Capital Power – 2019 Investor Day
December 5, 2019

Corporate Participants
Randy Mah – Director, Investor Relations
Brian Vaasjo – President and CEO
Darcy Trufyn – SVP, Operations, Construction & Engineering
Mark Zimmerman – Senior VP, Corporate Development & Commercial Services
Bryan DeNeve – SVP, Finance & CFO
Kate Chisholm – SVP and Chief Legal & Sustainability Officer

Event Participants
Robert Hope – Scotiabank
Robert Kwan – RBC Capital Markets
John Mould – TD Securities
Mark Jarvi – CIBC Capital Markets
Patrick Kenny – National Bank Financial
Ben Pham – BMO Capital Markets
Andrew Kuske – Credit Suisse
David Quezada – Raymond James

Presentation
Randy Mah
Good morning, everyone. I'm Randy Mah, the Director of Investor Relations for Capital Power. Welcome to our 11th Annual Investor Day event here in Toronto. This event is being webcast, so I'd like to welcome the listeners participating on the webcast. Earlier this morning, we issued a news release that outlines some of the highlights that we will be discussing today. We hope that you find the information presented today helpful in understanding the Capital Power story. Before we begin, let me cover off the standard disclaimer regarding forward-looking information. Certain information in today's presentation and responses to questions contain forward-looking information. I ask that you refer to the forward-looking information disclaimer at the end of the presentation as well as our disclosure documents filed on SEDAR for further information on the material factors and risks that could cause actual results to differ.

I'll start off with an introduction of the management team that are here today. We have Brian Vaasjo, President and CEO; Kate Chisholm, Chief Legal and Sustainability Officer; Bryan DeNeve, Senior Vice President, Finance and CFO; Darcy Trufyn, Senior Vice President, Operations, Engineering and Construction; and Mark Zimmerman, Senior Vice President, Corporate Development and Commercial Services. We also have Jacquie Pylypiuk, who heads up our Human Resources department.

So this is the agenda for today. We'll start off with presentations by Brian, Darcy and Mark and Bryan DeNeve, and then we'll take a midmorning break around 10:20, then we'll finish off with Kate and Brian Vaasjo. And then we'll go to Q&A for about half an hour. And then after the break, we have our guest speaker, Dr. Stuart Licht, the founder of C2CNT, will present on the innovative technology of transforming carbon into carbon nanotubes, and Brian Vassjo will talk about the commercialization of C2CNT. Finally, we hope that you can join us for lunch afterwards. Okay, I'll start – I'll pass it over to Brian to start things off.

Brian Vaasjo
Thank you, Randy. Good morning, ladies and gentlemen, and especially those who are tied in this morning electronically. Welcome to our 11th Annual Investor Day. As our news release outlined, we have a lot of exciting developments for next year and beyond that we'll be discussing with you today.

I'll actually start off with where we left off last year. This slide highlights the major theme of last year, five years of delivering results. Those five years started in 2013 when we went through a significant repositioning of the company. Our focus areas were AFFO per share, renewables, natural gas assets, contracted EBITDA and diversification. I could go through a very similar discussion as I did last year, it, however, would be repetitive. The conclusion, another year of strong delivery. However, I do believe there is a very significant message in that. Capital Power is delivering shareholder value year in and year out without changing strategy, without going into new countries, without going into new businesses. What will be clearer after today's discussion is that we are getting better and better at what we do.

Last year, I also discussed how we think investors should view Capital Power. The message was sticking to our strategy and delivering on that strategy over the short and long term. This year, I'd like to add another dimension to how investors should think about us at Capital Power. Although, I can say our basic strategy has not changed over the past six years. Our strategy and tactics have evolved modestly. This was largely because we've been very focused on anticipating the future and evolving to be sustainable and prosperous in that future. Two examples are our focuses on operational excellence and growth.

Looking at operational excellence. If you go back to about 2013, we spoke about a track record of six projects being completed on time and on budget. And we were working towards moving from being a third quartile from an operating performance perspective. We developed an approach of increasing performance, reducing costs while reducing risks. We achieved results well beyond our expectations, which we shared with you annually through to 2017.

In 2016, we commenced the GPS program to reduce emissions at Genesee by 11%, whether in coal or whether in natural gas service. As of today, as Darcy will describe, we are well into the top quartile. We announced this morning that the final stages of GPS will achieve a 12% reduction at Genesee by mid-2021, while at the same time, we are finishing our capability to burn 100% natural gas. Genesee 3 will have the lowest CO_2 emissions profile per megawatt hour than any other comparable plant in North America. When burning 100% natural gas, the entire Genesee complex will have the lowest CO_2 emissions per megawatt hour of any converted plant or potentially converted plant in North America.

While the completion of Whitla 1 or with the completion of Whitla 1, we've completed five more projects on time and on budget, or better. What we thought we had to do in 2013 to be competitive from an operations and construction perspective, I now believe has brought us to a point of being a true competitive advantage. Tomorrow, we'll continue down a path of actually creating real shareholder value from operational excellence, as Darcy will describe.

Part of that is under the Ops2030 initiative and continuous innovation, which will keep us on the leading edge of operational excellence and retain that competitive advantage we enjoy today. Or how we've executed on growth. In 2013, we commenced a strong focus on growing our contracted cash flow from approximately 30% of EBITDA in order to support dividend growth and our credit ratings.

We indicated that path was through disciplined execution on renewables and natural gas generation opportunities. We now have reached our goal of 2/3 contracted EBITDA through Genesee 1 and 2 coming off contract. We achieved this in large measure through prudently investing over $5 billion since 2013. We've had great success over these past six years from our natural gas acquisitions. Mark showed you a scorecard last year about how we've done in regard to those acquisitions. He's updated that, and it's an even better story this year. Mark will also share with you a report card on renewables, and how we've done in respect of our renewables projects over the last year. And we're equally proud of that. Contributing to that pride is a completion last week of Whitla 1, early and on budget. Looking forward to tomorrow, we'll continue to have a significant component of our cash flow from long-term contracts. We'll continue to invest in wind and eventually solar as we move forward as well as eventually storage.

As both Mark and Kate will discuss, our natural gas strategy, especially linked to the development of carbon capture and storage, continues to be very robust. Our operating, construction and commercial expertise will deliver this future without strategic turmoil.

Lastly, I want to comment on how we are, have and expect to be positioned from an ESG perspective. For almost two decades, CO_2 has been prominent in our thinking. When we proposed Genesee 3, two decades ago, we were volunteering to offset its carbon footprint to a natural gas equivalent. Early in this decade, we have developed the largest carbon credit position in the province, not just by trading, but by supporting technologies in a variety of businesses.

As of this last July, we've set emissions targets, which Kate will describe further in a few moments. We are actually reducing CO_2 emissions. We've always prided ourselves on social responsibility. We have a tremendous safety track record achieving the CEA President's Safety Award for the past six years. We are a leader in diversity at senior leadership levels. We do well from a governance perspective, everything from the Board outreach program, which started three years ago to ESG performance targets, making up 20% of our executive compensation to moving forward rapidly on integrated reporting. Kate will go into more detail, but these are not all new initiatives just to make us look good from an ESG perspective. These are elements that have been evolving in our organization and will continue to evolve. We believe we are a leader, and we will continue to be so. ESG can be added to the list of elements Capital Power has been delivering on. And this overall performance over time has resulted in delivering shareholder value. From 2013 to this week, Capital Power shareholders have enjoyed an average 19% per year total shareholder return, significantly outperforming both the TSX and the Utilities Index. All in all, an excellent record, which warrants investment. I will now turn it over to Darcy.

Darcy Trufyn
Well, thank you, Brian, and good morning. Over the years at Investor Day, I talked about some of the competitive advantages that we have in construction, engineering and operations. Today, I'm going to reinforce those aspects and speak specifically about our sustained excellence in operations, how operations have and continues to create new value with existing, with developed and with acquired assets, and I'll provide you with updates on both our Whitla 1 and Cardinal Wind projects. From an overall fleet perspective, we continue to achieve excellent plant availability and have averaged 95.5% with our fleet since 2014, inclusive of this year. 2020 will be an unusual year as both Arlington and Decatur have steam turbine overhauls. And with that, the plants will be dark. For 2020, we're projecting an availability of 93%. However, post 2020, we see a return to the 95-plus per cent availability figures.

From a renewables perspective, we are very pleased with the overall performance of our fleet and are continuing to average over 97% availability. We recently did some benchmarking with our thermal fleet. We got data from NERC, a lot of data, and we went through. And through that, what we were able to determine is we were actually in the top decile with fleet performance. So very proud of that.

Now I've spoken about our proactive maintenance culture over the years I've been here. But I very much believe in that because it's fundamental to our success. A forced outage can cost millions and millions of dollars in direct repairs and in lost revenue. So having a robust maintenance program and the maintenance culture is a must. And we continue to look at upgrades and improvements, and for example, over the last two years, we've upgraded our maintenance software, and we're just finishing rolling it out to the entire fleet. And it's a real strength now to have that.

And with that, we've tied it in with our safety. And so there's a natural link then with the safety and maintenance. And on risk, over the years, we've taken numerous measures to mitigate and manage risk from key critical spares to agreements on some of our high risk – higher risk equipment. And I would note that on insurance, we are actually claims free for the last six years. Few operators can say that. And with that, we have a great relationship with our insurers. They know our plants inside out, and their rates reflect the lower risk that they view of Capital Power. And lastly, we're very proud of our safety performance. As Brian mentioned, we have been recognized by the CEA for the past six years with their President's Award. We have consistently demonstrated that safety and operations performance go hand-in-hand.

