



ConWatch

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THE ENERGY ISSUE

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From the Editor

By Molly Jones

Energy and Economics

In 2018 it's easy to take for granted lights, cars, planes, phones, television, computers, heat, and air-conditioning. We consume a tremendous amount of energy which in turn uses a tremendous amount of resources, all of which are finite. In turning our focus for this issue to the topic of energy, it quickly became apparent that energy and economics are inextricably linked. Keeping pace with the world's demand for energy and using existing resources in a sustainable way require innovation. Opportunities for investing in this type of innovation have come to the forefront as the business sector begins to embrace and invest in solutions. In this issue, our interviewees and case studies show how integral and powerful economics can be as part of conservation strategy.

Conservation Study Trip

As Sarah Young, our reporter from the Conservation Study trip to Colorado put it so well, *"We came to understand the steppe ecosystem of the Front Range and the many issues around water scarcity, energy extraction, land use, and agriculture that affect the environment there."* Sarah left one thing out of her article however, when she wrote, *"Even the flowers were local, sustainable flowers from a member's farm."* She modestly didn't mention that they were from her own farm and they were spectacular!

Be sure to check on the status of issues the GCA has been following in the [NAL Issues to Watch article](#). ■



Molly Jones, Portland Garden Club, Zone XII, is the current Editor of ConWatch

News—From the Conservation & NAL Committees *By SaSa Panarese and Hollidae Morrison*

Wouldn't it be great if we could all use renewable energy to supply electricity to our houses and electric vehicles without installing solar panels or wind turbines on our properties? Actually, there are ways that we can all do this now. I know that the amount of electricity I use will be created through renewable resources because my provider allows me to choose a green option. Perhaps your electric provider offers the same service.

All but 13 states currently have either required or voluntary renewable energy standards or goals. In Massachusetts, over 90% of the electricity is generated from fossil fuel and nuclear power resources. We belong to the Quebec Interconnection where we share one single network of power lines, part of the electric grid. Generators from all over the region feed power into this grid and energy is drawn out on an as-needed basis. The electricity that is delivered to each home is determined by which power generators are geographically closest to that property.

Yet through my electricity provider, I can purchase a 100% renewable energy product. Does that mean that all my specific electricity actually comes from renewable resources? No, the electricity that flows into my house is not affected by my choice of electric supply product. Yet, my purchase of a 100% renewable product guarantees that an amount of electricity equal to my usage will be produced by a renewable energy resource. So, I like to think that when I turn on a light or drive my electric car, it is being powered by the sun, the wind, and the water.



How does this actually work? For every one megawatt-hour unit of electricity that is generated in New England, a corresponding “certificate” is produced. Each certificate documents the characteristics of the power source, information such as air emissions, fuel source, and date the facility began operating. The Independent System Operator of New England issues and tracks these certificates through a region-wide accounting system called the Generation Information System (GIS) and it ensures that no double counting is allowed.

When a consumer chooses green power, it means that their green power provider will purchase enough renewable energy certificates to match the customer's electricity consumption.

If your electricity provider does not offer this option, you can still be 100% green by purchasing your own

Renewable Energy Certificates or RECs. By choosing green power you are ensuring that renewable electricity is being delivered to the power grid on your behalf, thus creating a cleaner, healthier energy mix.■

SaSa Panarese, *Garden Club of Milton, Zone I*

Chairman of the Conservation Committee

Hollidae Morrison, *Garden Club of Jackson, Zone IX*

Chairman of the NAL Committee



Energy: An Overview

By Kathleen Biggins

Transformation. Disruption. Revolution. These are the descriptors experts use to describe the profound challenges buffeting the energy sector, one of the largest, most lucrative segments of the world's economy. This transformation will impact how our energy is produced, how it is delivered and how we will use it. And, it is happening both at the national and international levels and is unstoppable, driven by innovation and economics.

Sources

Perhaps the most profound changes are occurring in the area of production, where new technology is uprooting the powerhouse technologies of the past. In the U.S., cheap shale-gas from fracking has led to the closure of many coal plants, driving down electricity costs and reducing carbon emissions. Natural gas is less carbon intensive than coal, though some of this reduction benefit is offset by methane leaks. In 2015, natural gas knocked "King Coal" off its pedestal as the primary fuel for the generation of electricity in the US.

Companies that underpinned our old energy systems, including natural gas companies, are also being threatened by newer technologies like solar, wind, batteries and electric vehicles. The costs of these low carbon technologies have dropped precipitously due to technological advances and economies of scale. Today, according to energy experts such as the International Energy Agency and financial experts such as Morgan Stanley, Goldman Sachs and BlackRock, these technologies are beginning to compete on economics alone, no longer dependent on subsidies or political support.

Renewables

Wind and solar today are the cheapest new forms of energy generation in many parts of the world, including in the U.S. In 2017, 50 percent of new power generation built in this country was in renewables, and for the first time, they have begun to take market share from natural gas. On the international level, two thirds of all new power generation in 2016 came from renewable energy.



Transportation

The transportation sector is changing as well. As the costs of batteries continue to plummet, an impressive 65 percent in the last five years, electric cars are becoming much more affordable. Car companies project electric vehicles will be cheaper than combustion engines to build and buy by the mid 2020s. Consumers will benefit because electric vehicles last longer and have lower maintenance costs simply because they have fewer parts. In addition, cities and transit systems are increasingly choosing electric buses and garbage trucks to save money in the long term and reduce pollution. The projected growth of electric transportation is a boon to utilities, which will benefit from the increased demand, but will pose a direct challenge to oil companies.

Another new technology, fuel cells, which create energy from a chemical reaction instead of from combustion, also hold promise in the transportation sector. Major manufacturers such as Toyota are investing heavily in this approach. The success of both the electric or fuel cell car depends in part on infrastructure for

refueling—think “gas stations” of the future—and many states are playing a key role in creating the necessary networks. This disruption in the transportation sector is of critical importance to carbon emissions control, as transportation is now the sector that emits the most greenhouse gases, for the first time surpassing the electricity generation sector in the U.S.

Distribution

Another area facing rapid change is how energy is being distributed. Utilities traditionally relied on increased energy consumption for their profits. Now they have to develop new business models based on energy conservation and flexible delivery. They are facing challenges from other providers as well—corporations are bypassing utilities and generating their own renewable energy as a way to inoculate their business from the cost fluctuations and risks of the energy market. Consumers across the country are generating their own energy from roof-top solar, and towns and communities are building microgrids, often

powered by renewable energy and batteries, to provide consistent energy to their key institutions and protect against power outages.

Innovative Technology

In addition, other new technologies, like smart thermostats, are changing how energy is delivered. With the increase in connectivity and data, energy can *flow back* from a household to the grid when needed. In addition, smart thermostats enable users to take advantage of flexible pricing. If utilities can charge more at peak times and encourage more off-peak energy use, then they can avoid building expensive plants designed just for peak periods. New blockchain technology using shared data systems that record activity between energy networks are evolving and enabling the grid to be managed more dynamically and to function more efficiently.



Smart Consumers

Last, the way we use energy is also changing. Across our economy greater efficiency enables us to save money and use less energy, while providing the added benefit of decreasing our carbon emissions. LED lighting is a wonderful example of how technology has provided us with a superior product that is less expensive and has a lower carbon footprint. Americans today use significantly less energy than in the past, and it has not negatively impacted our economy or lifestyle. In fact, energy efficiency policies positively affected our economy, creating 2.3 million jobs in 2014 according to the U.S. Department of Energy.

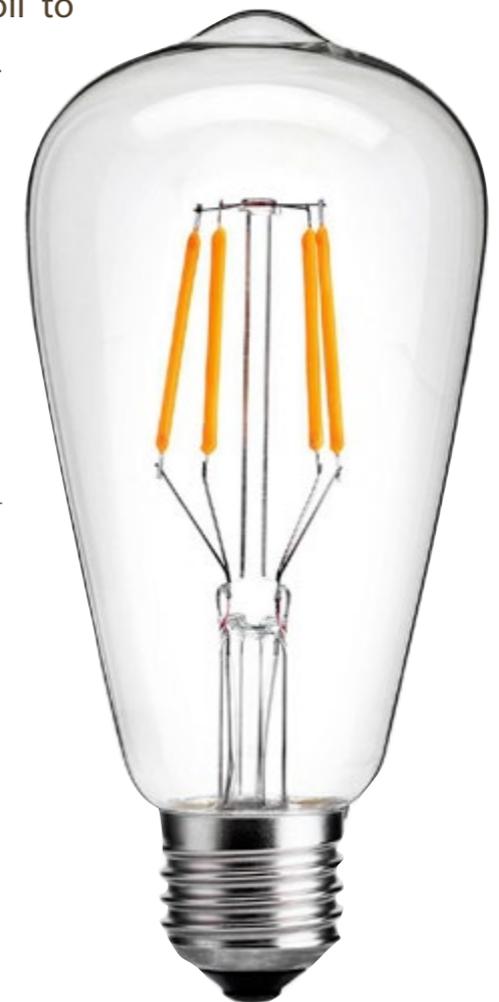
Global Impacts

As noted above, this transformation is happening on an international scale, with China, once considered a laggard in climate action, taking a leadership position in the low carbon economy. In part because of the need to address air pollution that comes with burning fossil fuels, China is aggressively investing in cleaner fuels and new technologies—including solar roads and innovative new nuclear energy sources. Egypt is building the world's largest solar facility, and Japan is testing the concept of solar energy production in space. Even Saudi Arabia, a country heavily dependent on fossil fuels, is investing in solar and wind, recognizing them as the fuels of the future.

