

Climate, Energy and Community: Vermont 2014

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This is a compilation of my 2014 Weekly Planet columns from the Sunday Rutland Herald and Barre/Montpelier Time Argus. This series started six years ago in January 2008; and an overview paper is available¹. These columns go through the seasons, dealing with weather, climate, climate change, energy and policy issues. They blend science with a systems perspective, and encourage the reader to explore alternative and hopeful paths for themselves, 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.

I believe that earth scientists have a responsibility to communicate clearly and directly to the public² – 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 create a resilient future.

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¹ **Betts, A.K. and E. Gibson (2012)**, Environmental journalism revisited. *Environmental Leadership: a Reference Handbook*. Deborah R. Gallagher, Editor, SAGE publications Inc., Sept. 2012, ISBN: 9781412981507. Available at <http://alanbetts.com/research/paper/environmental-journalism-revisited/#abstract>

² **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>

a) The courage to challenge the status quo

(January 26, 2014)

<http://rutlandherald.com/article/20140126/ENVIRONMENT/701269917>

The switch from fall to winter came very suddenly in December, and few of us were prepared. Then a stationary cold front brought Vermont many days of ice and fog, while New York City hit a new record temperature of 70 degrees. Stationary weather patterns have become more frequent in recent years.

The weather this winter has brought us frequent changes between snow and Arctic cold, and rain with warm advection from the south — and too many days in between with ice. Starting a snow and ice-covered plow truck at minus 15 degrees may build character, but I would rather sit by the fire and contemplate the paper I am writing on the summer climate of the Canadian Prairies.

Yet when the ground is covered with fresh snow reflecting the sunlight, my heart lifts. I bundle up and set out for a morning walk. This winter I have kept crampons on my boots because of the ice under the snows.

On the warm days I watch the snow melt, pick some kale protected under glass and dream of spring planting. We got some late-season volunteer plum tomatoes that sprouted from the compost. I picked them green before the first hard frost, and with a smile we ate the last one on New Year's Eve, along with our final Brussels sprouts.

Every year brings us the opportunity for a new beginning in our lives, and in the choices we make about how we will live in this world. This year there will be a series of reports from the working groups of the Intergovernmental Panel on Climate Change, known as the IPCC. The topics will be familiar to many readers.

- The working group report “Climate Change 2014: Impacts, Adaptation and Vulnerability” will be released on the March 29, after a meeting in Yokohama, Japan.
- The report “Mitigation of Climate Change” will be released a few weeks later on 11 April after discussions in Berlin, Germany.
- The “Synthesis Report” will be considered in Copenhagen, Denmark at the end of October.

These will map out in great detail the state of our knowledge about the changing climate of the Earth, including what lies ahead for human society and the natural world. I hope the media will not ignore these reports — because they are not news anymore. They are just sad reminders that we have done far too little to stem the tide of climate change since the last report in 2007. The fossil fuel industry will shed a few crocodile tears and be glad when the year is over, hoping that no one will question its business model for another 6 years.

But the Earth will go on warming and the Arctic ice melting, and it seems likely that extremes of weather will increase as our planet moves towards a new climate state. This year may come and go, but really the future is up to us. This is the planet we have been given. We must keep asking what we would like to leave for our children — and look at the decisions we make as individuals and as a society in that light.

The words of John and Bonnie Raines, now both 80 years old, have been echoing in my mind this month. Back in 1971, they had young children and he was a professor of religion. With a small group of friends, they had the courage to raid an FBI office. The files they found revealed that J. Edgar Hoover's illegal domestic spying was being used to intimidate those protesting against the Vietnam War.

Looking back they said simply, “It became pretty obvious to us that if we don't do it, nobody will.”

So I salute the first meeting of the Vermont Climate Caucus last week. I hope they will have the courage to pass a carbon tax, however small, to fund energy retrofits for low-income people in Vermont and help us all move in a new direction.

b) Gov't secrecy impedes understanding of climate change (March 23, 2014)

<http://rutlandherald.com/article/20140323/ENVIRONMENT/703239935>

Our northeastern climate has been frigid and snowy this winter, while the west coast has seen record high temperatures and drought. Across the Atlantic, Britain has experienced exceptional rainfall and devastating floods, while the weather in southeastern Europe shattered 100-year records for warm temperatures in January. It is all part of a climate shift towards more stationary jet-stream patterns that are giving extremes on a global scale. But we rarely see this global picture because the news media focus just on what is happening locally.

