CITY OF VANCOUVER

REPORT

Report Date: April 7, 2020
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Meeting Date: April 29, 2020
Submit comments to Council

TO: Standing Committee on Policy and Strategic Priorities

FROM: General Manager of Planning, Urban Design, and Sustainability, in consultation with the Chief Building Official

SUBJECT: Original Low Carbon Rezoning Condition for Occupancy of Children's and Women's Hospital

RECOMMENDATION

A. THAT Council accept the reductions in carbon pollution achieved and anticipated through projects underway at Children's and Women's Health Centre, Vancouver General Hospital and other healthcare facilities in Vancouver, as presented in Appendix A, recognizing the challenges that made the original planned construction of a stand-alone low-carbon heat plant infeasible, as fulfilling the intent of the 'Low-Carbon Heat Plant' condition of approval of the 2012 rezoning of 4500 Oak Street (Children's and Women's Health Centre of British Columbia);

FURTHER THAT the Director of Legal Services be instructed to revise or discharge any legal agreements resulting from the original rezoning condition of the Children's and Women's Health Centre.

B. THAT Council direct staff to work with the Provincial Health Services Authority, and other organizations as may be appropriate, to include deep carbon reduction options within future business case development and energy planning activities for the Children's and Women's Health Centre.

REPORT SUMMARY

The 2012 rezoning of 4500 Oak (Children's and Women's Health Centre) to amend the CD-1 (Comprehensive Development) District (126) (By-law No. 5091) (the "**Rezoning**") included a condition of approval requiring a new Low Carbon Heat Plant with capacity for a 65% reduction in carbon emissions from Children's and Women's Health Centre (C&W) and Vancouver General Hospital (VGH) or 25,000 tonnesCO_{2e}/year, secured via legal agreement and enforced via permit holds. The condition required the Owner to:

"*Enter into an agreement on terms acceptable to the General Manager of Engineering Services and the Director of Legal Services to convert to a low-carbon heat source to serve the Children's and Women's Health Centre campus on a timeline acceptable to the General Manager of Engineering Services and secured by a written commitment from PHSA, backed by the Province of British Columbia. The heat source must have installed capacity to reduce greenhouse gas emissions by a minimum of 65% below a business-as-usual approach to heating at the Children's and Women's Health Centre and Vancouver General Hospital campuses. Development of an on-site, low-carbon heat plant must adhere to the policy framework outlined in the Neighbourhood Energy Centre Guidelines and, as part of the necessary municipal approvals, it must include a public consultation process acceptable to the General Manager of Engineering Services and to the General Manager of Planning and Development Services, for the low-carbon heat source* (the "**Low Carbon Energy Plant Condition**")";

Since the Rezoning, and upon further study, achievement of the Low Carbon Heat Plant Condition as written was found to not be feasible, as the steam connection to Vancouver General Hospital ("**VGH**") is not viable and energy and capital costs have increased significantly. Despite these and other challenges, health authorities expect to achieve nearly 14,000 tonnesCO_{2e}/year of emissions reductions by 2022 largely through energy conservation, eliminating 1% of the city's total annual emissions from all buildings. Of these reductions, nearly 11,000 tonnesCO_{2e}/year come just from the Children's and Women's Health Centre and VGH campuses, achieving nearly half the original target while saving on operating costs for healthcare providers.

The existing steam heating plant is in need of renewal, and requires a revised business case be submitted to the provincial Treasury Board for approval. This is a great opportunity for staff to work together with Provincial Health Services Authority ("PHSA") on further carbon reductions, building off the achievements to date. In a letter provided to the City (Appendix C), PHSA commits to targeting the greatest reduction of carbon emissions while achieving core healthcare facility requirements. Through this work, together with significant future energy efficiency measures, the Children's and Women's Health Centre could surpass the original 65% emissions reduction target set in the Rezoning.

