're willing to pay for that energy.

So that alone would not mean that it would limit what Powerex would either import or export because they might be doing that for their other trade reasons. But there's limits that BC Hydro can put on the system that essentially, you know, always allow BC Hydro to have control of the system.

MS. de BORE: Okay, thank you. And maybe this will be better suited to the IR phase, but can you point me to any of the specific places in the TPA where BC Hydro is given that authority to put those constraints in place or where those constraints are explicitly raised in the TPA?

MS. MATTHEWS: Yeah, we'll take it as an IR. I can't remember the exact locations.

Proceeding Time 1:32 p.m. T40

MS. de BORE: Okay, thank you.

MR. AUSTIN: David Austin speaking. I'm sorry I don't have a hands up button, so I have to just try and find a spot.

The question I have, and maybe it's my lack of understanding, but with respect to what I would call comingling of flexible imports for trade and imports for domestic purposes in the transfer volume account, how at the end of the year, or during the year, can anybody figure out how much electricity BC Hydro is importing purely for domestic purposes?

MS. MATTHEWS: Yeah, so what we can show is what the annual deficit or surplus will be. Once those are comingled, we are not splitting out exactly what that is for. Now we do have the distinctions between the flexible import and the non-flexible import, and those have specific meanings. But the concept of like what we used to have as domestic versus trade, has really disappeared within this framework that we have now.

MR. AUSTIN: So the answer to the question is no, you won't be able to determine that anymore?

MS. MATTHEWS: We won't be breaking out those in any individual transactions of how much is for BC Hydro needs, versus what is for trade, that's correct. But what we do do is that we do have what those annual deficits, or those annual surpluses are, and the non-

flex and flex.

MR. HOLMAN: Yeah, we still have full separation between the surplus and deficit volumes and value. And it actually uses the actual surplus and deficit at the year end, and that is separate and distinguishable from trade. And there is actually additional transparency in that the 2020 TPA provides separation explicitly of flexible imports from non-flexible imports and flexible exports from non-flexible exports. So not only do you have separation between BC Hydro's financial responsibility of surpluses and deficits and Powerex's for trade, but now you also have the added transparency of flexible versus non-flexible that shows up as we go through the year.

MR. AUSTIN: I appreciate that, but it doesn't sound like at the end of the year anybody can point to a number that says for domestic purposes, BC Hydro imported X gigawatt hours of electricity.

MR. HOLMAN: Actual.

MS. MATTHEWS: Yeah, there will be an actual amount of the imports that come into the system, and likewise actuals of what leaves the system. So we will be reporting on that, and --

MR. AUSTIN: Yeah, I appreciate that, but that, the imports can include flexible imports for trade, which have got quite frankly nothing to do with BC Hydro's

domestic customers except through -- with respect to their rates. Right now, say for example, you can say in 2018, 2,000 gigawatt hours was imported purely for BC Hydro's domestic customer requirements. And it doesn't sound like you are going to be able to do that in the future. That's my question.

MS. MATTHEWS: So the old TPA, the allocation was after the fact, and really that's the same happening in the 2020 TPA, and ultimately, I mean BC Hydro's goal, my role and I will come to this in the later presentation is, to maximize the consolidated net revenue of the system. And so I disagree that that's something that ratepayers aren't interested in.

MR. AUSTIN: I certainly understand --

[inaudible/overlapping speakers]

MS. MATTHEWS: The framework under the TPA is different. So I'd completely agree that the framework under the TPA is different, and it's not broken down into this specific import for trade versus domestic. That is a change, yes.

Proceeding Time 1:36 p.m. T41

MR. AUSTIN: My final question is with respect to the slides. There was a reference in many places to the mid-C for the basis of a price and in other words it's an index price. Earlier in the presentations we heard that the volume of trade or the number of transactions

or whatever you want to call it is mid-C doesn't cover the full trading in the market anymore, say for example there's the ability to trade directly at California hubs.

So my question is does using mid-C as an index price properly reflect prices in the market? And I'll just add to that, let's say for example that there are premiums in terms of price for green or renewable energy in the market, how are those going to be captured in terms of the price index that's going to be used using mid-C?

