A RESPONSIBLE ENERGY POLICY FOR THE 21st CENTURY
March 2001

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ABOUT NRDC

The Natural Resources Defense Council is a national nonprofit environmental organization with more than 400,000 members. Since 1970, our lawyers, scientists, and other environmental specialists have been working to protect the world's natural resources and improve the quality of the human environment. NRDC has offices in New York City; Washington, D.C.; Los Angeles; and San Francisco.

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EXECUTIVE SUMMARY

This report offers a responsible approach to meeting America's energy requirements. And it is balanced, recognizing the need to extract resources, while proposing a range of environmentally preferred ways to increase supply and energy efficiency improvements that could substantially reduce the demand for energy without forcing Americans or American industry to make sacrifices.

The cornerstone of NRDC's (Natural Resources Defense Council) plan is increased energy efficiency, relying not on pie-in-the-sky, undeveloped technologies, but on readily available and cost-effective processes and technologies. In the short-term, the plan calls for increased reliance on natural gas as a bridge to renewable and environmentally sound energy sources in the future. Correspondingly, the plan calls for reducing U.S. reliance on dirtier fossil fuels—oil and coal. And the plan addresses the urgent needs of low-income households for affordable energy services.

In sharp contrast to NRDC's common sense approach is the Bush administration's controversial energy initiative. Among other things, it calls for opening the Arctic National Wildlife Refuge coastal plain to oil drilling and development, and for rolling back environmental safeguards to pave the way for more fossil fuel development. Already the plan has come under severe criticism for the irreparable harm it would cause pristine areas of the wildlife refuge. That criticism is entirely accurate. But there is another fundamental reason to reject the proposal: it is completely unresponsive to the problems it purports to address. It would make virtually no difference to America's energy supply in the short- or long-term, it would have no impact on energy prices, and it would have no practical effect on America's dependence on foreign sources of oil.

RESPONSIBLE OIL POLICY: FUEL EFFICIENCY, NOT FOOLISH DEVELOPMENT OF THE ARCTIC NATIONAL WILDLIFE REFUGE

Key Recommendations:

- Provide tax credits to individuals who buy clean and efficient advanced-technology vehicles employing hybrid gasoline-electric drive.
- Raise fuel economy standards for new cars, sport utility vehicles (SUVs), and other light trucks to an average of 39 miles per gallon over the next decade.
- Require replacement tires to be as fuel efficient as the original tires on new vehicles.
- Expand programs to weatherize low-income Americans' housing and help pay their energy bills.
- Provide incentives for smart growth development patterns that reduce sprawl.
- Do not drill in the Arctic National Wildlife Refuge.
- Do not drill in sensitive offshore areas, including moratorium areas, Alaska, and the eastern Gulf of Mexico.
- Maintain existing protections for sensitive onshore public lands and extend protection to other special places.

The reality that proponents of drilling in the Arctic National Wildlife Refuge refuse to acknowledge is that the United States cannot drill its way out of its energy problem. America has 5 percent of the world's population, but consumes nearly a quarter of the world's oil supply. It already has extracted the majority of its available oil. The obvious conclusion is that the United States can have a much greater impact on oil prices worldwide and can do more to help ensure its own economic security by cutting its demand.

For example, simply upgrading the quality of replacement tires to match that of tires that come as standard equipment on new cars would save 5.4 billion barrels of oil over the next 50 years—70 percent more than the total amount of oil that would likely be pumped from the Arctic Refuge over the same time period. Updating fuel efficiency standards to reflect the capabilities of modern technology would produce even greater savings. Increasing fuel efficiency standards for new vehicles to an average of 39 miles per gallon over the next decade would save 51 billion barrels of oil over the next 50 years—more than 15 times the likely yield from the Arctic Refuge.

Upgrading the quality of replacement tires to match that of tires that come as standard equipment on new cars would save 5.4 billion barrels of oil over the next 50 years—70 percent more than the total amount of oil that would likely be pumped from the Arctic Refuge.

DRILLING THE ARCTIC REFUGE IS UNRESPONSIVE TO AMERICA'S ENERGY NEEDS

The case for drilling the Arctic National Wildlife Refuge made by the Bush administration and its supporters on Capitol Hill makes no sense. Proponents wrongly present drilling as a solution to the current California energy crisis. They overstate how much oil could be pumped. They understate the environmental consequences. In fact, drilling in the Arctic Refuge coastal plain would have no bearing on California's current crisis, would cause huge and unnecessary environmental damage, would do nothing to address America's long-term need for greater energy efficiency, would not affect the price of gasoline at the pump, and would not significantly reduce U.S. dependence on foreign oil.

The available oil from the Arctic National Wildlife Refuge is a drop in the bucket of America's energy needs. The best U.S. Geological Survey estimate is that less than a six-month supply of oil could be economically recovered from the Arctic Refuge (about 3.2 billion barrels, spread out over a 50-year period), and that it would take at least 10 years of exploration, drilling, and pipeline construction before the oil would reach refineries. In its peak year of production—2027—the Arctic Refuge would yield less than 2 percent of projected U.S. consumption in that year.

