HOW OUR POWER IS CHANGING

Q&A DOCUMENT

The following is a complete list of questions and answers from a SaskPower online learning event, How Our Power is Changing, hosted on September 28th, 2022. Questions were submitted by participants during the session.

1. **You indicate that we have doubled wind power. What is the reasonable % amount that we will expect from wind post 2030?**

   We are still developing our future supply plan to meet our emission reduction targets, but we expect renewable power to play a big role. As this plan evolves, we will have a better idea about how much renewable power we can add and how quickly. Visit saskpower.com/engage to share your thoughts on our long-term plan.

2. **BD3 has sequestered 4.5 million tonnes, why not CCS another unit and eliminate more emissions?**

   In Saskatchewan, we have more than 70 years experience with conventional coal generation. Given our extensive knowledge and expertise operating coal-fired plants, we pursued the development of a Carbon Capture and Storage (CCS) project at Boundary Dam to reduce greenhouse gas emissions. The CCS project at Boundary Dam Unit 3 (BD3) continues to be an important part of SaskPower's efforts to provide reliable, sustainable power for Saskatchewan. Since the facility was commissioned, CCS has captured 4,752,988 tonnes of CO_2 that would have otherwise entered the atmosphere.

   When we built this facility, a lot of our power supply came from conventional coal. As one of the first to build this specific technology, we worked through a number of challenges and there are still challenges with CCS, like cost and reliability. We were hoping others would adopt CCS on coal, improving on our project design to make it more reliable and cheaper over time. Since we developed CCS, we have not seen much uptake elsewhere for carbon capture on coal.

   As we explore new supply options, we are looking to other jurisdictions who are experts in different power generation options to be the first to develop and operate new technologies. We want to learn from their experiences.

   The SMR development project is a good example. We are working closely with OPG, as they build their first SMR using the same design that we plan to use here in Saskatchewan. They are an experienced nuclear operator who has built and operated nuclear power plants. With this expertise, they are the right utility to build this new SMR technology.

3. **When we developed the first coal with CCS there was a discussion to market this technology around the world. What happened to those opportunities?**

   Leveraging our experience developing the first CCS on coal in the world, BHP and SaskPower partnered to create the International CCS Knowledge Center.

Its mission is to promote CCS technology and support new global CCS projects around the world in an effort to reduce greenhouse gas emissions. The center pursues new opportunities through business development, operations and technological improvements to advance the deployment of major CCS facilities.

4. **I read that in the USA, the east and west grids are not connected. Where can Saskatchewan import power from?**

   We are connected to Alberta and Manitoba, as well as to North Dakota and the Southwest Power Pool. Expanding our current interconnections with our neighbours will enhance the reliability of Saskatchewan's power grid by providing stable power in the event of adverse weather, an outage at a power station or problems with a transmission line.

   We recently announced that we are building a new tie line into the Southwest Power Pool to the south. The line to the United States will increase our ability to import up to 650 megawatts by 2027. We also have an opportunity to increase our imports from Alberta and Manitoba in the future. Those conversations are ongoing, as we explore what could be possible in the years ahead.

5. **It was said that emissions are recorded at source and that we count our exports in our emissions total. If we just import from the US Southwest grid, we don't count it as part of our totals. This seems like a way to artificially say we have reduced emissions. Can you provide additional detail?**

   The regulations require that greenhouse gas emissions are reported based on where they are created or emitted. For example, power generate in Saskatchewan at our natural gas power facility counts towards SaskPower's greenhouse gas emissions footprint. When we import natural gas power from our neighbours, we are not required to report these emissions.

   We are not sure how the technologies or regulations may change in the future. For this reason, we do track and count emissions for all options in our projections as we plan our future power supply.

6. **Will power storage ever be a possibility?**

   Yes, it will. In fact, we're building our first battery and energy storage facility right now. The facility is going to come online in Regina next year. The 20 MW facility is being built in northeast Regina and will be able to power up to 20,000 homes for one hour. This is a first for Saskatchewan and will give SaskPower the opportunity to gain some experience operating and maintaining a battery storage system.