This transformation may be a bumpy ride as in the past when we transitioned from whale oil to fossil fuels. Some jobs will be lost as old-fashioned energy sources are phased out, but there will also be great wealth and opportunity created by innovators. Our real challenge, both nationally and globally, is how quickly we can pivot to embrace the future. ■

Kathleen Biggins

*The Garden Club of Princeton, Zone IV;
Co-Founder and President of C-Change
Conversations, a non-partisan not-for-profit
created by GCA members to educate others
about the risks of climate change;
2018 Zone Conservation Award;
2016 Club Conservation Award*





Innovations are Coming

By Margaret Sieck

When you are despairing about the state of our planet and its environment, gaze thoughtfully out the window and dream, as Leonardo da Vinci would have dreamed, of what could be. And don't be surprised when you learn that the windowpane through which you're gazing is a transparent solar cell powering a smart window that controls the amount of heat and light coming into your home.

This is the kind of innovative thinking that is happening all around the globe as researchers, scientists, academics, business leaders and even artists work to find solutions to reduce human-caused climate change. *"Saving our environment will not hinge on a singular grand solution, but a constellation of technologies and policies working together,"* says Professor Yueh-Lin Loo, the Theodora D. '78 and William H. Walton III '74 Professor of Engineering at Princeton. Professor Loo is the Director of the Andlinger Center for Energy and Environment at Princeton

University and a co-founder of Andluca Technologies which arose from her decade-long research at Princeton's Organic and Polymer Electronics Laboratory.

Transparent Solar Cells

Professor Loo leads a team that is working on transparent solar cells and smart windows. *"Powered by a transparent solar cell developed in our lab that sits over the same footprint of the smart window, this technology can increase occupant comfort and decrease energy consumption associated with heating, lighting and cooling in buildings,"* says Professor Loo.

The solar field is full of other brilliant ideas as well. The Royal Melbourne Institute of Technology has developed solar paint that turns moisture into hydrogen fuel. And a group called *The Ray* in the state of Georgia has created a small section of a solar road with solar panels embedded in the road surface.



Photo: David Kelly Crow

Smart Charging Stations

Ubitricity, based in Berlin, has developed the technology to install outlets on existing light poles to transform them into charging stations for electric vehicles. This retrofit technology has been used in the U.K., France and Germany. After winning the first **NYCx Climate Action Challenge** for this breakthrough, the technology will be tested in New York, which has the goal of electrifying 20% of its vehicles by 2025. Smart charging cables will interface with utilities to charge end-users.

Green Cement

Carbon dioxide emissions can come from surprising places, such as the making of cement, which is one of the largest industries in the world.

The World Cement Association, whose corporate members account for more than one billion tons of cement annually, knew it had to do something, thus recently convened its first-ever global climate change forum. Their goals were *“to increase efforts to adopt new technologies faster and put greater focus on innovation in order to make crucial progress on reducing CO₂ emissions.”* Portland Cement, patented some 200 years ago, remains the staple of the industry but labs around the world are looking at ways to make “green cement.” Gaurav

Sant, an engineer at UCLA, is part of a team working on CO₂NCRETE to use CO₂ emissions to produce a cement-like building material. Professor Sant says the process is unique because there is no need for extra processing as it employs captured carbon emissions.

Run Your Dishwasher When the Sun Shines

Wind and solar power, classed as intermittent renewables, require both storage of energy when captured, and use when conditions are good for generating it. The idea is that it’s best to use power when it’s being generated, called **dynamic power pricing**, instead of husbanded for off-peak periods, as we did with traditional energy sources. The European Union is working hard to promote usage at off-peak times. A British start-up called Octopus Energy is working to develop software that communicates with “smart” household appliances, such as dishwashers, when energy rates are least expensive.

One ton of cement creates one ton of carbon dioxide.



Battery Storage – Think Big

The big issues with renewables such as solar and wind is their unpredictable natures, as anyone knows if they're planning a beach or sailing outing, coupled with the difficulty of storing the produced energy. So how do we capitalize on a long string of sunny days and fair winds producing lots of energy, while offsetting those gloomy, still days with little production? Many people are working on this problem and one of the most remarkable solutions being proposed is using the Hoover Dam, yes, that Hoover Dam, built in the 1930s, as a vast reservoir of excess electricity, ie a giant battery. The hope is that this can be accomplished by 2028, almost 100 years after the Dam was built. As improbable as it may seem on the face, The New York Times featured it in the business section this past July, including remarkable videos and images.

Wind Power Innovations Protect Wildlife and Save Money

On the wind-generation front, research is being done to design software that will both make wind turbines more effective and protect wildlife, such as bats

and migratory birds. The latter has known patterns and there is the hope that turbines can be temporarily shut down during peak migration periods.

As more research and innovation is done, greater efficiency is leading to improved economies in the market place. *One example* is that Block Island, the only currently operating offshore wind farm, was selling its power at \$244 per megawatt hour. Now the Vineyard Wind Farm, located off the coast of Massachusetts, and one of the nation's largest, is expected to deliver energy at \$74 per megawatt hour.

Urgency is a great motivator and these are urgent times. It is great to know that so many smart, imaginative and even quirky minds are working on our energy problems. As da Vinci said, *"I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do."* ■

Margaret Sieck

Garden Club of Princeton, Zone IV; member of C-Change Conversations Team



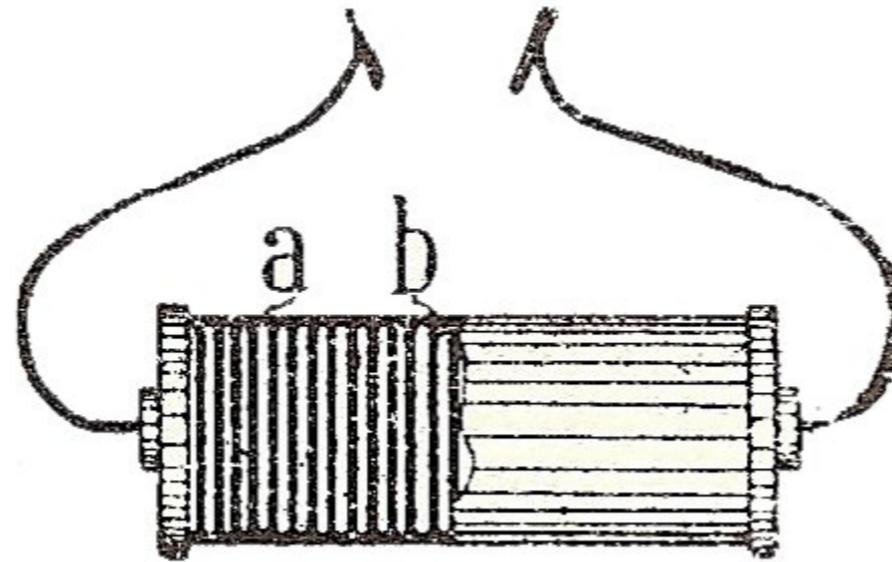
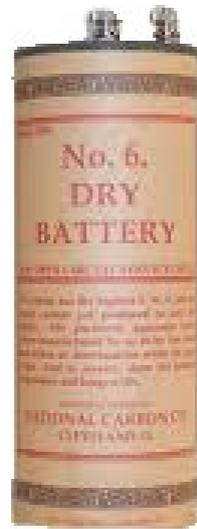
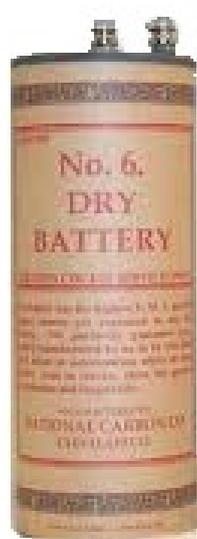
Everyday Things: Batteries

By Karen Ertl

Batteries may seem innocuous but they present real environmental problems. The EPA estimates that Americans buy nearly 3 billion non-recyclable batteries yearly. This means on average, every American discards eight batteries per year. [This site](#) has a great primer on how to choose the right batteries and understand the environmental impact of battery choices. Another site, “How Batteries Work” is an entertaining, easy-to-follow YouTube animation worth watching.