Now later on this morning, Mark's going to run through the overall commercial performance of our major gas acquisitions. But over the next two slides, I'm just going to take you through what operations is working on with Mark's team to add value from an operations side to these acquired assets. Now firstly, we review all of our assets with a long-term lens. So on those that we acquire, it means that we have, or we may have allowed to spend some money in the early years to bring them up to our standards. The first step for operations, after the acquisition, is the initial integration. And most of the activities are typical to any operation, but there are two key differences with Capital Power. The first is, we have a central operations philosophy, and the other is our cultural integration that we believe is equally as important. So all the plants we have acquired have been operating on a decentralized basis. At Capital Power, we feel we are much stronger, more successful and have much less risk if all of our plants operate through a central office.

It starts with us first, integrating the plant into how we work and to the company tools and standards, and we introduce them through our support group, which at Capital Power, we possess a wide cross-functional group of specialists and technical experts that the plants would not normally have internal access to from engineering and operations support, like turbine specialists, water chemistry, boiler and HRSGs, high-voltage equipment to cross-functional support, virtually all of the plants needs can be filled from within Capital Power.

Now the cultural part of the integration is the longer process. It starts with us communicating. That our intentions are to own the plant for the long term, treating our employees fairly and making them feel that they are part of the company. And then we do the things like leadership and Board visits. Brian Vaasjo, as an example, he visits our thermal plants at least twice a year. And tells them how things are going and how they're doing, and you know really, what we want them to do is understand that they are part of Capital Power and wear the colors of the company with pride. And once everything is operating as it should, we identify operation opportunities to optimize in order to create additional value. This can be operational in terms of how they actually do the work or can be technically as through physically how we can improve the equipment and the systems that they have.

So how are we doing? Well, from a plant perspective, performance wise, we are tracking ahead of availability objectives with the exception of Decatur, which because of the upgrade we did to the CT – one of the CTs, the combustion turbines, this year, it's slightly down. But everything else is tracking extremely well and Decatur will be – after the outage running, it is running extremely well. This summer, for example, in Arlington, the plant had its best record performance ever in its history at 99.9% availability.

Now consistently demonstrating that our plants are reliable, they are efficient, and they are well run are key parameters that our off-takers look at when dispatching. And these are the same factors we believe they will also look at when it comes time to recontracting. Now from a cost perspective, again, while we may find the outlying – odd outlying expenditure, I'm confident that year-over-year, we will meet and beat all of our operational business plan objectives. So how do we do that? Well, one of the advantages I mentioned earlier is that we have that internal team of specialists versus third-party contractors and consultants that the plants previously used. So there is the savings there, but it's more than just labor. It's the expertise being provided. Having an in-house turbine specialist, for example, saves us literally hundreds of thousands of dollars a year. We also have a very strong supply chain group that provides much better buying and uses company leverage and a fleet-sharing philosophy versus the buying and warehousing that the plants have typically done on their own. And from a sustaining capital perspective, we have a central projects group that implements the company processes – priorities, ensures we attain the necessary paybacks and executes according to plan. Now reining in capital expenditures to only those things that add value or are required to maintain performance or safety as we have demonstrated consistently over the many years adds savings.

Now regarding adding value. At Decatur, we saw an opportunity last year to substantially improve the asset value and make it more attractive by modifying the combustion turbines. We made the first upgrade earlier this year, as I mentioned, and it has been extremely successful. The plan is to upgrade the other two CTs by the end of 2021. Ultimately, adding 100 megawatts and improving substantially the heat rate.

At York, we are in the process of increasing the plant's peak firing capability by 14 megawatts and are working to substantially extend the wear life of the CTs. At Arlington, there are several major initiatives we are working on to add value. Now Mark's team saw an opportunity at time of acquisition to increase the plant's utilization significantly, almost doubling the plant's capacity factor. To do so, meant, we had to double the plant's water evaporation capacity. But first, rather than doubling it, what we did is we improve the efficiency and the existing water discharge we reduced by 20% or more. And we are now proceeding with the construction of another evaporation pond. But this time, it's only half of what the existing is. And as commercial got more into the details of expanding the plant's utilization, it became clear that there would be further benefit if we could alter the plant's dispatch capabilities. To accomplish this, normal engineering solutions would have cost about $4 million. One of our senior engineers came up with a solution. It cost us $250,000. So real value added for that plant. And also at Arlington, we're working on an energy storage system that will enable us to chill water off-peak and use that additional cooling on-peak and thereby reducing its parasitic load.

Another area that is growing in importance as we grow our critical mass is our planned outage costs. As a result, we've done some restructuring internally. We're already seeing results. And we believe this is an area that we can significantly improve on over the next few years.

Now regarding Ops2030. Well, firstly, in our short 10-year history, Capital Power has established a track record for innovation through optimization and performance improvements. Beginning in 2013, we embarked on a journey to optimize our plants from a cost and reliability perspective. That program was a huge success and delivered approximately $50 million in improved EBITDA from our existing assets. We also made major reductions in our sustainable capital spend. And then in 2016, as Brian mentioned, in response to the new carbon tax, Capital Power embarked on a five -year carbon intensity reduction program called Genesee Performance Standard, or GPS, which we believe is unique anywhere in the world. That program is in its final stages and has and will be a major success. So today, I'm presenting our new program, it's called Ops2030, and it's about creating the sustainable plant of the future. We envision a 10-year program that continues the optimization of our fleet through the use of technology, digitalization and other innovation. All of you know that in your own worlds, new technology is pushing the boundaries of what is possible. Capital Power wants to be leaders in the power plant transformation and retain our competitive advantages.

There are three focus areas, and each have large opportunities for improvement. As technology evolves from extended parts wear to higher plant efficiencies and outputs, to new ways of doing operations and maintenance, the opportunities are significant. Included in our 2020 plan, are several Ops2030 projects that will enhance our plants. Projects like the Arlington energy storage that I previously mentioned. We are in the process of developing a 10-year road map for Ops2030 and we'll be building those objectives in our long-term plan, just like we've done with past initiatives. Now from a data perspective, to put things in perspective, we collect approximately one million bits of data every hour. We intend to restructure how this data is collected across the fleet. In the future, this data will be used in a proactive manner for maintenance. Another significant area for cost improvement is on our parts wear. I can cite two examples at our plants today where, through technology, we are looking to extend the wear by 30%. Now there are all sorts of other changes we see coming with digitalization and technology. Some of that is already creeping into our current work. The renewables group is actually about a year ahead on their Ops2030 journey versus the rest of the fleet. A remote operation center has already been set up and a software system commissioned, and we are already seeing positive results.

Now while all of our wind farms are covered by service agreements. It is our intention to get much more involved with these assets. And as we grow our renewables fleet and grow our database, we will expand our technical capability. This will enable us to further optimize both the operations and long-term maintenance of these assets. And we are doing many other things to improve these assets. In some locations, however, we are restricted because of the nature of the offtake. But where we can, we are looking at software upgrades to improve turbine performance, aerodynamic upgrades, blade repair aids and other innovations to improve wind capture.

The transformation of Genesee is well underway on a number of fronts. On Genesee Performance Standard, GPS, I just want to follow the bouncing ball. When we first brought it out, as Brian mentioned, in 2016, it was at 11%. Last year, I came in here, and I said 10%, and that we would be reducing our capital spend as a result. But since then, we've worked hard, and we've actually found a way to increase our carbon intensity reduction to 12%, and that's through the addition of a new rotor on G3. And we – and for the dollars, so our capital costs have gone up to $45 million. But now we're projecting 12% reduction of carbon. And when you do the math and you look at 2022 that 12% equates to $38 million in annual savings, which is substantial.

So as Brian mentioned, the performance of Genesee, but specifically, if we look even at G3, G3 itself will be the lowest emitting plant – coal plant in all of North America. And as we move to gas, as Brian mentioned, those percentage reductions they carry forward. So huge benefit over the life of the remaining life of those assets.

Now today, we announced that we are proceeding with 100% dual conversion – conversion of G3 in addition to the previously announced dual fuel conversions of G1 and G2. Now creating dual fuel capability cost effectively on a supercritical, like G3 has been a bit of a challenge, but we finally got there. We have delayed the G3 outage subsequently from the fall of 2020 to the spring of 2021, so that we will be able to do this conversion. And as well, install the high-efficiency rotor in the G3 units. Now not only does that rotor upgrade allow us to reduce CO_2 emissions, we get an extra seven megawatts output.

We are planning to do all three of these fuel conversions during our normal outage durations, which I think demonstrates the competitive advantages we have with in-house engineering and construction expertise. And lastly, on our outages, over the past few years, we have started to lengthen the periods between our major overhauls on various modules of the steam turbines and generators. And this optimization has not impacted availability. On outage cycles, however, our high availability we attribute to our two -year cycles. But as we move to higher gas use, we expect to see lower boiler erosion. And at that point, we will likely extend the outage periods to a longer cycle. Now we announced today the successful completion of Whitla 1, one month ahead of schedule. In order to win Whitla 1 against a very strong field of tenders, we took a different approach to building Whitla. That strategy paid off. Our engineering and construction teams took charge of all aspects of the design and construction of that project, and we were successful.

Earlier this year, we reported that we are going to be slightly over budget. I am pleased to advise that with the early – earlier completion date and with things like completing the turbine systematically to start generating revenue early ahead of commissioning, we have been able to bring this project in on budget. So another successful development for Capital Power. On Cardinal Point, it is also proceeding very, very well, and we are forecasting it to be complete by the planned March 2020 date, and it is also tracking to finish on budget.

So in summary, from an operations perspective, Capital Power continues its strong year-over-year performance, optimizing – optimization and finding new value is embedded in operations and new assets are providing lots of opportunity for new value creation. Capital Power is embarking on a new 10-year program to transform its assets to the sustainable plants of the future through the use of digitalization and new technology. At Genesee, numerous initiatives and changes are underway that are transforming this major asset. And in new developments, Capital Power continues its track record with the successful completion of Whitla 1, and the forecast successful completion of Cardinal Point in Q1 of 2020. Capital Power is delivering responsible energy for tomorrow. Thank you. And I'll now pass it over to Mark.