MR. HOLMAN: So you're asking quite a -- I think a couple questions about the market, so maybe I'll take that one. So the first thing to note is that, you know, as described in my slides, the two different timeframes that are kind of the predominant timeframes where volume can be transacted is day-ahead and forward with less volume generally transacted in real-time.

So the first point I would say is that although the day-ahead volume and liquidity has declined, it still is an important market and really it's the day-ahead and forward physical markets that are the important markets for accessing liquidity to purchase or sell large volumes, either to meet a deficit, a surplus, or for residual capability. So

that's kind of the first thing to make sure that we're clear on.

The second part is is that the day-ahead mid-C index is still the best available index for the market value of energy in the Pacific Northwest or adjusted for transmission at the B.C. border. Now, Powerex does transact, as I described, at many different locations across the west, including California, but that is really taking -- when we're doing that from the BC Hydro system to or from, either surplus energy to meet a deficit or for trade purposes, it's taking that and combining that with Powerex's transmission investments to, again, as Heather described, for Powerex to maximize its net income, but to reach the broader goal of maximizing the consolidated value.

And so importantly, the transfer price still continues to be based on a mid-C index, which is the right location for the value of the BC Hydro supply, but to the extent we are able to capture premiums in remote markets by combining that with transmission rights that we compete and secure, all of that benefit of course is also returned ultimately back to the ratepayer as trade income BC Hydro uses to reduce rates.

MR. AUSTIN: Thank you. Just one follow-up question

from that. How does Powerex pay for that investment in transmission in the United States?

MR. HOLMAN: I'm not sure I understand the question.

MR. AUSTIN: Well, if you're investing in transmission in the United States, it costs money, so the question is does that money come from the parent, BC Hydro, or does Powerex have some sort of capital that it's accumulated over the years so it can invest in that transmission?

MR. HOLMAN: I think what I would say at a high level is that Powerex's net income is -- and the trade income is income that is earned after paying BC Hydro for surplus energy, or BC Hydro paying Powerex to meet a deficit and after paying for those transmission rights.

Proceeding Time 1:41 p.m. T42

So the cost of those transmission rights Powerex bears and then needs to recover that and more than that in order to generate income, which it does.

MR. AUSTIN: So essentially it just comes out of cashflow, is that correct?

MR. HOLMAN: I'm not in the finance department, so perhaps if you have further questions related that are financial in nature, it might be best to put those in an IR to BC Hydro.

MR. AUSTIN: Thank you very much.

MR. MacDOUGALL: So I don't see any other hands up. If other folks are in the same position as David and can't raise a hand, now would be the time. Otherwise, I think we're on a short break. Oh, Tom, did to you re-raise your hand?

MR. HACKNEY: I did, yes. So I earlier asked the question of whether there's a clear simple way to distinguish between a surplus and deficit on the one hand and the residual system capability on the other hand and I wasn't sure if I got the answer to that. And I'm not sure if this is the right place to follow up that.

MS. MATTHEWS: Yeah, no, we haven't --

MR. HACKNEY: If so, there's the question.

MS. MATTHEWS: Yeah, I haven't answered that yet, but in the section coming up after break I will definitely answer that question.

MR. HACKNEY: Okay, thank you.

MR. SANDVE: Okay, I'm not seeing any other hands so we're actually right one time. It's 1:43 so we'll come back at two o'clock for the final section.

(PROCEEDINGS ADJOURNED AT 1:43 P.M.)

(PROCEEDINGS RESUMED AT 2:00 P.M.) **T43/44**

MS. MATTHEWS: Come back from the break. In this part of part 2 of when you go through TPA terms, I'm going to be discussing some of the specific terms in the TPA

and some of these have already been brought up in the last couple sections, but I am going to be addressing some of the specific questions that have been asked, especially about the residual capacity. So this section is not as long and as dense as the other one that I just walked through.

So specified quantity requests. So previously I spoke about this as being one of the main benefits of the new 2020 TPA, that I no longer set the threshold purchase and sales prices but instead I can set the specified volumes that then become constraints on the imports or exports that Powerex has to achieve over a different time period. And they can be specified, you know, over the next couple months, over the next six months. It's really being set on what the system needs are in terms of how I and my group will be setting them.