Energy storage devices, [batteries](#), have become a necessity in today’s mobile world. They usually take the form of single-use alkaline batteries which make up approximately 80% of battery manufacturing in the U.S. They are seldom

recycled, often going into the garbage or a hazardous waste landfill. Scientists have been developing various forms of batteries for over 200 years, and devices such as the [Bagdad Battery](#) may have functioned as a primitive battery in ancient times. The long-lasting alkaline battery used today didn’t become widely available until 1959. Battery development continues to inch towards the objective of creating a battery that is longer lasting, efficient, affordable, and environmentally friendly. Rechargeable batteries are recyclable and last longer. They can be restored to full power, extending their life, but every battery has a finite amount of power and they all eventually become waste.



Different materials have been tried in battery development. Lithium batteries are lightweight and stay charged for substantially longer amounts of time. This characteristic makes them very popular for today's mobile devices. They can be encased in flexible wrapping which means that these batteries can be shaped for specific purposes such as mobile phones, personal digital tools, drones and toys. Lithium batteries cannot be re-charged, however, lithium-ion batteries are rechargeable.

The word "battery" comes from the Old French word "batterie" meaning, "action of beating" referring to a group of cannons in battle. In the 1700s the term "battery" was adopted to represent multiple electrochemical cells connected together as an energy storage device.

Electric Vehicles

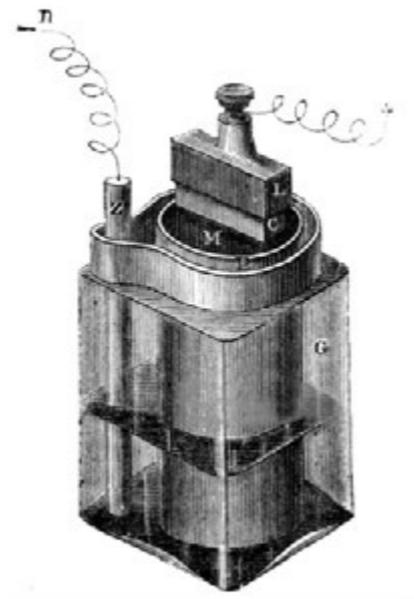
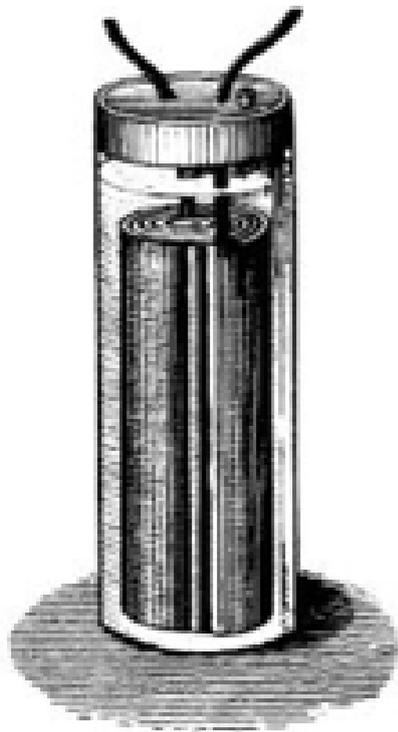
While other green energy technologies are stalled, electric vehicle battery development continues to be on track to meet sustainability expectations. Tesla, GE and others are continuing to work to develop better and cheaper batteries.

Their research promises to replace large scale lead-acid batteries that are currently used in public electric grids and to reduce the cost of electric vehicle batteries. New research continues to improve rechargeable lithium-ion batteries used in electric vehicles. Other technologies, including fuel cell batteries, thin-film polymers and batteries modified by nanotechnology, promise to expand lithium-ion battery use for electric vehicles and for other applications.

The International Energy Agency cautions that innovation in battery chemistry needed to maintain growth and progress presents supply issues with core elements that make up lithium-ion batteries, such as nickel, lithium and cobalt. China currently controls about 90% of the world's cobalt. Countries bordering both sides of the Pacific Ocean are already making plans to obtain materials needed in the production of batteries for the electric car revolution by mining the sea floor for needed supplies. Environmental Groups warn about the grave risks to deep-sea biodiversity that these mining efforts could have. Batteries continue to be part of the larger issue of sustainable energy, and using them responsibly continues to be one of modern life's conundrums. ■

BATTERY INFO, RESOURCES

- *This* is an excellent illustrated guide to different types of batteries and how to dispose of them.
- Check your local community's waste-disposal company for battery recycling and disposal guidelines. [Rechargeable Battery Recycling Corporation](#) locates stores/sites in your area that collect and recycle rechargeable batteries.
- Can't find a local recycling program? [The Big Green Box](#) is a nationwide program for companies and consumers to recycle your batteries and electronics. Your cost is as little as \$63.00 and includes a collection box, shipping, material handling and a certificate of recycling.
- This site, [Earth 911](#), has Lots of good recycling information including how to recycle computers.



BATTERY TIPS

- Do not use batteries of different brands or different ages together.
- Do not store single use batteries in temperature extremes. Don't place them in a refrigerator or freezer or car trunks or attics.
- Remove batteries from devices when they are unused for months at a time.
- Remove single-use (non-rechargeable) batteries from a device when it is plugged in to household current.
- Avoid storing batteries with metal objects, such as coins or paper clips. They may cause a short or affect the battery's polarity.
- Never burn a battery.
- Use the correct charger for the intended battery chemistry. Chemistry in batteries change and most chargers are meant to serve a specific chemistry and battery type.
- Do not use fast charge when the battery is cold or hot. Charge batteries at moderate temperatures.
- Batteries are not toys. Keep loose batteries stored safely to prevent access by small children. If you suspect a child has ingested a battery, go to the hospital immediately. Do not allow the child to eat and drink before medical attention.
- Damage may occur if lithium batteries are used in devices for which they were not intended. There is a higher risk of "thermal run-away" which can cause fires as seen recently in some cell phones and toys.

Karen Ertl

Philipstown Garden Club, Zone III

Current Subject VC–Climate Change, Conservation and NAL Committees

GLOSSARY OF BATTERY TERMS

ALKALINE is a conducting electrolyte, a basic ionic salt from an alkali metal.

ALKALINE BATTERIES use a reaction between zinc and magnesium dioxide to produce a flow of electrons. They are excellent back-up batteries and are good in emergency devices. 80% of the batteries sold in the US are alkaline batteries and they come in grades: premium, standard, economy. They are generally disposed of in landfills since their materials offer little value for recycling.

BATTERY POLES come in pairs: the Cathode (-) is the part of the battery which supplies electrons and the Anode (+) is the pole that accepts the electrons until the battery life expires. When batteries “die”, it is because the electrons can no longer flow between poles because they have been evenly distributed.

DRY CELL an electric cell in which the electrolyte is stored in a paste rather than a liquid.

ELECTROLYTE is an electrically conducting substance that produces a flow of electrons (electricity) when dissolved in a polar solvent, such as water.

ELECTROLYTE BALANCE is the difference in electrolyte concentration which is vital to the creation of an electrical discharge and thus electricity. A battery’s “life” is predicted by its energy density; the greater the density, the greater the battery life.

LEAD-ACID BATTERY invented in 1859–Gaston Plante’, is one of the oldest type of rechargeable battery despite a low energy density. It is a wet cell, most commonly used in traditional car batteries. Lead acid batteries are very dependable as a starter and standby battery and are the most cost-effective at this time. These batteries must be recycled because, the electrolyte is a strong corrosive chemical.

LITHIUM is a highly reactive metallic element, whose properties allow batteries to store a significant amount of energy. They are rechargeable, which extends the battery life. This larger amount of energy potential does not permit them to be used in devices for which they were not intended. They are susceptible to “thermal run-away”. Lithium batteries generally go to landfills since it is not cost effective to recycle their materials.

LITHIUM ION BATTERIES are the most common home electronics battery for portable devices because they are rechargeable. They have a high charge density (long life) but are more expensive per unit than other battery types. Lithium ion & cobalt magnesium batteries have a low toxicity and can be disposed of in landfills in low quantities. They should be recycled because their materials have recycling value. The lithium-ion family receives the most attention and is gradually replacing nickel-based predecessors that dominated the battery world until the 1990s. Cobalt batteries are used in electric vehicles.

NICKEL METAL HYDRIDE BATTERIES (NiMH) is the electrolyte that once replaced nickel cadmium (NiCd) in portable batteries. However, they are becoming obsolete. They are durable and generally used in older power tools. NiMH batteries can be disposed of in small quantities. NiCd batteries should be recycled because they contain cadmium which is a heavy metal that can contaminate landfills.

RECHARGEABLE BATTERIES are made from lead-acid, nickel-cadmium (NiCd), nickel-metal hydride (NiMH), lithium ion (Li-ion), and lithium-ion polymer (Li-ion polymer). They can be recharged to full power for a limited amount of times.

