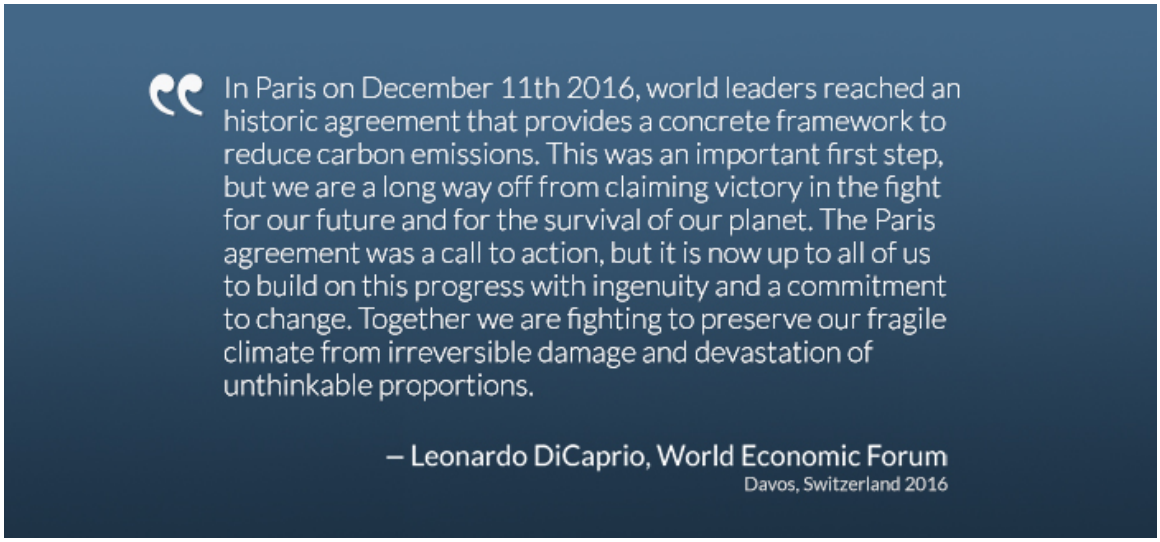
# The Leonardo DiCaprio Foundation Climate Action Plan




**The LDF Climate Action Plan** is a set of climate change solutions and targets that we believe can frame a universal strategy to combat climate change. We believe this plan can support visionary leaders in every nation who are attempting to find the appropriate combination of responses through policy, technology, and finance. There are important steps for all of us to take, as individuals in our homes, businesses, schools, and communities, but also as voters who decide which leaders will be entrusted with this massive challenge.

LDF recognizes that climate change solutions also present the world with unprecedented sustainable economic development opportunities. Installing building insulation or rooftop solar panels; converting decomposing waste into new products and clean, local energy resources; and restoring forests are just a few examples of how we can create millions of new jobs and make our communities healthier and more equitable, while making the globe a little cooler at the same time.

LDF therefore urges every citizen of the planet, especially our leaders in government, to address climate change with these strategies, which we present in order of their ability to slow the pace of greenhouse gas concentration in the atmosphere, that will provide the permanent solutions of a sustainable environment and a robust economy for generations to come.

# CARBON REDUCTION

**GOAL 1: Net zero carbon emissions by 2050**

A greenhouse gas ("carbon") reduction goal informs the level of effort needed for every solution. LDF takes its cue from the world's leading scientists and governments by embracing an aggressive, but achievable, global goal of at least 80% reduction of carbon pollution by 2050 compared to levels measured in 2010.[1] If achieved, this goal has the potential to keep global warming to no more than 2 degrees centigrade this century and reduce the likelihood of such temperatures thereafter. By doing so, we can avoid some of the most catastrophic impacts of climate change.

Though the 2 degree mark was believed to be a reasonable target, many experts now believe we should prevent average global temperature increases to no more than 1.5 degrees centigrade, which is achievable within this overall carbon reduction goal if we aggressively pursue the measures that can reduce carbon pollution on the fastest timeline and go one step further than reducing carbon pollution - - offset any remaining emissions with a variety of measures that allow us to achieve a net zero emissions goal by 2050.[2]

For example, in the US alone, the majority of the cars and trucks we drive are replaced approximately every 18 years. If we wait for zero emission vehicles to "save" us, we will obviously run out of time. The same is true for switching to 100% clean energy sources, which could take even longer, even with bold programs to retire polluting power plants or provide more homes with distributed clean energy such as solar panels.