   Battery storage is still a developing technology. We are hopeful that as the technology evolves, costs will come down, which would mean more possibility for this option in the future. Click here to learn more about our Battery Storage Project.

7. **I would like to know what the power costs from now to 2050 look like to support this plan. Are on-peak charges a possibility?**

   SaskPower has traditionally relied on coal, hydro and natural gas to meet the electricity needs in Saskatchewan. Our future challenge is delivering zero emission energy that can be dispatched at the exact time that it is needed.

   An increasing amount of energy in the future will be produced by renewable energy sources such as wind and solar, which deliver cost effective energy. However, reliable, consistent grid capacity is needed when the sun is not shining and the wind is not blowing. SaskPower is exploring new technologies to support this, including small modular reactors (SMRs), batteries and natural gas facilities that capture the carbon dioxide they produce. This could place price pressures on rates as these new technologies will be replacing legacy coal and natural gas, which were able to meet current capacity requirement at a much lower cost. In addition, the electrical wires and infrastructure that moves our power has to be significantly upgraded to support the new generation being added to the grid.

   SaskPower does not currently have dynamic pricing of electricity. The price is the same every hour of the day for our customers. The energy transition may place pressures on this pricing structure. The way we value dependable, reliable power will increase. For example, rooftop solar may be able to meet a single customer's needs during the day but at night SaskPower will need to rely on batteries and higher cost non-emitting generation to meet their demand. The excess energy delivered by the rooftop solar during the day will be worth significantly less than the reliable on-demand energy that is delivered at night. To ensure fairness and accurate pricing signals an adjustment to the pricing structure may need to be considered as SaskPower approaches net zero.

8. **Are "system costs" factored into wind and solar?**

   Yes. Cost is a key consideration when deciding on any of our power supply options. We have seen the cost of wind and solar reduced over the last five to ten years, however, as it continues to be more economical, these options do not provide continuous, reliable power. We need a mix of power options that include both baseload power and intermittent sources.

9. **Is the small nuclear reactor an option with our resources in the north? Where are we at with that technology? The more diversified we are the better our option to maintain the real time usage.**

   We recently announced the two study areas that are under consideration for a potential SMR in Saskatchewan. SMRs could be an option in the north, but on a smaller scale. The Saskatchewan Research Council is looking at a 5-megawatt reactor. This very small modular reactor (vSMR) could be used to support isolated

communities or mine sites. To learn more about our SMR project, visit saskpower.com\engage.

10. **What is the SaskPower labour force numbers from now until 2050 going to look like? What are the comparisons of worker required per kw for coal, natural gas, nuclear, wind and solar?**

    While we are working on a corporate workforce plan in support of the energy transition, we do not have an employee forecast to 2050. We will have a better understanding of the employee requirements as we develop the plan to 2050.

11. **How much of a concern is electrification for both grid capacity as well as a net-zero future?**

    Electrification can mean many things, like transitioning from gas cars to electric vehicles, switching your home heating from a gas-fired furnace to another option, and energy conservation.

    There is uncertainty on the adoption of electrification on many levels. We're not sure how many people will buy EV's, but we are seeing more of them on the road and more places to charge them. By 2035, gas-fired vehicles will not be for sale in Canada according to regulations. There is also more options to self-generate and to manage how much electricity you consume through conservation efforts. The cleanest and cheapest electricity is electricity that isn't consumed.

    At the same time, we are also seeing that the economy is doing very well here in Saskatchewan with announcements about growth and expansion for industries like canola crushing plants, and potash mines.

    SaskPower is doing its best to maneuver through the load-demand uncertainty but planning for electrification is a big part of our work.