ZINC-CARBON BATTERY is the traditional dry cell battery that delivers only small amounts of direct current flow. ■



Sustainable Investing

By Laura Nash

Putting Your Money Where Your Values Are

Sustainable Investing (SI) is one of the fastest growing areas in investment management today. SI investors with a long-term vision for society and the environment are looking to align their investments and values. As they attempt to clarify their investment objectives and strategies, a confusion of terms and acronyms can be overwhelming. However, as sustainable investing has become more visible, there is an increasing movement to establish standards and definitions.

While many terms are new and still being defined, the desire to link financial investment to values is not new. For example, in previous centuries, Quakers excluded investments in the slave trade. In the '80s the first mutual fund was established to avoid companies doing business in apartheid-era South Africa.

Socially Responsible Investing (SRI) has been the broadest and historically most used term and is still used by many boards and funds as a factor in evaluating companies for their social and environmental impact.

SRI was typically associated with exclusionary screening, the practice of generating a list of “sin stocks” and industries to exclude from a portfolio. Looking ahead, SRI is placing increasing emphasis on ranking and supporting companies with good environmental report cards. Exclusionary screening is also becoming more future-oriented, as investors weigh the long-term financial risks from future lawsuits and regulatory fines over past environmental impacts, especially in an era of climate change.

Environmental, Social and Governance (ESG) focuses on three areas of evaluation pertaining to sustainability.

- **Environmental:** Emissions, waste and resource conservation
- **Social:** Diversity, workplace safety, product and manufacturing integrity, and economic and community impact
- **Governance:** Board and executive diversity, corporate structure, accounting transparency, executive compensation

ESG is an inclusionary or “positive” screen, investing in companies that *actively* support the values of investors. Oftentimes the best actors are selected from each industry group. Some strategies allow for including “the best of the bad.” For example, one of the oldest values-based funds now allows some alcohol companies on its acceptable list because they have a strong record on workforce issues and environmental sensitivity. Rather than passively screening investments, ESG is a more active exploration into investment opportunities where creating meaningful social or environmental outcomes is an integral motivation both for companies and investors.



While the term ESG is commonly accepted, the emphasis and mix of E, S and G can vary widely between companies and investment offerings, making comparisons and evaluations difficult.

While ESG evaluates companies across a wide range of issues, impact investing focuses on a particular niche.

Impact Investing is an investment approach that targets and supports businesses whose operations, products and systems are aimed at making a positive impact on a social value shared by the investor. Typically activity in this area comes from larger investors with access to private equity investments, venture capital and other angel investment pools. Funds supporting renewable energy development in wind, solar or hydroelectric are examples.

Mission and Program Related Investing (MRI) and (PRI) are terms used by non-profit institutions and philanthropies to link their investments to the goals of their organization, using investments as a strategy rather than giving outright grants.

Shareholder Activism uses voting rights of shareholders to influence corporate behavior. Shareholder activists seek to directly influence corporate behavior by initiating conversations with corporate management on issues of concern, along with submitting and voting proxy resolutions. The more shares owned, the more likely shareholders are able to influence company behavior.

Is it Making a Difference? Yes!

Recently the new CEO of a major oil company announced his intention to personally engage with investors on climate risk and for the first time is allowing large shareholders to meet with board directors.

Another oil company announced that for the first time it will be measuring and reporting on its methane release and also its efforts to contain methane.

A recent industry analysis found that the average S&P 500 firm cites ESG-related terms when reporting the company’s financial results nearly twice as often as a decade ago. ■

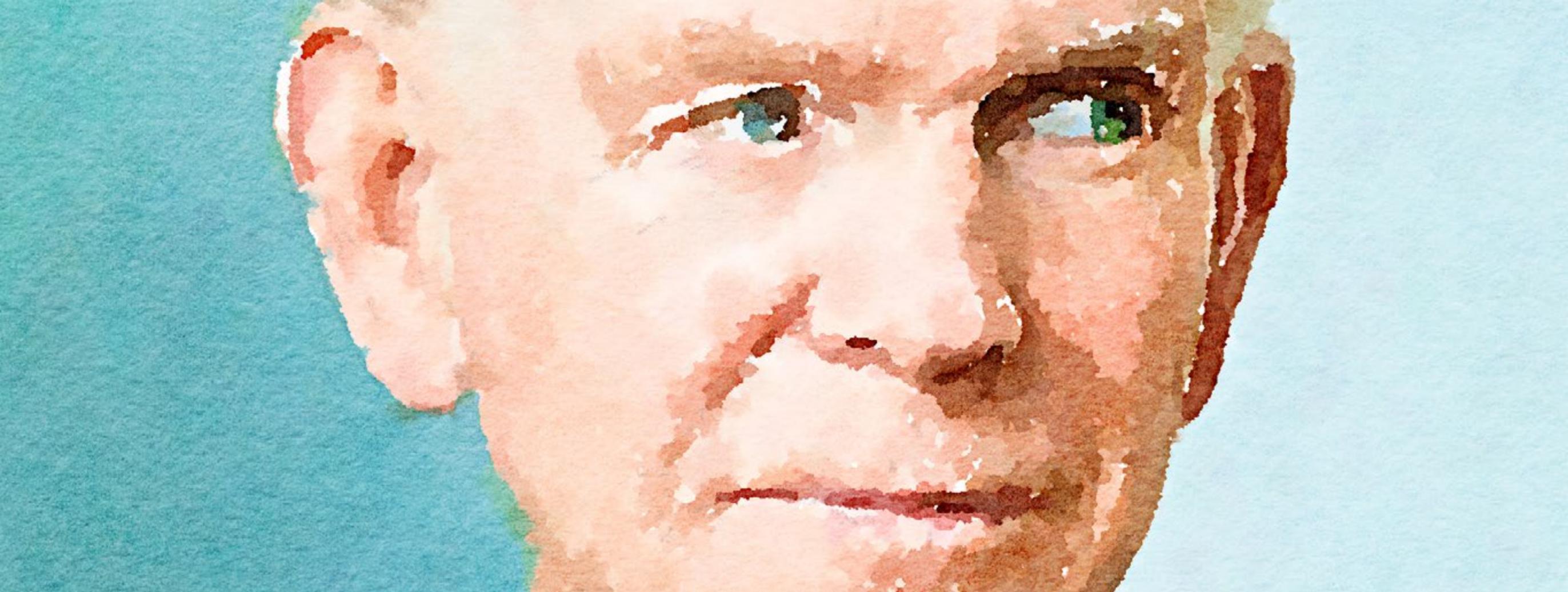
For more details, see Laura’s VC Report, [*Investing in the Environment*](#).

Laura Nash

Cambridge Plant & Garden Club, Zone I

Conservation and NAL Vice Chairman, Transportation and Infrastructure

Laura Nash is a former faculty of Harvard Business School and Boston University and past president of the Society for Business Ethics. She has covered business ethics/ social responsibility issues since 1979. In her personal portfolio she has adopted several of the strategies described here.



An Interview With Jeremy Grantham

by *Laura Nash*

Jeremy Grantham is Co-Founder and Chairman of Grantham Mayo von Otterloo, LLC, (GMO), a \$71 billion investment management firm in Boston that launched a Climate Action Fund in 2017. Jeremy and his wife Hanne are leading environmental philanthropists in the US and the UK, funding research and programs especially on environmental science and communication through the *Grantham Foundation for the Protection of the Environment*. Grantham reports that 98% of his net worth is invested in or committed to environmental foundations.

Mr. Grantham was a keynote speaker at the 2018 GCA NAL conference, and more recently at the 2018 Morningstar conference. In early August GCA member, Laura Nash, sat down with him to discuss his view on sustainable investing and

particularly climate-related investments. A week later GMO released Grantham's 35-page report, "The Race of our Lives Revisited." It's for anyone serious about staying up to date on climate change and economics.

Q: At the GCA's NAL meeting last February, you presented compelling new evidence about the effects of climate change, especially on soil depletion and warming trends. Anything to add?

JG: *Well, the cover of last week's **Economist** put the seal on it: climate change and global warming have come of age. The latest forest fires are only one sign. Even if we stopped all carbon emission today we'd still not make the Paris Accord's target of staying under 2° C increase in global temperature. The world is losing*

1% of its collective soil and ½% of arable land a year. We only have 30–70 good agricultural producing years left.

Q: How does this reality affect your investment philosophy?

JG: I personally think there are many good arguments for why environmentally conscious companies are probably better managed and better investment risks for the future, but the main point of my thinking is that climate is the one thing no investor can afford to ignore. Transitional industrial progress will happen more quickly than we realize, but it needs massive investment.

Q: What about negative screening versus positive screening?

JG: They're not necessarily contradictory. Negative is fine: take out the whole group cleanly and keep it out. A polluter who's covered up health effects and likely to face large litigation costs is probably not something you want to be in anyway. Wind-generated power is already outvaluing coal.

I believe you have to punish the wrongdoers. Some well-known and widely held companies have knowingly engaged in harmful practices for decades and deliberately silenced the scientists and covered up their own awareness of doing harm. It's reckless endangerment in my opinion and illegal to cover up a product's health risks. What's to stop them from misbehavior unless you penalize them?