And so this mechanism, as I talked about earlier, is really what eliminates the need for the 2019 letter agreement. And this is in 4.5, is the clause of the agreement that the specified quantity requests are discussed.

And so this point really just reiterates what I've already said. It allows us to set these specific needs over the different time horizons and that this provides BC Hydro a more direct way to

achieve the imports and exports that are required by the system.

Now, it's still the same, though, that Powerex can now decide, subject to the system constraints. And system constraints are what BC Hydro determines. So we set what those are. So subject to those constraints Powerex can decide which markets to be selling or purchasing into, so that can be the forward, the day-ahead, the real-time and also what hours of the day that those deliveries might be made. And then this provides the best opportunity for selling the surplus, purchasing the domestic imports and also using that residual (audio drops) these specified quantity requests that BC Hydro makes sure that we still set what the system needs.

So residual system capacity. This is also being brought up and the questions on it were about how do we determine it and how do we consider requests from Powerex to increase that. So I'm going to start by just defining what it is and get to how to determine it.

So it refers to the ability of the BC Hydro system to either purchase electricity products from BC Hydro to Powerex or for BC Hydro to sell. And really it comes down to the ability to back off the system. So we are generating on our system to meet our load

and if we back off generating, so now an import is needed to meet that load, that allows an import. And vice versa, if we increase our generation so we have more generation, so that enables the ability to make an export. And we've talked about this, that Powerex uses this residual capability for trade income by making imports in one period and offsetting sales in another period.

So how BC Hydro determines the residual capacity, it's through the modeling efforts and the tools that we do. And to answer the question from Tom, it's not like there's one point in time where you can define that it's this up to a certain point and now that's residual. In the RRA I talked a lot about how we planned the system in the operational timeframe and we do that at different time scales and using different tools. So the energy studies is one of those tools, it's looking out across the next three years of what the generation will be from the units or what the import or export requirements are. So we're looking at the three years, we're looking at it one year out, (audio drops) out the next couple months and then within the months we're looking at the two-week period, the next-day period. And it's a continual process and there's different tools that are defining it.

Proceeding Time 2:05 p.m. T45

And that process throughout that, which is what my team is doing, we are also talking to Powerex, on all those different time frames about what the system conditions are, how they are changing and what it's looking like.

So, it's very similar to what I talked about in the RRA, is this continual planning process. And then as part of that, we are constantly communicating with Powerex on that. And we are constantly reupdating those numbers. So it's not one individual spreadsheet that gets given to Powerex that says "this is the excess capability," because we are always looking at all of those different time frames.

And then this point just emphasizes what I had already said, it is this ongoing dialogue about the system conditions. And we are also having ongoing dialogue about the market opportunities more broadly. And we are providing and having those discussions about what the outages are on the system, what our loads will be, what the extra capacity there might be on the system, how much energy surplus we might have, how much deficit. And when I speak of surplus and deficit, we talked about this in the RRA as well, it's really surplus is you can think of it -- and this is kind of generalized as how it is, but it's the load

minus the inflows to the system. So, it's what's left over after we have met our load. But in the end, the processes for how we determine what is residual system capability (inaudible) 2003 TPA and the 2020 TPA.

Now, there is a clause in the agreement, clause 4.3, where Powerex may make a request to BC Hydro to increase the residual capability. And if BC Hydro determines to do this, this section allows that BC Hydro can recover that cost, incremental cost from Powerex.

So, as I mentioned previously, that is a term that was also in the 2003 TPA. It's not something that has been used often. I can't actually think of an example of it. But again, this is an enabling agreement. So if there is something that came up that wanted to -- if Powerex wanted Hydro to do something, but Hydro didn't think it was worth the benefit, then potentially Powerex could pay for it.

Now, what generally happens though is, as I've discussed, is it this continual dialogue back and forth. And where that's really important is when we are planning our generation outages. So we are always looking at wanting to have as many of those units available in the time periods where market prices might be high so that we can have exports from the system. And so there is this constant dialogue around

that, and also the constant adjustment of outages and other system constraints we may have, as can be done to try to again make the most value out of the system.

So surplus and deficit multipliers, we talked about this before in terms of how these are used with the annual surplus or deficit volumes, and that volume being going into the transfer volume account. Now, the principle behind how these deficit multipliers are set up are that it reflects the fair market value at which parties acting at arm's length would be willing to transact at.

