

**Alan Betts, Green Energy Times, 2019** <http://www.greenenergytimes.org>

**Alan K. Betts** (<http://alanbetts.com/writings> )

This is a collection of my 2019 articles in the Green Energy Times (<http://www.greenenergytimes.org/>).

This series started in 2016. Most of these articles have been edited or updated from articles I wrote for the Rutland Herald, sometimes with different titles (as well as pictures).

They blend science and opinion with a systems perspective, and encourage the reader to explore alternative and hopeful paths for their families and society. They are written so that a scientist will perceive them as accurate (although simplified); while the public can relate their tangible experience of weather and climate to the much less tangible issues of climate change, energy policy and strategies for living sustainably with the earth system.

The politically motivated attacks on climate science by the current president have sharpened my political commentary; since climate change denial will bring immense suffering to our children and life on Earth.

I believe that earth scientists have a responsibility to communicate clearly and directly to the public<sup>1</sup> –as we all share responsibility for the future of the Earth. We must deepen our collective understanding, so we can make a collective decision to build a resilient future.

*All my articles are available from my web-site, and can be freely reused under a Creative Commons license.*

*This pdf document contains the 6 articles as pdfs. Web access to editions and articles can be found at <http://www.greenenergytimes.org/back-issues-download/>*

### **Green Energy Times, 2019**

**Betts, Alan, Looking back; looking ahead.** Green Energy Times, January 15<sup>th</sup>, 2019.

**Betts, Alan, The clash between oil and the future.** Green Energy Times, March 18, 2019.

**Betts, Alan, Saving our children.** Green Energy Times, May 15, 2019.

**Betts, Alan, Rebellion to save the Earth.** Green Energy Times, July 19, 2019.

**Betts, Alan, Floods, Ice, Fires and Drought.** Green Energy Times, September 24, 2019.

**Betts, Alan, The Global Rebellion is underway.** Green Energy Times, November 27, 2019.

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<sup>1</sup> **Betts, A. K. (2011)**, Communicating Climate Science. *EOS Transactions*, 92, No. 24, 14 June 2011. Available at <http://alanbetts.com/research/paper/communicating-climate-science/#abstract>

# Looking Back – Looking Ahead



Rising sea levels. Image: the conversation.com

By Dr. Alan K. Betts

This is the time to look back on 2018 and reflect on what we have seen, and what we have learned. At the same time, the climate endgame is getting closer, so we must face reality. As greenhouse gases reduce the cooling of the earth to space, more and more heat is stored in the oceans, and warming oceans make tropical storms, hurricanes and typhoons more powerful and dangerous.

In 2017, hurricanes Harvey, Irma and Maria struck Texas, Florida, the Caribbean and Puerto Rico. Harvey stayed over the Houston region for four days and dumped over three feet of rain, giving catastrophic flooding, because very little rain can soak into the ground in an urban area. In 2018, tropical storms Lane and Olivia brought very heavy rain to Hawaii. Then hurricane Florence stalled for three days in mid-September on the North Carolina coast giving severe flooding from both the storm surge and twenty-five inches of rain. On October 10th, hurricane Michael intensified very rapidly just before it made landfall on the Florida panhandle as a category four storm, creating immense damage that stretched inland into Georgia. Rebuilding costs will be massive. In the western Pacific this year, there were six category five typhoons. The most powerful storm of the year, super-Typhoon Yutu, devastated the U.S. territory of the Northern Marianas Islands in late October, but little news reached the mainland.

For readers in the Northeast, these tropical storms are far away. Closer to home, it has been a year of different extremes. As the Arctic warms faster than the tropical regions, mid-latitude weather patterns are generally slowing down with larger amplitude waves in the jet-stream. This gives alternating extremes around the globe. In April, there was record cold in north-central U.S., which stretched up into Canada. This was followed by the six months, May to October, which set high temperature records in the east with record precipitation from Virginia to Pennsylvania. High temperatures and drought in the western U.S. led to severe fires in November in California that set new records for loss of life and property – beating the staggering losses in 2017.

