pollution prevention

Volunteering to prevent air pollution in San Juan County, New Mexico.

pollution prevention

SAN JUAN VISTAS

Working together to improve air quality

New Mexico Environment Department (NMED)
Air Quality Bureau • P.O. Box 26110
Santa Fe, NM 87502-0110

Toll Free (800) 224-7009 • (505) 827-1494
www.nmenv.state.nm.us/vistas

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TABLE OF CONTENTS

voluntary emissions reduction

WHAT IS VISTAS?

San Juan VISTAS is an acronym for *Voluntary Innovative Strategies for Today's Air Standards.* VISTAS is a voluntary emission control program administered by the New Mexico Environment Department (NMED), Air Quality Bureau to help improve air quality.

The purpose of San Juan VISTAS is to identify, promote and implement practices and technologies to reduce emissions that contribute to ozone, haze, and climate change (greenhouse gases). The New Mexico Environment Department (NMED) can assist a VISTAS Partner by analyzing technologies and practices for emissions reductions.

WHAT DOES IT MEAN?

VISTAS means working together as partners to identify, promote, and implement cost-effective technologies and practices to reduce air pollution affecting northwestern New Mexico, including ozone, haze, and greenhouse gases.

Painless

If every American home replaced just one light bulb with a compact fluorescent bulb, we would save enough energy to light more than 2.5 million homes for a year and prevent greenhouse gases equivalent to the emissions of nearly 800,000 cars. **Consider the improvements we could make in San Juan County, New Mexico.**

VISTAS PARTNERS

Who Can Join? Private and public entities can participate in VISTAS

- Industries
- Businesses
- Municipalities
- Organizations
- Community Groups

Each of us can take steps to reduce pollution. To be a VISTAS Partner, technologies and practices employed for emissions reductions must be above and beyond regulatory and permit requirements.

Why Join?

- Make a difference to improve air quality of the Four Corners region.
- Demonstrate how your company or organization is willing to make a positive difference in the community.
- Enjoy recognition for going above and beyond standard air emission regulations and requirements.
- Share technology and ideas to help other entities reduce air pollution.

Call the New Mexico Environment Department Air Quality Bureau to join.
(800) 224-7009 toll free or (505) 827-1494

SAN JUAN VISTAS
Working together to improve air quality

"It really is up to all of us to work together to protect our air quality in New Mexico. The key is that everyone needs to participate and no one should hesitate to take action, no matter how small or inconsequential that action may seem."

—Mary Uhl
New Mexico Environment Department, Air Quality Bureau Chief

Air Pollution in San Juan County *and* Northwest New Mexico

Air pollution in New Mexico is generated by a variety of sources:

- fossil-fuel fired electric generation units
- oil and gas industry
- motor vehicles, from passenger cars to commercial trucks and recreational vehicles
- local businesses such as dry cleaners and gas stations
- natural sources from soil and vegetation
- and lifestyle choices of individuals, such as heating and lighting homes

Everyone can help prevent pollution

Businesses, organizations and individuals all can take steps to reduce pollution. Every pound of pollution prevented from entering our air has a positive effect on air quality. Locally, businesses and industry use 50-70% of the electricity consumed, so positive steps can make large contributions to improved air quality. Businesses and organizations also can educate employees to apply good energy efficiency practices at work and at home.

How do we prevent pollution?

Use Less Energy

Using less energy reduces air pollution. Burning fossil fuels directly or using electricity generated by fossil fuel combustion results in increased air pollutants. Decreasing energy consumption correlates to decreased emissions. Every step taken to save energy is a step towards pollution prevention.

Add or Improve Emission Controls

From power plant scrubbers and selective catalytic reduction systems to engine oxidation catalysts and particulate filters, emission controls reduce exhaust emissions.

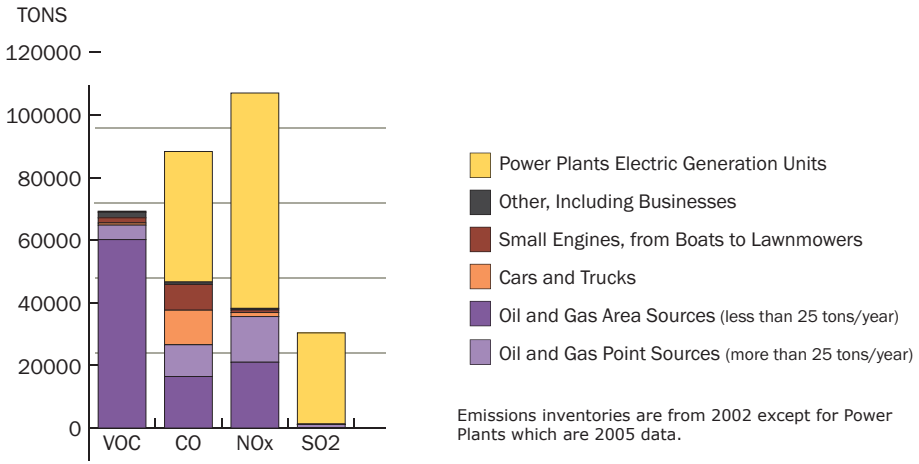
Increase Efficiency

Efficiency is getting more out of each bit of energy we use. The result can be a *direct* benefit by reducing emissions from equipment or cars and getting more work done for less money and an *indirect* benefit by reducing the demand for additional energy production. Energy efficiency saves energy, saves money on utility bills, and helps protect the environment by reducing the amount of emissions generated.

Local emissions generated in San Juan County

Increased growth in the area is rasing some concerns about a possible increase in air pollution emissions.

Though "cars and trucks" and "other" sources may look small on the graph, they have significant impacts in localized areas. An idling diesel truck parked at the schoolyard has a direct effect on children's lungs (see page 12).