Mark Zimmerman
Thanks, Darcy, and good morning, everyone. So for the last year, and Darcy just mentioned it, we've been referencing responsible energy for tomorrow. What do we really mean by that? Simply put, we're building a power company for the future, and we do that by delivering goals. As you all know, we're in the middle of an exciting transformation in our industry. And with any transformation, some uncertainty can arise, but it also provides a real opportunity for us to capitalize on. In this environment, though, it's critical that our goal is to remain nimble and resilient. Ready to navigate that uncertainty and capture those opportunities. By doing so, we'll continue in our growth plans and extend our track record of consistent and stable returns.

Today, I'll explain how our disciplined strategy and our portfolio of assets are uniquely positioned us for steady returns and growth in any environment. Specifically, our advantaged portfolio contains great assets that are strategically positioned in markets with strong fundamentals. Our high-performance teams have a solid track record of creating value through portfolio management, optimization and integration. And we see a bright future ahead with ample opportunities continue our distinct growth path. By executing our plan, our portfolio characteristics will continue to evolve and strengthen, becoming more diversified geographically into sustainable technologies and contracted cash flow. So since 2013, we have doubled our EBITDA. But it's not come from sticking with what we have done in the past, rather it has come from an intentional move with disciplined execution.

As a result, we've been evolving our generation portfolio of fuel mix and have geographically diversified our operations. We are proud of the last six years, and we are confident in our future. By continuing to do what we have been doing, we envision a future where we will meet or exceed our past performance. When we step back and look at our portfolio of assets, it has a number of key characteristics. It's competitive, young and efficient as many of our newest acquisitions and construction projects have a remaining life of greater than 20 years. The majority of our portfolio is strategically located in markets that rely on their capabilities for grid reliability. It has low volatility, as most are substantially contracted as we are focused on contract and M&A opportunities and originate long-term offtake arrangements for development projects.

With the operational and commercial talents for people, our assets are reliable as we maintain, as Darcy have said, and continue to look for ways to make them more efficient. And finally, we have diversified our risk to any one market by owning assets in different regions. By doing so, we reduced the political market fundamentals and environmental risks.

Overall, our assets offer optionality and are well positioned. Our gas assets are strategically positioned, efficient and flexible. Our wind assets are located in relatively strong wind regimes. Our coal fleet will soon be dual fuel. And I should note, we did have some trouble representing that on this slide. So to clarify, in essence, Genesee 1 to 3 are capable of coal firing today. They'll become 100% gas-fired capable during the dual fuel period starting in 2021 and will be only gas capable starting in 2030. In short, we ran out of bubbles and colors, but hopefully, I've explained the transition here. When we dig a little deeper into the strategic positioning of our assets, I would offer some of the specific observations.

In Alberta, we have wind with high capacity and capture factors, geographically dispersed to mitigate correlation effects with other wind farms due to their location. We have both efficient gas assets that are low in the merit curve as well as peaking gas facilities that can optimally monetize volatility. With our current announcement on dual fuel capability at Genesee. We've increased our optionality even further going forward. And there's other coal units that are high on the dispatch curve – that are high in the dispatch curve, they will get pushed out by new generation well before our units do.

Our thermal sites are also close to load centers. Edmonton and Calgary with access to low-cost gas and large transmission corridors. Further, there's an opportunity for us to mitigate some carbon exposure through offsets and by building renewable developments such as Whitla 2.

In Ontario, Goreway is one of a handful of large clean natural gas generators located in the high-value Greater Toronto Area. It is very efficient and sits low on the dispatch curve and can capture operating reserve revenues. York and East Windsor are also located in the same high-value areas. East Windsor is located close to Ontario's southwest wind production region and York, like Goreway, is also in the high-value Greater Toronto Area region. Both facilities are quick-start units that provide valuable flexibility to the ISO and can run when the system operator needs to balance the system due to unforeseen circumstances, such as wind forecast uncertainty. All of our facilities have access to major gas storage and transportation, infrastructure and have secure fuel supply. This portfolio provides real value to Ontario that is difficult to replicate. And we believe should be recontracted and even expanded. Indeed, we currently represent approximately 45% of the installed high-value, flexible thermal generation in the GTA.

In the U.S. South, we have relatively efficient units that can fill in for coal retirements. As an example, Arlington is right beside Phoenix, a large growing demand center. As it is difficult to build new gas in these regions due to cost as well as gas moratoriums, accelerating renewables penetration and coal retirements will increasingly require gas generation to provide stability to the overall system. As a result, we see a high likelihood of recontracting here as well.

And finally, in the U.S. Midwest, although load growth is more muted than in the past. There are companies looking to contract renewables, such as technology companies and companies looking to build data centers, leading to demand for renewable output. Strong wind regime also makes for competitive wind projects, especially as the coal projects retire. The markets are liquid and allow for contracting of renewable projects. This positions us very well for further renewables growth in this area.

Diving a little deeper into Alberta we see a positive outlook for the unique Alberta market and the associated power price expectations. The demand growth outlook is 1% to 2%, combined with the decline in baseload supply. As we look forward, we expect a similar environment as we've seen in the past, and within which we have succeeded. From a market perspective, we are seeing high spark spreads continue due to low gas prices and high carbon prices. Our gas units are relatively efficient and are positioned to thrive in this environment. Further, our dual fuel initiative, which will allow us to use 100% of either fuel, combined with our swap for 100% of G3, provides us the flexibility and optionality to enhance revenue along with better reliability. When this bullish environment is combined with the superior execution of our team, we deliver and have demonstrated a proven track record of success.

In Alberta, we have continued to economically grow while proactively managing our assets and successfully optimizing our portfolio revenue. And this has been applied into other jurisdictions in which we operate. Origination is becoming an increasingly important complement as we contract with aggregators for both power and environmental commodities and look to secure commercial and industrial offtake arrangements.

Our commercial management activities have provided additional certainty of cash flows to Arlington, and we continue to work closely to capture capacity and heat rate improvements while engaging and recontracting negotiations. Our M&A efforts are focused to stand the deal flow in order to capture high-quality opportunities in a disciplined way. And finally, the market skills developed can be applied to optimization opportunities while capturing synergies and effective integration. These competitive advantages are critical and will be maintained as we continue to expand our portfolio. And we see the results of these efforts in the recent results of our newest additions. Because of these competencies, our four major acquisitions are generally meeting and exceeding our original investment decision expectations. These assets are now fully integrated, and we continue to further optimize and enhance. And as we continue to apply our capabilities to future operations, we'll continue to enhance overall returns.

And as Brian mentioned, a similar story appears when we look at our recently added renewable fleet. Well, we have some – had some setbacks on Quality due to terrain and capacity factors, which we are addressing with technical solutions by working with Vestas and exploring operational solutions. Our other efforts have been meeting and exceeding our original investment case. Like our acquisitions, our teams are in place to continue to work the assets in order to surface even more value as we move forward.

A specific example of this post-integration optimization is Decatur. We are in the process of spending USD $60 million to upgrade our combustion turbines. The upgrade will provide us 100 megawatts of additional capacity and the fuel efficiency improvements from the upgrades will flow through the Decatur. In addition, we have been busy working on negotiating a toll extension and are in advanced discussions, which we expect to announce either later this year or into Q1 2020. Our current expectation is that the combination of these elements takes us to meeting and exceeding our original business case.

In addition, we have announced this morning that we will proceed with the second phase of Whitla. Whitla 2 is an approximately 97-megawatt expansion of Capital Power's Whitla Phase 1 project at an expected cost of $165 million. It is located in Alberta, 60 kilometers southwest of Medicine Hat and will begin commercial operation in Q4 2021. We continue to pursue commercial and industrial offtakes. The project will realize synergies from Phase 1, such as shared infrastructure like the transmission operations and maintenance building and take advantage of our Alberta market expertise. With this project, we continue to diversify our portfolio in Alberta. And while we continue to work our assets and growth initiatives, we are also attuned to ever-evolving outlook in the power generation sector.

The growth in U.S. renewables will continue as costs are increasingly competitive and appealing to society. We expect a similar profile in Canada. Equally important is that gas facilities are projected to be a meaningful and growing component of the grid, as illustrated on this slide, and reinforced by many other reputable long-term projections. In short, gas provides a cleaner replacement for coal generation that is being retired. It is reliable technology to fill the need for baseload generation and provides the flexibility to cover for variable renewables that can cause system issues. Therefore, our outlook for growth remains the same, more renewables, including solar and wind, more gas to help incorporate those renewables into the grid.

This future perspective is a view shared by many others, including the likes of Bloomberg New Energy Finance, who are one of the more bullish entities on the penetration of renewables into the North American grid. Even they acknowledge, and I quote, "the U.S. electricity sector continues to replace aging coal and nuclear with cheaper renewables and gas, which becomes the premier source of power generation." So to summarize, coal and nuclear retirements will lead to a significant gap in the supply mix that will likely be filled by cleaner economic technologies, such as wind, solar and gas. The proliferation of renewables will require reliable and flexible capacity for the system, stability and reliability, which will require gas technologies for the foreseeable future. Low gas prices and high barriers to entry make strategically placed existing gas assets very advantageous.

So within this environment, and as we look forward, we'll continue to build on that success of our past. With respect to greenfield developments, we'll continue to assertively pursue the development of our remaining development sites. We will also be looking to refill our opportunity pipeline of sites through structured relationships or outright purchases of operating and development portfolios. While we do see a potential slowdown in the U.S. wind development due to possible elimination of tax incentives, we are bullish on wind development over the long term. We also continue to look at solar. While project-level returns are lower than we would like, we continue to explore ways to make it economically work for us while maintaining competitiveness.

To maintain our solar options, we have made a modest investment in inverters to maintain the available safe harbor tax attributes necessary for us to remain competitive. We also remain alert to emerging technologies as we continue to look at other technologies that are complementary to our existing fleet, including storage and carbon capture utilization and storage. And one such example of such an initiative is C2CNT, which we'll be having a special presentation on later today.