However, combining these measures with reforestation, carbon capture/sequestration from sustainable agriculture, and other methods of offsetting any and all emissions will allow us to achieve the 1.5-degree limit.

**In order to achieve net-zero carbon emissions by 2050, LDF therefore calls for an interim goal of 30% reduction of carbon pollution by 2025, which the following measures, implemented in priority order, could achieve.**

For policymakers and businesses, LDF recommends:

- Adopt greenhouse gas reduction goals for your region or business of at least 80% below 2010 levels by 2050 and at least one interim goal that establishes a practical timeline and milestones to ensure the 2050 goals will be achieved.
- Draft a credible Climate Action Plan to demonstrate how the goal can be achieved across communities and environments, and how your policies will adapt if some solutions fail to deliver the expected results.
- Continue research and development of methods to offset carbon emissions that cannot be eliminated by 2050, including aggressive reforestation and urban tree planting programs, sustainable agriculture that sequesters carbon and improves the quality of soils, and other methods.

# PRICE ON CARBON

**GOAL 2: Average carbon price of $25 per tonne (USD) by 2020**

Whether you are an economist or simply balancing a household budget, there is likely to be agreement that the more something costs, the more likely we are to use it efficiently (or not at all). Putting a price on carbon emissions, in essence making the polluter pay for causing that pollution created in the first place, has proven to be an effective means of reducing greenhouse gases and encouraging efficiency.

The LDF Climate Action Plan calls for a price of at least $25 per ton of carbon pollution based on examples in various parts of the world, including the US, that have worked effectively.[3] While any cost will be an added expense, this number has been studied by several agencies and has found to be conservative while achieving underestimated gains.[4]

This cost can be applied in numerous ways that take into account costs, benefits, equity, and results. For example, the Canadian province of British Columbia imposed a carbon tax in 2008 which is “revenue neutral”, meaning that other taxes were lowered in proportion, which has the effect of making carbon-intensive products (like gasoline) more expensive, but less carbon intensive products (like locally grown vegetables) cheaper.[5]

In the US and Europe, the cap-and-trade approach has been used. This method sets a limit (“cap”) on carbon emissions from sources such as power plants and refineries, but leaves it to those businesses to find the most cost-effective way to achieve the reductions needed to get under the cap.

Some will upgrade equipment or switch fuels to achieve the goals, which may result in emissions far lower than their limit. In that case, the business may sell their extra “credits” to another polluter that has not been able to reduce below its limits (a “trade”).

In a cap-and-trade system, regulators may also allow companies to buy such credits from other, perhaps cheaper, sources of emissions reductions. For example, a project to replant a forest that absorbs carbon might provide the polluter with an “offset” of its emissions and therefore a cost-effective way to meet its obligations.

The value of these credits and offsets is a factor of supply and demand (rather than a set price, as would be the case with a carbon tax), but experience shows prices range from as low as US$2/tCO2e to has high as US$36/tCO2e.[6]

Regardless of how a price on carbon is established, the caps (or goals for a carbon tax pricing plan) should be set to achieve the overall carbon reduction goal of the local or national government and adjusted as needed over time depending on results.

For policymakers, LDF recommends:

- Include a “market mechanism” such as imposing a carbon tax or joining a cap-and-trade system as part of a comprehensive climate action plan.
- Create flexibility in the pricing mechanism chosen, so that results can dictate raising or lowering this type of price on carbon over time in conjunction with the efficacy of other measures.
- Collaborate with other jurisdictions, especially adjacent ones, to make carbon markets larger and more competitive and to prevent “leakage” (where consumers or manufacturers shop or move to nearby jurisdictions that may not have a price on carbon, thereby simply moving the emissions from one place to another).

## FOREST & OCEAN CONSERVATION

**GOAL 3: Zero net loss of forests by 2020 and protection of 30% of the oceans by 2030**

Destruction and degradation of the planet's forests and oceans, including critical habitat for flora and fauna that humans also rely upon for life, is a major contributor to carbon pollution in two ways.