Now, the other point is that in general, this allocation between BC Hydro and Powerex will not have any impact on the ratepayers. So the surplus and deficit multipliers are each different, and they are multiplied by the annual mid-C price. And then we talked about this before where it's the surplus multiplied by the price that then goes into the transfer volume.

Proceeding Time 2:10 P.M. T46

And that for surplus this is about value that BC Hydro will ultimately receive from Powerex over time for the sales of that flexible energy. And for deficit, this is a value that BC Hydro ultimately plays over time to meet the deficit as the imports occur.

Now, the surplus multiplier is initially

asset at 1.15 and the deficit is initially set at 0.85. And these are generally consistent with the value that was received under the 2003 TPA. We used the historical data to be deriving what these values are.

The Wear and Tear Procedure, this was a new clause in the TPA. And what it does, it allows BC Hydro to either charge or to pay Powerex for effects of if the import and export decisions are increasing or decreasing wear and tear on BC Hydro's generating equipment. Now, this is not something that we are using currently, we haven't integrated a price, but it does provide the option to be applied in the future. So there's no plans to do that at the moment, but if BC Hydro was to see that the imports or exports have changed significantly and for some reason those -- like they're being turned on and off a lot more and that's creating more start-stops or ramping on our units, then it's a way that we could recover the costs of that wear and tear. And really the main purpose of it is that it would then allow us to provide the correct price signal to Powerex so that they would account for that price in their activity of deciding on those imports and exports.

So, again, the principle is that -- and we don't have this in place at the moment in the method,

but if we were to set it up the principle would be that it would reflect a fair market value at which the parties would be willing to act at arm's length with, would be willing to transact. And, again, this wear and tear payment is going to be just between the two different companies, so there's no impact on ratepayers, it's really an allocation between the two companies.

There was a question from the BCUC panel on decision making under the 2020 TPA and how that affects the RRA. And this is actually my last slide, and so it's really meant to summarize my views on that and talk about the decisions. And so the main thing is that BC Hydro's goal remains the same and it's to maximize the consolidated net revenue from operation. So that's what the function of my group is, is to make sure we have generation to meet load and to make sure that we obtain the most value out of our system that we can taking into account all of our different constraints.

So the main thing is that under the 2020 TPA, the actual decisions that I make every day don't actually change. It's still the same discussions about what's happening, is inflows, you know, increasing or decreasing? Is a load up or down? Is the market changing? What are the constraints on a

system? I talked a lot in the RRA about those drivers and those are the same drivers that are affecting the economics of how we're dispatching the system.

But what the TPA does do is it provides better incentives in making these economic decisions and enables Hydro's surplus or deficit to be purchased and sold in those different timeframes as we've talked about. And so in the end what this then does is it enables maximizing the value of the system and that benefit does go to the ratepayers.

So I'll stop there for questions. And, Tom, hopefully I did cover your question on the residual capability.

MR. MacDOUGALL: I think you must've, since I don't see any hands or -- oh, there we go. I think Charlene beat you to it, Tom, so Charlene first.

MS. de BOER: No, I'm happy to yield the floor to Tom first to the discussion earlier in the day.

MR. MacDOUGALL: Go ahead, Tom.

MR. HACKNEY: I think actually I'm moving on to a different topic, so Charlene can go and if she --

MS. de BOER: No, no, I'll yield.

MR. HACKNEY: All right. Thank you. So just to confirm my understanding, the distinction between operating and planning does not affect the transfer pricing agreement at all, so if that distinction is

changed, it would mean the TPA would not be -- it would remain operative, is that correct?

Proceeding Time 2:16 p.m. T47

MS. MATTHEWS: Yes. So you're correct that when we talk about the operating time horizon and the planning time horizon that that hasn't changed and the TPA isn't impacting that.

MR. HACKNEY: Okay, yes, thank you. So, and this question may turn into an IRP question, but does that mean that if BC Hydro were to start using trade to meet some of its longer term requirement that the existing TPA or this 2020 TPA could still remain and function too for that purpose?

