

### Items for the Information of the Partners in Project Green Executive Management Committee

**TO:** Chair and Members of the Partners in Project Green Executive Management Committee  
Tuesday, September 21, 2021 Meeting

**FROM:** Darryl Gray, Director, Education and Training

**RE:** **THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2021 SIXTH ASSESSMENT REPORT SUMMARY**

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#### KEY ISSUE

A summary of the Intergovernmental Panel on Climate Change Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis*.

#### RECOMMENDATION

**IT IS RECOMMENDED THAT the following report summarizing the Intergovernmental Panel on Climate Change Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis*, be received.**

#### BACKGROUND

On August 9, 2021, the International Panel on Climate Change (IPCC) released the Sixth Assessment Report (AR6). The AR6 presents findings of 234 authors from Working Group I on the physical science basis of climate change and required the approval of 195 member countries, diplomats, and scientists. The report addresses the most-up-to-date physical understanding of the climate system and climate change, drawing on the latest advances in climate science, and combining multiple lines of evidence from paleoclimate archives, observations, process understanding, and global and regional climate simulations.

This report summarizes key findings from the AR6 in the areas of climate projections, regional adaptation, and limiting future climate change. It presents a case for enhancing climate lenses in PPG programming, as it is critical to ensure the business community is equipped to face the challenges of climate change and to do their part in creating a more sustainable future for all. Demonstrated throughout AR6 are climate-related risks and challenges that impact urban areas and the IC&I sector. It also presents opportunities for immediate action that, if performed collaboratively, can slow future global warming.

#### RATIONALE

Throughout the AR6, language is used to convey “virtual certainty” that human caused emissions has led to climate extremes, such as extreme heat, weather events, and drought. The AR6 provides compelling evidence that we need to deeply address greenhouse gas emissions (GHGs) as soon as possible and achieve net zero by 2050 if we are going to affectively curb global warming in the next 20 years. Without these efforts, the earth will continue to warm and existing climate extremes will worsen significantly.

The general level of confidence in claims that human behaviour is to blame for climate change is much stronger in the AR6 than in the AR5. IPCC’s AR5 placed a greater emphasis on the impacts of climate change on human health, while the AR6 places a greater emphasis on impacts to natural systems which humans interact with on a regular basis. Understanding

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that both are at great risk presents a paradigm shift in which the reinforcing relationship between human and environmental health is evermore present, and that we must protect the environment to protect ourselves.

### **Climate Status and Projections**

Since the AR5, researchers have been able to utilize new resources to better understand human influence on a wider range of climate variables, including weather and climate extremes. The AR6 has high confidence that these extremes are human-induced. Some examples of climate extremes include heatwaves, heavy precipitation, agricultural and ecological droughts, and tropical cyclones, all of which have increased in intensity and frequency since the 1950s. The scale of changes to aspects of the climate system in the last several centuries to thousands of years is unmatched to the changes documented in recent years. The last four decades have been warmer than any decade preceding the year 1850.

Furthermore, the AR6 has high confidence that human activity has contributed to specific global warming impacts that are irreversible. These include oceanic acidification (the ongoing decrease in the pH value of the Earth's oceans), contributing to ocean salinity since the mid-20<sup>th</sup> century, and the global degradation of glaciers since the 1990s, contributing to sea level increases.

In *Section B: Possible Climate Futures*, AR6 considers a set of five illustrative emissions scenarios to explore climate response to a broader range of human drivers than was assessed in AR5. These scenarios also account for natural drivers and natural climate variability (processes intrinsic to the climate system).

Through these scenarios, the AR6 projects with high confidence that even under very low GHG emission scenarios, global surface temperature will continue to increase until at least the mid-century, and not start to decline back to below 1.5 °C toward the end of the 21<sup>st</sup> century. Unless we commit to significant reductions in carbon dioxide and other GHGs in the next decade, global warming of 1.5 °C and 2 °C will be exceeded during the 21<sup>st</sup> century. If we do not commit to a decarbonized future, extreme climate events will only worsen, permafrost thawing will be expedited, and the ability of ocean and land carbon sinks to slow down the accumulation of carbon dioxide in the atmosphere will be overpowered. With every additional increment of global warming, changes in climate extremes continue to grow, and the likelihood of unprecedented extreme events is very likely.

### **Regional Adaptation**

The AR6 has medium to high confidence that severe agricultural and ecological droughts, extreme heat, and heavy precipitation and associated flooding are projected to become more frequent and intense in North American regions. The AR6 speaks directly about the urban context of climate change, indicating that human-induced local warming of cities and urbanization precipitate things like heatwaves, increases in heavy precipitation events, and stormwater runoff intensity. With many of PPG's members doing business in urban contexts, and with suppliers in the agricultural sector and in other parts of the world facing more severe climate realities, it is critical for the business community to assess upstream and downstream impacts related to their operations.

The potential of severe agricultural and ecological droughts can result in food shortages and supply chain disruptions. When growing seasons are impacted and crop production is compromised industries, especially those that rely on agricultural goods, are at risk.