Forests absorb CO2, the leading greenhouse gas, so cutting them down takes away one of our only methods of mitigating emissions created from other sources. When forests are cut down for agriculture, especially things like unsustainable palm oil plantations, the residues and smaller trees are burned, creating massive volumes of carbon and methane pollution equal to hundreds of coal fired power plants. For example, these types of fires in Indonesia alone have the ability to exceed the entire greenhouse gas emissions of the United States from all of its sources on a daily basis.[7]

Additionally, oceans play an important role in the global carbon budget by absorbing CO2 from the atmosphere. This blue carbon accounts for as much as 26% of global CO2 emissions absorbed in the past decade, but this natural absorption rate has been outpaced by our GHG emission rates and is estimated to decline in the near future.[8] An effect of absorbing CO2 is acidification, which in connection with warming temperatures has placed a strain on critical ocean habitats for different species of plants and animals. Mangrove forests, a key plant species that can store about 2.5 times as much CO2 we produce on an annual basis,[9] have been depleted or degraded in some areas due to strenuous ocean conditions.

We rank this goal in the Number 3 spot of the LDF Climate Action Plan, because it is one of the few mitigation measures that can have immediate results. This could potentially buy us time to implement more long-term solutions like switching to clean, renewable energy sources and clean transportation methods. However, these goals recognize that some deforestation and degradation will continue in parts of the world beyond immediate government or regulatory control and enforcement. Therefore, governments, NGOs, philanthropy, and communities need to identify places where reforestation and restoration can begin, which can offset any continued deforestation and degradation, even as global efforts continue to change unsustainable practices.

Finally, this goal is urgently needed for another reason -- too many critical habitats and wildlife populations are already endangered or facing extinction. By focusing on this goal and harnessing the financial and policy resources to achieve it, we can protect these last, vital remaining natural ecosystems and the myriad species they support. LDF makes the following policy recommendations.

**For Forests:**

- Adopt the “zero net loss” goal in the shortest timeframe possible.
- Lead by example: ban unsustainable logging on public lands, especially clear-cutting and burning.
- Prohibit imports of wood from illegal and unsustainable sources and require all imports to adhere to strict traceability standards.
- Invest in conservation projects with multiple co-benefits, such as habitat restoration that protects endangered species, provides regional cooling and water retention, and absorbs dangerous greenhouse gases.
- Include offsets for forest conservation and reforestation projects in any market mechanism such as cap-and-trade when setting a price on carbon.
- Develop and promote sustainable practices in areas that are already being farmed, including carbon-fixing practices using biochar and other natural methods of sequestration.
- Understand the needs of the most vulnerable communities in national adaptation planning, ensuring their participation in the planning process, and undertaking robust assessments of vulnerability that address capabilities and social and economic contexts.

**For Oceans:**

- Protect 30% of the world’s oceans by 2030 by establishing Marine Protected Areas (MPAs).
- By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- Develop and promote sustainable fishing practices in areas that are being overfished or are subject to illegal or unregulated fishing.

- Identify, protect, and restore important areas that sequester and store blue carbon, which include critical species like mangrove forests and sea grass meadows.
- Understand the needs of the most vulnerable communities in national adaptation planning, ensuring their participation in the planning process, and undertaking robust assessments of vulnerability that address capabilities and social and economic contexts.

# CLIMATE EDUCATION


**GOAL 4: 100% climate literacy by 2020**

The United Nations Intergovernmental Panel on Climate Change (IPCC), the world's leading scientists working together in unprecedented fashion to collect and report climate facts, trends, and solutions, first reported findings that should have alarmed all of the world's citizens into action as far back as 1990. Its subsequent reports have only underscored the need for urgent action - - so why are there still climate change "deniers" and leaders in politics and business who refuse to take action?

As with many complex questions, the answers are numerous, but the most basic one is a lack of climate IQ. Thoughtful people can differ on the best solutions to any crisis, but it's impossible to take effective action if key decision-makers are operating without the facts.

We therefore call on everyone to find objective, science-based information about climate change challenges and solutions, especially as it pertains to your community and country. For our children, schools and learning centers must adopt standards of comprehensive environmental education so that we can establish a basis of understanding from an early age for future generations.