MS. MATTHEWS: Yes. So the question of, you know, BC Hydro using long-term imports, I think you said, for meeting needs, like that is an IRP type of question and I think that the IRP that's occurring or happening that that would be the place to have that discussion. The TPA would continue regardless.

And I guess if there is other questions of that, like, we don't want to get into the IRP kind of territory here. But if there's any further questions on that we could follow up in IRs.

MR. HACKNEY: Okay, thank you.

MR. MacDOUGALL: Okay, I think Charlene -- sorry, didn't mean to cut you off, Tom

MR. HACKNEY: I'm done, thank you.

MR. MacDOUGALL: Okay, Charlene, I think you have the floor now.

MS. de BORE: Thanks. Just the slide you had on wear and tear triggered a question for me relating to transmission system costs. Because the wear and tear slide focused on generation impacts and the cost to BC Hydro's generation assets. I'm wondering if the TPA includes any provisions for costs associated with BC Hydro's transmission system assets?

MS. MATTHEWS: I'm trying to think how it's worded. I think it might just (audio drops) but regardless, we can (audio drops) in terms of certainly that provision was meant to be around start/stops of the unit but I'd have to go back and check the actual language there. In terms of actual transmission costs, we think that might be covered in section 6.2 of the TPA but ask us an IR on it and we'll go look and be able to reply easier to that.

MS. de BORE: Okay, sounds good. One or more probably coming your way.

MR. MacDOUGALL: Are there any other hands or questions or we'll move into the last section. Seeing none and I'm hearing none.

MR. HOLMAN: Thanks, Mike; thanks, Heather. So good afternoon. I just have three slides where I'm going

to discuss Powerex's perspective on the 2020 TPA, now that Heather has gone into some of the details. So the first slide is really going to talk about the 2003 TPA presented a barrier to forward market transactions that were delivered to or from the systems and really didn't prevent them but discouraged them.

Proceeding Time 2:21 p.m. T48

And so this slide I'm going to use a graphic and it's really going to highlight how Powerex's activity is conducted through a portfolio approach, where physical deliveries come from a variety of supply sources, to a variety of sale opportunities and require transmission rights that we must secure in advance of arranging deliveries, including often having to compete with other wholesale electricity market participants for those transmission rights, in order to ensure that we have the access to move power across the Western Interconnect.

So first I am going to talk about forward markets. And of course, remember that we did have I think in the neighbourhood of 2500 distinct transmission paths and 110,000 deliveries. And I'm going to try to back it up and try to put it into categories.

So on the supply side, when Powerex is in the forward time frame under the 2003 TPA, we really

had two different what I'll call buckets, or sources of supply. One was the Canadian Entitlement, and the other was forward market purchases. So forward market purchases might be where Powerex has gone out and procured Hydro surplus supply in the Pacific Northwest, maybe for a month, or for the summer season. Or we've gone out and contracted for the output of a U.S. wind facility or bought standard wholesale electricity and energy. And of course the Canadian Entitlement is Powerex's contract with the B.C. Government, which is the downstream benefit from the Columbia River Treaty. So those are the two key supply sources where we have supply, and we have some price certainty that we can transact and take that supply, and deliver it to sales opportunities in the forward markets.

Now, we often combine that with what is referred to as long-term transmission rights, where Powerex has procured transmission, for example, from the Pacific Northwest to the California border and beyond, or from the Pacific Northwest to the desert southwest, or entirely within regions, or in other directions between the regions. And then sales opportunities are forward market sales. And those could be sales for the balance of the month, for an upcoming month or several months, or maybe for Q3,

which is July, August, September, or for a summer season or a winter season.

And importantly what you see here, and I'm just drawing the line, is this is generally the portfolio approach that Powerex would apply in those forward markets where we are able to line up purchases, supply sources, with transmission rights, and execute on sales opportunities. So we have long been active in the forward physical markets. We are one of the most active participants in the Western Interconnect.

And maybe I will just use an example of what this might look like. So Powerex has secured transmission, as I just mentioned, transmission rights, from the Pacific Northwest to California. So we secure, compete and secure those long-term transmission rights, and we see an opportunity where we can purchase energy, let's say for the upcoming summer season, July, August, September, at $30 per megawatt hour, from a Hydro supplier with surplus, who is willing to commit that supply to us at $30 for those three months.