The most recent IPCC report is very blunt and very thorough, saying we have just twelve years to drastically reduce fossil fuel emissions or the damage to life on Earth will be increasingly severe as decades pass. Over Thanksgiving, the U.S. Global Change Research Program released the 2018 National Climate Assessment: a lengthy synthesis by three hundred scientists. This forecasts a century of increasing devastation from climate change to the U.S. economy, agriculture, infrastructure; coastal city flooding from a four-foot rise in relative sea level, and a cascade of deadly events from hurricanes to forest fires to drought. The chapter for the Northeast will be useful to readers (<https://nca2018.globalchange.gov/chapter/18/>).

In earlier days, government reports like this would be a wake-up call, since we can see what is happening both here and around the globe. But today, the U.S. federal government is simply ignoring reality and denying climate change is happening. The president recently blamed California's tragic fires on forest management ("they should rake the forest floor"). Asked about the National Climate Assessment, he said he didn't "believe" the scientists that wrote it. His falsehoods (<https://www.factcheck.org/person/donald-trump/>), are presumably to protect the interests of his fossil fuel sponsors. Yet in a parallel universe, his application to raise the sea-wall to protect his Irish golf course from rising sea level cites the dangers of climate change.

Back in 2012, North Carolina legislators passed an astonishing bill that barred policymakers and developers from using up-to-date climate science to plan for rising sea levels on the state's coast. This was because updated flood zones would restrict development and reduce property values. The climate system paid no attention. The storm surge and twenty-five inches of rain from hurricane Florence

simply drowned the stupidity of the North Carolina legislators, causing immense damage.

Readers need no reminder that living in fantasies is rarely good for business, so keep seeking the best technical guidance. As the oceans warm and the melting Arctic tundra releases methane, the Earth system is moving towards instability, which makes planning for the future a challenge. We must speak up in our local communities and invest in local resilience for the long-term.

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January 15th, 2019 | Tags: [Climate Change](#), [January 2019](#) | Category: [Climate Change](#), [January 2019](#)

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# The Clash between Oil and the Future

*Dr. Alan K. Betts*

Global ocean temperatures set a new record in 2018, beating the previous record set in 2017. New studies show that both the Antarctic and Greenland ice sheets are melting faster than ever, so that sea-level rise is accelerating. In the third week of January, the weakening polar vortex gave us bitter cold weather and heavy snow (and as I write more is falling). However, our spinach and lettuce in cold-frames are doing fine, as the snow cover has protected them.

That's the real world. But here in the U.S., the new surreal world continues. I remarked last month that the President refused to read the fourth National Climate Assessment mapping out how bad climate change will be for the U.S. if we stay on our present fossil fuel energy system. The EPA head also said he was too busy to read this report, which his own agency helped produce. His extraordinary excuse was that much of the science in the report came from the time of the Obama presidency. Am I to suppose by implication that the next NCA report will be filled with Trump science?



Pumping oil. Image: mexicinstitute.wordpress.com

The Federal government shutdown affected a lot of government science along with so many other “non-essential” government branches. Science is considered worse than non-essential, because much is incompatible with right-wing doctrine. The shutdown prevented the weather service from upgrading models and updating codes to receive all 2019 global data. It prevented many scientists from reviewing recent climate data. Slowly but surely, government by ideology and blackmail is pushing the U.S. into third-world status.

Both snow and missing data have meant that I have had time to read and think deeply. Reading the extraordinary book, “Oil, Power and War” by French author Matthieu Auzanneau, has given me a new global perspective on how our dependence on oil has led to far-reaching conflicts over the past century. I learnt a lot about the central role of oil in warfare – and the millions that have suffered and died for oil. The U.S. military and economic dominance has been closely tied to the control and access to global oil supplies. This still continues in the ongoing turmoil in the Middle East, and the latest struggle to regain control of the large Venezuelan oil reserves.

I thought I was well-informed, but now I realize the immense secret power of the U.S. oil monopolies has ruled government policy for the past century, rather than the reverse. In parallel to the military role of oil, the rapid material growth of the U.S. economy in the decades after World War II was also enabled by the U.S. global control of cheap oil supplies. Remember the magnificent icon of our growth and prosperity was the gas-hungry 1950s V8 Cadillac with fins.