I have been reflecting on why some nations keep critical climate records secret by not allowing free access to data on the Internet. The United States is an exception, as we insist that data that is collected using government funds be freely available. However, this is not the case in many other countries.

Canada, for example, has a tradition of protecting its data — one that scientists find very frustrating because the Canadian data is generally of excellent quality going back for decades. We need this data because the climate system does not recognize national borders.

My current research is based on superb data from the Canadian prairies. But when I give talks on the fascinating discoveries I have made using measurements that I did not know existed 15 months ago, puzzled students ask me: “Why would anyone keep such important data secret?”

I can't give a simple answer because it is part of a deeper syndrome, one of those conflicts between science and government. Governments are concerned with power, and they think open access to information weakens their authority. This attitude is partly self-centered nationalism, but secrecy also makes it easier for the political elite to deceive and manipulate the public.

Secrecy clashes with the values of science, which depends on open access, honest analysis and the free exchange of information. Consequently we see a struggle for the control of the “truth” in public forums, especially where the reality of climate change clashes with political and economic ideologies — not to mention the fact that fossil fuel reserves are worth a staggering \$30 trillion to the present economic system.

National political systems thrive on controlling information and managing national myths, a situation that presents a special challenge in today's global world because the myths of other nations differ from ours. At the same time, governments rarely tell the truth in public. This means that spying, like the NSA's global network, is useful, because it can give our government an edge. But spying must also be kept secret, because it doesn't resonate well with the democratic myths of a free country, free enterprise, free markets and so on.

Sadly this power framework based on secrecy, manipulation and control is useless for managing global climate change, which is slipping out of control. We need global collaboration to reduce greenhouse gas emissions, not governments that traditionally have seen other countries as threats to national self-interest.

Of course, deception is endemic in society. Last fall I traveled to Texas, where I was to give a talk about the Canadian prairie data at Texas A&M University. On the flight I was explaining with excitement my discoveries to a woman who worked for the oil industry. She was curious about climate change, but her final question stunned me: “How do you know the Canadians didn't make it all up?”

She was serious, and as a literal person I tried for a moment to imagine how a thousand Canadian observers could conspire over 60 years and a thousand miles of prairie to create such a magnificent data set that answered so many of our climate puzzles — but I failed.

For research scientists, open access to data is now a matter of scientific ethics, because science depends on careful, accurate analysis and the free sharing of results and the data behind them. When I finish my current analyses I must post this data, so that others can review what I have found.

c) Celebrate Mother Earth today

(May 11, 2014)

<http://rutlandherald.com/article/20140511/OPINION06/705119925/>

After a snowy winter Spring has arrived, much later than usual over the past decade. This year daffodils bloomed a month later than in the exceptionally warm spring of 2012.

In my garden spinach and lettuce overwintered under glass, and with the wet weather they are now growing fast. My peas are up. Remarkably a couple of spinach plants survived the winter, protected only by the snow cover. It is easy to love Mother Earth as spring blossoms with new life in Vermont — even on these cloudy rainy days that remind me of spring long ago in England.

The nearly stationary large-scale weather patterns have persisted across the continent. It has been wet in the east, with devastating floods in Alabama and the Florida panhandle. Meanwhile drought continues in the western United States, raising concerns for the coming fire season.

This year the Intergovernmental Panel on Climate Change, the IPCC, has issued a series of reports describing what is happening to the Earth's climate. Part of the story is daunting. We continue to get most of our energy from burning fossil fuels. We are slipping further behind in restructuring our energy system to be more efficient and more dependent on renewable energy. This means that the costs of adapting to climate change and increasing severe weather will continue to rise steeply.

Yet part of the report is encouraging. Technical advances in recent years, such as solar power, have made meeting the challenge feasible. In fact, the latest IPCC report concludes that the investment needed to transform our societies would reduce growth rates by less than one-tenth of a percent. Surely we could live with this!

Nonetheless it is clear from this recent report that time is running out to preserve the climate of the Earth for those who will come after us. We have the technology, we know where we should invest — and the cost is small compared to the cost of doing nothing. An investment of \$1 trillion now to slow the rise of carbon dioxide in the atmosphere reduces our adaptation costs by \$60 trillion later this century.

The news media scanned these recent reports but paid scant attention. Some sources even said that they saw little that was new! And the well-funded propaganda machine continues to assert that we have the right in a free country to dump carbon dioxide into the air at no charge. But this claim is just made to cover up the truth that we must leave much of the remaining fossil fuel in the ground, if we want to preserve a tolerable climate for the future.