We also continue to look at acquiring strategically placed midlife contracted gas assets. And rest assured, while we've looked at numerous projects over the last couple of years, we have maintained the discipline to only execute on those projects that provide the strategic and economic attributes that align with our strategy. It is a combination of all these activities, which give us confidence that we will be able to deploy $500 million a year into our target markets and technologies.

So what should you expect from us at a minimum for the next year? Continue to deploy the approximately $500 million into materially contracted gas and renewable opportunities, part of which will be in the form of at least one additional renewable development site, or project, pardon me. And we will remain in the deal flow to be aware of any strategic gas or renewable opportunities to capitalize on. So I will end where I did last year, as we look to our aspirations by 2030.

When we bring it all together, you can continue to expect a few things from our growth initiatives. A sustainable fuel mix that is focused on efficient and flexible gas facilities, wind and other new technologies, including solar, CCUS and batteries, continued growth of contracted and recontracted cash flow. Our diverse footprint across North America that allows us to navigate unforeseen events in any one market and continued increases in cash flow, which allow us to sustain few business expansion and support dividend growth. Ultimately, our disciplined growth will continue to support increasing returns to shareholders. Thank you, and I'll turn it over to – I think you're next, Bryan.

Bryan DeNeve
Thanks, Mark. So good morning, everybody. There'll be four, or actually three key messages I'll be delivering from the finance perspective. The first is that our growth in AFFO per share continues to support our growing dividend guidance as we move forward. Capital Power continues to generate sufficient discretionary cash flow to fund the $500 million of growth that Mark alluded to, without needing to access the equity market. And we'll continue to manage our balance sheet in a manner that will support investment-grade credit rating.

Each year, I review our financial strategy. It hasn't changed. But just to reiterate, there's four principles: The first is to maintain a consistent growing dividend over time within AFFO payout ratio of 45% to 55% and provide dividend stability through contracted cash flow. The second principle is to maintain a competitive cost of capital through maintaining investment-grade credit rating, which also allows us to access the capital markets when needed through various business cycles. It also is a great signal to investors about the stability of the dividend, as we move forward. The third plank is managing financing risk to, again, maintain investment-grade credit rating through properly laddered debt maturities and effective management of our interest rate exposure, foreign exchange exposure as well as counterparty risk. And finally, building on what Mark had mentioned, ensuring economic discipline and growth through adherence to target return expectations that supports our target growth in AFFO per share.

Just to expand a bit on the contracted position of our portfolio. With the expiry of the Genesee 1 and 2 PPAs at the end of 2020, we will still have 2/3 of our EBITDA under long-term contract. And this slide illustrates the remaining terms of those PPAs. We're currently in discussions with BC Hydro on Island Generation and also on Decatur in terms of extending those contracts. And for both of those, hope to hear or be in a position to announce, as Mark said, either by the end of this year or early next year in terms of the status of those discussions. One of the things that's important to note is with the recontracting of those two assets, our next major recontracting doesn't come up until the end of 2025 with the Arlington facility.

Turning to capital allocation. You know we basically look at our capital allocation, starting at the top is our adjusted funds from operations. We allocate approximately half of it to dividends back to common shareholders and dividend growth and the other half to investment in growth opportunities. But when you look at the growth opportunities, there's a hierarchy we look at as an organization. As Darcy went through, there's a number of opportunities, both from the operations side and commercial side, to improve the performance of our existing assets. Those investment opportunities typically generate returns that far exceed our target returns for growth projects. And the examples like Darcy mentioned, is increasing the capacity and capability units, increasing their efficiency. What we're seeing happen is that the amount of investment we're putting back into our assets has been increasing over time, and almost $100 million is targeted for next year. And that higher investment in our existing fleet, we expect will continue at higher levels as we move forward.

Looking – second on the list, we have our growth projects. And as Mark laid out, we've been very successful, both in terms of acquisitions and development projects and being able to exercise our competitive advantages on both those types of growth opportunities. Typically, however, we will prioritize development projects to the extent they're available over acquisitions. But we always are mindful, and we'll be monitoring for those acquisitions that are a good fit strategically. Finally, the final level is share buybacks and debt repayment. Our strategy is basically that we'll only entertain repurchases or debt repayment to the extent proper growth opportunities are in the immediate future. So you've seen us over the last several years when we've had excess cash and sufficient dry powder to maintain our growth strategy, look at buying back shares or paying down debt. The split between the two is all driven by ensuring we maintain the strength of our balance sheet investment-grade credit rating. So it's been a busy year on the finance side, we've raised $1.2 billion of capital in 2019. And I'm extremely proud of our team in terms of the success we've had this year as well as fantastic support from the banking community, some of the representatives are here in the room today.

But when you look back, we started out accessing the Canadian debt market with a seven -year term. That was sort of down the fairway, but we weren't too excited about that one in terms of how it turned out. We then went with the acquisition of Goreway, which we announced and went to market to raise some common shares and some preferred and largely driven by the large size of that acquisition of nearly $1 billion. Following that, we completed a private debt placement in the U.S. and had a very strong response there with terms of 10, 12 and 15 years. And certainly, we felt that, that signal to the Canadian debt market, the appetite to invest in longer-term debt with Capital Power, and we ultimately saw that when we went back to the Canadian market just recently here for $275 million at a 10-year term and at a rate of 4.424%. So we've been able to extend the term of the debt. It's certainly reflective of the confidence fixed income investors see in Capital Power's outlook over the longer term, and at the same time, of course, reducing our overall financing costs. So definitely a very good story over the past year.

This is a graph we've put up probably for a number of years and continue to speak to. Mark had a slightly different version of it. But decided we would refresh our traditional one also here, and we like the different colors on it. But also, it really highlights the fact that we have a brick-by-brick approach, we like to call it, to growth. We feel that allows measured and disciplined growth, and it has served us well since 2012. As you can see, as we scroll forward to 2020, we see that continued expansion of EBITDA coming from a full year of Goreway, in addition to the EBITDA from Cardinal Point and completion of the Whitla Wind facility.

So in terms of our guidance for 2020, as you saw in our press release earlier today, Capital Power is guiding to $525 million of target AFFO. And just building up from starting in last year's Investor Day, we – not last year's Investor Day – sorry, let me back up. Our target guidance following the Goreway acquisition was $510 million. And so just the evolution to the $525 million, the first thing we do is normalize for the 2019 Arlington toll. So the Arlington toll covered a larger number of months than the current toll. So we spoke to this a year ago at Investor Day like we always expected that reduction of $40 million in AFFO. So that's the first step to get us what we call a normalized AFFO target of $470 million.

We expect our current tax expense will be higher in 2020. That's just driven by, basically, in 2019, we do have the accelerated CCA off of Whitla, given it was completed this year and some other loss carryforwards that are more effective from a tax perspective in terms of AFFO than what we will be doing in 2020. So that's about a $15 million downward move. Slight change in CapEx year-over-year. And then we see the positive lifts relative to 2019. So the first is continued strengthening in the Alberta market. This is driven by, again, the strong pricing that Mark spoke to, but as well a fairly attractive natural gas market from our perspective in terms of lower fuel costs for our facilities, and that gets enhanced, of course, as we move to dual fuel capability at the Genesee facilities.

Also, when we look at the Alberta uplift, we are seeing continued strong capacity factors at our peaking gas facilities in the province. Of course, the other factor, I've already spoken to, is completion of Whitla, Cardinal Point, which will add $25 million of the AFFO. And then finally, the full year of Goreway, which is an additional $30 million. So that takes us to the $220 – sorry, $525 million guidance for 2020.

So just turning to 2019. Our guidance at Investor Day a year ago was $460 million to $510 million. We then subsequently revised that guidance, lifting it by $25 million following the Goreway acquisition. Based on actuals through October, and our projections for the last two months of this year, we are now lifting that guidance to $535 million to $555 million. So that – very strong results this year. A lot of it driven by great returns we're seeing in the Alberta market, but also strong performance across our fleet and assets.

So in terms of 2020 with a $525 million of adjusted funds from operations, it breaks down to about 40% will go to common share dividends and that includes a 7% dividend increase that we're intend for midyear of next year. The balance of the cash flow, which will be about $315 million, we refer to it as discretionary cash flow, will be available for deployment into growth initiatives. So this leaves us with the AFFO payout ratio of 40%, which remains well below our long-term target of 45% to 55%. So generally, we're continuing to see our AFFO per share growth is exceeding our dividend growth, resulting in a very healthy payout ratio. It's also important, though, of course, to look at the guidance on the AFFO per share basis, given we did issue some equity last year. But netting off, of course, some of the share buybacks we did this year. So in terms of our guidance for 2020, it's $4.98 on an AFFO per share basis, which is a 12% increase over the normalized AFFO per share in 2019. And again, that normalized number of $446 million, that's taking out the $40 million of Arlington uplift we experienced in 2019.

So looking out and given the continued growth we've had in contracted assets as an organization. For 2022, we're providing guidance – extending our guidance to increase the dividend, but we have reduced it from 7% to 5%. The reduction in the guidance is driven by the low interest rate environment, which has put downward pressure on returns we could expect from growth opportunities as we move forward. We do believe, though, in this current interest rate environment, 5% is an appropriate long run target for the organization. Now certainly, if we see a recovery in interest rates or increasing returns, that may be a factor we'll consider down the road.

So generally, as I mentioned, our discretionary cash flow supports at least $500 million of growth investment without needing to access the equity market. So just some high-level math of that is the growth opportunities that Mark's teams are pursuing generally will throw off an EBITDA multiple of approximately $10 million, so $50 million of EBITDA per year. When we translate that into an AFFO number, it's $38 million, which results in 7% AFFO per share growth without needing to raise equity.

Now that's growth just off our $500 million investment. Of course, what the organization is also doing is, as Darcy was describing, optimizing the value of our existing assets. So when you add that, we expect long run, as Mark said, to be more around 9% AFFO per share growth, which more than covers, of course, that 5% dividend growth guidance.