But because we refuse to make the transition from oil, the crash is coming closer. In a tragic microcosm across the border in Mexico, people risk their lives by tapping pipelines for gasoline. The poor are desperate for fuels, and it is a \$3 billion-a-year business for organized thieves.

I see much more clearly how accelerating climate change is linked to the power of oil in both our industrial society and our military dominance. The EPA has recently been told to roll back efficiency standards for cars once again to keep us trapped in this spiral of demand driving supply that is profitable for the oil industry. Right now the U.S. has record oil production, but we ignore the fact that in a decade or so, when this shale oil extraction peaks and the crash comes, the climate impacts will be irreversible.

Yet plug-in hybrid cars can right now deliver an 80% reduction in gasoline use, with large savings in fuel and maintenance costs to the owners, large gains for the climate, and a smooth transition away from oil. However, both society and the automobile industry are reluctant to really market them, because oil consumption and inefficiency control policy.

But shifting back to the renewable world, Vermonters are starting to tap trees for maple syrup as they have done for centuries, and soon we will be eating fresh spinach again.

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March 18th, 2019 | Tags: [Climate Change](#), [March 2019](#) | Category: [Climate Change](#), [March 2019](#)

# Saving Our Children

Dr. Alan K. Betts

On Friday, March 15, images and video flowed in from around the world, Australia, the Pacific, Asia, Europe and Africa, as more than a million students in 120 countries walked out of school to strike for the climate. Thousands of scientists supported them, but the real driver was their realization that global society intends to sacrifice them and their children, along with much of life on Earth, just to protect our consumer society and the profits of the oil companies and other wealthy corporations.

This winter, along with shoveling snow, I have been mulling over how our society's indifference towards the future of our children contrasts with the care we take to protect them in the present. There are days and nights when this fills me with dread. We need to discuss this, even though we would rather avoid it. Consider that there are political and religious campaigns to protect the lives of unborn children, but no similar campaigns to protect the unborn millions that will die in the climate catastrophe that we are creating. How can this be?

Other issues are at stake. The campaign in the present to protect the unborn is a convenient political fit for the disempowerment of women and their centuries-old subjugation by male authority. In contrast, the future deaths of the unborn, and much of creation, is consistent with centuries of exploitation of the Earth by humanity. It is coupled to the concept of human dominance, historically male dominance. This led to a misplaced sense of our power and authority over nature, which developed over the centuries in the western and colonial worlds. It led also to the ruthless suppression of the indigenous peoples, and their deeper understanding of our relation to the Earth's ecosystem.

As science and technology emerged as drivers of our civilization, this frame of human dominance and exploitation of the Earth and all its resources spread further. We became deeply embedded in a consumer society powered by oil, which could be cheerfully marketed as liberating for women, as long as they lived in a rich country.

Now the growth of our consumer society and economic system exploit the poor everywhere, the planet's resources and ecosystems, all to maximize current profit and channel wealth and power upward. Advertising and mass media keep us in line and continually feed us the sacred myths about our entitlement. Oil companies and other polluting industries bribe our politicians. Meanwhile, our time horizons get shorter rather than longer, as they would to match the time-scales of the Earth. The reality is that our global consumer economic system, powered by fossil fuels, is driving the energy imbalance of our planet that in turn is driving climate change. This is a crime against the Earth that will haunt humanity for centuries, and yes, eyes closed, we are sacrificing our children.

A rude awakening is coming because humanity does not control the Earth. This is obvious in every climate-related disaster, whether it be rising seas and hurricanes, floods and storms or droughts and fires. Afterward, we borrow the money and rebuild, but so far, our societies have refused to discuss and confront the consequences of our doctrines of power and exploitation. We can cooperate with each other or smaller scales, but the understanding that we need to collaborate with the Earth on a grand scale has been suppressed by our economic system, which is protected by well-funded propaganda.

