

HOCHTIEF: Climate-related Risks and Opportunities Analysis

Climate Change impacts

Over the last century, global average temperatures have risen by about 1°C. Climate researchers warn that further warming in excess of 1.5°C would have disastrous consequences. Some world regions are seeing more frequent extreme weather events such as storms and increasing precipitation, while others are subject to extreme heatwaves and drought. It is widely recognized that warming of the planet caused by greenhouse gas emissions poses serious risks to the global economy, and will have an impact across many economic sectors.

HOCHTIEF, an engineering-led global infrastructure group with leading positions across its core activities of construction, services and concessions/public-private partnerships (PPP), is exposed to climate change in various matters.

HOCHTIEF considers sustainability to be part and parcel of results-oriented business: We define sustainability as a systematic approach to harmonizing economy, ecology, and social responsibility across the depth and breadth of all our business activities with the aim of safeguarding the company's long-term viability. To this end, we apply a holistic focus, taking in our business segments and operating activities as well as our surroundings and the interests of our stakeholders.

We recognize the increasing international commitment of governments, communities and others to creating a low-carbon, climate resilient future. Within that environment, HOCHTIEF understands and supports the need to reduce emissions by boosting energy productivity, reducing waste, rehabilitating degraded land, increasing the use of renewable energy and driving innovation. Our approach involves considering risks that result or could result from our products and services for our stakeholders and the environment—for example in relation to clean air, clean water, clean soil, health, species conservation, etc. Our approach to resiliency—the ability to recover from or to be resistant to the impact of natural and manmade disasters—and long-term changes resulting from climate change includes building on the technical expertise to provide for the long-term comfort, livability and sustainability of buildings and communities.

This paper is focused on the climate-related impacts on the HOCHTIEF Group: We constantly evaluate climate-related impacts by means of corresponding mitigation strategies.

HOCHTIEF definition of climate risk

At HOCHTIEF, climate risk is defined as damage caused by climate events that potentially has negative impacts on the qualitative or quantitative attainment of business targets. Climate risk is addressed centrally for the entire Group. In order to identify the impacts of climate change for HOCHTIEF as a whole and to adequately assess the risks involved, we make use of external frameworks such as that of the Task Force on Climate-related Financial Disclosures (TCFD). These also help to identify the information needed by investors, lenders, and insurance underwriters to appropriately assess and price climate-related risks and opportunities.

HOCHTIEF, while exposed to the impacts of climate change, has significant resilience due to the nature of the contracting services it provides. Some of the risks will likely impact the Group, but these can be readily identified, priced and mitigated, limiting their financial impact, while a range of opportunities should develop across the business that may generate additional sources of revenue in the future.

In the following, we present an analysis of climate-related risks and opportunities and the respective financial impacts on the HOCHTIEF Group. The assessment is based on the recommendations of the TCFD framework.

Analysis of climate-related risks by activity and the potential financial impacts

Type	Climate-Related Risks	Potential Financial Impacts
Transition Risks	Construction <u>Policy & Legal</u> - Increased price of GHG emissions - Enhanced emissions-reporting obligations - Mandates on and regulation of existing products and services - Exposure to litigation - Disappearance of market segments (e.g. power plants) due to political decisions	- Carbon price passed on to (mostly government) clients in contractual pricing - Limited due to existing Greenhouse and energy reporting protocols - Limited impact due to the nature of the services provided - Indirect effect of carbon pricing on revenues if demand for products goes down as clients' business activities are affected by carbon prices - Fines and judgments may result in Increased costs and/or reduced demand for products and services - Reduced revenue in specific market segments
	<u>Technology</u> - Substitution of existing products and services with lower emissions options - Unsuccessful investment in new technologies - Costs to transition to lower emissions technology	- Unlikely to impact as: 1) construction services are difficult to substitute, and 2) price impact passed on to clients - Technology transition unlikely to require significant investment and cost impact passed on to client
	<u>Market</u> - Uncertainty in market signals - Increased cost of raw materials - Disappearance of market segments (e.g. power plants) due to political decisions	- Reduced demand for some products with transition to others (e.g. more public transport) - An abrupt and unexpected shift in energy costs, or raw or manufactured materials, may not be able to be passed on to clients - Higher investments in other segments to compensate the disappearance of market segments
	<u>Reputation</u> - Shifts in consumer preferences - Stigmatization of sector, esp. high-climate impact sectors - Increased stakeholder concern or negative stakeholder feedback	- Reduced revenue as clients pressured by NGOs (et al) not to deal with coal-related contract mining companies - Difficulties in hiring qualified staff/increased personnel cost - More difficult to access financing as providers pressured by NGOs (et al) not to deal with coal-related companies
	PPP and Concessions <u>Policy & Legal</u> - Increased price of GHG emissions - Enhanced emissions-reporting obligations - Mandates on and regulation of existing products and services - Exposure to litigation - Disappearance of market segments (e.g. power plants) due to political decisions	- Carbon price passed on to (mostly government) clients in contractual pricing - Limited due to existing Greenhouse and energy reporting protocols - Limited impact due to the nature of the services provided - Fines and judgments may result in Increased costs and/or reduced demand for products and services