All sectors of society must be engaged to overcome such a massive global challenge, including all men and women of the public, government officials, private sector, academics, and spiritual leaders and congregations. Good places to start include:

- The basics: Natural Resources Defense Council[10]
- In depth: The IPCC (information available in many languages)[11]
- By topic: EnvironmentalScienceDegree.com[12]
- For wildlife and natural ecosystems: National Wildlife Federation[13] & WWF[14]

For leaders in politics and business, we ask them to provide the following education:

- Workforce training to prepare workers for careers in a low-carbon economy (clean energy and fuels; energy efficiency; waste optimization; forest conservation, etc).
- Adaptation measures for vulnerable communities, including how to manage droughts in farming communities; floods along rivers and coastlines; health threats during extended heat waves; etc.
- Mandatory environmental education, especially in grades K-12, similar to the comprehensive curriculum established in California under its groundbreaking Education and the Environment Initiative of 2003 (AB1548).[15]
- Of course the policymakers themselves need to be fully conversant about the problem and its solutions. We call on elected and appointed officials at all levels of government (but especially local and regional authorities, where most climate change impacts are felt and solutions will be implemented) to obtain the best science-based information available to inform policy-making.

# ENERGY EFFICIENCY

**GOAL 5: 40% more efficient by 2025 compared to 2015**

Generation of electricity, especially from fossil fuels such as coal, oil, and gas, is the primary source of the greenhouse gas emissions that are warming the planet and contributing to climate change both globally[16] and in the US.[17] Using less energy - - for the same amount of light, heat, motor output, etc. -- can cut carbon emissions literally overnight.

For example, the state of California is 40% more energy efficient than the rest of the United States, thanks to energy efficiency initiatives in buildings, appliances, and factories.[18] If the entire country followed California's example, we could retire all of our coal-fired power plants and save a lot of money on energy bills.

And how fast can energy efficiency measures deliver big results? New York's Empire State Building took simple measures - - replacing insulation, windows, and lighting - - and beat expected energy efficiency gains each of its first three years, saving $7.5 million.[19] In Chicago, the Willis Tower undertook more extensive measures (and added a wind-powered turbine to the roof) to cut its energy consumption by 80%, which is the equivalent of 150,000 barrels of oil every year.[20]

Energy efficiency measures provide another important benefit - - as we transition to zero emission cars, high voltage charging stations will consume a lot of power. Imagine how many battery-electric cars could recharge near the Empire State Building and Willis Tower without straining the electrical grid or adding new generating capacity!

For individuals and businesses, LDF offers these examples of energy efficiency actions in buildings, including[21]:

- Change lighting to LEDs and install dimmers and motion sensors to power lights only when needed.
- Install “smart” thermostats and program them for more efficient heating/cooling (especially when no one is in the home or workplace).
- Replace old escalator/elevator, pump motors, and heating/air conditioning systems with new efficient ones that save up to 75% of electricity.
- Add insulation, especially to doors, windows, and roofing.
- Replace gas or electric water heaters with solar water heater systems, which can pay for themselves in a few years of energy saving.
- More resources and tips can be found at the Energy.gov website.

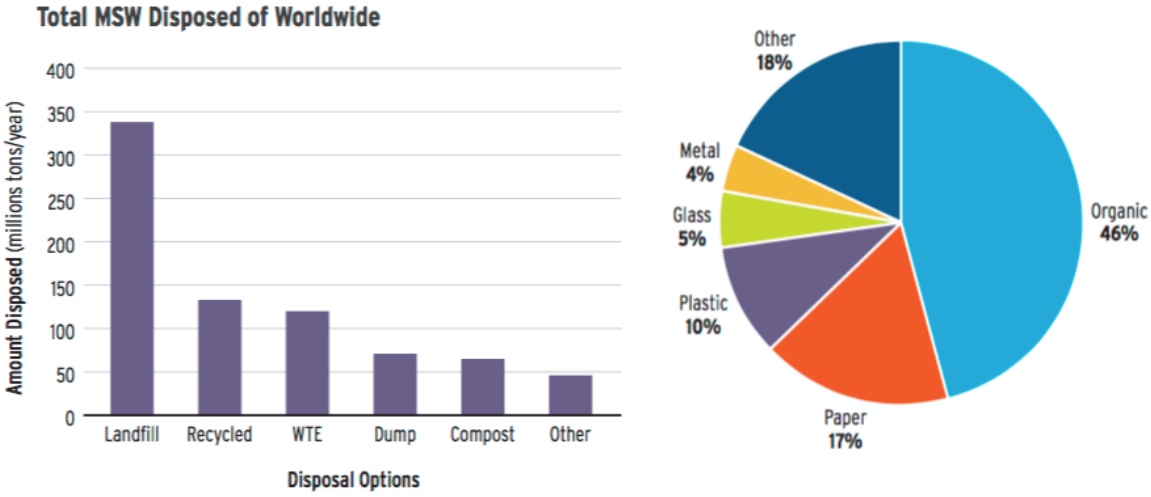
For policymakers, LDF recommends:

- Set energy efficiency goals based on the current overall efficiency of your region, but for most parts of the world at least 40% in ten years. Establish programs to help your communities achieve that goal.
- Lead by example: set the highest energy efficiency standards for buildings occupied or owned by government and launch a retrofit campaign to upgrade existing schools, offices, hospitals, and other government buildings.
- Retro commissioning (“tuning up” existing systems in a building to ensure they are operating efficiently as designed) can also deliver significant results in a matter of days. For example, California tested 50 typical government buildings (schools, offices, hospitals) and made them an average of 18% more energy efficient immediately without any retrofits or changes to the physical structure, equipment, or appliances.[22]
- Upgrade building and appliance codes to mandate use of the most efficient systems and materials in new construction and remodeling.
- Provide finance options for home and building owners who need a way to pay for improvements and repay costs from savings.
- Require owners of rental properties to benchmark their buildings against widely accepted standards for energy efficiency, so that prospective tenants can select the most efficient options.

# WASTE REDUCTION

**GOAL 6: 90% reduction of all waste by 2025**

Humans generate 3.5 million tons of waste per day and are on pace to throw away nearly twice that amount by 2025.[23] For city dwellers alone, their daily waste would fill a line of trash trucks stretching 5,000 kilometers.[24]




*Source: The World Bank, "What a Waste: A Global Review of Solid Waste Management"*[25]

The vast majority of this waste features three characteristics important to climate change:

- Less than one third is recycled or used for fuel, the remainder going to landfills or dumps.[26]
- At least half is organic matter, including food waste, which decomposes rapidly into methane, which is 25 times more potent as a heat-trapping gas than CO2 (the most common greenhouse gas).[27]
- In a few locations, as much as 60%[28] of this waste is separated and recycled in some manner, meaning we already know the economically viable means to end the "waste of waste" (and technologies are being demonstrated all over the world that prove we could utilize up to 95% of all waste with moderate changes in policies or incentives).

Like the LDF's goals Numbers 1-5, this goal is ranked ahead of other important climate change solutions because it can be implemented very rapidly with significant benefits for the environment and local economies. "Zero waste" programs are being implemented in places as diverse as Oran, Algeria[29] and Seattle, Washington USA.[30] Entire states like California set diversion goals (diverting waste from landfills to productive uses) of 50% by 2005 (compared to a 1990 baseline) and have accomplished that goal,[31] allowing policymakers to set a goal of 75% diversion by 2020.[32]

Businesses are also recognizing the value of zero waste programs, because reducing waste improves the bottom line. The world's largest retailer (Walmart)[33] and one of the world's largest consumer products companies (Unilever)[34] are committed to this goal, to name just two.

Recognizing the commercial-scale adoption of these programs and the potential for them to generate jobs and lower municipal costs, LDF believes a global goal of using at least 90% of the waste that today is being discarded, is practical and achievable.

For political and business leaders, LDF recommends:

- Set a zero waste goal in the shortest timeframe possible.
- Develop strategies to reduce volumes of waste in the first place, including reduction of wasteful excess packaging, single-use plastic bags, etc.
- Ban materials that are easily recyclable from landfills, including electronic waste, food waste, and bottles/cans.
- Work with communities and businesses to incentivize conversion technology projects, especially for wastes that cannot be easily reduced such as waste tires and sewage bio-solids.
- Work with small and large-scale farmers to reduce the use of petroleum-based fertilizers, pesticides, and herbicides; reduce farm waste by converting it into biochar or other carbon-fixing and soil remediation practices; and incentivize conversion of other organic and food wastes into animal feed and organic fertilizers.

