

**Because Legislation to Reduce Carbon Fuel Use is a **Slow Resort**  
to Prevent Mounting Cost of Increasing Climate Damage  
ESF Presents**

## **ESF Climate Solutions**

Foreword: Please think of this as a work in progress. Sort of a part-way cooked **Stone Soup** . Diversity of input can bring greater strength. Please send thoughts and contributions to [webmaster@esf-oregon.org](mailto:webmaster@esf-oregon.org).

### **I. ENERGY DECISIONS OREGONIANS CAN VOTE FOR WITH THEIR \$\$\$ - TO AVOID FUTURE DAMAGE FROM CARBON OVERUSE**

*Note that it is often true that it takes an up-front investment to gain the payoff of cheaper energy.*

- A. Carbon Fuels – Transportation**– Source of 40% of Oregon's Carbon Pollution
  - a. Parking a car/truck one day per week can save 14% of personal GHG pollution .
  - b. Parking 2 days / wk = 28%. Just takes a little more planning to visit all your destinations on 1 day, not 3.
  - c. When you can park your car 5 days / wk, you avoid significant fuel costs as well stemming pollution.
  - d. When you notice **the most you drive is 40mi per trip** (as is true for many city dwellers), this is within the range available with a **used electric vehicle like a Nissan Leaf**. Sticker prices for such vehicles are not shocking. Your fuel costs when charging overnight at home is \$0.03/mile instead of \$0.20, so you continue saving on fuel cost but you can go back to driving 7 days / week.
- B. Carbon Fuels – Residential Space Heating**– Source of 7% of Oregon's Carbon Pollution
  - a. You only need electricity to heat a home with heat pump technology.
  - b. Heat pumps provide for air-conditioning and heating in the same unit.
  - c. Substantial savings can result from a successful energy makeover, due to maintaining comfort while cutting energy and energy billing to 60% of previous consumption and cost.
  - d. Heat pump heating capacity is less than replaced furnaces, so the conversion to heat pump technology includes a possible home energy makeover including: more insulation, air sealing, upgraded windows, and better chimney vent closures.
- C. Carbon Fuels – Water Heating – Clothes Drying**
  - a. Electric dryers and water heaters are affordable and efficient and carbon-fuel-free. Excess heat from the dryer and water heater can help to dry other cloths on air-dry racks.
- D. Zero-fuel Energy Generation**
  - a. In California 40% of electric vehicle owners choose to install solar panels, which makes for driving on sunshine. To recharge overnight the energy source is either the power grid or a home-installed battery bank. The latter arrangement offers readily available transportation during weather emergencies or other power outages. This is a zero-emission option.
  - b. Small water pumps can supply electricity for homes/farms/ranches located near streams and high-flow creeks. This often requires operating permits from the authority having jurisdiction. This is a zero-emission option.

## II. ENERGY DECISIONS OREGON CITIES CAN MAKE TO AVOID FUTURE DAMAGE FROM CARBON OVERUSE

### A. Carbon Fuels – Transportation – Source of 40% of Oregon's Carbon Pollution

- a. Cities find that after assessing fleet usage patterns many high-cost working vehicles are parked most of the year, used only occasionally for low capacity work, and consume fuel inefficiently.
- b. Fleet operation and maintenance costs are reduced substantially when an aftermarket electric vehicle can be substituted without loss of service support. This effectively replaces high emission assets with zero emission equivalents.
- c. Federal offsets for the acquisition cost of electric buses and light rail serving public transportation are substantial, offering a zero emission option.

## III. ENERGY DECISIONS OREGON COMPANIES CAN MAKE/HAVE MADE TO AVOID FUTURE DAMAGE FROM CARBON OVERUSE

### A. Companies Going Green:

#### **Green Source - Renewable Power | PGE**

PGE has bought or plans to buy power or unique claims on the electricity produced from these types of power plants. The portion supplied by PGE is based on recent utility production and purchases of renewable energy.

<https://www.portlandgeneral.com/business/power-choices-pricing/renewable-power/green-source>

#### **Clean Energy in the Pacific Northwest**

100% Clean for PNW is about making a rapid, just, and complete transition to a renewable, low-carbon economy. It's about leaving our home better than we found it.

<http://www.100forpnw.org/>

#### **Standing Stone Brewing makes the short list.**

Standing Stone's [RPM Bike Program](#), [waste management program](#) and [One Mile Farm](#) operations were all recognized as top reasons for our brewpub making the list. We're overjoyed with the recognition (especially because it's employee-driven) and want to thank our coworkers for all their innovation and energy that keep these programs thriving!

#### **Pacific Power expanding network of charging stations**

Pacific Power is adding to the thrum of National Drive Electric Week (Sept. 8-16) by taking steps to expand the network of charging stations that will be needed as the number of electric cars in Oregon moves toward the state's goal of 50,000 electric cars on the road by 2020.

