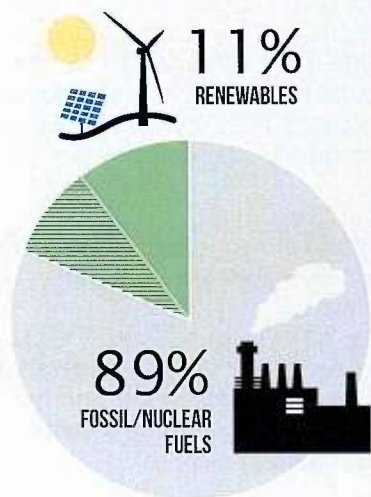


VERMONT'S ENERGY FUTURE

TRANSPORTATION + THERMAL + ELECTRIC

TODAY Vermont's **total** average energy consumption in 2011 was 5,000 MW_{avg} (149 TBtu/year) of energy (heating, transportation, electricity). We consumed 89% from fossil/nuclear fuels while only 11% (550 MW_{avg}) from renewable sources.



Type	Sources	TBtu/Year	%	MW _{avg} ⁺
Fossil Fuel	Natural Gas	8.6	4%	288
Fossil Fuel	Petroleum	80.2	54%	2,686
Renewable	Hydro	0.2	0%	7
Renewable	Wood and waste	10.5	7%	352
Fossil/Nuclear/Renewable	Electric sales	18.9	13%	633
Losses	Electric generation & system losses	30.6	20%	1,025 ⁺⁺
Total		149.3	100%	5,000

Conversions
 1 TBtu = 1 trillion Btu
 8,760 hours = 1 year
 1 MW_{avg} = 0.03 TBtu/year

+ Megawatt average (MW_{avg}) considers the capacity factor of each technology and is the average energy over one year
 ++ Approx. 700 MW avg. thermal power plant losses
 * U.S. EIA 2011 Data (Table C4) - www.eia.gov

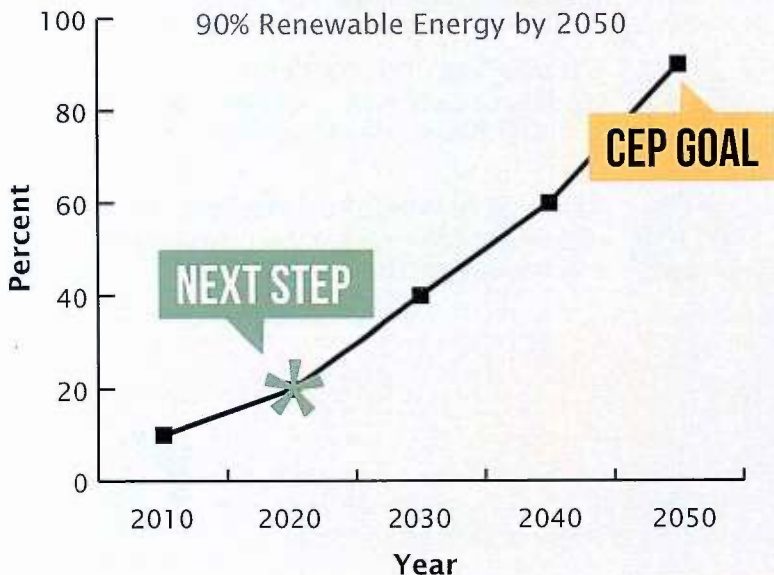
20% BY 2020 = 11% TODAY + 9% NEXT STEP

20% RENEWABLES BY 2020

To keep on track with the Comprehensive Energy Plan (CEP)* mandate of 90% renewable by 2050, over the next 6 years we must increase our renewable energy capacity, conservation, and efficiency measures to satisfy 20% of our total energy consumption. This interim goal of 20% by 2020 is an attainable benchmark that will position Vermont to reach 90% by 2050.

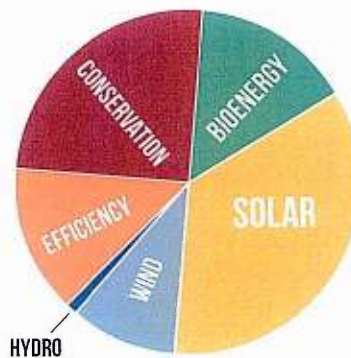
Vermont Comprehensive Energy Plan

90% Renewable Energy by 2050

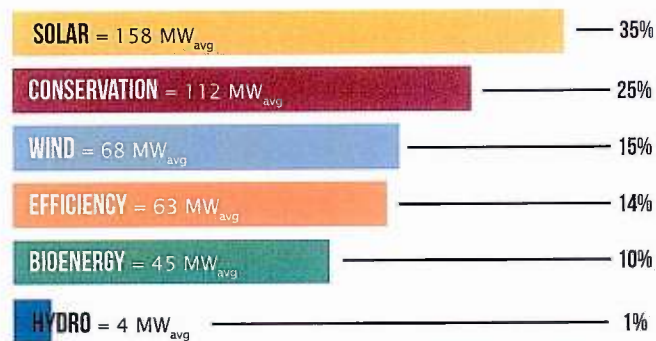


9% NEXT STEP

450 MW_{avg} Energy Consumption



FROM WHERE?