So when we look forward to 2020, we anticipate we'll be coming back to the Canadian debt market for approximately $200 million. And in addition, we will be putting in place tax equity investment with Cardinal Point, which will be announced early next year. So together that raises about $400 million of financing in conjunction with our funds from operations. When you look at those dollars and the uses of that cash flow. Of course, we have our common and preferred share dividends, debt repayment, which will be primarily our credit lines, but also a debt maturity we have in November of next year. The anticipated investment in C2CNT, this is the investment to increase our interest to 40% in that technology. Enhancement CapEx, those projects that we're doing at Decatur, Arlington, dual fuel capability at Genesee will total $95 million in 2020. We have growth CapEx of $150 million, which includes the completion of Cardinal Point as well as some anticipated initial investments to safe harbor some solar equipment. And also in terms of the initial investments in the commercial scale C2CNT facility at Genesee.

Now of course, we have a $500 million target of committed capital over and above this, it isn't reflected here. But of course, we're well positioned with our balance sheet to be able to fund that growth. And then lastly, as we talked about sustaining maintenance CapEx of $95 million. So as we typically do, we've updated our Alberta commercial portfolio position. So just to remind everybody, this is the EBITDA that is basically subject to merchant pricing in the Alberta market currently represents about 20% of our overall EBITDA.

When we roll into 2021, with the expiry of the G1, G2 PPA, it will increase to about 1/3 of our EBITDA. In terms of percentage of our baseload length sold forward, we're currently sitting at 63% in 2020. This is somewhat lower than what we typically have experienced at this point, as we've rolling into the prompt year, a lot of that was driven by very low liquidity in the Alberta market, in the first portion of 2019. As you can see, forward prices remain very robust. In Alberta, at the end of November, we were at $58 for 2021 and $54 for 2022. So certainly, pricing that reflects the cost of a new build, new generation. And also, as Mark showed, both forwards and third-party forecasts reflect that price level on a go-forward basis.

So in terms of our credit metrics, we monitor, of course, very closely those metrics that have been articulated by DBRS and S&P. When we look forward to 2020, we feel very comfortable being able to maintain those targets and maintain the investment-grade credit rating as we roll forward. So in terms of our debt maturity schedule, you can see the new debt that has been raised this year in terms of $300 million going out to 2026, the U.S. private placements in the lighter gray bars, and then the $275 million of 10-year debt. And that lengthening the term of our debt, as you can see, has very much pushed out our debt maturity schedule, which is, again, as I mentioned earlier, reflects the increased confidence in the long-term outlook for Capital Power.

So we're happy to see that our dividend yield has dipped below 6% again. One of the things I'd like to emphasize on this graph is, if you go back to December of 2014, we were almost at 5% dividend yield, and that was with a portfolio that was very much more concentrated in Alberta, very much higher percentage of merchant EBITDA. So given the de-risking we've had in the Capital Power portfolio, we believe we're still trading high relative to where our dividend yield should be in this interest rate environment, we feel it should be back down at least around the 5% level, and certainly, that's a catalyst we see for our share price on a go-forward basis.

Now just turning to guidance for 2020. We did want to spend a bit of time with a bit more detail on a few areas. So the first one is on sustaining CapEx. And one of the things that's happened, as you're aware, we completed the K3, G3 swap with TransAlta. And what this has meant is that, of course, we're responsible for 100% of the maintenance and sustaining CapEx for Genesee 3. Whereas, we had 50% before and 50% of Keephills 3. Now those outages were always staggered year-over-year. Of course, now when we have two outages at Genesee, which will be the case in 2021, you now see a spike in our sustaining and maintenance CapEx. So when you roll through the next several years, we have, for 2020, we have an increase in our sustaining CapEx, which is due to the Arlington outage, major outage there. That gets us to $95 million in 2020. But we look forward to 2021, as I mentioned, we're going to have two outages at Genesee. And those outages are, of course, the normal maintenance outages. But during those time, we'll also be taking the opportunity, as Darcy said, to implement dual fuel capability as well as rotor upgrades. So that increases our sustaining maintenance CapEx there by $30 million and takes us to about $120 million for 2021.

However, when we roll forward to 2022, we'll be back down to one Genesee unit on outage. So that reduces it by $30 million. But in addition, we'll be through the Decatur and Arlington major outages. So we'll be back down to approximately $70 million in 2022. And when you look longer term, basically, you'll see our maintenance sustaining CapEx, sort of averaging in that $85 million to $95 million level. However, those years, where we have two Genesee outages, it'll be higher; one, it'll be lower, but that just gives you a sense of the profile as well as the long run sustaining maintenance CapEx for the organization.

Now one thing I do want to just clarify is that dollars spent on like dual fuel capability at Genesee, we don't view that as sustaining maintenance CapEx. We view that as effectively growth CapEx because it's enhancing the capability of the assets. So that wouldn't be included in the sustaining CapEx numbers. So as in previous years, we've provided some guidance around modeling EBITDA on U.S. wind projects. So consistent with that theme. Here's Cardinal Point, of course, the very high front-loaded EBITDA is a result of the production tax credits and MACRS (modified accelerated cost recovery system) that the tax equity investor’s sees. So we consolidate these investments on our balance sheet, but that EBITDA is really – that front-loaded EBITDA is really just reflecting the tax benefits that flow to the tax equity investor. From Capital Power's perspective, we see that pretax cash flow, which we see around $10 million, and then as the PPA term ends, we'll see – because it's a very low contract price, we will see some uptick in terms of our financial returns on the project.

So the other element I just wanted to touch on was the shape of our AFFO in 2020. So our AFFO actually has a very large element in Q3. So almost 45% of our AFFO, we're projecting will come from Q3. And there's a number of factors that drive that: The first reason is the majority of our scheduled outages incur in the first half of the year; the second thing is, we received the off-coal compensation payment, that $50 million is in Q3; the third element is that Q3 is typically the highest margins in the Alberta market. The reason being is we do have fairly healthy electricity prices due to the cooling load in the province, but also very low natural gas prices. So that drives the higher margins on our commercial portfolio in Alberta in Q3; and then finally, we do have contracts that are more heavily weighted to Q3 in terms of the shape and profile. So on a go-forward basis, we're going to be providing this breakdown, just to give everybody a sense of how we see the allocation in AFFO throughout the year.

So to wrap up, it highlights continued strong balance sheet to support our investment-grade credit rating and to be able to fund $500 million of growth without having to access the equity market. We're still tracking well below our long-run payout ratio of 45% to 55%. Very good outlook in terms of recontracting the Decatur and Island Generation facilities. And finally, confirming our dividend guidance of 7% growth through 2021, but then extending the guidance of 5% through 2022. Thanks.

Randy Mah
All right. Thanks, Bryan. We're slightly ahead of schedule. So we'll take a break, let you refresh your coffees and start-up again at 10:30.

Kate Chisholm
Capital Power has been on its sustainability journey for a very long time. Doing the right thing has always been part of our DNA. The only part of sustainability that's new to us is broadcasting it. We've long believed that sustainable sourcing and responsible energy production will make us a supplier of choice. This is why we volunteered to have Genesee 3 comply down to the emissions level of a combined cycle plant long before regulation required it, and why we've been playing in the CCUS space since 2005, when we began our first gasification study. We also believe that our employees are our most important resource and have striven for a long time to be an "employer of choice", and we know that being welcomed in the communities in which we operate expedites permitting and minimizes operations disruptions. Today, I'm going to tell you about some new initiatives and remind you of some existing initiatives that all fit together to make Capital Power a strong ESG investment. So what's new this year in sustainability at Capital Power?

Well to answer that, turn your imaginations with me if you will to a world in which… demand for electricity has grown due to electrification and democratization. Renewables have been built out to the maximum possible wherever possible. Batteries are widely used to elongate the benefits of intermittent renewables. Cost to consumers and reliability of power generation is maintained by natural gas and without emitting carbon dioxide. Even in China, India, Africa and other places where reliance on thermal generation is unlikely to abate in the foreseeable future. We, at Capital Power, believe that the quickest, most efficient and most likely way for the world to meet our collective Paris targets is not to aim exclusively to go to 100% renewables as soon as possible. We believe we'll only be able to realistically confine climate change to 2 degrees or less by proliferating technology to remove carbon from natural gas generation so we can use it as well.

In Canada, the provinces of British Columbia, Manitoba and Quebec are very lucky. They're blessed with rich hydro resources. Alberta, Saskatchewan, Ontario and the Maritimes are not. Different regions are blessed with different natural resource mixes and so their approaches to climate mitigation must accordingly differ. This is not a political statement, just a realistic fact. My favourite example to illustrate the importance of natural gas to power generation is Alberta during the month of February 2019. I hope that many of you were not there. It was our coldest February in 50 years, and renewables were available less than 5% of hours. In many hours, there wasn't a single kW of reliable power. In other words, Alberta needed to meet 100% of its load in those hours with non-renewable energy. Many well intentioned people would suggest that we should abandon fossil fuel and aim to fulfill such a need with batteries.

Just for fun, I asked my team to calculate what February 2019 would have looked like, if Alberta was using only renewables and batteries, based on the actual renewable capacity factors in that month. Bearing in mind that the Alberta pool price currently averages around 5.5 cents per kWh. As you can see, using the renewable/battery mix for just 24 hours would raise prices to 8 cents per kWh. For a full week, the price would rise to 56 cents per kWh and consumers would pay $2.24 per kWh for a month like February. Importantly, that's the energy price alone. It does not include any portion of the transmission build that would be necessary to deliver that result. Many other regions are similarly constrained like large parts of the US, Europe, Asia, Africa and India. This is why the world needs an "all-of-the-above" solution to conquer climate change. I know that Mark spoke to you about this earlier, but it's a pretty important point. Even in California, arguably the greenest, most forward thinking US state, and one with a very, very strong solar resource, this holds true.