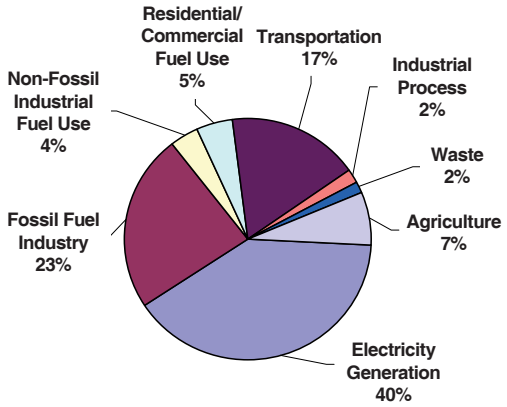
Emissions inventories are from 2002 except for Power Plants which are 2005 data.

New Mexico Greenhouse Gases

New Mexico is leading the way to reduce greenhouse gas emissions with several climate change initiatives!

- Greenhouse gas emissions reporting and regulation development
- Oil and Gas Emissions Reduction Study
- Clean Cars Regulation Development
- Greenhouse gas reduction targets:
  - 2000 levels by 2012
  - 10% below that by 2020
  - 75% below by 2050

On a per capita basis, NM produces twice the national average of greenhouse gas emissions. Electricity generation is the largest emitter of greenhouse gases in NM followed by the Fossil Fuel Industry. Transportation is predicted to be the fastest growing sector. The year for the inventory pie chart is 2000.



5-20% the amount municipalities have improved with smart controls on heating and cooling, and efficient lighting.

21% the amount a California State office building reduced their peak electrical load. (Peak demands often drive the demand for new power plants to go online.)

50% or more the potential reduction of NOx emissions from a compressor engine using lean burn technology.

30-50% the amount of NOx reduced by implementing low NOx burners and overfired air on an existing coal-fired power plant.

$45,000 the amount the city of Atascadero, CA, population 20,600 people, saved by implementing a $1600 conservation education program.

$170 the amount a typical household saves per year by using cold water in both the wash and rinse cycles.

$60+ the amount saved annually by turning off a spare refrigerator or upgrading to an Energy Star refrigerator.

307 the number of tons of pollution San Juan county could reduce if each person changed one incandescent bulb to a compact florescent bulb.

1300 the number of tons of pollution reduced per year if San Juan County drivers cut one trip out of 10.

750 the number of pounds of coal not burned per year by using a compact fluorescent bulb instead of an incandescent light bulb

Zero the mileage of an idling vehicle.

Local businesses have reduced emissions by using more fuel efficient equipment from generators to compressors. For local business examples see examples further in this booklet and the VISTAS website, www.nmenv.state.nm.us/vistas.

"Why bother?"

"If I make an improvement, it's only a drop in the bucket."

"I can't do enough in my company to make a difference."

"It's only a little bit, what difference does it make?"

Why bother? Because each step adds up.

When individuals within companies and organizations take the first steps in simple changes for the better, air quality benefits are enjoyed by everyone. See examples for different companies and situations in the following pages. For specific information and to calculate pollution savings, go to the VISTAS website, www.nmenv.state.nm.us/vistas.

together, we can make a difference

We can reduce air pollution *directly*, for example driving less, or using a fuel efficient vehicle; or we can reduce pollution *indirectly* by reducing energy use.

plan errands efficiently

Want to improve your mileage? Reduce two trips out of 10—that's a 20% improvement, and it's free! For example, county wide = **2602 tons** of criteria pollutants prevented.

the fleet improvement

As vehicles need replacing, add low emission vehicles to the fleet. If only 10% of the local vehicles doubled mileage efficiency, the total emissions would decrease by 5%, equivalent to **650 tons** of criteria pollutants.

100 heavy-duty diesel trucks replaced with compressed natural gas trucks would prevent **322 tons** of pollution.

home lighting—efficiently!

Each person in San Juan County replacing three incandescent bulbs with new compact fluorescent bulbs, is equivalent to preventing **920 tons** of pollution.

improvements for oil and gas producers

A plunger lift improvement on 100 wells in San Juan County can potentially reduce **10,000 tons** of VOC's per year (see ConcocoPhillips 2006 case study, page 22).

building improvements

Home insulation can save 20-30% on heating and cooling bills. Plugging air leaks around doors and windows also saves. Older, less insulated homes show the most savings. If 100 homes in Farmington were upgraded, it's equivalent to **300 tons** or more CO2 emissions reductions and **1 ton** of both SO2 and NOx.

commercial lighting improvements

Lighting is often 35% of business' electrical costs. Upgrade from older T12 (1.5" diameter) tubes with magnetic ballasts to T8 (1" diameter) fluorescent lamp tubes with solid-state electronic ballasts to save about 22% electricity. If 100 businesses upgraded 50 bulbs the reduction would be **134 tons** of carbon dioxide.

don't idle

If 3,000 diesel trucks in San Juan County reduced idling by 10 minutes a day, that adds up to **1,500 tons** pollution reduction per year! In fact keep in mind that idling modern fuel injected vehicles longer than necessary can actually damage engines in the long term.

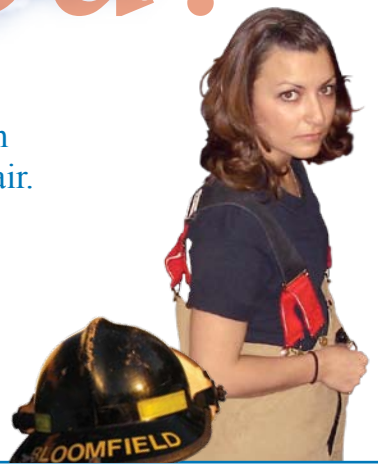
Just these steps alone add up to an estimated

16,429 tons

of pollution prevented

who are you?

