

# Are we Facing a Climate Apocalypse?

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Recently media reports have referred to “apocalyptic” effects of global warming. These headlines remind us of Vincente. B. Ibañez’s novel, *The Four Horsemen of the Apocalypse*.<sup>1</sup> Set in France during the early days of the First World War, Julio Desnoyers is conversing with one of his neighbors, a Russian named Tchernoff, who is a little drunk. The subject turns to the war and Tchernoff suddenly blurts out “... And when the sun arises in a few hours, the world will see coursing through its fields, enemies of mankind....” In response to Julio’s question, he described these enemies: “The first Horsemen will appear on a white horse and in his hand he will carry a bow and he is Conquest. The second animal is a flame colored steed. His rider brandishes an enormous sword. He is War. Then will appear a black horse. Its rider holds in his hand a scale in order to weigh the maintenance of mankind. He is Famine. The fourth animal is a pale colored horse and his rider is called Death.”

## COULD THIS BE A REALISTIC SCENARIO FOR A FUTURE CLIMATE?

We’ve had warnings for more than 30 years, but most countries failed to take action. The Paris Agreement, signed by 197 countries, is the major international agreement dealing with climate change. Unfortunately, almost all countries are behind in meeting their climate goals and there is no enforcement mechanism. Now, in one way or another, the horsemen are coming.

The first horseman’s arrival will be characterized by heat waves, drought, crop failures and species extinction, marked by the disappearance of thousands of plants and animals with millions more at risk.

The second horseman is accompanied by rising seas and crashing waves due to ocean heating and the melting and collapse of Arctic and Antarctic ice. Millions of people living on the edge of the world’s oceans are seeing their homes threatened. Many coastal villages, from Alaska to the South Pacific

and to Asia, are already underwater.

The third horseman brings violent winds and storms. Hurricanes are more frequent and last longer. Rainfall is more intense; the hundred-year storm comes every few years. Dams and levees fail; storm water systems are overwhelmed; and areas prone to flooding become uninhabitable.

The fourth horseman leads a growing mass of migrating refugees. They flee from lands where climate is unbearable, there aren’t enough jobs, water is scarce, farms are failing, disease is endemic, and social breakdown or conflicts exist, and peace is threatened. The current Covid-19 pandemic’s deaths, unemployment, and economic recession could be considered a preview.

## WHERE ARE THE HORSEMEN TODAY?

For most people they are over the horizon and not yet visible. This is due to latency, the delay between increasing greenhouse gas emissions and the resulting impact of global warming.

However, some of us can hear hoof beats. The worst effects will be delayed, so we won’t know the full extent of damage already caused until years from now. The effects of global warming are insidious, creeping up on us, not like a sudden “wake-up call” such as 9/11 or Pearl Harbor.

Could the global Covid-19 pandemic preview the consequences of a climate apocalypse? With more than 45 million cases, 1.2 million deaths, widespread recessions and unemployment, we’ve failed to stop its spread, but with the new vaccines, it will eventually end.

With global warming, there is no vaccine.

## ARE APOCALYPSES OCCURRING?<sup>2</sup>

*Evidence from California.* One headline read: “California’s Climate Apocalypse: Fires, heat, air pollution. The calamity is no longer in the future—it’s here, now.”<sup>3</sup> A huge rash of wildfires had broken out in the western U.S. In California, over four million acres burned—more than twice any previous year. Property damage and loss of life set new records in California, Oregon, and Washington. A satellite image taken during this time period showed the smoke cloud from the western wildfires juxtaposed on an image of three hurricanes lined up and approaching the southeast United States. Their impact—high winds, storm surge, massive rainfall and flooding—brought death and destruction.

*The Pacific Northwest and Canada.*<sup>4,5</sup> The earth’s average temperature is

rising. It will continue rising and remain elevated for more than a century after greenhouse gas emissions cease and the atmospheric concentration of CO<sub>2</sub> falls below 300 ppm. Canadian government studies show Canada is warming at twice the rate of the rest of the world. Its average land temperature has increased 1.7°C (3°F) since 1948, when it began keeping records.

*The (un)frozen North and South.*<sup>6</sup> Record heat in Siberia is causing wildfires and melting permafrost and ice, raising sea levels. Other consequences are loss of habitat for animals living in the Arctic and Antarctic, such as polar bears and penguins, and indigenous populations that are being forced to relocate. Polar ice ranges from two to five meters thick (Arctic) to 2,000 to 4,000 meters (Antarctic). Once substantial melting occurs, a “tipping point” could be exceeded, causing the process to become irreversible. The rate of melting today already threatens to exceed anything Greenland has experienced in the last 12,000 years.<sup>7</sup>

*The world's oceans.*<sup>8</sup> About 90 percent of the heat from global warming is absorbed in the oceans, where the average temperature is increasing faster than on land. The heat and ocean acidification caused by CO<sub>2</sub> absorption are affecting marine life. Coral reefs are dying.

### WHAT SHOULD WE DO?

A climate apocalypse is not inevitable. However, the need to take action is urgent. We can make the changes necessary if we develop the political will. We need to aggressively reduce greenhouse gas emissions starting now. Fortunately, there are technological alternatives available now that are proven, economic, and being implemented in many locations. Positive changes are occurring, but not fast enough.

*Public education is a priority.* An informed public must press for political action. Emission goals need to be set



“Four Horsemen of the Apocalypse,” by Albrecht Dürer, courtesy of the Metropolitan Museum of Art, New York

and adhered to. Some commitments have been made but not enough. In September 2018, Governor Jerry Brown signed a bill stating that California would get all its electricity from renewable sources by 2045.<sup>9</sup> Canada stated a goal to reach net zero by 2050 but has not reported a plan to achieve this. In a speech to the United Nations, President Xi Jinping stated that China’s greenhouse gas emissions would peak by 2030 and reach net

zero by 2060.<sup>10</sup> Every country needs a national plan to reach net zero.