With final occupancy of the Children's and Women's Health Centre scheduled to begin in approximately June 2020, staff recommend Council accept the condition as fulfilled based on the significant carbon reductions achieved, and direct staff to work together with PHSA on the steam heating plant renewal business case, to avoid impacting the occupancy schedule and achieve further carbon reductions at the Children's and Women's Health Centre.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

In July 2011 Council approved the Greenest City Action Plan setting carbon reduction targets city-wide and for the existing building stock, and in September 2012 Council approved the Neighbourhood Energy Strategy prioritizing carbon reductions at legacy steam systems and in priority neighbourhoods, including the Cambie and Broadway Corridors.

In November 2012 Council referred the rezoning at 4500 Oak Street (Children's and Women's Health Centre) to Public Hearing, and in December 2012 Council approved the rezoning with conditions recommended by the Director of Planning.

CITY MANAGER'S/GENERAL MANAGER'S COMMENTS

The City Manager supports these recommendations to recognize the carbon reductions achieved to date and allow occupancy of the Children's and Women's Health Center to proceed as scheduled, while ensuring continued collaboration on the important work of eliminating carbon pollution from the Children's and Women's Health Centre. In light of the unprecedented need for healthcare infrastructure capacity due to the COVID-19 pandemic and the uncertainty of its future course, and the significant carbon reductions achieved, facilitating timely occupancy of the expanded health facility would meet multiple City priorities.

REPORT

Background/Context

The Challenge of Decarbonizing Hospitals

Hospitals are among the most complex, operationally demanding, and energy intensive buildings in the world. They have many unique energy uses, such as imaging equipment and sterilization needs, and must operate reliably and continuously year after year. Some hospital energy uses require high temperature heat (for example, steam for sterilization) that limits the technology options for how that heat is generated, and typically fossil fuels are used to produce the high temperatures needed. New hospitals often use renewable electricity and heat pumps for low- and moderate-temperature applications, and optimize the design of the building to work with these temperatures. High-temperature applications can present more of a challenge for avoiding fossil fuels and require the use of biofuel or electric boilers that come with cost trade-offs.

Existing hospitals are often even more difficult to decarbonize due to older, inefficient systems that are not optimized for moderate temperatures, and complex patchworks of systems built up over years of renovations and expansions. In a campus of multiple health facilities the number of energy systems and uses increases and becomes even more complex. Due to fully continuous, year-round operations in critical areas, healthcare retrofits also come with increased operational considerations, such as hoarding and infection control. This combination of size, complexity, and operational demands make decarbonizing existing hospitals uniquely challenging and capital intensive.

Greenest City and Neighbourhood Energy

In 2011 City Council approved the Greenest City Action Plan and set goals of reducing community emissions by 33%, and emissions in existing buildings by 20%, by 2020. The plan highlights the success of the Southeast False Creek Neighbourhood Energy Utility (NEU), which reduced emissions by 55-65% in the new community, and neighbourhood energy showed great promise to cost-effectively reduce emissions in other communities and campuses. Low-carbon conversion of the steam systems at Children's and Women's Health Centre and VGH was identified as a priority in the 2012 Neighbourhood Energy Strategy. In this context, ambitious carbon reduction and energy planning goals

began to be included in new community plans and rezonings. As of 2018 community emissions have reduced by 12% and building emissions by 11% while experiencing strong population and economic growth.

Children's and Women's Health Centre

The Children's and Women's Health Centre is located on a 46-acre (18.6-hectare) site that is bounded by Oak Street, Heather Street, 28th Avenue and 32nd Avenue, and accommodates both the BC Women's Hospital and the BC Children's Hospital. BC Women's Hospital provides a range of specialized health services that address the needs of women of all ages and backgrounds. It is Canada's busiest maternity hospital and is the main maternity service-provider for women and families in the Vancouver Coastal Health Region. BC Children's Hospital delivers child and youth health and rehabilitation services and is the province's major treatment, teaching, and research facility centre for child health, with over 200,000 children cared for on an annual basis. Both hospitals are agencies of the PHSA, and this campus of care is exceptionally important to the health service infrastructure of both the city and the province.