National politics exist in a child-like fantasy land. Many in power pretend that if they close their eyes, climate change will go away — or since they are old, they won't have to deal with it. But these political children in their self-centered fantasy world are simply dumping unimaginable costs on their children and grandchildren, and on the Earth itself.

Economically we know what we need to do: introduce a waste tax on burning fossil carbon. And we have most of the technical answers, so climate change has now become a moral problem. How long will we be content to sacrifice the wellbeing of future generations, while we persist in our historic wasteful lifestyle?

The climate of the Earth is complex. We don't know all the answers. From the political perspective our situation looks bleak. But human beings are extraordinarily creative, and we will have to change and adapt. Mother Nature is much more powerful than any of our technology.

So start with hope and connect with your fellow citizens. Invest in the society we need. And develop your relationship with the Earth. We must work with her — and it will never be too late. We are all in this together. Let us take joy in the transformation and ask: "Do we really treasure Mother Earth?"

d) Costs of severe storms require a fossil carbon tax

(June 29, 2014)

<http://rutlandherald.com/article/20140629/OPINION06/706299931>

The storm with golf ball-size hail that hit Rutland last month was another wakeup call. The hail dented a lot of cars, damaged roofs and broke windows and vinyl siding. This type of storm is more typical of Oklahoma than Vermont, because it takes strong instability to give the powerful updrafts that can recycle hailstones within the storm until they grow to this size. Fortunately cell phones gave urgent warnings, and most people took cover. But Rutland again had downtown flooding.

The Rutland Department of Public Works Commissioner Jeff Wennberg, who understands climate change risks, said, “In a six-year period we’ve had six storms that were deemed 10-year storms or worse, and Irene was a 100-year storm. Our storm water system just wasn’t built for this level of intense storms.”

Rebuilding our infrastructure and fixing flood damage from increasing severe weather is going to cost money, which small town budgets cannot afford. Will we simply have to suffer, or will our leaders really grapple with the issue?

The fundamentals are very clear, except to those lost in ideological dreamland. Vermont spends about \$1.5 billion each year burning fossil fuel — and dumping the waste CO₂ into the atmosphere for free. The Earth’s water cycle processes amplify the warming produced by the carbon dioxide pollution, and severe weather is increasing. Vermont is responsible for a small share of a global climate problem that is getting worse.

The global problem requires federal action and an agreement between China and the United States. But Vermont has to pay the price of increasingly severe weather, as do all the other states. Obviously we must add a fossil carbon waste tax to the price of all the fossil fuel burnt in Vermont to raise funds to pay for rebuilding. We need new infrastructure that can handle the storm water. And we also must implement all the efficiency measures required to reduce the amount of fossil fuels used by our homes, businesses and transportation.

A 10 percent fossil carbon waste tax would raise about \$150 million a year in Vermont— a good start towards paying our escalating bills. Retrofitting homes typically reduces energy usage by 30 percent, so this tax would be easily offset by the savings on our heating bills. Much more efficient cars are available, so the improved mileage would likewise offset the carbon tax on gasoline.

Of course people don’t like taxes, because they do not trust politicians to spend wisely. They see national leaders who are less concerned about whether climate change is happening and more intent on continuing to deny the facts. Too many politicians are focused not on what the country and our children need, but on raising dollars for reelection.

We must have an honest discussion, not political hypocrisy. The climate is much more powerful than we are, and we have to deal with it every day.

A similar issue faces us in terms of protecting Lake Champlain. That lake absorbs the waste streams from our homes, towns and farms. When asked, 90 percent of Vermonters say they want clean water in our rivers and lakes — but only a minority are willing to pay for it.

People think they can dump their waste streams for free and then be rewarded with a free lunch! It is time for us to grow up and face reality.

This month the Environmental Protection Agency proposed standards to reduce CO₂ pollution from coal-burning power plants by 30 percent. The shift away from fossil fuel power plants may reduce profits in the traditional energy sector, but the Earth benefits enormously. Barclays recently downgraded the entire U.S. electricity sector, predicting an inevitable transition away from the utility monopoly on power generation as distributed energy generation becomes cheaper. We can be grateful that this transition has started in Vermont with both utility and legislative support

e) A radical alternative to a carbon tax**(August 17, 2014)**

<http://rutlandherald.com/article/20140817/OPINION06/708179943>

I started writing this column on the lawn on a perfect summer day in July with elegant wave clouds high in the atmosphere blowing in from the Adirondacks. I am finishing it at a family gathering in England where I grew up.