<u>Technology</u> - Substitution of existing products and services with lower emissions options - Unsuccessful investment in new technologies - Costs to transition to lower emissions technology	- Unlikely to impact as: 1) construction services are difficult to substitute, and 2) price impact passed on to clients - Technology transition unlikely to require significant investment and cost impact passed on to client
<u>Market</u> - Uncertainty in market signals - Increased cost of raw materials - Disappearance of market segments due to political decisions	- Reduced demand for some products with transition to others (e.g. more public transport) - An abrupt and unexpected shift in energy costs may not be able to be passed on to clients - Higher investments in other segments to compensate the disappearance of market segments
<u>Reputation</u> - Shifts in consumer preferences - Stigmatization of sector - Increased stakeholder concern or negative stakeholder feedback	- Reduced revenue as clients pressured by NGOs (et al) not to deal with coal-related contract mining companies - More difficult to access financing as providers pressured by NGOs (et al) not to deal with coal-related companies
Services and Mining <u>Policy & Legal</u> - Increased pricing of GHG emissions - Enhanced emissions reporting obligations - Mandates on and regulation of existing products and services - Exposure to litigation - Disappearance of market segments (e.g. power plant maintenance) due to political decisions	- Altogether limited impact due to nature of the services provided - Carbon price passed on to clients in contractual pricing - Limited through existing Greenhouse and energy reporting protocols - Reduced revenue from decreased demand for thermal coal - Fines and judgments may result in Increased costs and/or reduced demand for products and services - Reduced revenue in specific market segments
<u>Technology</u> - Substitution of existing products and services with lower emissions options - Unsuccessful investment in new technologies - Costs to transition to lower emissions technology	- Altogether limited impact - Declining revenue in contract mining (replacement of thermal coal by renewables and other energy sources)
<u>Market</u> - Changing customer behavior - Uncertainty in market signals - Increased cost of raw materials -	- Altogether limited impact - An abrupt and unexpected shift in energy costs may not be able to be passed on to clients

	<u>Reputation</u> - Shifts in consumer preferences - Stigmatization of sector - Increased stakeholder concern or negative stakeholder feedback	- Altogether limited impact - Reduced revenue as clients pressured by NGOs (et al) not to deal with coal-related contract mining companies More difficult to access financing as providers pressured by NGOs (et al) not to deal with coal-related companies
Physical Risks	Construction <u>Acute</u> - Increased severity of extreme weather events such as cyclones and floods	- Delayed construction process and more frequent and prolonged project interruptions causing reduced revenue due to acute extreme weather events (e.g. floods causing damage; droughts reducing water availability; extreme heat waves reducing productivity; increasingly severe and frequent extreme weather incl. storms, cold spells, heavy rains)
	<u>Chronic</u> - Changes in precipitation patterns and extreme variability in weather pattern - Rising mean temperatures - Rising sea levels	- Sea level rise is likely to negatively impact cost for execution and maintenance of coastal infrastructure projects and lead to loss or reduction of surface areas reducing fields of activity - Rising temperatures may reduce employee productivity and negatively impact costs - Potential for increased incidence and wider spread of diseases such as malaria, dengue fever etc. which could reduce employee productivity and negatively impact costs - Higher cost for OSHEP measures (e.g. equipment) with cost impact passed on to client
	PPP and Concessions <u>Acute</u> - Increased severity of extreme weather events such as cyclones and floods	- Delayed construction process and more frequent and prolonged project interruptions causing reduced revenue due to acute extreme weather events (e.g. floods causing damage; droughts reducing water availability; extreme heat waves reducing productivity; increasingly severe and frequent extreme weather incl. storms, cold spells, heavy rains)
	<u>Chronic</u> - Changes in precipitation patterns and extreme variability in weather pattern - Rising mean temperatures - Rising sea levels	- Potential for flooding of infrastructure may delay construction progress and reduce revenue - Rising temperatures may reduce employee productivity and negatively impact costs - Potential for increased incidence and wider spread of diseases such as malaria, dengue fever etc. which could reduce employee productivity and negatively impact costs - Higher cost for OSHEP measures (e.g. equipment) with cost impact passed on to client