Instead, we should listen to Mary Christina Wood and encourage our teenagers to campaign for a new planetary patriotism that transcends national boundaries and give them the resources and training to build a truly sustainable society. They need guidance and massive support, but their future is on the line, and our aging corrupt politicians have failed them. To protect the interests of our children and grandchildren, we must accelerate the transition away from fossil fuels to a much more efficient society, powered at least 80% by renewable energy. That is a morally acceptable use of our excellent technology, whereas destroying our stable climate system is not.

The snow has finally melted, and I have been thinning lettuce and spinach that wintered over under glass and admiring the rhubarb sprouting. The community farm in Pittsford, Vermont, where I live is starting its second year: growing more food locally brings communities together.

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May 15th, 2019 | Tags: [Climate Change](#), [Front page](#), [May 2019](#) | Category: [Climate Change](#), [Front Cover](#), [May 2019](#)



In March 2019, South African youths protest for action against climate change outside Parliament in Cape Town. Photo: Ashraf Hendricks, [www.groundup.org.za](http://www.groundup.org.za).

« [Saving Earth](#)

# Rebellion to Save the Earth

*Dr. Alan K. Betts*

This has been a winter of extremes across the planet. Saturated soils from late snowmelt and heavy spring rains have delayed planting crops here in the northeast. For Vermont, this was the fourth wettest April on record and we have had another seven to eight inches of rain in May. While it was exceptionally cold in the northern US in February, temperatures set new records in Europe. In England temperatures peaked at 70 degrees in February, and fires started on the moorlands. At the same time, visionaries in England were planning the first rebellion to save the Earth: The Extinction Rebellion. This is fitting because the industrial revolution powered by fossil fuels took off in Britain in the late 1700s with the development of efficient steam engines.

No-one anticipated then that as the burning of fossil fuels accelerated, and increasing greenhouse gases trapped more heat in the oceans, climate change would also accelerate. This April and May, the Arctic ice shrank to a new minimum, and the mid-latitudes are frequently seeing nearly stationary global weather patterns that are increasing climate extremes. Unfortunately, poorer tropical countries are seeing far worse. In southeast Africa, where tropical cyclones used to be very rare, two powerful storms developed over the warmer ocean and hit Mozambique. First came cyclone Idai in March with massive flooding which left about 1000 dead. Then Kenneth, an even stronger category 4 storm struck in April with five feet of rain in less than a week. Try to imagine the flooding and destruction in a poor nation.

In early May, a new UN report on Biodiversity and Ecosystem Services reported that soon a million species will go extinct from loss of habitat and climate change. Nature is in an unprecedented global decline and species extinction rates are accelerating. The report chair, Sir Robert Watson, comments "The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide. We need transformative change."

It is the rich nations that are responsible for the tragedy that is devastating the Earth and the future of humanity. For 27 years, we have not kept the promises we made in 1992 to stop dangerous climate change, and now we are deep into a climate emergency. But rather than acknowledge this and act, we listen to the soothing propaganda from the fossil fuel industry and their many affiliates that say: "Buy bigger cars and trucks and buy more consumer stuff. Use your freedom to exploit the Earth: the future is not our responsibility."

So, it was heartening to see that this new global group, the Extinction Rebellion, has grasped that the destruction of the Earth is now a civil rights issue, which can only be checked by civil disobedience. This rebellion to save the Earth is not to defend individual rights, but to defend the rights of our children and the rights of life on Earth that faces extinction. They will not accept that while our corporations have the 'right' to exploit the Earth, so far the Earth has been given no rights.

This group is trying to force the rich countries responsible for destroying the planet to take action on the global climate and ecological emergency. They shut down London for 3 days, April 15-17, with a huge street party, until they were successful in getting their first demand: that the British and Scottish governments tell the truth and declare a 'climate emergency.' The second demand is that government must act now to halt biodiversity loss and reduce greenhouse gas emissions to net zero by 2025. This is very demanding goal requiring tight coordination across all levels of government and industry. The third demand by this non-political group is that the government must create and be led by the decisions of a Citizens' Assembly on climate and ecological justice. You can read their honest commentary on the challenges ahead on their web-site: [rebellion.earth](http://rebellion.earth).