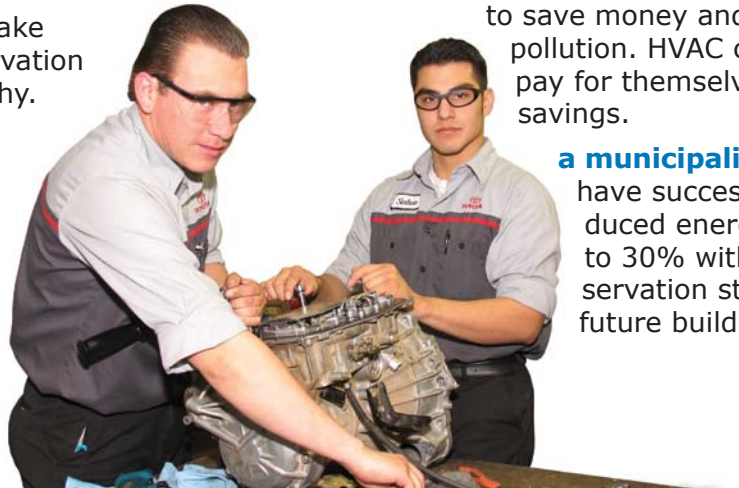
Prevent pollution and improve our air quality! Each of us can contribute to cleaning up New Mexico's air.



a small business owner Efficiency and mindful energy usage can save money and pollution. Implement efficiency plans and reward employees for their contributions and ideas.

a teacher Share your ideas and teach students the value of clean air, and lead by example—turn off equipment, ride your bike to school. See Schools on page 12.

an administrator Make efficiency and conservation the working philosophy. Share with staff the concept that every little bit counts. See Schools on page 12.



a mom or dad Efficiency is the name of the game and consolidating and reducing car trips is a big step. Turn off the lights in empty rooms. Make Junior turn off the lights for you. Time for a new fridge? Replace appliances with Energy Star appliances—they'll use less energy and ultimately save you money.

a facilities manager Energy audits can show how to run a facility more efficiently to save money and reduce pollution. HVAC controllers pay for themselves in energy savings.

a municipality Cities have successfully reduced energy usage up to 30% with easy conservation steps. Planning future buildings to be highly efficient pays off for the taxpayers too. Make a city pledge to reduce pollution by 10% in two years. See pages 12-13.

a church Leading by example! Churches have decreased energy costs by upgrading lighting and heating and cooling, saving thousands of dollars annually.

an oil and gas producer Efficient technology goes far to save production costs, capture more product and reduce pollution. See page 16 for more examples.

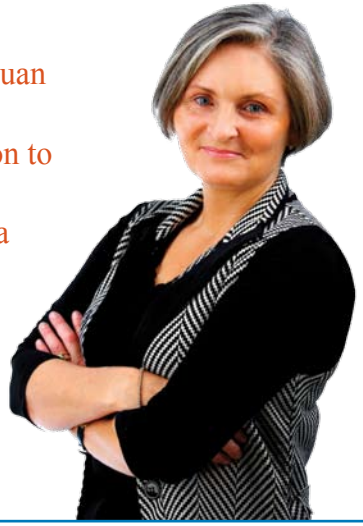
a truck driver Whether it's a welding rig, drilling rig or semi, drive efficiently! And don't let your vehicle idle.

a contractor Reduce emissions on generators and engines by 20-50% with emission controls.

VISTAS can help your company or organization reduce pollution in San Juan County and the region by providing:

- Technical assistance and information to get you started.
- Incentives for choosing to become a VISTAS Partner.

To learn more, contact the New Mexico Environment Department's Air Quality Bureau toll free at (800) 224-7009.



a fabrication shop Efficient lighting and buildings, just turning off the lights and turning off computers adds up. Metal cutting carbide tips are cleaner and less "smoky" than abrasives. Use heat exchangers in winter to keep air fresh and reduce heating fuel.

construction worker Encourage your customers to apply LEED, Leadership in Energy and Environmental Design, building standards. Plan your day efficiently—try to reduce one trip in the truck. Don't idle your trucks—just turn 'em off when you park. Use newer, efficient generators.

gardener or lawn maintenance From blowers to trimmers, small engines can be high polluters. If using two-cycle oil, look for "non-smoking" oil. Avoid gasoline overfills; consider electric options and newly designed cleaner gasoline equipment.

a hotel manager Make efficiency part of the policy. HVAC smart controls, capturing heat from dryers, energy efficient lighting, and properly designed windows are just a few of the ways to save.

"VISTAS is a practical approach to a mounting problem. By reducing emissions and energy consumption, businesses can help protect air quality and begin moving in a new direction of clean energy."

— U.S. Representative Tom Udall (N.M.-3)

"The Environment Department developed this program because of our concern about ground-level ozone in the Four Corners region of our state. VISTAS offers a voluntary approach for companies and organizations to take simple steps to reduce emissions of air pollutants."

— Ron Curry
NMED Secretary

"Specifically recognizing air quality improvements, the VISTAS program supports businesses' choices to reduce emissions, and in many cases, save money. Practices and technologies adopted for VISTAS may carry over to Green Zia, a New Mexico environmental excellence program."

— Michelle Vattano
NMED Pollution Prevention Coordinator

organizations and schools

Most schools spend more money on energy than school supplies, but they don't have to...

Organizations, from government to non-profit groups, can have direct and indirect effects on air quality that often can be reduced through various emission reduction practices. VISTAS can help your organization determine if a VISTAS Partnership is for you and get you started with brainstorming ideas for reducing emissions.

From K-12 to colleges, schools have dual roles in our air quality. Schools use energy and can also educate students about energy efficiency, conservation of energy, and new technologies.

See a full list at VISTAS website, www.nmenv.state.nm.us/vistas

NO IDLING

turn off idling busses, cars and trucks

Make your school or organization (and business) an exhaust-free zone. Vehicle exhaust is hazardous to human health, especially children. Today's cars do not need to be warmed up except below 0°F.

Reducing idling lowers the maintenance costs on each vehicle, saves fuel and protects public health and air quality.

FACT Idling diesel and gasoline exhaust contain more than 40 hazardous pollutants—Vehicle idling can have a powerful effect on the outdoor air quality at the local and community level.

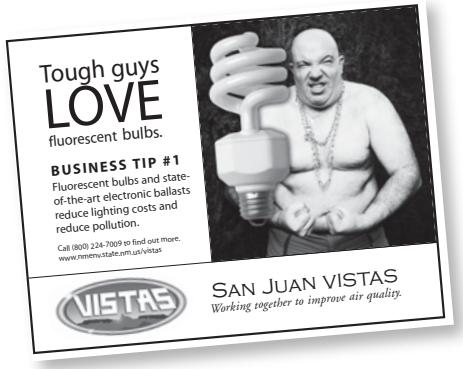
FACT Idling is hard on the engine— For modern diesel engines idling can actually be harder on the engine than driving down the road!