This slide comes from the California ISO and it depicts a portion of time in March of 2019. I chose that particular time period because the average temperature in California in March is 9 degrees Celsius at night and 19 degrees at midday so it's not too cold, and there's not too much air conditioning load - just mild, sunny weather. The yellow spots are the daily periods when solar is available. Purple is natural gas and the grey are all the imports, which are primarily natural gas as well. You can see that California uses natural gas to fill in the gaps left by renewables because of natural gas' low cost and flexibility. And by the way, for the same good reasons depicted in these slides, so do BC Hydro, Manitoba Hydro and Hydro Québec.

Besides continuing to need natural gas for supply shaping purposes, we also believe that, assuming we can render it into a non-emitting resource, there are additional considerations that will make it desirable over the long term. It takes up less space and uses less arable land. It's low cost for consumers. Its flexible dispatchability enables the system to assimilate the maximum renewable capacity while also ensuring reliability. It's easily integratable on a low short term and no long term emitting basis where supply is available. This why so many government climate plans, including the EIA, the UN's Intergovernmental Panel on Climate Change and Canada in our own PanCanadian Framework, are increasingly reflecting the importance of CCUS to the world's climate change fight and specifically midcentury decarbonization goals.

Our investment in C2CNT, which you'll hear much more about later this morning, is only one example of what's possible with carbon conversion. Carbon conversion differs from other forms of CCUS, like storage or sequestration and utilization for EOR and other purposes. Because it takes the captured carbon and converts it into valuable products that can be sold to earn revenue that offsets the cost of capture. In addition, many of those converted products are completely benign and inert. So they don't pose the risk of later release of the carbon. If you're lucky, like C2CNT, you can also create carbon benefits downstream. There's a lot of ubercool work being done on carbon conversion right now, and the materials produced by it very widely, including everything from jewelry and vodka to graphene and carbon nanotubes, textiles, methanol for fuel and feedstock uses, polymers and plastics for 3D printing, sodium bicarbonate or baking soda and the manufacturer of stronger, lighter car parts, plane skins, boats and trains. Of course, you've probably all heard by now of lush cosmetics famous carbon soap.

CCUS will play an essential part of the world's cleaner energy future. Here is a description of Capital Power's road to Paris at a high level. This is the first time we've shown you how our work in CCUS and our natural gas portfolio will follow a logical linear pathway in support of mid-century decarbonization. This is really important, write this down. Note that 2,500 tonnes of carbon nanotubes can be produced from 10,000 tonnes of captured carbon, and those 2,500 tonnes of nanotubes will avoid 2 million tonnes of carbon in the production of cement. The downstream benefits in aluminum production are 3 times higher. We believe this strategy is both responsible and resilient.

We also continue to assert ourselves as a neighbor of choice in all of the communities in which we operate. Examples of the ways in which we walk this talk include, thank you to Scotia, who noted in 2018 that we devote more to community investment than our peers on the basis of a percentage of revenue. We mandate all senior plant management to become the face of Capital Power in the local community, developing relationships and participating in the community. And by the way, doing this increases plant staff engagement as well. We were also the first in Ontario to compensate adjacent neighbors of our wind farm landowners, a practice which we have continued to follow elsewhere. Others have now started to imitate this practice, which we interpret as a grand complement.

We'll also obviously continue to work on becoming an employer of choice that can recruit and retain top talent in all of our relevant fields. Now this is also the first time we've announced specific targets for our sustainability program. They're ambitious, and they are the right thing to do. While also clarifying how investors and other stakeholders can expect Capital Power to ensure responsible, reliable power for decades to come.

Capital Power's TCFD 2.0, which will be published as promised last year in February of 2020, will incorporate more detail regarding the risks and opportunities to Capital Power's business from climate change and specifically, how resilient our corporate strategy is expected to be. As also promised, our 2019 year-end disclosure will integrate transparent ESG and financial reporting into one place where investors can understand exactly how Capital Power plans to do well by doing good.

Now the only area of achievement on this slide I haven't yet touched on is the G part, where I think we are also doing very well. In this respect, please note that as of 2020, fully 20% of our executive short-term incentive pay will be based on meeting ESG targets. So we are literally putting our money where our mouths are. Of course, there's a lot more ESG information about Capital Power, that will be made transparent in our year-end report. With that, I'll turn it back over to Brian to wrap things up. Thank you ever so much for your attention.

Brian Vaasjo
Thanks, Kate. As we do every year, we provide annual priorities and targets that we speak to each and every quarter thereafter. This year, the nature of our annual targets are unchanged from 2019. Looking first at our operational targets for availability, we're on target for 95% in 2019. 2020 drops temporarily to 93%, as a result of planned outages, associated with growth and enhancement capital programs. Our sustaining capital expenditures are trending within the target range for 2019. The 2020 target range is $90 million to $100 million, up $10 million from 2019.

Turning to our financial targets. Adjusted EBITDA for 2019 is expected to come in at the higher end of the target range, $870 million to $920 million. For 2020, the adjusted EBITDA range is from $935 million to $985 million. Adjusted funds from operations for 2019 is estimated to come in between $535 million and $555 million. This is well above our target range of $485 million to $535 million. Our AFFO target range for 2020 is $500 million to $550 million. This is an increase of 12% over the 2019 midpoint of $470 million normalized for the Arlington toll.

In addition to the significant amount of work being done for our existing assets, our targets for growth are similar to prior years. We have a committed growth capital target of $500 million, similar to the last few years. Completion of the Cardinal Point Wind project on-budget and on-time. And continuing the advancement of Whitla 2 for construction in 2021 are both 2020 targets. We expect an additional renewable project to be advanced in 2020.

I'll conclude by getting back to how should investors think about Capital Power. First, we have a solid six-year track record of growth, yielding AFFO per share of 13%, dividend growth of 7% and average annual total shareholder return of 19%. This is consistent with our guidance of 7% for 2020 and 2021. Our 5% dividend growth guidance for 2022 is reflective of changing costs of capital. We are forecasting exceeding the AFFO range for 2019 and normalized AFFO growth of 12% for 2020. With the improvements in Alberta, our excellent long-term outlook and continuing record of results year-after-year, we believe, there should be a further improvement in our dividend yield. In summary, Capital Power represents an attractive investment opportunity. Thank you.

Questions & Answer Session

Randy Mah
Okay. Thanks, Brian. We're happy to take your questions. If you could use the microphone before asking your question and also to identify yourself. Any questions?

Robert Hope
Rob Hope, Scotiabank. Maybe can you just comment some additional thoughts on Whitla 2. Whether or not you're going to keep that merchant or if you are looking for some long-term contracts there as well as kind of what – realized pricing you think you can get on the merchant facility, that's wind in South Eastern Alberta as well as kind of the amount of green magnitude or green attributes are going to spit off there?

Mark Zimmerman
Thanks, Rob. So maybe I'll unbundle the questions a little bit. First off, much of the benefits or the economics that we're seeing from Whitla 2 itself aren't just solely the offtake. There's great offsets that we'll have to mitigate some of the compliance obligations we have in relation to our carbon footprint in Alberta. There's also some tax benefits in the form of accelerated tax appreciation that'll help us as well. So even at that starting point, not 100% of the economics are solely exposed to the merchant curve. That being said, we are continuing in a number of different discussions with a variety of commercial and industrial folk, and there is interest in buying those green attribute sort of generation. But they have yet gotten to the point, where they're willing to commit over the long-term for some of those elements. We're very encouraged, but they're not there yet. So we would expect some amount. All that being said because of the attributes that we'll be getting for our own benefit, both tax and carbon compliance, we are prepared to move ahead and have this thing constructed because we also see great synergies that are available to us when combined with our Whitla 1 facility. And so all in the package remains very appealing. If we ultimately get to where we have it contracted up, all the better.

Robert Kwan
Robert Kwan, RBC. Just around the outlook and the lower returns, can you just first talk about what are your IRR hurdles at this point and compare that to where they were before? And then as you think about the 5% dividend growth for 2020, you also talked though about the lower returns generating 7% AFFO growth. And if you give you some of your optimization, you might be up at 9%. So why are you looking at the 5% growth? Or is there something else that you're kind of provisioning for some of the contract runoffs at the same time?

Bryan DeNeve
Yes. So in terms of return expectations. Certainly, it varies depending on the nature of the opportunity. But our levered return targets are sort of in the 10% to 12% range right now. Previously, if we look back, it was more around 11% to 13%, 11% to 14%. So that reflects that downward movement in the cost of capital. In terms of the 9% versus the 5%, it's not so much the recontracting, it's more – we do realize that even though we have a very young fleet, there we are going to reach a point, where some of those assets will retire. So certainly, what you'll see happen of course is our payout ratio will continue to decline because of that gap. But at some point, we do want to be mindful of the fact that some of those assets will eventually be retired, and that gives us the ability then to continue dividend growth through those retirements.

Robert Kwan
If I can just ask one other question. Just on Decatur, you mentioned that you expect to meet or exceed your recontracting assumptions. Can you talk directionally about what you're expecting? Were you expecting it to be flat? Or is there something else?

Bryan DeNeve
I'll hand that over to Mark.

Mark Zimmerman
Let me push the right button here first. Given where we're at in the negotiations, we were very confident that we'll be able to be in a position to announce something here shortly. But as you can imagine, many of the details of that are quite sensitive. I would say that we aren't looking for wholesale step down immediately. There will be some shaping elements that will come into play in respect to the contract or the recontract period. We'll, of course, be able to describe that much more fully, once we draw them to a conclusion, bringing out, but we're not looking for a material year-over-year change.

Brian Vaasjo
Actually, could I add just a comment to that? Just a point of clarification. I think what Mark actually said was that – and I don't mean just now. But when he was speaking earlier, I believe his comment was around the business case, the original business case, not the recontracting. So I don't believe Mark said that the recontracting was better than our expectations, but the overall business case and recognize also that we're adding another 100 megawatts to the plant. And as an overall bundle, it's meeting and exceeding our business case, not the specifics of consideration of recontracting.

Mark Zimmerman
Thanks Brian.