In contrast, the collapse of ethical standards and honesty in Washington, and the attacks on climate science mean we cannot expect leadership here. So, follow and support these global movements to hold governments accountable. Recognize we have no right to sacrifice our children and much of life on Earth. Take a deep breath, keep talking to your neighbors and politicians, and accelerate the transition to an energy efficient renewable future.

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July 19th, 2019 | Tags: [Climate Change](#), [Extinction Rebellion](#), [July 2019](#) | Category: [Climate Change](#), [July 2019](#)



Image: [garryrogers.com](http://garryrogers.com)

## Floods, Ice, Fires and Drought



Sixteen-year-old Greta Thunberg reached New York after crossing the Atlantic Ocean on an emissions-free sailboat. Thunberg does not travel by air due to the associated carbon emissions.

*Alan Betts*

Water is everything to our planet. As I write, Greta Thunberg has reached New York after crossing the Atlantic in fifteen days on a racing yacht, arriving just ahead of tropical storm Erin. She will be in the United States for the global strike for the climate system on Friday, September 20 to 27, and she will speak to the United Nations on September 23. This is an existential protest by youth who are unwilling to be sacrificed for corporate greed. Indeed, the continued unchecked exploitation of the Earth and the poor by the fossil fuel industries and society is both a crime against humanity and the Earth itself. Capitalism has given rights to corporations, but the Earth still has no rights. Legal battles are underway across the globe to establish the crime of ecocide, the destruction of the Earth's living ecosystem, but this may come too late.

The fossil fuel industry is spending some \$200 million a year on dishonest propaganda and bribes to politicians to protect its \$100 billion in annual profits. We need escalating fossil carbon taxes to reframe the economics and to help pay for both present and future costs. But the highly profitable global consumer economy, driven by fossil fuel, has purchased the silence of millions.

Let us briefly review the global weather and climate perspective. The increasing greenhouse gases have slowed the cooling of the Earth to space, and melting ice and snow has reduced the reflection of sunlight, so the Earth is warming. More than ninety percent of this heat is stored in the oceans. But the Arctic is warming twice as fast as the equator, and this has changed the mid-latitude jet stream towards large amplitude north-south waves that move slowly. In July for the first time, a convective storm in Kansas moving to the southeast, circled back over the Gulf as a tropical storm, forming the weak hurricane Barry that struck Louisiana, causing \$10 billion in flooding damage.

For the year ending with June 2019, the central United States was cool with record precipitation in Nebraska, Kansas, Oklahoma and Arkansas. It was the second wettest on record for Iowa and Texas. The flooding on the Mississippi River this spring was the longest on record. The eastern and southeastern U.S. was warm, but fourteen eastern states also had record precipitation for the year. The realization is spreading that billions are needed after floods to rebuild levees and build new floodwalls to hold back rising waters in towns. This should be funded by a tax on fossil fuel.

But elsewhere in the northern hemisphere, there were record high temperatures in Europe as well as Alaska, and fires across the warming Arctic, especially in Siberia. These fires spread soot that darkens the Arctic ice and speeds melting. The very warm air from Europe also blew north over Greenland, and set new records for Greenland ice-cap melt in early August. As the Arctic ice melts, climate changes, and as Greenland melts, sea-level rises.

With Brazil once again encouraging development, more than forty thousand fires were set burning across the Amazon to clear land during the tropical dry season. In India, millions are running out of fresh water. The city of Chennai with 10 million people has a water crisis, with desiccated reservoirs and shrinking ground water supplies. Water is critical for agriculture and crops everywhere, but three quarters of the earth's soils are now degraded as well. An era of environmental collapse is coming, as complex natural systems become destabilized. The rich countries that have the largest carbon footprint carry the largest responsibility.