FACT Idling with the air conditioner can increase emissions by 13%.

FACT Idling wastes fuel and money— Every 10 minutes of idling costs you at least 1/10 of a quart of fuel.

RESOURCES—ENERGY AUDITS

- ☑ FREE — Farmington Electric Utility Energy Services Office: 505-599-1163
- ☑ FREE — PNM Home Energy Analysis: www.pnm.com/customers/hea.htm
- ☑ FREE — US Department of Energy — Energy Efficiency and Renewable Home Audits: www.eere.energy.gov/consumer/your_home/energy_audits
- ☑ FREE — NM EMNRD Energy Conservation and Management Division Tips & Tools: www.emnrd.state.nm.us/ecmd/Tips/tips.htm
- ☑ Contractors — search online for "NM energy efficiency audits"



Free publicity and bragging rights! Sign up for VISTAS and receive recognition from the New Mexico Environment Department.

building improvements

Increased insulation, modern windows, better building designs using correctly placed windows reduces heating and lighting costs, and make rooms bright, better places to learn and work. Encourage your schools, boards and administrators to adopt high efficiency building standards.

energy management

Efficient HVAC (Heating, Ventilation and Air Conditioning) systems and efficient lighting can reduce annual utility bills an average of 20%.

site surveys and energy audits

Analyze building performance, identify building upgrade opportunities, and learn how to improve with an energy audit. See list at the top of this page.

cars, cars, cars

Replace fleets over time to hybrid vehicles, low emission and highly efficient vehicles. Encourage carpooling and make carpooling available.

upgrade fleets to natural gas

Natural gas engines are cleaner burning than diesel engines.

make it personal and fun

Share ideas with staff, hold competitions for energy reduction, give awards.

lighting improvements

Not all fluorescent bulbs are created equal. The newer, 1" diameter T8 bulbs (vs the older 1.5" T12 bulbs) save about 22%. Lighting accounts for 40% of schools' energy use.

teach

Teach students the value of clean air, and lead by example—turn off equipment and bike to school. Make math problems applicable to energy efficiency. Relate conservation to money saved and pollution reduced in class. Set up competitions for pounds of pollution of reduction between classes and between students—"Weight-watchers for Pollution."

apply for energy grants

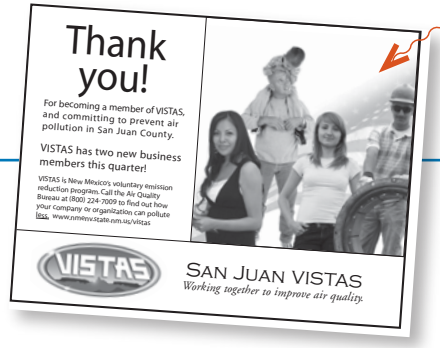
Grants and educational materials are available to teachers. Contact NMED for more information.

turn it off!

Turn off lights and computers in unoccupied rooms. It's so easy but it helps!

general industry
and commercial sources

Save a pound, save a ton, maybe save some money. From pump jacks to power plants, convenience stores to delivery companies, all can make a contribution to preventing pollution.



Industrial and commercial sources include:

- *Coal-fired power plants*
- *Gas-fired power plants*
- *Refineries*
- *Oil and gas industry— from exploration and drilling to wellhead and transmission*
- *Retail businesses of all kinds from small hardware stores to dry cleaners and shopping malls*
- *Fleet and delivery services*

new/future coal-fired power plants

Integrated Gasification Combined Cycle (IGCC) process can lead to lower emissions and easier carbon capture.

Low NOx burners and selective catalytic reduction can lead to 80-90% NOx control.

existing coal-fired power plants

- Improvements in efficiency can lead to less pollution per megawatt electricity generation.
- Retrofitting advanced low NOx burners and utilizing overfired air can reduce NOx by 50%.
- Selective catalytic reduction system can be retrofitted to reduce NOx 70% or more.

natural gas turbine power plants

Natural gas combustion is a cleaner burning process. Using the waste heat for a combined cycle or co-generation improves efficiency.

crude oil and petroleum refineries

Improving efficiency directly saves money, and emission controls decrease pollution.

- Ultra low NOx burners reduce nitrogen oxides. Scrubbers reduce SO2.
- Selective catalytic reduction reduces NOx.
- Flare gas recovery and treatment prevents CO, CO2, NOx, SO2 and VOC emissions. The recovered gas can lead to $100,000s of savings in product sales.

natural gas processing plants

Fugitive natural gas emissions from gas processing plants can be substantial. Detecting and repairing leaks reduces greenhouse gas emissions and sends more gas to market.

"Forward-thinking business owners can do the right thing for air quality through our voluntary VISTAS program. We're seeing increasingly common examples of how environmental protection goes hand-in-hand with good business sense. VISTAS relies on this win-win relationship for our environment and businesses."

— Jim Norton, NMED Environment Protection Division Director

It's OK to brag to customers!
Let customers know that your business is doing its part. Free publicity, ads and bragging rights when you sign up for VISTAS.

fleet management — Improve your fleet & put a VISTAS bumper sticker on your cars today!

- Retrofit emission controls, such as oxidation catalysts, can reduce particulate matter by at least 20%, hydrocarbons by 50% and carbon monoxide by 40%.
- Natural gas, biofuels, and hybrid vehicles often reduce tailpipe emissions and some have federal tax incentives.
- Replace old vehicles with more fuel efficient vehicles to save money and reduce emissions. Many vehicles now get 30 miles per gallon; compared to 20 mpg, you'll prevent 1/3 the pollution and save about $5,000 in fuel over the life of the car. ($3/gal; 100,000 miles)

retail businesses

Heating, cooling and lighting are the bulk of energy usage for retail stores. Upgrade to efficient lighting, get an energy audit to determine the largest improvement for your investment. Encourage carpooling. Brag to your customers as you improve!

no idling

Make your business an exhaust-free zone. Today's cars and trucks do not need to be warmed up except below 0°F. Reducing idling lowers the maintenance costs on each vehicle, saves fuel and protects public health and air quality.

FACT Idling is hard on the engine—
For modern diesel engines idling can actually be harder on the engine than driving down the road!