*Implement a carbon fee.* Canada and 40 other countries have some form of carbon fee. The concept is to charge producers a fee, based on mine output or wellhead production, starting at around US\$20 per metric ton of CO<sub>2</sub> produced. This charge is payment for discharging greenhouse gases into the atmosphere, which should not be free. This measure, coupled with the elimi-





Hurricane Sally hits Pensacola, Florida, September 2020.

Courtesy Boston Globe, Sept 2020

nation of all subsidies for fossil fuels, would stimulate energy efficiency and investment in renewable energy.

In January 2018, California and Québec formed a joint Cap and Trade program that created the largest carbon fee market in North America. Recently the mean price per metric ton of CO<sub>2</sub> (the August 2020 auction) was US\$16.68. The auction raised in excess of US\$144 million which California and Québec will invest in GHG reduction projects.<sup>11</sup>

In addition, Canada has a C\$20/metric ton carbon fee now, administered provincially. It generated C\$2.8 billion (US\$2.1 billion) in 2019-20. Households receive about 90 percent of the fee income.<sup>12</sup> In our opinion, carbon fee revenues should largely be spent on essential projects to stop global warming, with some funding for low income families and businesses that are adversely affected. Ultimately, carbon fees should equal the cost of removing carbon from the atmosphere, at least US\$100/ton (C\$133/ton).

*International cooperation.* Stopping global warming will require an unprecedented level of global cooperation. The world's leading industrial economies have to lead the transition

to abundant and affordable energy from renewable sources. They are the largest sources of greenhouse gases and also have the technical, financial and management resources to make the transition. The U.S. should rejoin the Paris Agreement, as Biden intends to do.

### OUR PROPOSED ACTION PLAN<sup>13</sup>

If there is an inadequate response to global warming, by 2050 global greenhouse gas emissions are likely to exceed 80 Gigametric tons per year, a 45 percent increase over 2019.<sup>14</sup> The Intergovernmental Panel on Climate Change (IPCC) goal of keeping the Earth's average temperature rise to less than 2°C will have been missed and it will be headed to 3°C or higher by the end of this century.

*The first positive measure* is an easy one—keep improving energy use efficiency and conservation. Currently the world uses 2% less energy per unit of GDP each year. This can be increased to 3% with known, available and cost-effective technology such as LED lamps, heat pumps, and more efficient industrial processes.

*The second measure* is to stop using coal to generate electricity. In the interim, replace coal by natural gas;

eventually, convert all electricity generation to wind and solar. Considering current trends, by 2050, half of global electricity can be generated from renewable sources

*The third measure* is to switch to renewables for heat and power. Residential and commercial buildings use natural gas and some oil for heating and cooking and some other needs. In new construction, meet these needs with renewable electricity. Do the same with industry—convert to microwave ovens, induction or dielectric heating, and so on.

*The fourth measure* is to accelerate the use of electric vehicles for transportation of people and goods, meanwhile increasing the fuel standard for conventional vehicles to 21.3 km/litre (50mi/gal) or greater. Expand research to develop hydrogen and alternative fuels for transportation.

*The fifth measure* is to stop deforestation and plant areas that can support more trees. The IPCC recommended an increase of 1 billion ha of forests.<sup>15</sup> If 1 trillion trees were planted in new or reclaimed forests, over time they will sequester millions of tons of carbon. This is more than 100 trees for every person on earth, and yet probably not enough. Trees need care for several years, some would die, so it might take two trillion trees. Researchers say that the best results come with planting a mixture of indigenous trees, some with different heights, to benefit from diversity.<sup>16</sup> Canada has committed to planting 2 billion trees, and China, 100 billion. As large as these numbers are, it's not enough.

*The sixth measure* is to deploy agricultural practices that reduce greenhouse gas emissions from agriculture, the largest source of methane and nitrous oxides. Improved farming methods use less fertilizer and reduce methane emissions from livestock. Although likely difficult to implement globally, reducing livestock produc-

tion would decrease emissions and also reduce land clearing needed for pastureland and animal feed.

### TOWARDS NET ZERO

If the first four measures described above are implemented on a global basis, emissions would be reduced by about 35 Gigametric tons by 2050. Compared to the “present trends” case of over 80 Gigametric tons, global emissions would be falling and would drop to the 2010 level. This is not net zero but is probably a realistic estimate of what can be done. It would be a good start, and it would buy time for additional improvements to be implemented. This outlook would change significantly if the half-dozen countries that are the greatest greenhouse gas emitters followed Canada’s example and imposed a carbon fee of US\$20/metric ton or more. However, there are many political obstacles to be overcome.

### WE CAN STAVE OFF THE FOUR HORSEMEN

If we take prompt action, we can reduce the consequences of future global warming. Unfortunately, it will take a long time to recover from the damage already caused, and then only after we reach net zero greenhouse gas emissions. However, we can foresee a bright future with abundant supplies of clean, renewable energy at competitive prices if we take action now. A bonus would be a large reduction in air pollution and better public health.

Failure is an option. If we fail, we will condemn our children and grandchildren to an unpleasant future and we will deserve in full measure the curses they will heap upon our memories for not taking action. ■

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To read the endnotes for this article, see [peacemagazine.org/v37n1p16.htm#notes](http://peacemagazine.org/v37n1p16.htm#notes)

Reference:  
*Peace Magazine,*  
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