John Mould
John Mould TD Securities. Maybe just starting with the dual fuel at Genesee and how that plays in with where the carbon price is may be going. And I know we're still waiting for some finality there, with the federal price and whether that is going to perhaps get through the Supreme Court, et cetera. But assuming we're moving to $50 price in a couple of years. How much do you see Genesee actually burning coal as a percentage of its output in that environment? And I know we're going to hear more about the nanotube side of things, but how relevant is that plan to potentially enabling more coal firing down the road?

Bryan DeNeve
So in terms of gas consumption at the Genesee facility, you know certainly with $30 carbon pricing, which is where it's currently at, I think we're going to be around the range of 40% of the fuel will be coming from natural gas. Certainly, if we do see ultimately that price increase, it's going to be pushing more natural gas through the plant and that's one of the things with the dual fuel is providing us that capability to mitigate the impact of higher carbon prices.

Mark Zimmerman
Can I add to that, Bryan?

Bryan DeNeve
Yes.

Mark Zimmerman
You raised the carbon tax issue equally and important to keep in mind is the price of the natural gas commodity as well. And it had been quite low, given the bottleneck that we had seen on transportation. There was some steps taken by the industry and TransCanada to temporarily adjust those that we had seen a rise in gas price, but that volatility in the gas price will also be factoring very much into that equation.

John Mould
And then maybe just one other question on your growth targets. In your news release, you mentioned you referenced $500 million of growth not explicitly contracted all of that in your slide deck. And you also reference renewable development, and not wind you have in the past? So I guess, are you seeing more of a line of sight to potential solar developments. Can you talk a bit about that more and potential for more renewable opportunities on the merchant side in Alberta beyond the Whitla announcement from today?

Mark Zimmerman
So maybe I'll give a stab at some of that. We're conscientiously saying renewables in a sense of both wind and gas. We would expect in the U.S. over the next couple of years that there may be a bit of a slowdown on the wind side. Many expect that as the PTCs expire the same level of price support is in there. And so the price of wind goes up a little bit. That being said, you're seeing an increasing penetration of solar into many resource plants that are out there, many states, et cetera, that want to see greater utilization of solar. We have participated in solar in the past. We feel we have the competencies to participate in that in the future, but we would acknowledge that is one of the areas that we see some pressure on returns, as there seems to be a lot of money that is directed to that, especially for longer-term in service solar opportunities. Straight up, those returns are fairly skinny, but we are actively exploring if there's other ways, whether structurally or through other arrangements and joint ventures, if there's a way we can get to having those solar opportunities to be economic for us. The final point would be, we did make an investment in some inverters because as part of that need to be competitive in solar on the offtake, the results of those tax subsidies that were out there. So we wanted to ensure that we get some of that safe harbor equipment inside that can maintain the competitiveness for us. It is a pretty fungible commodity though, it's not solely utilized in just one type of installation that can be spread around. So we wanted to maintain that competitiveness, while we figure out how we can best play in this space. Over

the long term, we would expect it would be both wind and solar and other technologies.

Bryan DeNeve
So just to add one thing to Mark's response is, our target returns on solar are the same – virtually the same as what they are on wind developments. So we're not going to be chasing returns – lower returns on solar. As Mark said, we're finding ways that we can develop and build those projects and generate the same shareholder value that we have with the wind developments we've done.

Mark Jarvi
Mark Jarvi from CIBC. Maybe it's extending – I think there was a question along the lines of more merchants as well in the last question. But just as you hit 2/3 contracted, is that a target? It's important for credit metrics, credit rating agencies. What sort of the appetite again for more merchant or gas contracts and maybe aren't fully contracted, as you think about maybe not just so much as pursuing contracted, but just total return optimization?

Mark Zimmerman
So it's kind of a part in part on the balance sheet side, I'll let Mr. DeNeve speak to that. But you did mention on the gas commodity side. We are fully aware of the exposure – increasing exposure that we have on the gas side, as we have more and more gas utilization. We've been very active in also managing and mitigating what that fuel exposure is, especially for that fuel exposure that isn't a flow-through component into the price ultimately, i.e., the fuel that we're exposed to on our side. We are actively managing that. In addition, our future requirements, we have addressed at Genesee in terms of access to the necessary fuel that we'll need, as we move forward with our dual fuel plans. In terms of the overall balance sheet though, on the rating agency, Bryan, maybe you want to?

Bryan DeNeve
Yes. We have reached that threshold, where with G1 G2 coming off PPA, we're going to be above the 2/3. So certainly, that was the prime objective. But what I would say is, we're going to be very diligent to make sure we remain above that 2/3. We are not going to be doing anything that will jeopardize that ratio. But certainly, given that we have now reached that point, we would also want to be mindful of the risk-reward tradeoff we see on various opportunities. So certainly, we'll be evaluating and taking that into account. But I think the most important thing to stress is that, that 2/3 is very important to us, and it's something that will be sustained as we go forward.

Mark Jarvi
And then just maybe there was comments around opportunities in Ontario longer term. I know the ISO has talked about maybe blend and extend and opportunities. Maybe you could just talk about sort of timeline do you think for deploying capital? And what kind of projects that would be scale and scope?

Mark Zimmerman
So it's interesting when you take a look at the new integrated resource plan they have, especially factoring in the nuclear refurbishments and the retirements and maybe ongoing. It starts looking like a fairly sizable gap, negative reserve margin might be developing, which would require new capacity to be developed or transported in. And we start seeing that, I think it's in the neighborhood of 1.5 to 2 gigawatts in the '23, '24 sort of time frame. What excites us about that opportunity is both our York facility and our Goreway facility, we do have the infrastructure in place, the excess land. So to the extent they move towards having part of that solution provided in the form of additional gas-fired generation, we would look to participate in any sort of RFP that comes out of that. Once you get past that time frame, there's also another block that may be coming forward, depending upon load growth and electrification of the transportation sector, that could cause a second round of more capacity being required. Given the strategic location of both Goreway and York, within the GTA and the challenges in citing new greenfield plants and/or increasing transportation into the GTA, we think both of those plants are well positioned to be competitive in either of those rounds. Net-net, it's probably a bit of time of 4, 5 years beyond, but it does look very promising.

Brian Vaasjo
If I could just go back on merchant comment or the question. And just to be clear, as Bryan commented, we'll be very diligent in looking at risk reward balances, as it relates to merchant and contracted. But just to be clear, we wouldn't be looking at merchant any place but Alberta. We wouldn't – you wouldn't expect to see all of a sudden investment in PJM or because we thought we may have had some room on the merchant side. It's really focused on the province of Alberta and the opportunities we see there.

Patrick Kenny
Yes. Pat Kenny, National Bank. Just looking at the forward prices on Slide 29, doesn't look like there's any step down in the curve in 2023. Just wondering if that's reflective of your views, given the Suncor plant coming on? And if so, maybe walk us through why you think the market can absorb that incremental supply?

Bryan DeNeve
So I'll kick it off, and Mark will add, of course, if he sees fit.

Mark Zimmerman
And Brian will clarify what we both say.

Bryan DeNeve
One of the things that was a big positive was when Suncor clarified that facility will be coming in, in the second half of 2023. So and certainly, I think Darcy's team would confirm that's probably the best timing that they will achieve given what they're doing. So that allows quite a bit of time of load growth to sustain that supply-demand balance. But the other thing is that Alberta is now in a place with the end of the PPAs that all the supply is going to be in the hands of commercial entities, that will be making decision on whether it makes sense for older facilities to continue to operate them or whether to mothball them or shut down. So that is dramatically different than what we experienced of course in the 2016, 2017 period here in Alberta. So we see in 2023, virtually no impact because of the timing of the add; 2024, some slight downward pressure. But of course, then we believe we'll have 1% to 2% load growth in Alberta, that will then absorb that. But again, more importantly is, you'll see a response on the supply side, which you didn't in the past. So we think that bodes well in terms of long-term prices for the province.

Patrick Kenny
And then maybe just a follow-up on with Whitla 2 under development, and maybe tying into some of Kate's comments around the ESG front. Can you just confirm me if you're looking at developing the batteries and the energy storage in conjunction with the wind projects? Or I guess, what's the outlook and the timing for the cost to come down that it makes economic sense to bring those into the projects?

Mark Zimmerman
So we've been actively engaged in discussions with a number of battery suppliers out there. And looking at the economics and do look at opportunities to incorporate that in other developments, whether or not be with wind or solar or natural gas plants for that matter. I would observe that it seems to be getting closer where things can make more economic sense, and there is an increasing societal appetite that is out there, that is also encouraging. To this point, we have not proceeded to a great depth to bring a project like that forward, but it does seem that the stage is being set at a bundled solution could be very attractive to a number of offtake parties, and it's also getting the point where it's very comparable to other solutions they may have.

Ben Pham
Ben Pham, BMO Capital Markets. I just want to understand on the contracted targets 2/3. So I know that's where you're going to get Genesee 1 and 2 coming off. You mentioned you wanted to be above that. But I guess, for a company that's trading at a discount to peers and really paying a pretty healthy dividend, and there's some growth. Isn’t there really an urgency to really get that contracted portion to 80% or more, just kind of where you are right now? And if you're at 2/3, does that contemplate any change of leverage or payout ratios when you kind of think about that on a sustainable basis?

Bryan DeNeve
So in terms of the payout ratio, I don't think they are – there's anything that gets changed because of the contracted percentage. Certainly, for us, the 45% to 55% again is aligned with that strategy to have sort of half our capital going to sustaining the growing dividend and half being available for growth opportunities that we put to work. Certainly, there's benefits to having a high contract percentage. So certainly, that right now, with a 20% of our EBITDA be in merchants, certainly, a very stable portfolio. What we want to make sure, though, that is how it all ties into our credit rating. And certainly, we want to make sure, again, we're going to sustain that 2/3 and certainly having a percentage above that is prudent.