FACT Idling diesel and gasoline exhaust contain more than 40 hazardous pollutants—
Vehicle idling can have a powerful effect on the outdoor air quality at the local and community level.

FACT Idling with the air conditioner can increases emissions by 13%.

FACT Idling adds to global warming—
Every quart of gasoline produces 5.1 pounds of carbon dioxide.

FACT Idling wastes fuel and money—
Every 10 minutes of idling costs you at least 1/10 of a quart of fuel.

The average long-haul truck idles at least 1,830 hours per year, and, using $2,200 of unnecessary fuel and emitting 17 tons of carbon dioxide, 10 pounds of fine particles and 615 pounds of nitrogen oxides every year.

oil and gas

industrial and commercial sources

Join the growing numbers of companies in the oil and gas industry that are taking voluntary steps to reduce emissions.

Preventing pollution often amounts to recovering product that would otherwise be lost and saving money that would otherwise be spent. The oil and gas industry has specific examples that can reduce emissions throughout the process from drilling and production to gathering, treatment, refining, compression and transmission.

drilling rig engines
Converting diesel rig engines from 2-stroke engines to more efficient and cleaner 4-stroke engines can ultimately decrease operating costs with increased fuel efficiency and reduce criteria pollutants by 50% or more.

green completions/flareless drilling
Save/reduce up to 70% of vented methane emissions during the "completing" of natural gas wells. Instead of venting or flaring, the gas is cleaned for delivery to sales.

commingled production
Commingling of production may reduce the number of tanks, separators and compressors and reduce emissions.

insulating of heaters/separators/production tanks
Reduced heating fuel results in direct emission reductions.

plunger lift optimization
Reduce venting of natural gas.

vapor recovery on production units
EPA Natural Gas STAR partners have generated significant savings from recovering and marketing these vapors while at the same time substantially reducing emissions of methane and hazardous air pollutants. Vapor recovery units on crude oil and condensate tanks capture flash emissions that result when crude oil or condensate is dumped into the tank from the production separator. The air quality benefits from reducing VOC losses to the atmosphere; if sufficient flash gas is present, there are economic benefits also.

reduce trucking of produced fluids
Centralizing water storage and/or disposal can reduce truck hauling and vehicle emissions. Monitoring and control technology can also reduce trips to the field.

lean burn compression engines
Development of lean-burn engine technology for use on small well-head compressors could reduce NOx emissions on individual new compressor engines by 50-80%.

Be recognized for your good efforts
Free publicity, ads and bragging rights! Sign up for VISTAS and receive publicity and accolades from the New Mexico Environmental Department.

exhaust after treatment
Oxidation catalysts can be installed on lean-burn low NOx engines to reduce CO and hydrocarbon emissions by 90%.

advanced dehydration
Natural gas dehydration is the third largest source of methane emissions and causes more than 80% of the natural gas industry's annual HAP and VOC emissions. Advanced dehydration technology recovers gas and reduces emissions.

refineries—See more on page 14.

"We've added insulating shells to our heaters/separators in the field, so now they use less gas. It's sounds like a small step, but there are thousands of wells in the field."

— Bruce Gantner, Environmental Health and Safety Manager for ConocoPhillips

VISTAS is modeled on EPA's Natural Gas STAR program, to help gas companies identify cost-effective opportunities to reduce methane emissions. Technologies and processes applicable to the oil and gas industry in San Juan County are listed below. Details are at VISTAS website, www.nmenv.state.nm.us/vistas

EPA Gas Star Options

Compressors/Engines
- Reducing Emissions When Taking Compressors Offline
- Automate Systems Operation to Reduce Venting
- Automated Air/Fuel Ratio Controls
- Install Electric Compression

Dehydrators
- Portable Desiccant Dehydrators
- Replacing Glycol Dehydrators with Desiccant Dehydrators

Pneumatics/Controls
- Options for Reducing Methane Emissions From Pneumatic Devices
- Convert Gas Pneumatic Controls to Instrument Air

Tanks
- Installing Vapor Recovery Units on Crude Oil Storage Tanks

Wells
- Installing Plunger Lift Systems in Gas Wells
- Green Completions

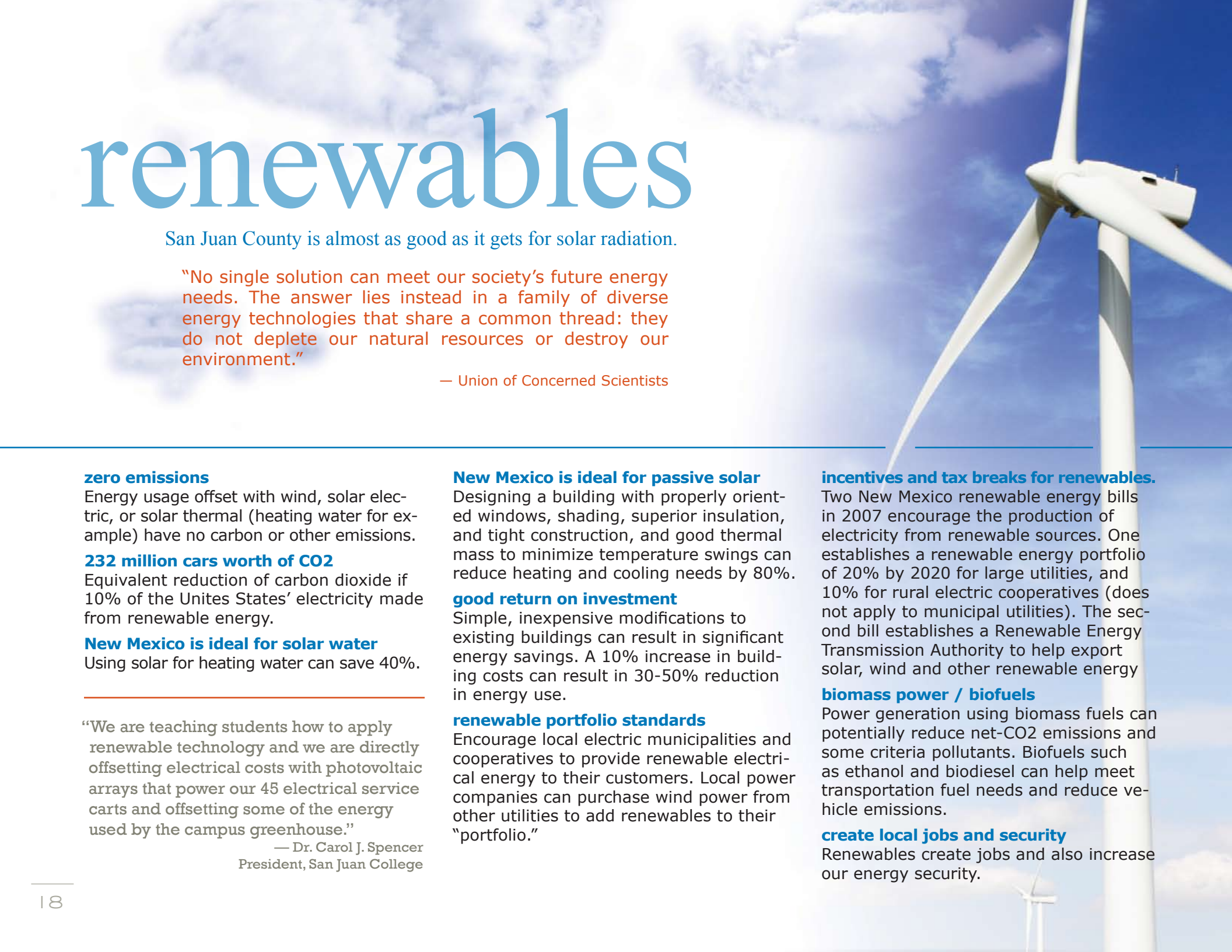
Other
- Process Optimization
- Directed Inspection and Maintenance with Optical Imaging
- Conduct Directed Maintenance and Inspection at Remote Sites