2012 Master Plan, Rezoning, and Conditions of Approval

In March 2012 a rezoning application was submitted to the City on behalf of PHSA that would allow the first three phases of a new Master Plan for the Children's and Women's Health Centre, including: a Child Care Centre and Ronald MacDonald House (Phase 1); demolition of a portion of the Shaughnessy Hospital to accommodate a new acute care tower (Phase 2), and renovation of the Children's and Women's Hospital building (Phase 3, sometimes referred to as the '1982 Building') to accommodate the Sunny Hill Health Centre for Children. Refer to Appendix B for site plans showing the state of the campus in 2012, the planned final build-out after the completion of the Master Plan (Phase 7), and the current state at the completion of Phase 3.

According to the Ministry of Health, the $676 Million project will, "improve delivery of patient care by providing optimal patient access and patient flow, improved operational efficiency/capacity for inpatient services by consolidating and developing space designed to current paediatric care standards, and provide flexible spaces to support changes in health care models".

At the time of the Rezoning, replacement of some of the boilers in the heating plant was being considered. With the Rezoning, an opportunity was identified to instead create a new low-carbon heating plant on the site, and the Low Carbon Heat Plant Condition was based implicitly on the following key assumptions:

- Potential for 25,000 tonneCO_{2e}/yr reduction through a 65% reduction at both Children's and Women's Health Centre and VGH;
- Potential for energy cost savings compared to natural gas, freeing-up operational budget for healthcare services;
- Load opportunities at VGH (via legacy interconnecting steam line to Children's and Women's Health Centre), and surrounding neighbourhood via Neighbourhood Energy Strategy; and
- Budget approval of approx. $30 by provincial Treasury Board.

With these assumptions in mind, as well as the City's ambitious carbon reduction goals, the Low Carbon Heat Plant Condition was included to require a new low-carbon heating plant with installed capacity capable of a 65% reduction in greenhouse gas emissions

from both the Children's and Women's Health Centre and VGH sites, which was later secured in a legal agreement with PHSA as a 25,000 tonneCO_{2e}/year reduction in emissions. While the agreement is with PHSA, it should be noted that VGH is operated by Vancouver Coastal Health (VCH), and any changes to energy systems at VGH would also require approval by VCH management and board of directors. Provision of the heating plant was not included in the Public Benefits Strategy and there were no Community Amenity Contributions for the Rezoning.

2020 Occupancy Requirements for Children's and Women's Hospital

The legal agreement securing the Low Carbon Heat Plant Condition was accompanied by holds on building permits, and later, via occupancy holds. These holds are formalized through a legal agreement on the title of the property. The latest and final hold in place is on occupancy of Phase 3, which is expected to begin by June 2020, and which cannot proceed while this existing occupancy hold is in place. As the occupancy hold is a result of the Low Carbon Heat Plant Condition, which is a condition of approval of the Rezoning by Council, the hold can only be removed by the satisfaction of the condition, or by Council amending or removing the condition at a public meeting. The City's Legal Services has confirmed that, given the details and nature of the Low Carbon Heat Plant Condition and the presentation and feedback that was made and received at the public hearing for the Rezoning, a regular meeting of Council is sufficient for this purpose.

Strategic Analysis

Original Rezoning Condition No Longer Feasible

In the years following the Rezoning, a new low-carbon heating plant as envisioned in the Low Carbon Heat Plant Condition has become infeasible, due to important changes in the key assumptions:

- **Connection to VGH not viable:** An engineering study found the Laurel Street steam line would require extensive remediation or replacement. This makes a 25,000 tonneCO_{2e}/year reduction impossible, as a low-carbon heating plant for just the Children's and Women's Health Centre site would only achieve a reduction of approximately 10,000 tonneCO_{2e}/year;

- **Declining price of natural gas:** The 2012 average base price of natural gas delivered by FortisBC was $3.23/GJ, down from a July 2008 peak of $9.78/GJ, and continuing to fall to a 2019 average of $1.55/GJ. This has increased the cost of renewable energy options like biofuels compared to the existing use of natural gas, and means a low-carbon heating plant (if not combined with significant energy efficiency measures) would likely increase operating costs of the hospital (potentially impacting health services and operations), rather than reduce them as expected in 2012 and earlier. Modest increases in the carbon tax in recent years have not been enough to fully counter this effect;