We then have a sale opportunity in California, and let's say we have a purchaser in California who is willing to pay $50 per megawatt hour. So we are able to purchase power at $30, sell

it at $50, and let's say that the transmission rights that we've procured, the cost of those is $10 per megawatt hour. Well in that case, we can secure forward supply at $30, pay $10 in transmission costs, for a total cost of $40, and sell that power for $50 per megawatt hour, generating $10 per megawatt hour in income that ultimately becomes trade income, and is returned to BC Hydro and ratepayers.

Now, after we've executed transactions in the forward markets, we get to the day-ahead and real-time markets. And the first thing I want to highlight with that arrow is that those supply sources, those transmission and even sales opportunities, we can also utilize those in the day-ahead and real-time markets.

So, for example, the Canadian Entitlement, we may choose to make sales supported by the Canadian Entitlement in the forward market time space or time frame, but we may also have Canadian Entitlement that we choose to support sales in the day-ahead or real-time market. Similarly, long-term transmission rights, we may secure those on a yearly or multi-year basis and not fully utilize those to support forward market sales.

Proceeding Time 2:25 p.m. T49

In fact, we may save a considerable amount of those to use in the day-ahead and real-time markets. So this

is the portfolio in the forward markets but remember that these components can also be used in the day-ahead and real-time markets.

So now I start bringing in other supply sources. So now once we get to the day-ahead and real-time timeframes under the 2003 TPA we now are aware generally of the transfer price and we can see BC Hydro's forecast surplus energy, trade account exports using the residual system capability, day-ahead market purchases so we may purchase additional energy in the Pacific Northwest, the Desert Southwest, California or anywhere within those regions and we have real-time market purchases. We then can add to that the procurement of short-term transmission rights under the open access competitive framework and we can use that, those different supply sources, together with those long-term and short-term transmission right, to meet the BC Hydro forecast system needs, which again we know the transfer price generally when we get to the day-ahead timeframe. We can use the supply sources to use the residual system capability and import energy that is recorded in the trade account. We can make day-ahead market sales and we can make real-time market sales.

So you can see the six different categories of supply sources, the five different categories of

sales opportunities and the two different categories of transmission rights with the forward market first taking place and then everything below the dotted line being in the day-ahead and real-time markets.

Now, the 2003 TPA unfortunately presented a barrier to forward market transactions, as Heather described, because of that transfer price risk. Powerex would not know whether an export or import from the BC Hydro system was allocated until one day at a time, what the day-ahead mid-C index was for the particular day and hence what the transfer price was until one day at a time. So it was very challenging for Powerex to make sales, for example in California, dependent on either surplus energy or residual system capability because we wouldn't know the transfer price until one day at a time. So coming back to that $50 per megawatt hour market sale, we might forecast when we're making that sale, let's say we're in May and we're making a sale for July, August, September, and we thing there's going to be forecast surplus energy and we think it might be a transfer price of $30 but we don't really know. If we make that sale using our long-term transmission rights reliant on the BC Hydro forecast surplus energy, we may find when we get to each day the transfer price is actually higher than the $50 minus the $10 in transmission costs and it

actually results in a loss for Powerex. So what would often happen is we would secure forward market purchases in the Northwest even from Hydro suppliers who had similar forecast surplus energy because it did not entail this one day at a time transfer price risk.

So the 2003 TPA discouraged Powerex from committing these potential sources and opportunities prior to knowing the applicable transfer price each day. One thing I do want to stress is that it does not mean that Powerex was not transacting in the forward markets making sales or forward market purchases, it just meant that we were more inclined to serve our forward market sales with supply that was supported by the Canadian Entitlement or supplied from forward market purchase under a variety of contracts.

Now, when we get to the 2020 TPA this really unlocks forward market opportunities. So there was a slight switch there, where now instead of the trade account it says the transfer volume account. But what you can see happens in now by removing that one day at a time allocation and transfer price risk and we have this transfer volume account, and let's take the scenario where the account is positive, we now know that exports from that account are going to occur at that weighted average price and the price is not going to change dramatically each day depending on

who it was allocated, as occurred under the 2003, and what the day-ahead index was on that particular day. And so this unlocks our ability to use the BC Hydro surplus energy, the residual capability as well as forward market purchases in Canadian entitlement to supply forward market sales and we can also use these to support deliveries to meet BC Hydro's system needs and imports using the residual capability.