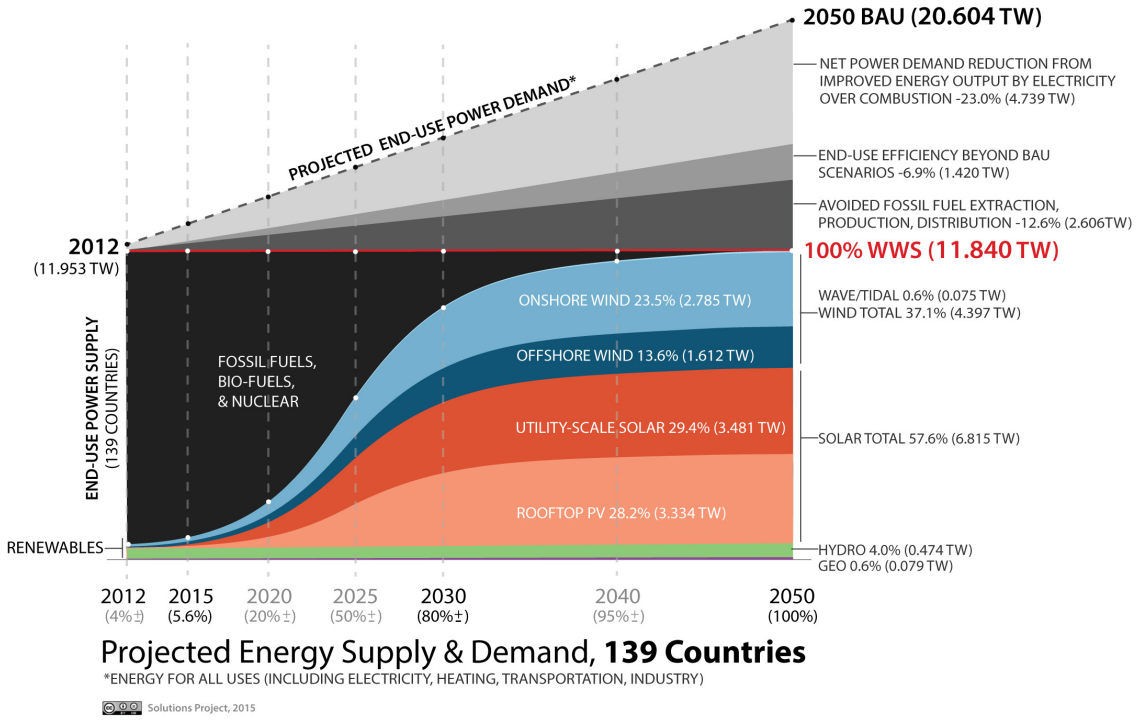
# CLEAN, RENEWABLE ENERGY

**GOAL 7: 100% of all energy generation from renewables by 2050**

Perhaps the most iconic examples of a sustainable, low carbon future -- where threats of climate change are a thing of the past - - are solar panels and wind turbines. The cost and efficiency of these clean, renewable energy sources (along with geothermal, tidal, off-river hydro, and other renewables) has steadily improved over the past two decades so that now, in some parts of the globe, they are cheaper and more reliable than fossil fueled energy generation.[35]

Globally, the opportunity is even greater for developing nations than developed ones, because places like India, where a quarter of the population has no access to electricity today,[36] can energize communities with distributed solar and other renewables, avoiding massive power plant and transmission line infrastructure development, delays, and cost.

But how realistic is a goal of 100% “brown to green”? More than half the states in the US have developed “renewable portfolio standards” (mandates that utilities source a growing percentage of power from clean, renewable sources) and credible plans for all fifty states have been developed for making that transition entirely.[37] Globally, especially where communities are adding new generation for the first time, plans also exist to achieve the 100% goal even sooner than places where existing infrastructure and entrenched interests may delay the transition.[38]




*Source: The Solutions Project, "International Energy Mix, Transition to 100% Clean, Renewable Energy by 2050"*[39]

For political and business leaders, LDF recommends:

- Adopt a 100% clean renewable energy goal in the shortest timeframe possible.
- At a minimum, adopt an interim goal of 50% clean renewable energy by 2025 as outlined by leading experts (see Figure below)
- End subsidies for fossil fuels that unfairly disadvantage cleaner sources of energy.
- Ban hydraulic fracturing ("fracking") if projects cannot be proven to fully protect and prevent at-risk communities from ground and surface water pollution, as well as dangerous methane leaks.
- Phase out nuclear energy, which is no longer a "clean" energy source as has been demonstrated at Chernobyl, Ukraine and Fukushima, Japan, among other locations of leaks and pollution. Mining and refining of uranium also consumes vast amounts of energy, provided today largely from fossil fuels, reducing any low-carbon benefits significantly.

# CLEAN TRANSPORT


**GOAL 8: Net zero transportation emissions by 2050**

In the United States, our transportation sector, which includes fossil fuel exploration and exploitation; fuels refining, production and transportation; and combustion in vehicles, creates as much as 26% of our carbon pollution.[40] Globally, this number drops to 14% when accounting for both developed and developing nations.[41]

Although it is likely that there will still be some reliance on petroleum-powered transportation in 2050, LDF supports the goals of an 80% reduction of carbon from the transportation sector and a net zero emissions goal (compared to a 2010 baseline) by 2050.