The bad news is, if we don't get it right and decarbonize the entire industrial system, not just energy—transportation, agriculture, land development—the rest of our conservation work won't matter, nor will traditional companies. We need to create a force for colossal economic investment in the environment.

ESG is a way to make a proactive effort to be involved in climate that involves positive screening. We are looking at an explosion of investment opportunities as the world transitions to cleaner energy. And most investors have not kept up

with the changes. Almost all do not understand the full scale of climate change—perhaps not surprisingly since information is being suppressed. How can that not affect the cost of a stock?

You're dealing with a rapidly, unevenly changing marketplace on an enormous scale, much of it currently underpriced. That's attractive. There are many micro-specialists in agriculture, for example, developing new products and practices that fly in the face of the large oligopoly that has dictated the spread of monoculture crops, C4 crops and weeds. These advances are opportunities for investors. It's important to get involved in some of these paradigm-changing and life-enhancing new agricultural ideas.

Also, it's a sure thing that the rate of technological change will happen more quickly than we think. Five years ago I said it would take 9–12 years for wind and solar to catch hold, and five years later we're already there.

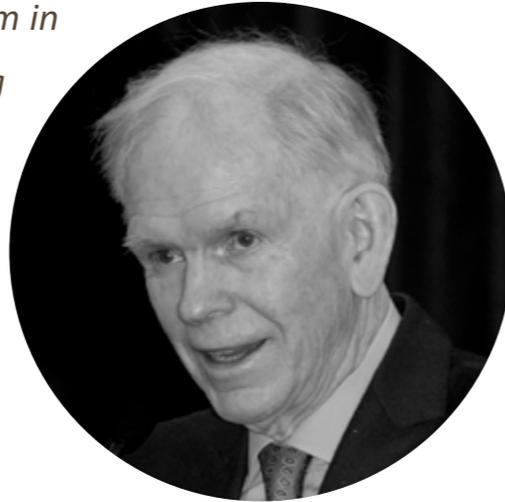
Q: I can see where the largest investors can access these companies and make a huge difference in share of ownership votes and proxy filings; and they can fund research to identify new solutions. But isn't it harder for the small investor to get involved?

JG: It is, no doubt. But investing in one of the many green funds in your personal account or attaching yourself to one of the many green non-profit organizations is a good way to start. Also, for your own portfolio you can copy the green foundations and pension funds that list their holdings.

Q: Not surprising that you might invest in green agriculture, but are there any surprises in your climate-related holdings?

JG: One very big difference is that we are willing to fund interim steps even if it looks bad. Take copper in which we are heavily invested. It's as dirty as you can get, but it will be essential in clean energy, new grids, etc. There's no time to mess

around with perfection. We have to outperform in our fund to show that climate change investing works. And more importantly, we have to win this climate battle at almost any cost in our global society. That means triage, tricks, but also not getting ahead of ourselves on issues that are vague when there's so much right in front of us to solve with funding.



Q: Where do you stand on the common assumption that climate investing to the exclusion of oil and gas will penalize performance?

JG: *It's an urban legend and most investment committees still believe it in their hearts. We just conducted a massive study of how portfolios performed when you eliminated oil and gas stocks (and also tested the elimination of other sectors.) We looked at various time periods of investment from three years to ninety years, through various business cycles. Portfolios excluding oil and gas on average did not suffer. Their exclusion or the exclusion of any of the other sector groups is just as likely to help or hurt, and critically, the differences are very very small.*

Q: What about shareholder activism? Effective?

JG: *It can be. But proxies are a limited means. We need loud propaganda. No point in having a green portfolio if you don't make it public and organize the action. The oligopolies don't want organized opposition. Interestingly the colleges don't lead on this. Edinburgh is one of the few that's recently stepped up to realizing a link between its research and its endowment. The Garden Club of America is a thoughtful and progressive organization. If it does green investing, people will notice.*

I'm also amazed at how the general media fails to communicate with the scientists, and vice versa. Our foundation has just pledged \$2.5 million in matching grants for environmental reporting.

Q: Anything else?

JG: *It's not part of your questions, but obviously population is our other greatest threat. We focus on climate but if the world population continues to grow at the current rate, we won't be able to save large parts of the world from starvation. We've just invested in a small company that will look at modifying seed to be more productive and drought tolerant for Africa and elsewhere. Its top personnel are all surprisingly senior people in their field. The company is growing like a weed, excuse the pun. ■*

Laura Nash

Cambridge Plant & Garden Club, Zone I

Conservation and NAL Vice Chairman, Transportation and Infrastructure





An Interview with Peter Nadosy

By Linda Fraser

Peter Nadosy serves as Managing Partner of East End Advisors LLC after having served as Senior Advisor at Morgan Stanley until his retirement. Prior to that, he served as President and Vice Chairman at Morgan Stanley Asset Management. He has served as the Director of the Harvard Management Company, Inc., is a trustee of the Ford Foundation, the Director of the **Doris Duke Foundation**, Trustee Emeritus for the Brooks School, Director of the John Simon Guggenheim Memorial Foundation, and a member of the Board of Trustees for Central European Education. He is also a member of the Amherst College Investment Committee and a Trustee Emeritus, and he has served on

the boards of other nonprofit organizations, including the World Wildlife Fund, the Summit Foundation, and The Brearley School.

Given his experience in overseeing and advising foundations and non-profit institutions on their investment strategies, Peter seemed like the perfect person to help me understand the world of impact investing for non-profit institutions.

The following is from a recent conversation with Peter, who chairs the Ford Foundation's Investment Committee, soon after he was featured in the



Ford Foundation Headquarters

April 13, 2018, New York Times article announcing the Foundation's decision to commit \$1 billion of its \$12 billion-plus endowment to investments that "earn not only attractive financial returns but concrete social returns as well."

LF: *Some might say that The Ford Foundation's announcement was a significant departure from the usual Wall Street investment strategies. How did they come to this decision? What did it mean to the mission of the Foundation?*

Foundations have discretion on where funds are allocated, donated, etc. They aren't typically set up with the sole purpose of funding an institution. For example, if a family creates a foundation, they could explicitly say in their policy statement that they are willing to give up some financial return in order to increase social return. Since Impact Investing is quantifiable and direct, this approach has worked best for the Ford Foundation whose mission is "social justice" and to "change people's lives" because they can focus on "low income housing usually combined with some social services" and "financial inclusion or

access to services to help people manage their finances. Impact or mission related investing makes sense for larger foundations with lots of money."

PN: *"At the Ford Foundation about ten members of the investment group spent probably 1000 man hours coming to terms with what impact investing really was and was not, and how that tied into the foundation's mission."*

The Foundation has also built safeguards into their impact investment strategy, phasing their investment over a period of time, to allow for analysis and change, should it be needed. They also evaluated ESG investing versus impact investing. ESG focuses on corporate behavior and investments are allocated to the best actors vs. specific projects. He is not a fan of ESG investing as a strategy for a foundation with a specific mission or for an endowment.

"Our final take was to concentrate on investments that would earn some financial return, probably less than what we expected from our core investments, say 2–3% annual return, and would have a direct impact on individual's lives."

LF: How might nonprofits like the GCA and others translate your study?

PN: "Endowments are created for the sole purpose of funding a particular institution. If the trustees of an endowment went into impact investing where the risk-return profile is less attractive than traditional investments, it may be a breach of their fiduciary duty which is to earn enough to achieve at least a real inflation-adjusted rate of return after distributions."

"One of the biggest challenges is to sort through a lot of offerings by the financial community that have mission-related labels but are by and large just marketing schemes. Individual investments in each, for us (Ford Foundation), would probably start at the \$10 million level. In other words impact or mission related investing makes sense for large foundations with lots of money."



clean tech projects, which quite a few years ago were very much in the limelight, so far have had very poor return records, especially overseas."

LF: What do you see as the future for impact investing?

PN: "I'm very hopeful that more foundations accepting a marginally lower rate of return on their funds will get involved in mission related investing to complement their specific programs. For endowment funds, the field is much more difficult as their focus has to be earning enough to achieve at least a real inflation adjusted rate of return after distributions to their institutions."

Economics runs in the family. Peter's wife, Pat, is a former foreign exchange options trader, who in her second career is a highly respected botanist. She is a member of the Southampton Garden Club and is keenly aware of the significance of horticulture and plant life to the health of individuals and the planet. ■

LF: What if nonprofits were to look at impact investing as it relates to their mission statements?

PN: "At another foundation, we are beginning to look at investments in the conservation area. At the first level these are land preservation opportunities. **Carbon capture** initiatives are now coming to the fore and promise to be even more exciting. Changing farming practices hold great promise. I'm a great proponent of some form of carbon tax that could really have a positive impact on the environment. Unfortunately, in this area neither political party wants to go beyond lip service. Renewable energy projects also offer some attractive opportunities. Unfortunately,

Linda Fraser

Southampton Garden Club, Zone III
Chairman, NAL 2015–17
Currently Director, Zone III; Executive Board Liason for Conservation;
Zone Director serving on the Executive Board, Finance Committee.