<https://www.pacificpower.net/index>

#### **Apple now globally powered by 100 percent renewable energy**

As part of its commitment to combat climate change and create a healthier environment, Apple today announced its global facilities are powered with 100

percent clean energy. This achievement includes retail stores, offices, data centers and co-located facilities in 43 countries.

<https://www.apple.com/newsroom/2018/04/apple-now-globally-powered-by-100-percent-renewable-energy/>

### **Amazon Web Services & Sustainability**

In January 2018, AWS achieved 50% renewable energy usage. Five solar farms that AWS previously [announced](#) are now in operation in the Commonwealth of Virginia. Together with Amazon Solar Farm US East, the six solar farms bring 260 megawatts of renewable energy capacity onto the grid. AWS and Dominion Virginia Power join forces on a landmark renewable energy delivery deal. Read the Rocky Mountain Institute blog [here](#) for more details.

<https://aws.amazon.com/about-aws/sustainability/>

### **B. Considering Logistics**

Relying on available Green Grid – not a large capital investment if utility power options are offered.

If a Green Grid is not accessible and you have good solar roof with unobstructed exposure to South or West, you can still go green. Pricing of solar panels is no longer a dominant cost factor.

Fleet mileage costs can be below \$0.03/per mi and low cost electric vehicles are obtainable on resale with adequate range.

Tesla life cycle cost comparison is interesting.

<https://cleantechnica.com/2018/10/07/tesla-model-3-total-cost-of-ownership-estimate-crushing-it/>

### **C. Water management deserves attention**

Rain runoff is a major source of pollution. Rainwater catchment prevents unnecessary demand. Encourage slow-paths for rain runoff from cities or farms. Think about a rain garden - major pollution reducer.

## **ESF Climate Solutions - ESF Supports the IPCC Call for Decarbonization to Stay Under the 1.5°C Limit**

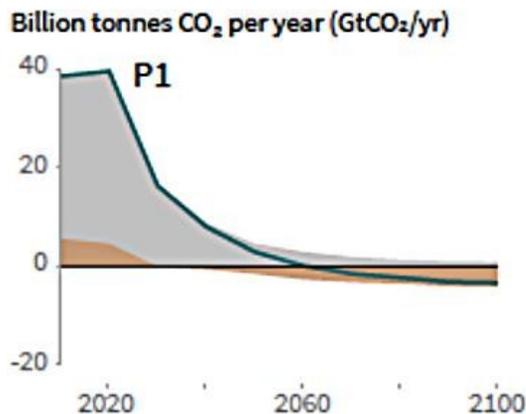
Several different mitigation strategies can achieve the net Carbon Dioxide Removal (CDR) that would follow a pathway that limits global warming to 1.5°C with no or limited overshoot.

The following graphic is taken from the Summary for

Policymakers: <http://www.ipcc.ch/report/sr15/>

This is the basic strategy that ESF Climate Solutions [supports](#). Taken from SR15 Figure SPM.3b, Pathway 1 (P1). It does not rely on CO2 Carbon Capture and Storage (CCS) or bioenergy with carbon capture and storage (BECCS).

● Fossil fuel and industry ● AFOLU AFOLU: Agriculture, forestry and other land use



**P1:** A scenario in which social, business, and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A down-sized energy system enables rapid decarbonisation of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used.

Global indicators	P1
Pathway classification	No or low overshoot
CO <sub>2</sub> emission change in 2030 (% rel to 2010)	-58
↳ in 2050 (% rel to 2010)	-93
Kyoto-GHG emissions* in 2030 (% rel to 2010)	-50
↳ in 2050 (% rel to 2010)	-82
Final energy demand** in 2030 (% rel to 2010)	-15
↳ in 2050 (% rel to 2010)	-32
Renewable share in electricity in 2030 (%)	60
↳ in 2050 (%)	77
Primary energy from coal in 2030 (% rel to 2010)	-78
↳ in 2050 (% rel to 2010)	-97
from oil in 2030 (% rel to 2010)	-37
↳ in 2050 (% rel to 2010)	-87
from gas in 2030 (% rel to 2010)	-25
↳ in 2050 (% rel to 2010)	-74
from nuclear in 2030 (% rel to 2010)	59
↳ in 2050 (% rel to 2010)	150
from biomass in 2030 (% rel to 2010)	-11
↳ in 2050 (% rel to 2010)	-16
from non-biomass renewables in 2030 (% rel to 2010)	430
↳ in 2050 (% rel to 2010)	832
Cumulative CCS until 2100 (GtCO <sub>2</sub> )	0
↳ of which BECCS (GtCO <sub>2</sub> )	0
Land area of bioenergy crops in 2050 (million hectare)	22
Agricultural CH <sub>4</sub> emissions in 2030 (% rel to 2010)	-24
in 2050 (% rel to 2010)	-33
Agricultural N <sub>2</sub> O emissions in 2030 (% rel to 2010)	5
in 2050 (% rel to 2010)	6

\*Kyoto-GHG emissions are based on SAR GWP-100

\*\*Changes in energy demand are associated with improvements in energy efficiency and behavior change