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The AR6 has high confidence that all regions will experience increases in hot temperatures. Among its impacts to natural systems, extreme heat is especially detrimental to human and agricultural health. Especially in urban centers, the presence of grey infrastructure and impermeable surfacing are key contributors to urban heat island effect and extreme heat.

There is stronger evidence since the AR5 that the global water cycle will continue to intensify as global temperatures rise. The result will be increased variability of precipitation and surface water flows and intensification of very wet and very dry weather in many North American regions. The AR6 also states that human activity is responsible for the global degradation of glaciers since the 1990s, contributing to sea level increases. In coastal cities like Toronto, the combination of more frequent extreme sea level events (due to sea level rise and storm surge) and extreme rainfall/river flow events will make flooding more probable.

PPG's [Business Case for Natural Infrastructure](#) business guide outlines the various impacts of flooding on private lands and business operations, from supply chain disruptions, infrastructure repair costs, employee absenteeism and more. Natural infrastructure solutions involving vegetation not only sequester carbon but provide a host of benefits to mitigating impacts of climate change, including flood risk and urban heat island effect. PPG will continue to utilize STEP and TRCA resources to educate and promote the transition from grey to natural infrastructure across the TRCA jurisdiction.

Although the AR6 demonstrates clear evidence that human drivers are the cause of global warming, it is important to consider the role of natural drivers and natural climate variability, especially in localized and near-future contexts. For example, variations in solar and volcanic drivers have distracted from human-caused global warming. Based on paleoclimate and historical evidence, it is likely we can expect at least one large explosive volcanic eruption in the 21st century. Due to the cooling aerosols emitted, the climate will temporarily cool, masking human-caused climate change. These events should be considered when planning for a full range of possible climate changes, and not distract from efforts to address human-caused impacts.

Although exceptionally severe outcomes such as ice sheet collapse, abrupt ocean circulations changes and other compounding events are low likelihood, the AR6 has ensured they are part of risk assessment should global warming temperatures rise above 2 °C.

### **Limiting Climate Change**

AR6 simulations of varying GHG emission scenarios demonstrate with high confidence that we will see clear improvements in GHG and aerosol concentrations and air quality if we achieve low or very low GHG emission scenarios in the coming decades. If we commit to deep decarbonization, we can expect to see temperatures begin to lower around mid-century. Specifically, the AR6 prescribes that we must limit cumulative carbon dioxide emissions, along with strong reductions in other GHGs 50% by 2030 and achieve net zero by 2050. The emphasis on cumulative emissions indicates the need for collective action. As PPG programming has demonstrated, aggregated efforts can produce significant positive results.

As climate change becomes more focal across the globe, there is increasing demand from shareholders, consumers and asst managers that businesses commit to net zero pathways. Primary GHG concentrations produced through human activity which have contributed to global warming include carbon dioxide, methane, nitrous oxide, and fluorinated gases. Each of these GHGs are produced through the production and burning of fossil fuels, industrial activities, agricultural and land uses, the treatment of wastewater and solid waste,

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etc. The AR6 presents a unique opportunity for businesses to examine how they contribute to the production of GHGs by looking at how they perform their operations, their procurement policies, the energy used to produce materials and deliver services, the life cycle of their products, and the commitment to climate action among partners and suppliers. There are interventions that can make a measurable difference in each of these areas of consideration, especially when cooperation and collaboration across sectors and supply chains is emphasized.

Finally, the AR6 anticipates we can avoid a high GHG emission scenario (e.g., 4°C centigrade of warming) and subsequent climate disasters because of the general trajectory of progressive climate action occurring across the globe.

### **Relationship to Building the Living City, the TRCA 2013-2022 Strategic Plan**

This report supports the following strategies set forth in the TRCA 2013-2022 Strategic Plan:

**Strategy 5 – Foster sustainable citizenship**

**Strategy 8 – Gather and share the best sustainability knowledge**

### **DETAILS OF WORK TO BE DONE**

Moving forward, PPG is committed to strengthening the integration of climate mitigation and adaptation lenses into its programming and leveraging the four performance areas (water stewardship, waste management, energy performance and stakeholder engagement) to inspire action on climate change among the business community. Actions in each of these sustainability areas have potential to directly address human drivers of climate change, such as GHG emissions and sustainable land use practices.

PPG is well-equipped to support the PPG membership base in aligning with international targets to achieve net zero emissions by 2050, and in preparing for future climate impacts. These climate impacts are especially severe in urban contexts with high levels of grey infrastructure, where many PPG member businesses operate. PPG can play a role in supporting the IC&I sector to plan strategically to achieve this target within the scope of their own business practices and operations. Now is an opportune time for PPG to continue playing a role in supporting the IC&I sector to understand climate risks, develop action plans, and implementing projects with measurable impacts.

PPG will provide summaries to the Executive Management Committee on each of the IPCC's upcoming reports shortly after their release. These reports include:

- Working Group II: Impacts, Adaptation and Vulnerability (14-18 February 2022)
- Working Group III: Mitigation of Climate Change (21-25 March 2022)
- Synthesis Report (26-30 September 2022)

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