12. **Your 214 mega watts of coal-fired power. What would be required (# of turbines, sq ft solar) in renewable i.e. wind and/or solar to produce that power?**

    The average size of wind turbines is about 3 MW per turbine. A 214 MW wind farm would require a minimum of about 71 turbines and occupy about between 5,700 and 9,000 acres of land. However, the footprint of the wind turbines is quite small so farming activities can continue within the bounds of the wind farm.

    A solar farm would require about 1,700 acres of land to produce 214 MW when the sun is shining. While crop farming is limited within the solar farm, animal grazing is possible, allowing the land to be used for both energy production and livestock production.

13. Has SaskPower shared cost information about those non-economic options for hydro? Would be helpful to inform the public on understanding options available.

There are many sites that could potentially work for hydro in Saskatchewan, but they're all in northern Saskatchewan and run-of-the-river. Run-of-the-river hydro is when you generate electricity from the natural flows in a river rather than creating a huge reservoir. These projects are more costly and often have smaller generation potential. The electricity generated at these locations would have to be moved extremely long distances resulting in significant line loss, which also adds to the cost. In 2016, SaskPower explored the potential of a run-of-the-river hydro facility near Black Lake – the project did not move forward because the completion cost was estimated to be $700M.

14. A uranium fuel source has many disadvantages. Thorium seems to be a much better fuel choice. Is SaskPower looking into this choice?

It's something we're in the early stages of evaluating, along with other advanced reactor technologies, but for our current project, the BWRX-300 represented the best case for commercial operation in the timeline we are working with.

15. Is water the only emission from hydrogen generated power?

The most common product of burning hydrogen is water but this depends on the atmosphere within which the hydrogen is burned. If hydrogen was burned in pure oxygen, the product would only be water. However, when hydrogen is burned in the presence of nitrogen, there are oxides of nitrogen released. The amount of nitrogen oxides released when burned in the atmosphere is considerably less compared to the burning of fossil fuels.

16. With CCS are we exploring research that a percentage of biomass combine with coal can produce net negative emissions?

Conventional Coal plants are currently mandated by Federal regulations to shut down by 2030. We have assessed co-firing biomass with coal in our coal power plants. There were several challenges including: availability of biomass, transportation distance, equipment modification, and amount of biomass feedstock processing required. In other jurisdictions, with sufficient proximate biomass, it may be theoretically possible to produce net negative greenhouse gas emissions if you only burn biomass and capture the CO_2 produced.

17. What's the economic feasibility of more large hydropower up north? This is in the context of SMRs being expensive, are we comparing apples to apples.

Saskatchewan has a few options for larger hydroelectric projects. These projects could become cost competitive as we continue to explore different generation options that reduce our emissions. That said, hydroelectric projects have long lead times and if they

are to be advanced, they will require thorough environmental assessment and public and Indigenous dialogue, consultation and engagement.

18. Regarding the comments of "wind and solar are cheap", do SaskPower's models account for system costs? For example, if we build 1000 MW of wind power, what additional infrastructure counts towards the cost? Transmission lines yes, natural gas or import backups maybe?

SaskPower models our future power system by assessing various generation options and combinations of potential projects (including imports) that could work together to meet our power supply needs.

Decisions to add specific generation projects such as wind and solar are made only after assessing the complete system cost. Once the decision has been made to add a certain amount of one type of generation, specific project locations are assessed to determine the potential transmission costs. The most economically favorable projects are then selected with transmission and overall system costs being considered.

19. Saskatchewan & Canada are uniquely positioned to bring the cleanest fossil fuel energy to the world to aid in the transition to carbon neutrality. Cheap Clean Energy... with SaskPower's capabilities & economic impact as a major employer does this mission statement seem a bit narrow? We desperately need good paying middle class jobs in our region & throughout the province & country.... is there an ethical issue here to broaden the mission statement and make winning contributions to both economy and the environment?

SaskPower's mission it to ensure reliable, sustainable and cost-effective power for our customers. Many of our corporative initiatives strive to enhance and grow the relationships and economic benefits to the communities we serve.