In my last column I wrote about the need for Vermont to introduce a carbon tax to help pay the local adaptation and rebuilding costs from climate change. But this will not move the US away from a fossil fuel economy. For this to happen all fossil carbon fuels need to become more costly – they are far too cheap at the moment, because we have not included the long-term costs. How can we do accomplish this without imposing suffering on the poor?

The best plan proposed is called “Fee-and-Dividend”. This is much more than a skillful repackaging of a carbon tax – it works like this. A fee is placed on fossil carbon at the mine or well head or when imported to the US; and all the money goes not to the government, but back to every US citizen as a dividend. Every year the fee increases \$10 per ton of fossil carbon, so fossil fuel gets more expensive over 10-year period. This gives the economy the clear signal it needs to burn less fossil fuel, either by becoming more energy efficient or by shifting to renewable energy.

But the economy as a whole does not suffer because the money is reimbursed to the people to spend as a dividend. The dividend does not go preferentially to the rich, or to Wall Street trading schemes, or to the Federal government to spend; but back to the people, including a half share to children. In 2025, the dividend to a family of 2 adults and 2 children is estimated to be \$288 a month. So there is a clear sense of equity in this proposal.

Studies show that the economy would benefit greatly, creating 2 million jobs in the first decade and increasing the net GDP. The US share of global carbon pollution would fall 33% in 10 years and 52% in 20 years. Because it is revenue neutral, it has support from both political parties, except among those who pretend that climate change does not exist! Or those who think that the role of government is to improve the fortunes of their rich donors, and hope that just enough of their philanthropy will trickle down to the poor, as to prevent social unrest!

This would not fix all our global problems, but it is a critical step towards reducing carbon emissions. I could think of improvements – the opportunity to send a tithe to improve lives in poorer nations, who have suffered so much at the hands of the rich. But we would have to oversee this ourselves, since our governments might devise schemes to send weapons to dictators, rather than say solar-powered lighting to the people.

The benefits are so large that one might think that our politicians would rush to support this fee and dividend scheme. Some Republicans and Democrats do, but it is a radical and egalitarian idea, so it is considered dangerous. The usual players, rich investors, don’t get special treatment – they would much prefer a carbon trading scheme that would enrich them. Politicians wouldn’t get kickbacks from special interests. The fossil fuel industry would steadily lose their massive profits (\$100 billion for the oil industry last year), so it is in their business interests to object and fund opposition.

But the Earth would rejoice, and the gratitude would resound down through the centuries for all of life on this planet, including our own descendants. This is a moral issue: justice for the Earth and her people.

So what are we waiting for? As usual, true leadership. Our leaders are waiting to see whether public opinion will support them if they act.

f) Marching toward our climate future

(October 5, 2014)

<http://rutlandherald.com/article/20141005/OPINION06/710059929>

I am writing this column in my mind on September 21 on the streets of New York City on a warm but cloudy day. We are here with more than 300,000 others for the People's Climate March. Some are a little solemn because they understand what lies ahead for the Earth. But the students are excited to march in such a magnificent and festive parade, rhythmically chanting "This is what democracy looks like".



Figure 1. More than 300,000 demonstrators, including thousands of Vermonters, make their way down Sixth Avenue in New York City during the People's Climate March on Sept. 21.

There are groups from all across society, all over America and all across the world. Marchers from the boroughs flooded by hurricane Sandy, from Bangladesh and island nations, workers displaced by globalization who want to build a renewable energy economy, groups representing Catholic, Buddhist, Protestant and Moslem traditions, and interfaith groups such as Vermont Interfaith Power and Light. They are here because they know that that we the people must speak up, or our governments will continue to hide behind the coat-tails of the wealthy interests they represent. Pretending to believe that climate change is not our responsibility; that sacrificing our children and the Earth to maintain profits makes economic sense.

Elders were marching and singing for their grand-children. Infants rode and slept in strollers: they are safe today, but it will take a very determined community effort to protect their future. Students came from many schools and colleges, including Middlebury, UVM and Burr and Burton. All these see their moral responsibility for the Earth. We may be angry at the self-centered passivity of our leaders, but we are not helpless, we are determined and resolute.

Before the collapse of the medieval period, it was heresy to question that the Earth might not be the center of the universe. Galileo had to deny what he saw through his telescope, or be burned at the stake. Now the idolatry of political and financial doctrines have made it a heresy to recognize how our fossil fuel driven economy is driving rapid climate change. Melting the icecaps will flood not just Wall Street, but millions in low-lying areas across the globe. So Climate Justice was a strong theme: we do not have the right to destroy so much of life on this Earth to protect out idols.