* 2011 Comprehensive Energy Plan: http://publicservice.vermont.gov/publications/energy_plan/2011_plan

HOW CAN WE DO IT?

These initiatives will help us generate more while using less:



Outreach & Education

Increase public outreach and education on energy matters.



Electrify Our Energy System

Generate electricity with renewable resources, shifting away from liquid fossil fuels.



Conservation

Improve carpooling, recycling, biking, walking programs.



Weatherization

Weatherize 80,000 homes and retrofit heating with renewable sources.



Electric Vehicles

Add tens of thousands of electric vehicles.



Solar Thermal

Supply 50% of building hot water load through solar thermal installations.



PACE Vermont

Promote Property Assessed Clean Energy (PACE) to allow financing for home energy upgrades using monthly energy savings.



Bioenergy

Continue to promote clean and highly efficient uses of biomass and biofuels.



Standard Offer Program

Expand the VT Standard Offer Program to 5MW per project and greatly increase the annual capacity goals.



Net-Metering Program

Remove or raise the electric utility net-metering cap and remove limits on size to increase customer-owned generation.



Solar Electric

Build several hundred megawatts of solar capacity.



Distributed & Community Generation

Site renewable capacity close to end users, reducing costly long distance transmission while upgrading local distribution systems.



Wind Energy

Build additional new capacity and contract for additional regional capacity.



Property Taxes

Value net metered solar equipment similar to other business equipment and home appliances. Don't include in local property tax assessment.



Mass Transit

Triple our bus fleet, power with biofuels and add commuter rail between our cities and towns.



Hydro

Support and maintain existing in-state hydro generation. Encourage development of small-scale hydro capacity.



Streamlined permitting

Establish fixed timelines and electronic filing of permit applications to increase transparency and lower costs.



On-bill financing for renewables

Reduce upfront costs of renewable and efficiency investment through payment on customer's utility bill.



Carbon Tax and Dividend

Establish a carbon tax on fossil fuel sources and shift this dividend benefit to Vermonters.



Renewable Portfolio Standard (RPS)

Implement RPS incorporating these initiatives and measureable renewable targets.

THE IMPACT

Each step on the journey towards 90% renewables by 2050 is an opportunity to foster economic security and energy independence, safeguard our environmental legacy, drive in-state innovation and job creation and increase community involvement and investment while reducing greenhouse gas emissions





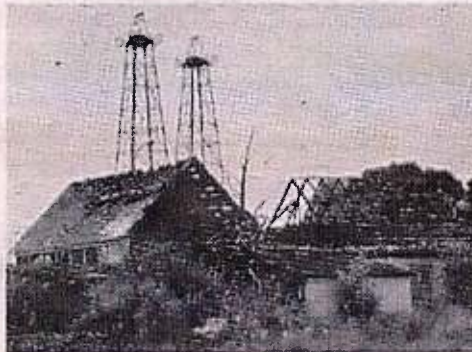
David Blittersdorf's View from the Top

Running the Numbers: A Call for Energy Literacy

Energy is the defining issue of our time, and numbers and data form the backbone of discussions about energy. The problem with this is that there are serious flaws with energy literacy in America. Mathematics and statistics are often misunderstood, and can be easily twisted to suit specific agendas. We also lack the education in rhetoric and logic that is necessary to interpret information accurately. Quite often we get stuck considering the species and size of various trees, and we miss looking at the forest: the big picture of how our energy use has changed dramatically over the past hundred years, and will continue to change over the century to come.

Finite resources are extracted or produced at a rate of a normal distribution over time — a bell curve. The American Petroleum Institute is currently running TV ads claiming that the United States is going to be the number one producer of oil, and will thereby become energy independent. This is a massive fiction, because the world has peaked its production of oil, and being reliant on a finite resource does not support energy independence. This is the meaning of peak oil: we are at the top portion of the bell curve, balanced at the apex of the peak production of all of the oil that has ever existed on earth.