But again, as we move forward, as Brian mentioned, most of our growth is focused on contracted because it is growth outside of Alberta. So as things unfold, certainly, we would expect that percentage to continue to increase, just naturally based on where our growth focus is and the fact that we will only be doing merchant in the Alberta context. And to be frank, there's with Suncor moving ahead with their cogen facility, that's going to take up a lot of the need for new supply as well as Sundance 5 being repowered. But again, you have to see how these markets evolve and unfold. But I think you could be pretty confident that balance of probabilities would be that contracted percentage will increase over time.

Ben Pham
Okay. Can I ask then on the dual fuel strategy? What's the thought process and end goal in 2030? Is that new CT units you're adding on or repowering? And then just to that, like, I don't know Kate knows or somebody else just sort of ESG funds, do they view that dual fuel as still coal still because you're still – you can switch back and forth? I know some nuance there. But just curious about that as well?

Kate Chisholm
You'll notice that we didn't present the dual fuel as a sustainability target, and that's because you can switch back and forth. It will have significant improvements over – in the decade between 2020 and 2030 on our emissions profile at Genesee, but we're not presenting that as a sustainability win. Although it – the government, and there are lots of parties who view it as

a social win because of the jobs that will be preserved and the insurance against high natural gas prices for consumers.

Benjamin Pham
And just on end goal on 2030; new CT repowering?

Bryan DeNeve
So currently, once we reach 2030, we'll no longer be burning coal at that point. So we'd look at those facilities, just continuing forward to 100% natural gas on a simple cycle basis. Having said that, though, lots of work internally to evaluate repowering those facilities similar to what TransAlta is doing at Sundance 5. So certainly, that's work that continues to be underway within the organization, and it wouldn't be surprising to see that we could very easily reach a similar conclusion that at some point as we roll towards 2030, making an announcement that we're moving to repowering one or more of those units.

Mark Zimmerman
Yes. I might add to that, Bryan. It's to have the existing infrastructure in place, the buildings, the water, the transmission does provide a real competitive advantage versus many other new greenfield opportunities. So the brownfield potential, which not only applies on this facility, but many of our others, is also a significant future value, that's all that perhaps is not fully appreciated.

Andrew Kuske
Andrew Kuske, Credit Suisse. A bit of a multipart question that relates to the volatility in the power market in Alberta that we're going to see in the next couple of years. And you yourselves have mentioned that you're not as contracted right now, just given the volatility expectations. You've had really good capture of all over the years, just historically we're going to look at a lot of different data. But when you start to think about just the market behaviors, how does that change your portfolio optimization strategies from what you've had in the past to the future. Maintenance - how does that change on a go-forward basis? And then how should the underlying value that we think about that portfolio being worth. As it evolves, does it translate into lower multiple?

Mark Zimmerman
So maybe I'll take a stab at the first part, just in terms of the market itself. We do expect greater levels of price volatility to start coming back into the Alberta marketplace. In fact, there's been a few days over the course of the last month, where we did hit triple digits as some units that come off, et cetera. But I would reinforce what Bryan had said earlier, now that, that capacity is increasingly and will be fully more in commercial hands, add to the uncertainty connected with what the pricing environment was going to be in a capacity market where carbon tax is going to be a – whether there was a federal program or the TIER program, the balancing pools activities in respect of that. Has that all starts to diminish. I think that's why you're seeing the more bullish forward curve starting to emerge. We haven't yet seen liquidity come back because I think a lot of those guys have really benefited from floating in the market over the last few years with the lower spot prices. But if that starts to migrate up, we would see between the volatility and liquidity that our guys should be able to maintain that sort of performance that they've been able to achieve in the past in terms of an absolute price you see on that chart of ours. And Brian is going to clarify for me here.

Brian Vaasjo
Just in terms of – you had asked another part of the question is, does it change the way we sort of operate and think about things. And some recent work that we had done because it's important to understand, are you paying for availability? And do you need to, would you be better off having a lower availability and lower maintenance costs, et cetera. In our recent work, and it's consistent with what we've always said is that availability and the way those units operate are actually going to be more important in the future than it has been in the past few years. So, the work that Darcy and his folks are doing in terms of ensuring that those units are available and at very high levels is extremely important to our financial – or to the financial benefits of the Alberta market going forward.

Robert Hope
Rob Hope, Scotiabank. Just a clarification on your 2020 guidance, and then I'll get a question on Genesee. The uplift in Alberta of $25 million, that's off the old guidance that you did prior to the update from, today, is the expectation that 2020 looks pretty similar to 2019?

Bryan DeNeve
I think if you go back to our view of 2019 at Investor Day, a year ago, certainly 2020 is higher – a better – higher margins on our Alberta portfolio relative to 2019. And I think as we've gone through the year, and Mark's team has optimized around the trading side, it closed the gap between the two. And we've seen that with our succeeding guidance in 2019. So certainly, that's moved closer together. But we still see 2020 being healthier.

Robert Hope
Okay. And then just looking at the 2021, any updated thoughts on kind of any impact on the PPAs on G1 and G2 rolling off? If there's going to be an uplift or downlift there?

Bryan DeNeve

Yes, it's it really is going to come down to what we're able to lock in for prices in '21. As Mark mentioned, liquidity has been slow to recover, but it is recovering. And as the chart I showed earlier, we've hedged quite a bit in 2022, interest enough. But '21, we've seen a lot of volatility in our trading group has taken advantage of that, so actually buying and then selling and that's pushed up the capture price. At the end of the day, if we capture in sort of the high 50s on our Alberta portfolio, we should be close to maintaining the EBITDA off those assets as we go through the transition of the PPAs.

David Quezada
David Quezada, Raymond James. A quick follow-up here on just the recontracting. Can you just give us any thoughts on the case for recontracting at Island? And directionally, what you expect to happen there? And then maybe some early thoughts on Arlington as well?

Mark Zimmerman
The discussions, thus far, have been more along the lines of the absolute need for those facilities. And the observation that they have been running a lot more than they have been historically and hence the importance. But then we quickly get into the discussion of not only the recontract price, but the recontract term. And that's where the art really comes in because we also have to factor in what our flow throughs, what are on their account, our account, et cetera. Very early days on the Island side, overall returns, one would expect to be similar on a go-forward basis. But to have any more granularity at this point, given that it's really a triangulation of all those variables is difficult to pinpoint. We would expect a similar sort of thing with Arlington as we have those discussions, it is needed. It's providing great value on the off-season. We've now got another counterparty that does like to tap into it. When we get to a point of having those recontracting discussions, again, it will be not only term and price, but what sort of elements are our account versus theirs. Overall, though, we still think the economics keep circling out to similar what they have been historically.

Randy Mah
Any further questions? Okay. If not, I'll pass it over to Brian to start us off on the C2CNT discussion.

Brian Vaasjo
So, I'll just make a couple of comments while we're shuffling and Stuart's joining me on stage. So, Kate has described in her discussions the strategic reasons why Capital Power has invested in a venture like C2CNT. In fact, I have stated to a number of you over the last year or so, that I believe that this technology has the potential to move the dial on climate change by itself.

In 2018, Capital Power made a direct investment in C2CNT, an entity, which owns all the nano carbon intellectual property, Dr. Licht and his team had developed, is developing and will develop. Capital Power is committed to a 9% interest, but we expect to increase our interest to 40% through the exercise of options through 2020. Through this 40% ownership interest in addition to participating in, of course, the great technology, will benefit from the continued production of the Shepard development site as well as the future commercial arrangements, C2CNT enters into with third parties.

In time, we'd expect that C2CNT may enter into some direct investments in other facilities. We are excited to announce that next year, we'll start the development of the Genesee Carbon Conversion Center. This will be the world's first commercial scale production of CNTs directly from carbon. We will permit the site early next year for 7,500 tonnes per year of production. Phase 1 will be targeting 2,500 tonnes per year. Construction should commence mid-2020, with completion sometime in 2021.

Capital cost is expected to be between $20-$25 million. As the note indicates at the bottom of these two slides both the increase in ownership and proceeding with the Genesee Carbon Conversion Centre are contingent on technology being successful. An investment in new technology is speculative by its nature. We are however very bullish on this opportunity. Of course, Capital Power will go through further detailed due diligence at the time of making additional financial commitments. And before I introduce Professor Licht, I would like to comment that in what you see in terms of our projections, in our outlook for 2020 we’ve included the capital necessary to move forward on both the investment and in terms of the Genesee Carbon Conversion Centre. We have not included any financial results, or you know, any uptick associated with that. Part of that goes to the fact that there’s different financial commercial negotiations that are going to be taking place over the next year and certainly having any kinds of indications as to what we think, or what would be coming out of C2CNT is commercially not wise at this point in time. So, there are no implications other than of course the capital included in our 2020 outlook.

So, with that I do have the pleasure of introducing Dr. Stuart Licht. Dr. Licht’s research focuses on providing technical solutions to climate change. The research introduces and scales up a new chemistry to transform the greenhouse gas carbon dioxide into the strongest material known, carbon nanotubes. Stuart Licht is professor of chemistry at George Washington University. Professor Licht’s C2CNT team is currently competing as a finalist in the Carbon X-Prize competition to form the most valuable product from carbon dioxide. Professor Licht is an electric chemist with over 400 papers and patents focused on sustainability. He served as program director in the Chemistry Division of the U.S. National Science Foundation. Is a Fellow of the Electrical Chemical Society and recipient of numerous industry and societal research awards.

Mr. Licht helped establish fundamental chemical principles in the field of photoelectric chemistry as well as some of the highest efficient solar cells. He has broadened the foundation of understanding of environmental electrochemical phenomena ranging from carbon capture to generation collection, microelectron chemistry, chemical speciation, analytical chemistry, chemical conversion, and water purification. So with that, Dr. Stuart Licht.

[Dr. Stuart Licht, founder of C2CNT, was a guest speaker at Investor Day. Transcripts for his presentation on the technology of C2CNT are not available but his presentation can be accessed on Capital Power's Investor Day webcast.]