We need this reminder, even though none of this is good news. Here at home remember local agriculture is critical. Harvest and share your crops and thank your local farmers. Plant a rye-grass cover crop to improve the soil in your vegetable garden. What can you plant to winter over under glass? In early April, we delight in eating spinach and lettuce that was planted in October. Teach your children and grandchildren to grow food and support and educate them when they protest against the corruption in our society. Roots in the Earth can support us through the difficult times ahead.

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September 24th, 2019 | Tags: [Climate Change](#), [September 2019](#) | Category: [Climate Change](#), [September 2019](#)

## The Global Rebellion is Underway



Extinction Rebellion: London, October 10, 2019

Alan Betts

At the end of September, seven million people, mostly youth around the world, joined with Greta Thunberg in a global climate strike to protest the fact that our industrial societies intend to sacrifice our children to protect the present economic system, and especially the profits of the fossil fuel industry.

Pause and listen to the clarity of her speech to the UN (<https://www.washingtonpost.com/climate-environment/2019/09/23/greta-thunberg-vows-that-if-UN-doesnt-tackle-climate-change-we-will-never-forgive-you/>). If a 16-year-old can understand so clearly our destruction of the Earth's stable climate and living biosphere, one might wonder whether our leaders are just stupid. Of course, we know why. In the past 30 years as the climate crisis has accelerated and our understanding has deepened, many of our leaders have tried to hide from the truth in a web of lies to avoid acknowledging their greed, corruption or political self-dealing.

Entire websites have been created with phony climate science to feed their ideologies of denial and try to pacify their conscience. Even though at a deeper level, most of them know that destroying the Earth's ecosystem to make money is a crime against our children and the Earth itself.

The first step is to realize this is an existential crisis, a real planetary emergency for humanity and much of life on Earth. No amount of ideology and denial can protect us from warming oceans, more powerful storms and extreme weather, and the loss of so many species that we and all life depend on. We have idolized economic growth and the freedom to exploit the Earth and the poor, but the Earth is not listening to our self-righteous doctrines that maximize profit and protect the wealthy. Our planet is simply getting warmer as increasing greenhouse gasses slow the cooling to space; while at the same time, ice and snow melt so that less sunlight is reflected.

As I write in mid-October, the first global phase of the Extinction Rebellion to save the Earth (Rebellion.earth) has just finished. Their motto is **Compassion; awareness; courage**. This remarkable group formed in the UK over the past winter and has spread rapidly around the globe. They understand deeply that climate change, and the extinction of so many species in the living biosphere, is now a civil rights issue for our children and for the Earth itself: it is the crime of ecocide. Like previous civil rights issues, it will take non-violent civil disobedience to wake the conscience of reluctant societies and selfish people.

Time is running out as scientists have been shocked by how much climate change has accelerated in the past ten years. These Rebels are pushing for rapid reduction of our greenhouse gas emissions; asking for a serious attempt to zero our global carbon budget by 2025. Since our global carbon budget is still increasing despite 25 years of promises, this is unthinkable to our economic system. Actually a 50% reduction by 2025 would be a staggering achievement and set us on the right track.

For nine days in cities around the globe, this powerful, non-violent rebellion challenged the ecocidal reality of our global market economy that refuses to place value on the future of the Earth. This movement is peaceful and loving, creative and artistic, but relentless and disruptive, since without pressure, governments will refuse to make the radical policy changes needed.

In London, Paris, Berlin, Brussels and Dublin; Rome, Amsterdam, Madrid, Prague and Istanbul; Cape Town, Buenos Aires, Rio and Santiago; Mexico City, New York, Montreal and Vancouver; Melbourne, Perth, Mumbai, Colombo and Jakarta, the Rebels are putting down roots for the long struggle ahead to save the Earth. Some countries treated them with compassion and understanding, while others reacted with anger and violence. Many have been arrested, but their dance and music will continue across the Earth as they regroup and regenerate for the next phase. They understand clearly what most refuse to understand: that business as usual is driving accelerating climate change with catastrophic consequences for all life on Earth within the lifetime of our children and grandchildren.

Because they see this clearly, they have resolved to resist for the sake of life on Earth. Generations to come will be grateful to them. I hope readers will stop and reflect deeply on their values and act to support this courageous movement.

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