- **Reduced load opportunities:** The load opportunities that would be important to the economies of scale of a low-carbon heat plant did not materialize:
  - Legacy steam connection to VGH not viable;
  - new neighbourhood load opportunities have not appeared as envisioned in the neighbourhood energy strategy in large part as a result of new construction under the Zero Emissions Building Plan becoming significantly more efficient than was perceived as possible in 2012;

- **Cost escalations:** Further engineering studies and estimates revealed costs for a new heating plant ranging from $58.5M to $117.3, all of which are multiple times the original $30M approved by the Treasury Board. The studies also suggest energy conservation measures may provide carbon reductions of the same size or larger than a new low-carbon heating plant yet at a lower cost.

The inability to connect to VGH has rendered the carbon reduction target as written in the Low Carbon Heat Plant Condition impossible to achieve, and taken together the above changes in the key assumptions mean the condition is not viable as originally envisioned.

Significant Carbon Reductions by Health Authorities in Vancouver

Despite the challenges of decarbonizing hospitals noted in the Background section, sites across PHSA, Vancouver Coastal Health, and Providence Health Care are expected to achieve:

- Approximately 14,000 tonnesCO_{2e}/year of emissions reductions by 2021 through energy efficiency and retrofit measures, as summarized in Appendix A, eliminating 1% of the City's total annual carbon emissions from buildings;

- Approximately 11,000 tonnesCO_{2e}/year of these reductions come exclusively from the Children's and Women's Health Centre and VGH campuses, achieving nearly half of the original carbon reduction goal, together with operational cost savings for healthcare providers.

These achievements have been made possible by the hard work of the dedicated Energy and Environmental Sustainability (EES) team, and through the annual Carbon Neutral Capital Program (CNCP) funding administered by each of the health authorities.

Looking to the future, the CNCP program is expected to continue to accrue carbon reductions at each of these sites. As for further efficiency-related carbon reductions at Children's & Women's Health Centre, in a summary of the low-carbon plant studies provided by PHSA, it is estimated that significant reductions are possible through energy conservation measures. These reductions could surpass the original 65% reduction target for the site, and provide operational cost savings, even without making improvements to the heating plant.

COVID-19

The COVID-19 pandemic has highlighted the importance of adequate capacity in local healthcare infrastructure. Although Children's and Women's Health Centre is not a primary facility for the intake of COVID-19 patients, it is a part of contingency planning and could become one should the need arise, now or in the future. The Health Centre plays a critical role in providing capacity and supporting the overall healthcare infrastructure, and the occupancy of the soon-completed Children's and Women's Hospital can support this important role.

Opportunities to Collaborate on a Low Carbon Health Campus

Since 2012 the existing boilers in the heating plant at the Children's and Women's Health Centre have continued to age, with one boiler offline and another at the end of its service life. To address these issues and ensure reliability of operations, PHSA must study and submit a revised business case to the provincial Treasury Board in order to make capital replacements or improvements.

The study and creation of a revised business case presents a great opportunity for the City and PHSA to work together to reduce emissions at Children's and Women's Health Centre campus going forward. A collaborative approach will ensure that the options studied and business case include both operational constraints and emissions reductions potential at the Children's and Women's Health Centre campus. This commitment is represented by Recommendation B directing staff to work with PHSA, and the letter of commitment from PHSA included in Appendix C.

Looking farther into the future, it is anticipated that future phases of the Master Plan for the site will require another rezoning, complete with consultations with the City and the public on how a potential application responds to the Climate Emergency and other priority issues. Staff expect this to present another opportunity for the City and PHSA to work together to provide high-quality health care infrastructure while reducing carbon pollution in Vancouver.

Implications/Related Issues/Risk

Financial

There are no financial implications.

Human Resources/Labour Relations

There are no human resources / labour relations implications.

Environmental

Since 2010 nearly 14,000 tonnes of reductions in annual carbon pollution have been achieved at health facilities in Vancouver, a total greater than the entire annual emissions of the Children's and Women's Health Centre and representing 1% of the City's total annual carbon emissions from buildings.