renewables

San Juan County is almost as good as it gets for solar radiation.

"No single solution can meet our society's future energy needs. The answer lies instead in a family of diverse energy technologies that share a common thread: they do not deplete our natural resources or destroy our environment."

— Union of Concerned Scientists



zero emissions
Energy usage offset with wind, solar electric, or solar thermal (heating water for example) have no carbon or other emissions.

232 million cars worth of CO2
Equivalent reduction of carbon dioxide if 10% of the Unites States' electricity made from renewable energy.

New Mexico is ideal for solar water
Using solar for heating water can save 40%.

"We are teaching students how to apply renewable technology and we are directly offsetting electrical costs with photovoltaic arrays that power our 45 electrical service carts and offsetting some of the energy used by the campus greenhouse."

— Dr. Carol J. Spencer
President, San Juan College

New Mexico is ideal for passive solar
Designing a building with properly oriented windows, shading, superior insulation, and tight construction, and good thermal mass to minimize temperature swings can reduce heating and cooling needs by 80%.

good return on investment
Simple, inexpensive modifications to existing buildings can result in significant energy savings. A 10% increase in building costs can result in 30-50% reduction in energy use.

renewable portfolio standards
Encourage local electric municipalities and cooperatives to provide renewable electrical energy to their customers. Local power companies can purchase wind power from other utilities to add renewables to their "portfolio."

incentives and tax breaks for renewables.
Two New Mexico renewable energy bills in 2007 encourage the production of electricity from renewable sources. One establishes a renewable energy portfolio of 20% by 2020 for large utilities, and 10% for rural electric cooperatives (does not apply to municipal utilities). The second bill establishes a Renewable Energy Transmission Authority to help export solar, wind and other renewable energy

biomass power / biofuels
Power generation using biomass fuels can potentially reduce net-CO2 emissions and some criteria pollutants. Biofuels such as ethanol and biodiesel can help meet transportation fuel needs and reduce vehicle emissions.

create local jobs and security
Renewables create jobs and also increase our energy security.

For solar tax credit information go to: www.emnrd.state.nm.us/ecmd/

Above: APS' photovoltaic installation, Phoenix, Arizona.
Left: Tom Munson, Coordinator of the Renewable Energy Program, San Juan College, Farmington, NM.

costs of wind vs coal

Today the cost of wind power has dropped substantially, to about 2.6 to 4.8¢ per kilowatt hour as compared to coal, at 4 to 5¢.

purchase greenhouse gas credits

You can purchase credits to offset CO2 production at www.terrapass.com.

solar electric — New Mexico is ideal

Making solar rebates and net-metering agreements available in the Four Corners would help promote renewable energy.

In most parts of New Mexico PNM pays customers with small systems, 10 kW AC or less, for their environmental benefits. The PNM program, combined with state and federal tax incentives, can reduce the installation cost by about 60 percent up to a maximum of $9,000. And a 30% state tax credit on installation costs for qualified systems can save up to $9,000. PNM is also allowing customers to interconnect (grid-tie) to their distribution system, buying the electricity at 13 cents/kwh. www.emnrd.state.nm.us/ecmd/

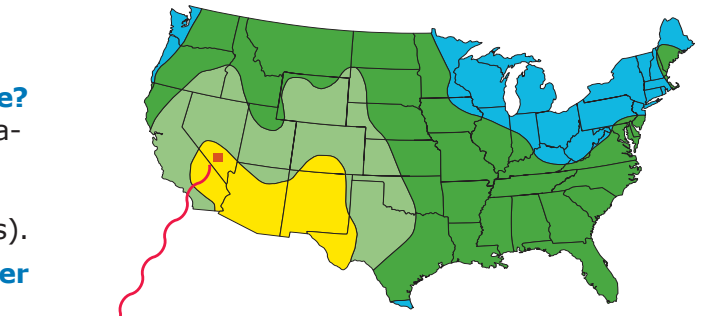
how much solar area to power one home?

1 square meter (3.3'x 3.3') of photo voltaics produces about 276 kWh of electricity per year. An efficient household needs 3600 kWh (about 10' x 14' of solar panels).

how much solar area is needed to power all the U.S?

An area about 100 miles on each side (10,327 square miles) is the amount of land needed to generate as much electricity as all the powerplants currently in the US (2005 technology and 3.8 billion kilowatt hours). See red area on map at right.