Gardy Bloemers



Gigi Goldman



Winsome McIntosh

Impact Investing: Case Studies

By Sophie Glovier

Garden Club of America members have a long history of finding innovative ways to restore, improve and protect the quality of the environment. This article profiles three members who have incorporated their commitment to environmental issues into their approach to investing. While the investment tools that they use are different, these members share a passion for environmental issues and the intention to harness the power of business to solve the difficult challenges that face our natural world.

Gardy Bloemers, Garden Club of Albemarle

"If I was going to talk the talk, I needed to walk the walk." Concerned about issues of climate change and clean water, Bloemers set out to learn how she could use her personal investments to make a positive difference on the issues she cared about. An important resource for her was The Forum for Sustainable and Responsible Investment, a nonprofit which serves as a hub for sustainable, responsible and impact investing in the United States. The *"learn"* section of their website includes *"SRI Basics"*, detailed information on the performance record of impact investments, online publications like, *"Investing to Curb*

Climate Change" and even an online course, *"The Fundamentals of Sustainable and Impact Investing"*. Gardy found that impact investing has changed over the years. Early approaches focused on screening out companies that did not match investors' values. This strategy sometimes resulted in lower returns as sectors avoided performed well compared to the rest of the market. Newer approaches focus on *"ESG"* investing, looking for companies who perform well on a variety of metrics that assess social and environmental citizenship and have excellent governance. Recent studies have shown that this approach can provide competitive returns and also have lower levels of risk.

When considering adding impact investing to a portfolio, Gardy feels it is valuable to, *"think about what is important to you and what values you would like to see reflected in your portfolio."* There are a wide range of offerings focusing on issues from renewable energy to affordable housing and gender equity. Given the increasing interest in impact investing, most firms have an expert in this area who can help you to learn more. *"It doesn't have to be black and white,"* Gardy says, *"you can just take a small step."* She gives an example of

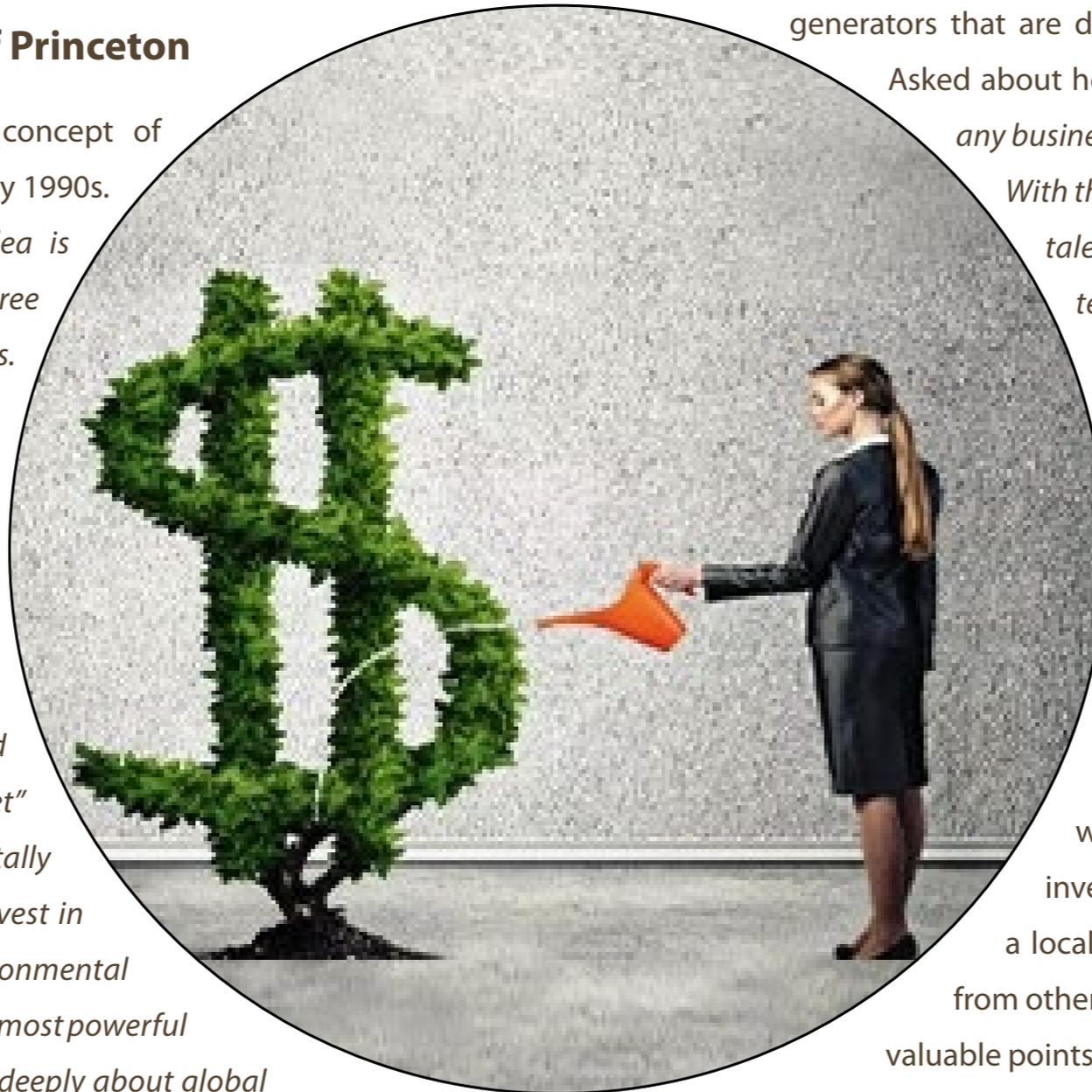
a friend's daughter who didn't see an impact investment offering in the options in her company's 401K plan. She met with her human resources department and told them why having such an option was important to her and many in her generation. As a result, the company added an appropriate option. Gardy described the woman's pleasure at knowing that her money was invested with companies that were aligned with her values.

Gigi Goldman, Garden Club of Princeton

Gigi's investing is influenced by the concept of "triple bottom line" developed in the early 1990s.

According to the *Economist*, "...the idea is that companies should be preparing three different (and quite separate) bottom lines.

One is the traditional measure of corporate profit—the "bottom line" of the profit and loss account. The second is the bottom line of a company's "people account"—a measure in some shape or form of how socially responsible an organization has been throughout its operations. The third is the bottom line of the company's "planet" account—a measure of how environmentally responsible it has been." Gigi writes, "I invest in companies that embrace social and environmental responsibility because our world needs the most powerful and best resourced organizations to care deeply about global challenges we all face. I believe these kinds of companies will garner the admiration and loyalty of their employees, customers and partners which is good business practice any way you look at it."



Gigi has also become a member of a group called Investor's Circle Social Venture Network, an early stage impact investing network of investors, foundations and venture firms that fund enterprises dedicated to health, education, community and the environment. One company in which she has invested is Gridless Power, which has developed a user-friendly, high capacity, portable battery system fueled by solar energy to replace the incumbent solution of diesel operated generators that are dirty, noisy and in some cases dangerous.

Asked about her goals for this investment she says, "Like any business I invest in, I want Gridless to be profitable.

With that I know they can attract and sustain good talent to build the company and keep up with technological advances. I see them expanding across industry sectors and geographies including the developing world where distributed renewable energy is the only solution that makes sense for over 1 billion people who suffer from energy deprivation and inequality."

Similar to Gardy, Gigi feels it's important to educate yourself, being clear what values you care about in setting your investment objectives. Gigi adds that joining a local investment group is a great way to learn from others who come to the table with different and valuable points of view. Impact Investing is a hot topic and there are many books and online resources on the subject.



Photo by the Boat Company

Winsome McIntosh, Georgetown Garden Club

Winsome McIntosh* and her family's McIntosh Foundation have been taking a creative approach to philanthropy for over 40 years, seeking to apply business principles to measurably improve social and environmental problems via systemic change before impact investing was a mainstream idea. Winsome's husband Michael's family business was The Great Atlantic & Pacific Tea Company (A&P), and during a grueling summer job on the company's fishing boats, he fell in love with the Alaskan wilderness. He took the helm of the McIntosh Foundation in the early 1970s and built it into one of the most respected private foundations focusing on environmentalism and public interest law. As a strategy to stop the clear cutting of the Tongass National Forest in Alaska, the world's largest remaining temperate rainforest, funds from the foundation were used to establish [The Boat Company](#), a nonprofit company that uses ecotourism both to raise awareness of this special part of the world and to demonstrate to the local community that the development of a tourism industry was a feasible and profitable alternative to logging. The McIntosh Foundation's investment is being paid back over time from the company's profits. This type of investment by a foundation is called a Program Related Investment or "PRI". According to the Foundation Center, *"These are investments made by*

foundations to support charitable activities that involve the potential return of capital within an established time frame. PRIs include financing methods such as loans, loan guarantees, linked deposits, and even equity investments in charitable organizations or in commercial ventures for charitable purposes". IRS rules now allow foundations to make mission-related investments in for-profit companies. Winsome and her family are learning more about this area and plan to allocate a portion of their grant money to testing investments, potentially focusing on forestry issues, beginning next year. Winsome suggests that others involved with foundations learn about PRIs, which needn't be made in large amounts.