<p>Services and Mining</p> <p><u>Acute</u></p> <ul style="list-style-type: none"> - Increased severity of extreme weather events such as cyclones and floods 	<ul style="list-style-type: none"> - Potential for flooding of utilities and mines may reduce revenue
<p><u>Chronic</u></p> <ul style="list-style-type: none"> - Changes in precipitation patterns and extreme variability in weather pattern - Rising mean temperatures - Rising sea levels 	<ul style="list-style-type: none"> - Potential for flooding of utilities and mines may reduce revenue - Higher cost for OSHEP measures (e.g. equipment) with cost impact passed on to client - Potential for increased incidence and wider spread of diseases such as malaria, dengue fever etc. which could reduce employee productivity and negatively impact costs

Analysis of climate-related opportunities by activity and the potential financial impacts

Type	Climate-Related Opportunities	Potential Financial Impacts
Resources Efficiency	Construction <ul style="list-style-type: none"> - Use of more efficient modes of transport - Use of more efficient production and distribution processes - Use of recycling - Move to more efficient buildings - Reduced water usage and consumption 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins through efficiency, extended or adapted business models - Increased revenue from retro-fitting buildings to reduce energy consumption - Increased revenue from circular economy approaches
	PPP and Concessions <ul style="list-style-type: none"> - Use of more efficient modes of transport - Use of more efficient production and distribution processes - Use of recycling - Reduced water usage and consumption 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins through efficiency, extended or adapted business models - Enhanced competitiveness (scale effects through high efficiency, applied R&D innovation, e.g. AI)
	Services and Mining <ul style="list-style-type: none"> - Use of more efficient modes of transport - Use of more efficient production and distribution processes - Use of recycling - Move to more efficient buildings - Reduced water usage and consumption 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins through efficiency, extended or adapted business models - Enhanced competitiveness
Energy source	Construction <ul style="list-style-type: none"> - Use of lower-emission sources of energy - Use of supportive policy incentives - Use of new technologies - Participation in carbon market - Shift toward decentralized energy generation 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins - Higher demand of renewables and efficient technologies due to switch away from fossil-fuel based energy sources likely to lead to higher revenue and advanced competitiveness - Reduced exposure to future fossil fuel price increases - Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon - Potential policy incentives for infrastructure projects advancing decarbonization through new energy sources