We know where all of the oil is, and we won't be discovering any more of it. The bell curve of humanity's use of oil fits within a 200-year period, between the years 1900 and 2100; we are now at the halfway point of this unrepeatable one-time oil boom. How we choose to use our remaining oil will affect the future



Abandoned oil derricks behind an abandoned farm.
Photo from EPA.

of society on our planet, with respect to climate change as well as energy. So we need to carefully consider the facts, to make informed decisions and hold our leaders accountable. Energy literacy is paramount. We need to be having regular public conversations that result in action.

The total amount of oil that has been or ever will be usable is about 2 trillion barrels. You might think that's a lot of oil, but remember in the years since 1900 we've already used about half of it, and worldwide were currently using over 32 billion barrels a year, and counting. So, let's do the math: a total of 2 trillion barrels ever available, divided in half, equals 1 trillion barrels remaining. One trillion is 1000 billion. One thousand billion barrels divided by 32 billion barrels per year equals a little over 31 years, at the current rate of use. But keep in mind we'll be descending the bell curve, so there will be less oil available year to year, and it's likely we will be stretching out these diminishing amounts for the rest of this century.

Why does all this matter? Our society is hurtling at breakneck speed toward the brick wall of the finiteness of fossil fuels, and we will hit it soon. More than 40% of U.S. energy comes from oil. Depending on a finite and decreasingly available fossil fuel is not a sustainable or smart energy policy, and CO2 emissions keep rising as we burn our way into planetary environmental system collapse.

What is to be done? Let's put the brakes on fossil fuel use. Become energy literate — consider how you use energy to transport, house, heat and feed yourself and your loved ones, and begin to restructure your lives to decrease fossil fuel consumption. We have a golden opportunity, a short period of time in which to make changes. We cannot make more fossil fuels, but we can still choose to conserve what remains. Begin at the personal level, and also engage at the local level: how does your town power its buildings, or run its water treatment facility? Statewide, we need a carbon pollution tax to fund these changes, and we need to push for the same at the federal level. This is not pie-in-the-sky thinking — I speak from pragmatism. Our future depends upon understanding the facts, and having the foresight and fortitude to change our lives.

David Blittersdorf is the President/CEO of AllEarth Renewables in Williston, VT — a company that specializes in the design and manufacture of the grid-connected AllEarth Solar Tracker. He founded NRG Systems in Hinesburg, VT, and is the managing partner of Georgia Mountain Community Wind.

2/15/15

VERMONT SOLAR REFERENCES

BUSINESSES

Cold Hollow

Contact: Paul Brown
 Email: paulb@coldhollow.com
 Phone: (802) 244-8771

Woodstock Aqueduct Company

Contact: Eric Wegner
 Email: wegnereric@aol.com
 Phone: (802) 457-4497

TOWNS & SCHOOLS

Middlebury College

Contact: Mike Moser
 Email: mmoser@middlebury.edu
 Phone: (802) 443-5326

Town of Starksboro

Contact: Susan Jefferies
 Email: susanjefferies@gmavt.net
 Phone: (802) 453-3611

NON-PROFITS

Craftsbury Outdoor Center

Contact: Judy Geer
 Email: geerjudy@gmail.com
 Phone: (802) 586-7767

VT Youth Conservation Corps

Contact: Thomas Hark
 Email: thomas.hark@vycc.org
 Phone: (802) 434-3969

VERMONT SOLAR CUSTOMERS:

- Town of Hinesburg
- Town of Williston
- Town of Starksboro
- City of Rutland
- University of Vermont
- Middlebury College
- Rock Point School
- Merchants Bank
- The Energy Mill
- Vermont Food Bank
- Smugglers' Notch Resort
- Vermont Technical College
- Woodchuck Hard Cider
- Vermont Electric Cooperative
- Evergreen Gardens of Vermont
- Yestermorrow Design Build School
- Laraway Youth and Family Services
- Sojourns Community Health Clinic
- Home Security Management Corporation
- Woods Market Garden
- Small Dog Electronics
- Concept II Rowing
- Lincoln Elementary School
- Vermont National Guard
- Episcopal Diocese of Vermont
- Sterling College
- American Flatbread
- Green Mountain Power
- Champlain Orchards
- Bast and Rood Architects
- Woodstock Aqueduct Company
- Cold Hollow Cider Mill
- VT Youth Conservation Corps
- Jericho Settlers Farm
- Morse Farm Maple Sugarworks
- Branon Family Maple Orchards
- Sterling Brook Farm
- Big Picture Farm



Small Dog
ELECTRONICS
Always by your side



The University of Vermont



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concept 2

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