Legal

There are no legal implications.

CONCLUSION

This report recommends Council accept the significant reductions in carbon pollution achieved to date as meeting the intent of the original rezoning condition, and direct staff to take appropriate action to allow occupancy of the Children's and Women's Hospital to proceed as scheduled. It also recommends Council direct staff to work together with PHSA to continue the important work of eliminating carbon pollution from Children's and Women's Health Centre. Given the importance of healthcare infrastructure and capacity due to the COVID-19 pandemic, and the significant carbon reductions achieved, facilitating the timely occupancy of the Children's and Women's Hospital as recommended will support multiple City priorities.

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APPENDIX A: Carbon Reductions in Vancouver by Health Authorities

EcoES Other Project Summary
Updated March 17th 2020

High Level Summary of Anticipated GHG Reduction

The following table summarizes the results of the more detailed tables that follow (with individual projects listed). The following table shows that other projects within CoV limits are likely to exceed 13,000 tCO_2e when including the projects that have already been completed, initiated or planned for implementation. There are ongoing efforts within the Energy and Environmental Sustainability (EES) team to complete more detailed studies to identify opportunities and refine the understanding of the GHG reduction potential within healthcare facilities within CoV limits. In addition, the EES team are proactively pursuing funding and incentive opportunities in order to overcome the barrier of constrained funding. Such incentive opportunities include the CleanBC programs.

	PHSA	VCH & PHC	Total	How reduction is achieved
Other Projects				Various projects, most notably:
C&W Reduction 2010 to 2015	2,549	0	2,549	Pipe insulation, SHY-AB demolition
Completed (2016 to 2019)	1,117	4,016	5,133	CWHC 1982 Heat Recovery, SPH CH2 & Heat Recovery, VGH HRC Phase 1
In-Progress	615	2,781	3,396	CWHC Phase 3 CNCP, CWHC CMMT CNCP, VGH HRC Phase Two
Planned*	504	2,232	2,736	BCCRC TGH, GFS Plant Renewal, etc.
Sub-total	4,785	9,030	**13,815**	

*Planned projects are likely to proceed (for example, based on using CNCP funding)

APPENDIX B: Site Plans

Figure B-1 – Site plan showing the existing condition of the site in 2012

Figure B-2 – Site plan showing the complete 7-phase build-out (future)

Figure B-3 – Site Plan showing the condition of the site today with Phases 1&2 complete (orange), and Phase 3 nearly complete (Children's & Women's Hospital building, sometimes referred to as the '1982 Building')

APPENDIX C: Commitment Letter from PHSA

Provincial Health Services Authority
Province-wide solutions. Better health.

April 16, 2020

Re: PHSA EcoEnergy Project & Carbon Emissions Targets

This letter is in response to the City's willingness to rescind the covenant on title at the Children's & Women's campus, which outlines the requirement to reduce overall carbon emissions from Provincial Health Service Authority (PHSA) and Vancouver Coastal Health (VCH) healthcare facilities. PHSA acknowledges that it has made all efforts to explore options that would achieve maximum carbon reductions, but due to market conditions and changing circumstances, achieving the desired target is not feasible. Despite the inability to meet the desired carbon emission target outlined in the covenant, PHSA has been working diligently to reduce emissions through smaller projects, and over the last 10 years, has reduced emissions by ~4,785 tCO_2e, including completed, in progress and planned projects at PHSA operated facilities in the City of Vancouver.

PHSA will be updating the original EcoEnergy Business Plan to reflect the changing circumstances, and is committed to targeting the greatest reduction of carbon emissions, while ensuring that other core healthcare facility requirements are prioritized and achieved. As part of the Business Plan refresh, PHSA commits to including the City of Vancouver sustainability team in the plan development, to harness City staff expertise and ensure the plan meets healthcare requirements, while responding to the City's interests and goals.

PHSA and the Province are appreciative of the City's desire to work cooperatively on achieving a revised energy plan for the Children's & Women's campus, and look forward to a collaborative working relationship on this matter moving forward.

Sincerely,

Linda Lupini

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