A good resource for anyone interested in learning more is the Impact Finance Center. Many GCA members use their environmentally conscious investments as another way to make a difference. It boils down to the three Ps; Profit, People, and Planet. ■

*Winsome was Chairman of the NAL Committee, 1983-87, and recipient of the Margaret Douglas Medal in 1989.

Sophie Glovier

Garden Club of Princeton, Zone IV; Subject VC–Energy Sources for NAL and Conservation Committees; member of C-Change Conversations Team



Conservation Study Trip: Boulder, Colorado

By Sarah Young

Conservation and NAL Committee members converged from across the US in September in Boulder, Colorado for our annual Conservation Study Trip (CST) hosted by the Garden Club of Denver.

Members came to immerse themselves in a new and different place, to experience the unique version of the West that is Colorado's Front Range. They came to sample the legendary farm-to-table cuisine of the Boulder Valley, to stretch their endurance as they hiked the golden foothills of the Flatirons, and most of all, they came to stretch their minds as they learned about the unique conservation issues in Colorado and the West.

Participants stayed in vintage cottages built circa 1920, at the Chautauqua National Historic Landmark. The National Park-like atmosphere and the rustic but comfortable cottages set the stage for a week of clean mountain air and easy camaraderie.

SaSa Panarese and Hollidae Morrison did a masterful job of fitting all the committee work and votes into one day of meetings in the old Chautauqua Community House so the rest of our time was devoted to learning, eating, hiking, conversing, more eating, and seeing the many sides of Boulder County and Denver.

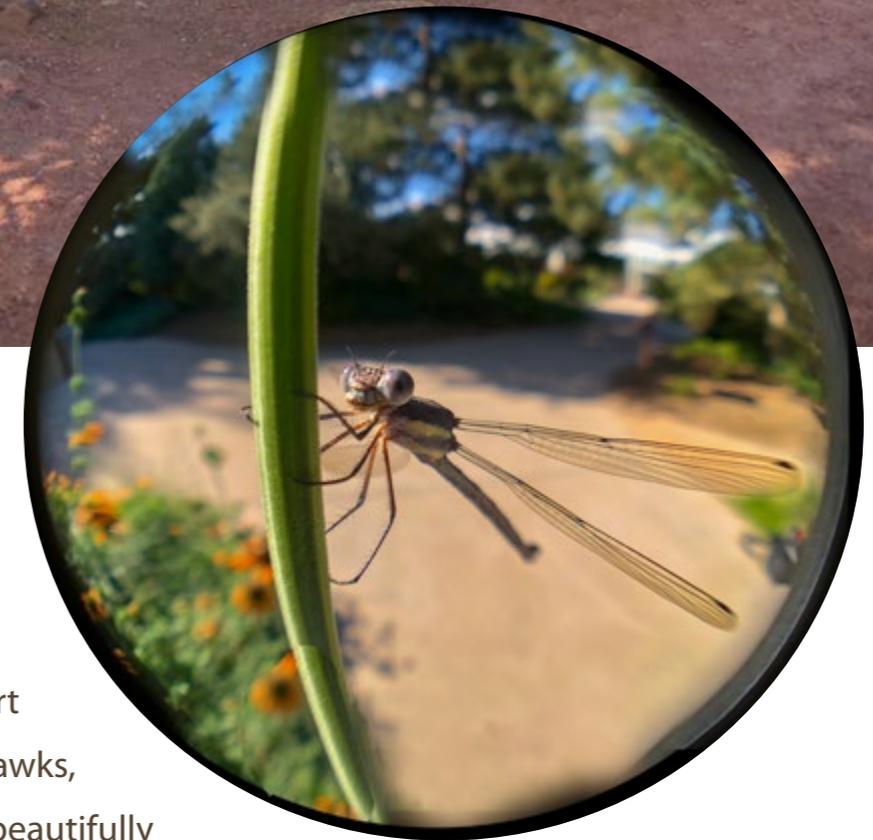


The Speakers Committee dedicated many hours and much effort to assembling an outstanding and diverse group of speakers. We came to understand the steppe ecosystem of the Front Range and the many issues around water scarcity, energy extraction, land use, and agriculture that affect the environment there.

Wednesday, we were in Boulder with speakers at the University of Colorado Museum of Natural History and the National Center for Atmospheric Research (NCAR). Morning speakers talked about protecting grasslands from development through conservation easements; eccentricities of water law with the many competing demands for Rocky Mountain snow melt water; and pollinators of the Front Range. In the afternoon, we toured NCAR, learning about the history of the I. M. Pei-designed facility and hiked while we learned about the Blue Line

that limits City of Boulder development into the foothills.

Our final day was spent in Denver. We saw short grass prairie, bison, hawks, and other wildlife at the beautifully restored Rocky Mountain Arsenal Wildlife Refuge, which had been a manufacturing site for chemical weapons during World War II. Our speakers at the Refuge talked about the unique and subtle beauty of the steppe ecosystem and about controversies surrounding energy extraction and water usage on the Front Range. They also encouraged solving



political problems in Colorado by creatively brainstorming in a non-partisan way to find solutions to conservation challenges. Lively questions and discussions followed each speaker and we all learned a lot, even the locals!

The final bus stop was Denver Botanic Gardens (DBG), the most enchanting and interesting venue for all of us plant enthusiasts. We heard from the brilliant horticulturists at DBG about their quest to find beautiful and useful plants indigenous to all the steppe areas of the world and bring them into cultivation so that we can have appropriate, colorful and verdant landscapes in our semi-arid climate without wasting our most limited resource on the steppe, water. We toured the gardens with our speakers and learned about the amazing Water-Smart Garden and the Steppe Garden as well as DBG's new Science Pyramid.

Deborah Foy, a Boulder "Foodie" with deep ties to the Boulder County Farmers' Market and local farm-to-table restaurants and farms, planned an extensive culinary experience for us all week. Our meals ranged from a perfectly seasoned and delicious vegetarian meal at the Dushanbe Tea House to a magical farm dinner evening at Pastures of Plenty Farm with distinctive and wholesome sack lunches in between. Our final meal in the GCD members' homes was the highlight of our eating experience. The welcoming warmth and comfort of the historic Denver homes and the hospitality of the GCD hostesses made their delicious food even more delightful.

Committee co-chairs Cindy Scott and Deborah Foy, along with their planning committee from both the Garden Club of Denver and the Broadmoor Garden Club in Colorado Springs, seemed to have considered every detail in the planning of this event. Meals were served with reusable or compostable plates and utensils. Reusable water bottles were provided instead of plastic water bottles. Plastic was avoided at every turn. Food was organic whenever possible. Even the flowers were local, sustainable flowers from a member's farm.

It was a pleasure to know that we were not polluting this beautiful mountain environment.

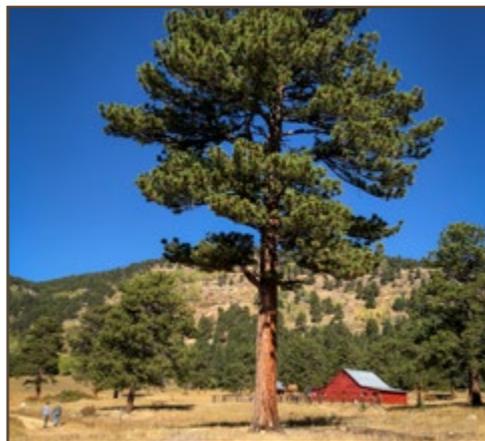
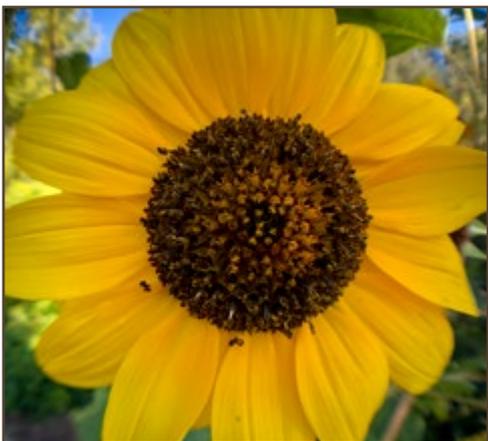
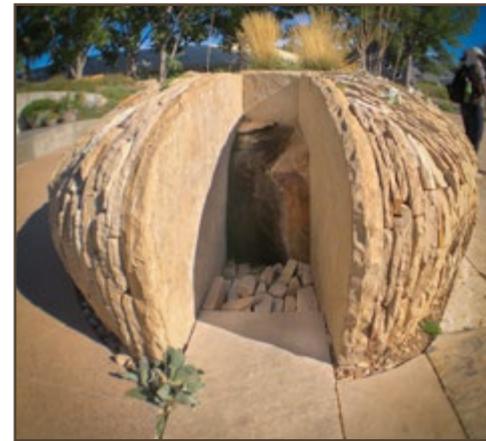
The high decibel level of conversation and laughter on the bus is always an indication of the best part of Conservation Study Trips. Happy reunions with old friends and enthusiastic welcoming of new friends with shared passions for the environment made for a joyful atmosphere as we made our way together around the Boulder Valley and Denver. The inevitable conversations about our children and grandchildren reminded us of why we work for the environment and for future generations. ■