As described in Goal #1, some emissions would need to be offset to achieve “net zero”, but the technologies and policies are available to accomplish that goal. And, to avoid automakers and consumers waiting decades to get started, we support an interim goal of at least 25% reduction by 2030.

Like other climate solutions however, there is also good news that can justify a goal of reducing the carbon content of our transportation fuels dramatically over time. The European Union[42] and numerous states in the US[43] have passed laws to restrict carbon emissions from tailpipe emissions. California has also regulated the fuel, requiring reductions in the carbon content of the fuel itself.[44] China has adopted some of the world’s most aggressive fuel economy standards, so that each mile travelled generates fewer emissions of all kinds.[45]

Beyond efforts to make conventional fuels and vehicles less polluting, automakers are producing more zero emission vehicles (including battery-electric and hydrogen-electric models) and some governments are mandating an increasing percentage of these vehicles be sold in their regions.[46] A major problem that has prevented faster adoption of these vehicles is the lack of recharging or refueling stations, but some jurisdictions, like California[47] and Germany,[48] are facilitating faster deployment of stations to encourage automakers and consumers to switch to zero emission options.

Of course the best way to reduce emissions from transportation is to walk, ride a bike, or use mass transit. Governments and businesses are incentivizing these behaviors,[49] along with vanpools and flex-time work hours (to help workers cut commute times, which also waste fuel).

Although we place this mitigation strategy last on the list because of the decades that will be needed to shift significant parts of the transportation sector from "brown to green", it cannot deliver benefits without aggressive adoption of policy and technologies starting now.

For policymakers, LDF recommends:

- Adopt a goal of an 80% reduction of carbon from the transportation sector and a net zero emissions goal (compared to a 2010 baseline) by 2050. Like the power generation goals, some emissions would need to be offset to achieve "net zero", but the technologies and policies are available to accomplish that goal. And, to avoid automakers and consumers waiting decades to get started, we support an interim goal of at least 25% reduction by 2030.
- Adopt strategies to achieve the goal including a Low Carbon Fuels Standard, tailpipe emissions standards, fuel economy standards (such as the Corporate Average Fuel Economy "CAFE" standard in the US), and zero emission vehicle mandates. It is important to note that CAFE standards alone cannot achieve the overall goal of reducing carbon pollution from the transportation sector, so citizens should demand more from their government officials than any one strategy by itself.
- Lead by example: local and national governments lease and buy more vehicles in most countries than any private sector entity. Adopt aggressive procurement rules for achieving low carbon and zero emission goals for public fleets ahead of the overall goal timelines.
- Facilitate wider adoption of zero emission vehicles by partnering with the private and NGO sectors for rapid deployment of charging stations and clean fuel refueling stations.
- While the world still uses oil in transportation fuels, adopt restrictions on the most polluting sources -- offshore or deep-water drilling and extraction of oil from tar sands should be banned everywhere, including prohibiting imports of oil from those sources (not just a "not in my backyard" prohibition of offshore drilling along nearby coastlines).

## CONCLUSION

LDF is not alone in its sense of urgency or its belief that our global community can achieve these goals, but only if we all act together as quickly as possible. The goals outlined in this plan are meant to be aggressive, providing a pace to which we can measure our progress to protect and preserve our planet and way of life.

For a good summary of the issues and further evidence that the LDF plan is moving us in the right direction, we recommend reading a recent blog by Hal Harvey, CEO of Energy Innovation. The post, entitled “Climate: How to Win"[50] discusses the importance of major countries to adopt strategies to combat climate change as soon as possible. Following the landmark agreement from COP21, it has never been a better time than now to urge world leaders to adopt a comprehensive climate action plan.

The bottom line? We can do this, but there isn’t a moment to lose. LDF stands ready to do its part. Are you?