U.S. maximum annual solar radiation is yellow



"The installation and use of renewable technologies are growing at a pace that exceeds all other energy options. San Juan College offers a 2-year AAS degree and a 1-year certificate for Photovoltaic System Design and Installation."

— Tom Munson, Coordinator
Renewable Energy Program, San Juan College, NM

personal steps

Air pollution affects us all, and all our individual steps add up to improve air quality.

QUICK STEPS — YOUR SMALL STEPS ADD UP!

- ☑ reduce energy use by turning off equipment and lights when not in use
- ☑ plan and combine errands to reduce driving trips
- ☑ purchase Energy Star® office equipment and appliances
- ☑ use high-efficiency lighting
- ☑ see a full list at the VISTAS website, www.nmenv.state.nm.us/vistas

Air pollution, from the haze we see to the invisible carbon dioxide that causes global warming, affects us all. Though VISTAS is a program for organizations and businesses there are many steps individuals can take. In general we can improve our air quality by using less energy, and using energy more efficiently. See a full list at www.nmenv.state.nm.us/vistas.

be efficient
Be energy efficient. Monitor your energy use and try to reduce your consumption by turning off lights, updating some of your household appliances to Energy Star and products to low-energy models, and using your air conditioner wisely during the summer months.

purchase "green power"
Why? Green power does not create harmful smog emissions. Green power is energy that is generated from renewable sources, such as water, solar energy and wind.

reduce use of paints, pesticides, solvents and...
Reduce your outdoor use of VOC-releasing products such as oil-based paints, lawn pesticides, car cleaning solvents and waxes to reduce VOCs and smog.

build a clean fire
Dark smoke rising from a chimney means that the fire is not hot enough and is releasing large quantities of pollution. Also consider using propane or natural gas

cut down on the use of small motors, such as lawnmowers, leaf blowers, chain saws, and lawn and garden tractors.

Why? Small engines, especially older models, are high polluters and emit as much or more than autos.

It's not your grandfather's push mower. Today's modern push mowers are sleek, light and much easier to push, and require no fuel—free to run and zero emissions.

Plant leafy trees to provide shade in the summer, and allow light in the winter. **Why?** Properly sited trees reduce home air conditioning and winter heating needs considerably by providing shade and windbreak.

Carpool—Use carpool postings to encourage employees to carpool.

Walk, ride your bike, and plan errands efficiently. Start by eliminating one errand a week in the car by combining trips.

Where is energy typically used in the home?

56% for heating and cooling
14% to 25% for water heating
20% for appliances and electronics
15% for electrical lighting

Clothes washer—set to warm or cold, not hot. Switching from hot to warm for two loads per week can save nearly 500 pounds of CO2 per year if you have an electric water heater, or 150 pounds for a gas heater. Front loading washing machines will usually cut hot water use by 60 to 70% compared to top loaders.

Water heater—Turn it down. Thermostats are often set to 140°F when 120 is usually fine. Each 10° reduction saves 600 pounds of CO2 per year for an electric water heater, or 440 pounds for a gas heater.

Refrigerators to furnaces—Select the most energy-efficient models when you replace your old appliances. Look for the Energy Star Label — your assurance that the product saves energy and prevents pollution. Buy the product that is sized to your typical needs — not the biggest one available.

FACT Small gasoline engines are significant polluters—Currently, a 2-cycle push mower emits as much hourly pollution as 11 cars and a riding mower emits as much as 34 cars. A recreational watercraft can emit as much as 348 cars an hour.

SAVINGS If all households in the USA used ENERGY STAR refrigerators, the electricity saved could eliminate the need for 19 coal-fired power plants.

SAVINGS 5,000 CFLs (instead of incandescent bulbs) represent a reduction of 656 pounds of soot, 15,750 pounds of sulfur dioxide and 8,550 pounds of nitrogen oxide.

SAVINGS Backyard trees may result in up to a 40% reduction in air conditioning needs, a 10% reduction in heating needs and a decrease in ambient air temperatures of up to 7°F.

SAVINGS Replacing a typical 1973 refrigerator with a new energy-efficient model saves 1.4 tons of CO2 per year.

SAVINGS Investing in a solar water heater can save 4.9 tons of CO2 annually.

SAVINGS Every gallon of gasoline you save avoids 22 pounds of CO2 emissions. If your car gets 25 miles per gallon, for example, and you reduce your annual driving from 12,000 to 10,000 miles, you'll save 1800 pounds of CO2.

SAVINGS If your new car gets 40 miles per gallon instead of 25, and you drive 10,000 miles per year, you'll reduce your annual CO2 emissions by 3,300 pounds.

SAVINGS Insulating walls and ceilings can save 20-30% of home heating bills and reduce CO2 emissions by 140 to 2100 pounds per year. Replacing windows with new argon-filled double glaze can save up to 2400 pounds CO2 per year. Weatherizing can save up to 1100 pounds of CO2 per year for a typical home.

"The average New Mexico residential customer consumes 7,200 kWh in a year, but that value could be at least cut in half with mild efficiency improvements."

—Carl Bickford,
Professor, Engineering and
Renewable Energy, San Juan College

"The easiest thing at home is changing from incandescent bulbs to compact fluorescents (cf). They are 70-75% more efficient and they last 10 times as long. And they are much cheaper than years ago."

— Belinda Swope, 4th grade teacher,
Park Avenue School, Aztec

VISTAS Success Stories

POLLUTION SAVINGS

ConocoPhillips

- Downsized 33 compressor engines to reduce 212 tons of NOx, 5 tons CO, and 23,389 tons CO2.
- Installation of some new cleaner engines to replace existing reciprocating engines reduced NOx emissions by 837.5 tons/yr and CO emissions by 226.7 tons/year
- Installed 69 insulated production separators and 72 insulated production tanks leading to reductions of 2.65 tons/yr NOx, 0.55 tons/yr CO, and 3,178 tons CO2
- Optimized plunger lifts on three wells resulting in reduced venting of an estimated 308 tons VOC's per year
- Capstone Turbines and Reduced Trucking of Produced Fluids

POLLUTION SAVINGS

Red River Compression

- Newly developed small lean-burn compressor engines meet and exceed 2 g NOx / hp hr interim emissions standards for the area. Use in the San Juan County field will lead to reduced emissions. Report to be completed for 2007.