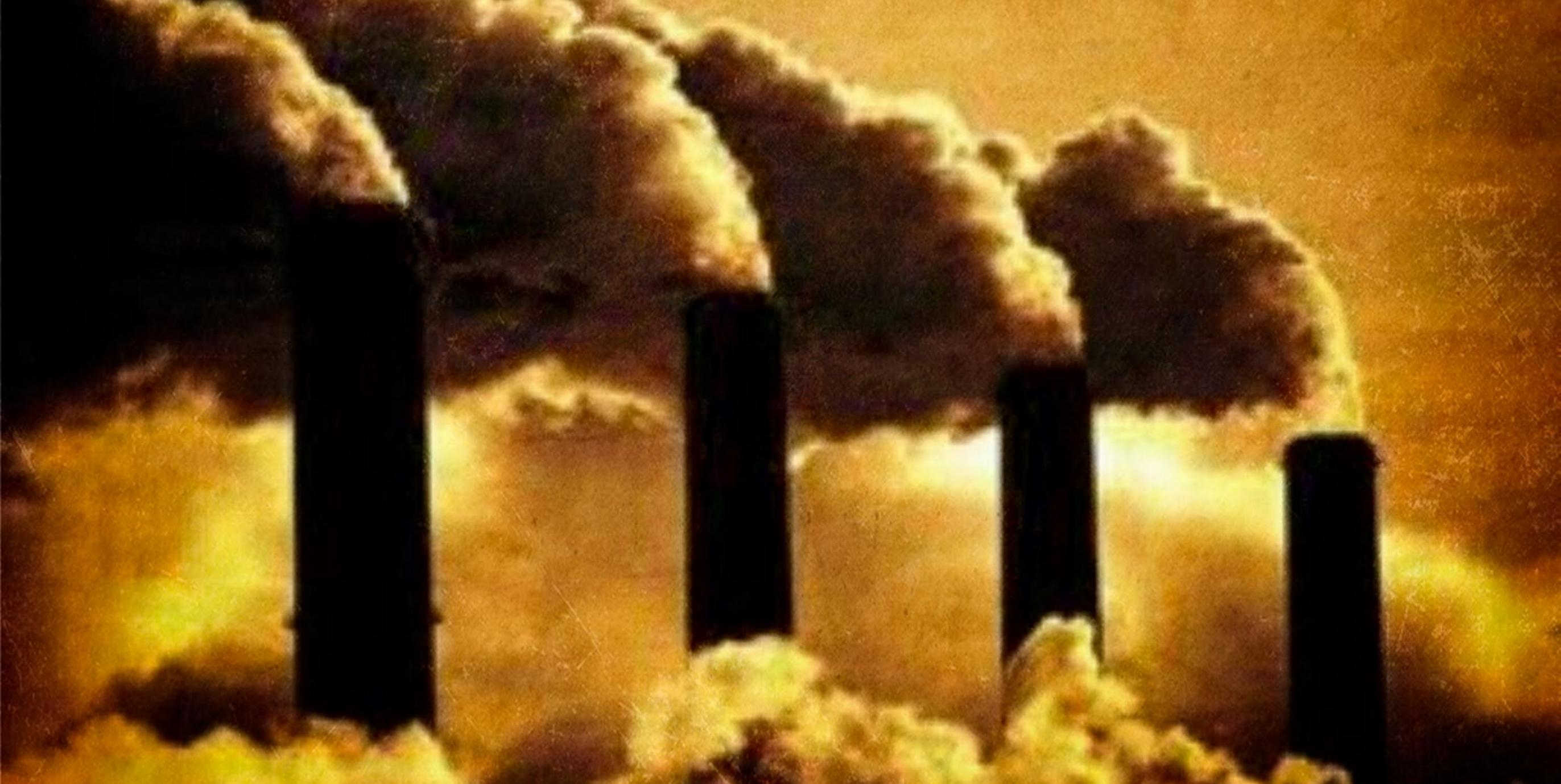
Sarah Young

Broadmoor Garden Club and Denver Garden Club, Zone XII

Current member of the Boulder CST Planning Committee







NAL Issues to Watch: Clean Air

By Mary Kelberg and Hannah Sistare Clark

Clean Air Update

Dense, visible smog in many American cities helped to prompt passage of the 1970 Clean Air Act. The Act established the Environmental Protection Agency (EPA) to consolidate federal environmental research, set emission standards, monitor air quality and enforce regulations.

The 1970 Clean Air Act set limits on six common pollutants: particulate matter, ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide and lead. Later revisions to the Act added carbon dioxide and methane, greenhouse gases that

contribute to climate change. In addition, Congress authorized the EPA to issue national standards limiting air pollution from new industrial sources.

Subsequent revisions to the Act in 1977 and 1990 sought to improve its effectiveness and to target newly recognized air pollution problems such as acid rain and damage to the ozone layer, both of which have been eliminated as a result of EPA efforts.

The Clean Power Plan (CPP)

The United States created the CPP to establish guidelines for limiting greenhouse gas emissions in America as part of the United Nations Conference on Climate Change, held in Paris in 2015. The Paris Agreement is voluntary and does not carry the force of international law. It has been signed by every nation of the world and its goal is to limit carbon dioxide emissions. The U.S. agreed to limit carbon dioxide emissions to 32% below 2005 levels by 2030.

In 2015, the EPA issued the 2015 Rule, pursuant to the Clean Power Plan (CPP). The Rule sought to reduce, and for the first time, set limits on carbon dioxide emissions from electrical power generation, reduce emissions from coal-burning power plants, and increase both energy conservation and the use of renewable energy. Litigation soon followed and is still pending, therefore, the Rule has never been enforced.

In August, 2018, the EPA released the proposed Affordable Clean Energy Rule (ACE), its long-awaited proposal to replace the 2015 Rule. The ACE Rule turns the regulation of carbon dioxide and methane to the states to determine their own standards for reducing

carbon pollution from coal-fired power plants. The EPA proposes to loosen some permitting requirements.

The NAL and Conservation Committees actively monitor issues of top priority to the Garden Club of America as summarized in the GCA position papers. Based on provisions in the Clean Air Position Paper, the committees recently submitted **comments** to the Federal Register, opposing the ACE Rule: *“To maintain clean air necessary for a healthy ecosystem, it is urgent that we limit greenhouse gas emissions from new and existing power plants, and improve fuel efficiency throughout the transportation sector.”*

CAFE Standards (Corporate Average Fuel Economy)

Transportation recently surpassed the electricity sector as the nation’s top emitter of greenhouse gases with tailpipe emissions from cars and trucks now accounting for about a third of America’s carbon dioxide emissions. First enacted by Congress in 1975 and adopted in 1978 as a result of the Arab Oil Embargo, the purpose of Corporate Average Fuel Economy (CAFE) standards is to reduce energy consumption by increasing the fuel economy of cars and light trucks. Raising the standard requires automakers to create more fuel-efficient vehicles. When Congress first passed the Clean Air Act in 1970, lawmakers carved out a special waiver for California, allowing it to set tougher standards.

In 2018 the federal administration released a set of proposals, called Safer Affordable Fuel Efficiency (SAFE), to roll back CAFE rules on fuel efficiency and challenge state waivers of greenhouse gas regulation.





The NAL and Conservation Committees recently submitted [comments](#) to the Federal Register that oppose amending the CAFE standards with the SAFE Rule: *“Clean air is essential for healthy plants, animals and people. In order to improve air quality, the GCA supported the Clean Air Act of 1970 and has continued to support clean-air initiatives that lower the amount of carbon dioxide, methane, and other greenhouse gases and that reduce these pollutants through an integrated strategy of regulated emission caps, imported energy efficiency, and greater use of renewable energy sources.”* ■

For related resources on the GCA website

[Legislative Update for Clean Air](#)

Eleanor Rhangos’ VC Report [Clean Air Policy: Full Speed in Reverse](#)

[GCA Letters to policymakers](#) (found under Legislative Action, third link down)

[GCA Position Paper on Clean Air](#)

Mary Kelberg, Westhampton Garden Club, Zone III

Current Vice Chairman of Legislation and Policy

Hannah Sistare Clark, Garden Club of Mount Desert, Zone I

Current Vice Chairman of Legislation and Policy, Assistant

NAL reports serve in an advisory capacity, based on committee research. Individual clubs and members may act on any issue as they choose.