So coming back to our example where we had the $50 per megawatt sales in the forward markets, $10 in transmission costs, now those two may still occur but instead of purchasing forward energy from surplus hydro in the northwest at $30 per megawatt hour we could instead decide to rely on forecast surplus energy without that risk of the transfer price risk that occurs one day at a time.

Proceeding Time 2:30 P.M. T50

So the 2020 TPA encourages Powerex now to transact in the best available temporal markets, so now we can use these sources and sink energy back at the BC Hydro system, both to meet needs and using the residual capability forward, day-ahead or real-time. So in the best available temporal markets to sell BC Hydro surplus energy, those would be flexible exports if they were sold out as flexible; purchase to meet BC Hydro system needs, again flexible; and using the

residual capability to make offsetting purchases and sales. So the 2020 TPA really unlocks the ability to not just rely on that day-ahead market and to a lesser extent the real-time market, but to also have access to the forward market given the declining liquidity in the day-ahead markets, the increased variability on the BC Hydro system, and the premium prices we are now seeing in forward markets for particular clean renewable products as well as to meet resources adequacy needs.

So last slide is the -- from Powerex's perspective, the 2020 TPA better aligns with evolving markets, better enables Powerex to sell BC Hydro surplus energy, to purchase to meet BC Hydro energy deficits, and to maximize trade income using residual system capability. How does it achieve this? By eliminating the transfer price risk, that one day at a time approach inherent in the 2003 TPA, unlocking forward market liquidity and premium prices.

I thought it would be helpful to just kind of describe how these line up, and so I went back ten years and said from 2011 and earlier we had the 2003 TPA, in 2019 and fiscal 2019 and fiscal 2020 we had the two letter agreements, and for fiscal '21 and beyond the 2020 TPA. And you can see how this lines up with the notable decline in day-ahead liquidity and

the expanding forward market opportunities, the 2020 TPA, is it really aligning with the evolving wholesale electricity markets.

So that's all I had. Any questions?

MR. MacDOUGALL: Okay, I don't see any hands up yet. No?

MR. SANDVE: Okay, we're not seeing any hands on our side, so I think that wraps things for today. I want to thank everyone, Commissioners, BCUC staff, interveners, all observers for taking the time today to be a part of this workshop. I hope it was helpful in terms of bringing some meaning to the application, helping to explain the 2020 Transfer Pricing Agreement, and answer some clarifying questions before we get into the information requests.

Just to review the next steps in the process, as have been set out by the panel, information requests from the BCUC are due into BC Hydro October the 8th, followed by information requests from interveners on October the 15th, and then responses from BC Hydro to those information requests will be due November the 19th

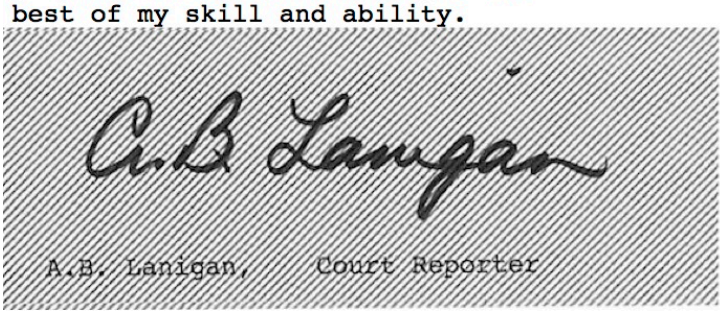
So as I said at the beginning, hopefully this workshop was helpful today in terms of providing some context and understanding, but definitely encourage you if you have questions, even if they were

asked today, if you've got clarifications or additional details you want to get from those, put them into a written information request and we'll gladly add further details and context in writing through the process that I just set out.

So with that I think we're done for today. Thanks again everyone for the time and I look forward to the information requests later on in October.

(PROCEEDINGS ADJOURNED AT 2:35 P.M.)

I HEREBY CERTIFY THAT THE FORGOING is a true and accurate transcript of the proceedings herein, to the best of my skill and ability.



September 22nd, 2020