# ENDNOTES

[1] "2010 to 2015 Government Policy: Greenhouse Gas Emissions." Committee on Climate Change. 05/08/2016.
[2] European Geosciences Union. "1.5C vs 2C Global Warming: New Study Shows Why Half a Degree Matters." Science Daily. 04/21/2016.
[3] "Effective Carbon Prices." OECD. 11/04/2013.
[4] Noah Kaufman. "A Carbon Price Will Reduce Emissions More Than Computer Models Predict." World Resource Institute. 01/13/2016.
[5] "Carbon Tax." B.C. Ministry of Finance.
[6] ECOFYS. "State and Trends of Carbon Pricing." World Bank Group. 09/01/2015.
[7] Nancy Harris. "Indonesia's Fire Outbreaks Producing More Daily Emissions than Entire US Economy." World Resource Institute. 10/16/2015.
[8] Rob Monroe. "How Much CO2 Can The Oceans Take Up?." Scripps Institution of Oceanography. 07/03/2013.
[9] Tiffany Stecker. "Restoring Mangroves May Prove Cheap Way To Cool Climate." Scientific American. 07/31/2012.
[10] Amanda MacMillan. "Global Warming 101." NRDC. 03/11/2016.
[11] "Sixth Assessment Report." IPCC. 09/16/2016.
[12] "101 Top Web Resources on Climate Change." Environmentalsciencedegree.com.
[13] "Global Warming." National Wildlife Federation.
[14] "Effects of Climate Change Overview." WWF.
[15] California Education and the Environment Initiative.
[16] "Global Anthropogenic GHG Emissions by Sector." Center for Climate and Energy Solutions.
[17] "President Obama's Plan to Fight Climate Change." Whitehouse.gov. 06/25/2013.
[18] "California's Energy Efficiency Success Story." NRDC. 07/2013.
[19] "Innovative Empire State Building Program Cuts $7.5M in Energy Costs Over Past Three Years." Clinton Foundation. 08/11/2014.
[20] Susan Saulny. "Sears Tower to Be Revamped to Produce Most of Its Own Power." New York Times. 06/24/2009.
[21] Comment: Because factories and other consumers of electricity are different and more technical, these recommendations focus on homes and workplaces, where individuals can make typical changes more quickly.
[22] Bing Tso, Michael Baker and Philippus Willems. "Results from a Comprehensive Impact Evaluation of the 2006-08 California Retro-Commissioning Portfolio ." ACEEE.
[23] Daniel Hoornweg, Perinaz Bhada-Tata and Chris Kennedy. " Environment: Waste production must peak this century." Nature. 10/30/2013.
[24] Ibid.
[25] Ibid.
[26] Daniel Hoornweg and Perinaz Bhada-Tata. "What a Waste: A Global Review of Solid Waste Management." World Bank. 03/01/2012.

[27] Daniel Hoornweg and Perinaz Bhada-Tata. "What a Waste: A Global Review of Solid Waste Management." World Bank. 03/01/2012.
[28] Niall McCarthy. " The Countries Winning The Recycling Race." Forbes. 04/04/2016
[29] "Zero Waste Program." Regions20.
[30] "Zero Waste." King County Solid Waste Division. 01/13/2015.
[31] "California 50% Solid Waste Reduction Achieved!" US EPA.
[32] "California's 75 Percent Initiative: Defining the Future." CalRecycle. 06/16/2016.
[33] "Sustainability." WalMart.
[34] "Unilever reaches new zero waste to landfill milestone." Unilever. 10/20/2015.
[35] Ethan Zindler. "Wind and Solar Boost Cost-Competitiveness Versus Fossil Fuels." Bloomberg. 10/05/2015
[36] Todd Lindeman. "1.3 Billion are Living in the Dark." Washington Post. 11/20/2015.
[37] The Solutions Project.
[38] Go100Percent.
[39] "International Energy Mix, Transition to 100% Clean, Renewable Energy by 2050." The Solutions Project.
[40] "Sources of Greenhouse Gas Emissions." US EPA.
[41] "Geenhouse Gas Emissions Data." US EPA.
[42] "Euro Emissions Standards." Automobile Association Developments.
[43] "Tailpipe Emissions." Greener Cars.
[44] "Low Carbon Fuel Standard." CA EPA. 08/05/2016.
[45] "The Chinese Automotive Fuel Economy Policy." UNEP. 02/01/2015.
[46] ZEV Mandate.
[47] "California's Hydrogen Transportation Initiatives." CA EPA. 06/15/2016.
[48] "Germany: New Joint-Venture Plans 400 Hydrogen Stations by 2023." Electric Cars Report. 10/14/2015.
[49] "Cycle to work Scheme Implementation Guidance." Gov.UK. 10/28/2011.
[50] Hal Harvey. "Climate: How to Win." The Hill. April 19, 2016.