Products and Services	PPP and Concessions <ul style="list-style-type: none"> - Use of lower emission sources of energy - Use of supportive policy incentives - Use of new technologies - Participation in carbon market - Shift toward decentralized energy generation 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins - Higher demand of renewables and efficient technologies due to switch away from fossil-fuel based energy sources likely to lead to higher revenue and advanced competitiveness - Reduced exposure to future fossil fuel price increases - Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon - Potential policy incentives for infrastructure projects advancing decarbonization through new energy sources
	Services and Mining <ul style="list-style-type: none"> - Use of lower emission sources of energy - Use of supportive policy incentives - Use of new technologies - Participation in carbon market - Shift toward decentralized energy generation 	<ul style="list-style-type: none"> - Reduced tender prices (e.g. through efficiency gains and cost reductions) most likely passed onto clients, and/or higher margins - Reduced exposure to future fossil fuel price increases - Reduced exposure to GHG emissions and therefore less sensitivity to changes in cost of carbon - Development of low emission power generation technology provides opportunities for mining of 'low emission' coal
	Construction <ul style="list-style-type: none"> - Development and/or expansion of low emission goods and services - Development of climate adaptation and insurance risk solutions - Development of new products or services through R&D and innovation - Ability to diversify business activities - Shift in consumer preferences 	<ul style="list-style-type: none"> - Increased revenue from 'green rated' infrastructure and buildings and/or entirely new types of infrastructure and buildings that fulfil new needs in a decarbonized world - Higher margins through efficiency, extended or adapted business models - Increased revenue through demand for lower emissions products such as renewable energy projects
	PPP and Concessions <ul style="list-style-type: none"> - Development and/or expansion of low emission goods and services - Development of climate adaptation and insurance risk solutions - Development of new products or services through R&D and innovation - Ability to diversify business activities - Shift in consumer preferences 	<ul style="list-style-type: none"> - Increased revenue from 'green rated' infrastructure and buildings and/or entirely new types of infrastructure and buildings that fulfil new needs in a decarbonized world - Higher margins through efficiency, extended or adapted business models
	Services and Mining <ul style="list-style-type: none"> - Development and/or expansion of low emission goods and services - Development of climate adaptation and insurance 	<ul style="list-style-type: none"> - Development of low emission power generation technology provides opportunities for mining of 'low emission' coal - Higher margins

	<ul style="list-style-type: none"> risk solutions - Development of new products or services through R&D and innovation - Ability to diversify business activities Shift in consumer preferences 	
Markets	Construction <ul style="list-style-type: none"> - Access to new markets/market segments - Use of public-sector incentives - Access to new assets and locations needing insurance coverage 	<ul style="list-style-type: none"> - Increased revenue through demand for related infrastructure such as transmission lines, flood protection, ... <p>Potential policy incentives for infrastructure projects advancing decarbonization through new energy sources</p>
	PPP and Concessions <ul style="list-style-type: none"> - Access to new markets/market segments - Use of public-sector incentives - Access to new assets and locations needing insurance coverage 	<ul style="list-style-type: none"> - Increased revenue through demand for lower emissions products such as renewable energy projects - Increased revenue through demand for related infrastructure such as transmission lines, flood protection
	Services and Mining <ul style="list-style-type: none"> - Access to new markets/market segments - Use of public sector incentives - Access to new assets and locations needing insurance coverage 	<ul style="list-style-type: none"> - Increased revenue and/or higher margins from operating and maintaining renewable energy infrastructure - - increased revenue due to demand for other metals and minerals such as lithium, nickel, rare earths, etc.
Resilience	Construction <ul style="list-style-type: none"> - Participation in renewable energy programs and adoption of energy efficiency measures - Resource substitutes/diversification 	<ul style="list-style-type: none"> - Increased revenue and/or higher margins by providing protection to infrastructure from sea level rises and storm surges - Potential cost for upgrading technical expertise to provide for the long-term comfort, livability and sustainability of buildings and communities
	PPP and Concessions <ul style="list-style-type: none"> - Participation in renewable energy programs and adoption of energy efficiency measures - Resource substitutes/diversification 	<ul style="list-style-type: none"> - Increased revenue and/or higher margins by providing protection to infrastructure from sea level rises and storm surges - Potential cost for upgrading technical expertise to provide for the long-term comfort, livability and sustainability of buildings and communities
	Services and Mining <ul style="list-style-type: none"> - Participation in renewable energy programs and adoption of energy efficiency measures - Resource substitutes/diversification 	

Overview

Type	Climate-Related Risks	Relevant division(s)		
		Construction	PPP and Concessions	Services and Mining
Transition Risks	<u>Policy & Legal</u>	X	X	
		X	X	X
			X	
	<u>Technology</u>		X	
			X	X
		X		
	<u>Market</u>	X	X	X
		X		X
		X	X	
	<u>Reputation</u>	X	X	X
		X		
X		X		