There were windmills and solar panels marching as a reminder that creating an energy efficient society powered by renewable energy is now a possible future that would emerge rapidly from a tax on fossil carbon.

There were dance groups and marching bands from around the world, and Vermont's Bread and Puppet Theater. A lone bugle sounded the reveille, and people cheered for every wake-up call. Mayor De Blasio, showed up, after announcing a plan for NYC to reduce greenhouse gas emissions by 80% by 2050, starting with huge efforts to improve the energy efficiency of public and private buildings. He said: "**Climate change is an existential threat to New Yorkers and our planet. Acting now is nothing short of a moral imperative.**" Energy retrofits to the Empire State Building in progress will reduce its energy consumption by 38%. All the cities and towns in Vermont should follow suit. Governor Christie stayed away, paralyzed between the recent reality of Sandy, the upcoming election and the power and stupidity of the Republican right. I saw one older women marching with a refreshing sign that said "I am a Republican that believes in climate change"!

The marchers, including 2000 Vermonters, have returned home to contrast the reality of their home towns with their vision of creating a sustainable future. This will need all of us, in every community, this decade and for decades into the future. Yes, those who see and understand must lead. Not everything we have set in progress can be undone, but our efforts now will pay off for the Earth and for those who come after us. Look at the autumn colors and remember.

g) US-China pact is a step forward

(November 30, 2014)

<http://rutlandherald.com/article/20141130/OPINION06/711309953>

As I write the week before Thanksgiving, it feels like winter has arrived, and the ground has started to freeze. News comes to us in sound-bites. This past week gave us: “Earth has warmest October on record as ocean temperatures top charts”; “The National Weather Service warned that the snow, generated by cold air blowing over the warmer Great Lakes, could eventually total 6 feet in places”; and more dramatically “Are we doomed to Arctic Winters in America?”

But on the real Earth all these sound bites are inter-woven. Super Typhoon Nuri formed over the warm waters of the Western Pacific, peaking with sustained winds around 180 miles per hour - one of the strongest tropical storms of the year. As it moved north past Japan into the Arctic, it coupled with the polar jet-stream and re-intensified into a near-record storm in the Bering Sea off Alaska. This disrupted the Arctic vortex and dragged frigid air into the US, and down across the Great Lakes, which like the Pacific are getting warmer at the end of summer. Temperatures in Chicago fell 40 degrees in 2 days, and lake effect snow storms dropped many feet of snow on parts of Wisconsin, Michigan and New York State.

But the big news this month was the agreement by the United States and China to take action on climate change. Sure it is late in the game, but for climate change which is slowly accelerating and has a very long memory, it will never be too late to reduce greenhouse gas emissions. Whatever we do now will benefit the Earth and her children long after we are gone.

The US-China agreement infuriated some politicians because they had been arguing that the US did not need to take serious action until the Chinese did – and anyway climate change was invisible if you buried your head in the sand. The Chinese had argued for years that the nations that industrialized first were responsible for most of the fossil CO₂ in the atmosphere, so they should reduce their emissions first. It was only fair to let the developing nations industrialize by burning their share of coal. In fact, we helped them do this by moving our manufacturing to China. The result has been increasing wealth for China, but catastrophic air pollution that has made living in the cities unhealthy. Lung cancer rates are soaring among non-smokers.

More broadly, China now has polluted ground water, and so much fresh water has been diverted to industry and agriculture that the northern rivers are running dry. Faced with worsening environmental problems, China has been rapidly developing solar and wind energy. So the shift from burning coal is now possible, but it will still take a decade or two. This agreement is clearly a sane move for China that will benefit both its citizens and the Earth.

Our President made this agreement, but the US is a basket case politically, and Congress will now try to destroy it. They are attacking the EPA (once championed by Republican Presidents Nixon, Reagan and George H. Bush) by describing its measures to reduce CO₂ emissions from coal-fired power plants as a ‘War on Coal’. Really! Would they like to fill our cities with smoke like China’s, and again pollute our lakes and soils with acid rain?

These same politicians say moving from fossil fuels to renewable energy will push up our utility rates and “destroy jobs”. Perhaps they should get on the train to Vermont. Here, employment is growing as we build solar farms at a fast pace, and Green Mountain Power is reducing its electricity rates this fall.

The struggle for sanity and democracy are interconnected. The Peoples Climate March took a little credit for the US-China agreement. We all need encouragement, but we should remember we are part of a web of life that is far greater than humanity. Putting the profits of the fossil fuel companies over the climate of the Earth will be a humbling disaster for the United States – as well as other countries like Canada and Australia, who are retreating from climate action.