2005 VISTAS Partner Estimated Emissions Reductions

NOx	121.78 tons/year
CO	-12.97 tons/year (i.e. increase)
VOC	330.54 tons/year

2006 VISTAS Partner Estimated Emissions Reductions

NOx	1,096.97 tons/year
CO	278.56 tons/year
VOC	308 tons/year
CO2	28,288 tons/year

References • Links

Energy Efficiency

DOE Energy Efficiency and Renewable Energy (EERE)
Home Page: http://www.eere.energy.gov/

Rocky Mountain Institute – http://www.rmi.org/

Oil and Gas: US EPA Gas STAR – http://www.epa.gov/gasstar/

Flex your Power (CA energy efficiency marketing and outreach campaign)
http://www.fypower.org/

Alliance to Save Energy – http://www.ase.org

Environmental Protection Agency – http://www.epa.gov/ (search for energy efficiency and ENERGY STAR)

Fleet (car and truck) Improvements

www.eere.energy.gov/fleetguide/niche_toolkits.html

Renewable Energy

New Mexico Solar Energy Association – http://nmsea.org/

American Wind Energy Association – http://www.awea.org/

National Renewable Energy Laboratory (NREL) – http://www.nrel.gov/

San Juan College Renewable Energy Program
http://www.sanjuancollege.edu/pages/4003.asp

Solar Living Sourcebook, by Doug Pratt

Tax Credits

New Mexico Solar, Hybrid and Sustainable Building Tax Credits
http://www.emnrd.state.nm.us/ecmd/

Federal Tax Credits
http://www.energystar.gov/index.cfm?c=Products.pr_tax_credits

State of New Mexico Agency Resources

New Mexico Environment Department Air Quality Bureau –
http://www.nmenv.state.nm.us/aqb/

New Mexico San Juan VISTAS – www.nmenv.state.nm.us/vistas

New Mexico Energy, Minerals and Natural Resources Department
http://www.emnrd.state.nm.us/main/index.htm

NM Climate Change Initiatives
http://www.nmenv.state.nm.us/cc/index.html

VISTAS

www.nmenv.state.nm.us/vistas

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SAN JUAN VISTAS

Voluntary Innovative Strategies for Today's Air Standards

Working Together to Improve Air Quality

Private and public entities can participate in VISTAS. To find out more, please call the New Mexico Environment Department Air Quality Bureau .

How to Join?

1. Read the details about VISTAS on the back of this form.
2. Fill out the form and fax or mail back to the New Mexico Environmental Environment Department.

New Mexico Environment Department (NMED)
Air Quality Bureau

P.O. Box 26110
Santa Fe, NM 87502-0110

Phone: (505) 827-1494
Fax: (505) 827-1543

Or go online to get the form,
www.nmenv.state.nm.us/vistas

This is a voluntary agreement between _____ (company name) and the New Mexico Environment Department (NMED) to improve air quality in the Four Corners by reducing air pollution including ozone, haze and/or greenhouse gases. The company agrees to implement emissions reductions of volatile organic compounds, oxides of nitrogen, carbon monoxide, sulfur dioxide, particulates, ammonia and/or greenhouse gases.*

Authorized Company Representative _____
first/last name

Signature _____ Date _____

San Juan VISTAS Partner's Implementation Manager

Title • Name _____

Address (Stree/city/state/zip) _____

_____

Tel • Fax _____

E-mail _____

New Mexico Environment Department

Air Quality Bureau Chief, New Mexico Environment Department

Signature _____ Date _____

The VISTAS Partnership to Improve Air Quality

New Mexico Environment Department's Responsibilities

1. Provide VISTAS Partners with public recognition for their commitment to San Juan VISTAS through one or more of the following: press releases, advertisements, articles, and awards.
2. Assist VISTAS Partners with implementation by analyzing technologies and practices for emissions reductions, when appropriate.

VISTAS Partner's Responsibilities

1. Appoint a company representative as their VISTAS Implementation Manager responsible for implementing this voluntary agreement.
2. Within six months of signing this agreement, submit an implementation plan describing how emissions reductions will be achieved, including expected types and amounts of technologies and/or practices, expected emissions reductions, and timeline to completion. Qualification for participation in the VISTAS program requires emissions reductions that are above and beyond regulatory requirements.
3. Submit annual reports by April 1 describing the measures implemented, the costs of implementation, and the associated reduction(s) of volatile organic compounds, oxides of nitrogen, sulfur dioxide, particulates, and/or greenhouse gases including, water vapor, carbon dioxide, methane, nitrous oxide, ozone, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and others.
4. Inform VISTAS Partner's employees about participation and cooperate with NMED efforts to publicize San Juan VISTAS.

General Terms

1. Either party may terminate this agreement at any time without notice, penalties, or further obligation. NMED agrees not to publicize a VISTAS Partner's withdrawal from the program.
2. The VISTAS Partner agrees that the activities it undertakes connected with this voluntary agreement are intended to provide services to the New Mexico state government and that the partner will not seek compensation from a state agency.
3. The VISTAS Partner agrees to not claim or imply that its participation constitutes NMED approval or endorsement of anything other than commitment to San Juan VISTAS.
4. Plan(s) and documentation submitted by a VISTAS Partner to NMED for purposes of San Juan VISTAS are intended to specify emissions reduction activities that are completed in addition to all applicable regulatory and permit requirements. Such plans are not intended to determine VISTAS Partners' compliance with regulatory and permit requirements.

*Greenhouse gas emissions include but are not limited to the following pollutants: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

SAN JUAN VISTAS
Voluntary Innovative Strategies for Today's Air Standards

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SAN JUAN VISTAS

Working together to improve air quality

New Mexico Environment Department (NMED)
Air Quality Bureau • P.O. Box 26110
Santa Fe, NM 87502-0110
Toll Free: (800)-224-7009 • (505) 827-1494
www.nmenv.state.nm.us/vistas

pollution reduction

making a difference...

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