Proponents overstate how much oil would be extracted from the refuge. Proponents of drilling maintain that as much as 16 billion barrels of oil would be pumped from the Arctic Refuge. The claim is a gross exaggeration that ignores the U.S. Geological Survey's conclusion that about 60 percent of the oil in the Arctic Refuge would not be economically feasible to produce. Even if there were 16 billion barrels of oil available in the refuge, more than three times as much could be saved by raising vehicle fuel economy standards to an average of 39 miles per gallon.

Drilling in the coastal plain would have no impact on California's electricity problems or any other state's electricity problems. Most U.S. electric power plants do not use oil. Less than 1 percent of California's electricity is generated by burning oil. The

average for the United States as a whole is only 3 percent. And as noted above, oil from the refuge would not flow to refineries for at least a decade.

Less than 1 percent of California's electricity is generated by burning oil.

Drilling in the Arctic National Wildlife Refuge would have no impact on the price of energy. The oil market is global, and refuge oil would expand global oil reserves by just 0.3 percent—a quantity far too inconsequential to affect prices at the pump or elsewhere.

Drilling in the coastal plain would spoil an irreplaceable natural treasure. The Arctic National Wildlife Refuge is a fragile wilderness that would be ruined by oil drilling.

RESPONSIBLE ELECTRICITY POLICY: CLEAN AIR, ENERGY EFFICIENCY, CONVERSION TO RENEWABLES

Key Recommendations:

- Establish a national "system benefits" fund to promote energy efficiency, support research and development, and maintain universal service.
- Establish a federal "portfolio standard" to ensure that renewable energy steadily increases its market share at minimum cost.
- Extend the renewable energy production tax credit, which encourages greater reliance on emerging renewable energy sources.
- Provide tax incentives for advanced energy-efficient buildings and appliances.
- Strengthen energy-efficiency standards for appliances and buildings.
- Establish comprehensive limits on air pollution from power plants covering emissions of carbon, nitrogen, sulfur, and mercury.
- Require full disclosure to customers about the sources and environmental impact of their electricity.
- Reject new subsidies for so-called "clean coal" technology and nuclear power, and eliminate existing subsidies.

Another form of energy in the news today is electricity. As Californians suffer through an unprecedented electricity crunch, politicians a continent away are beginning to debate the causes of—and solutions to—the shortfall.

Contrary to suggestions from the White House, the California crisis is not a function of pollution regulation, and it will not be solved by drilling in the Arctic National Wildlife Refuge. The real reasons for the crisis include a market structure that failed to ensure long-term supplies as a hedge against volatile spot market prices, rapid consumption growth in neighboring states that is overloading the interstate power grid, cutbacks in electricity infrastructure investment throughout the West, and reduced hydropower generation due to low rainfall. As if all of that were not enough, investigations continue of alleged anti-competitive practices by power generators.

Also contributing to the crisis is a contraction in available natural gas supplies, leading to higher costs (almost one-third of California's electricity is generated with natural gas). Again, the upswing in natural gas prices is partly the result of industry decisions to forego exploration and cut storage levels after years of low commodity prices. Another con-

tributor to natural gas price increases is a short-term reduction in pipeline capacity in the Southwest due to an explosion last summer.

California already has acted to reduce its exposure to volatile short-term electricity markets by providing for a more balanced portfolio of longer-term purchase contracts. Looking ahead, the fastest, cheapest, and cleanest response to the electricity crisis is to take advantage of the state's many immediate opportunities to ramp up its investments in energy efficiency and renewable energy. These measures already contribute more than 15,000 megawatts to the Western power grid, which never needed them more. And the California Energy Commission recently issued emergency upgrades for efficiency standards governing all new buildings, which will yield the equivalent of two giant coal-fired power plants (1,000 megawatts) in the next five years. Also, last September, the Legislature and Gov. Gray Davis created a 10-year, $5.5 billion investment fund for energy efficiency and other sustainable energy technologies. California legislators could do more, starting with making a large additional investment from California's budget surplus in energy efficiency and renewable energy.

California also needs more highly efficient natural-gas-fired power plants. NRDC and other environmental groups support the ongoing additions of such plants, which have had no difficulty meeting California's siting requirements. Since April 1999, nine plants totaling nearly 6,300 megawatts have received siting approval. Six are under construction, and at least three are expected to be on-line by the end of this year (2,368 megawatts). At least 14 more plants capable of generating about 7,000 megawatts are poised to follow, rebutting claims that environmental safeguards somehow prevent additions of generation capacity. The new plants (both renewable and fossil) are dramatically cleaner than their aging gas- and coal-fired competitors across the Western power grid. Indeed, the capacity additions anticipated over the next several years are both clean and large enough to begin improving air quality by displacing those dirtier competitors during at least some hours of the year.

Nonetheless, President Bush said recently, "If there's any environmental regulations…preventing California from having a 100 percent max output at their plants[1]—as I understand there may be—then we need to relax those standards." But as reported by the *Los Angeles Times* on January 25, Richard Wheatley, spokesman for Houston-based Reliant Energy Co., which operates four Southern California power plants, said that the assertion that environmental regulations are holding back output "is absolutely false. We're making every megawatt available on request. We factor the air quality regulations into our daily operating basis, and they are not causing us to withhold power." The *Times* could find only one small, obsolete plant that had to suspend operations temporarily to comply with air quality standards, and it accounted for less than 0.2 percent of California's peak power needs.

In the long-term, the best path for California is the best path for America: strong clean air standards; increased reliance on energy-efficiency measures; a shift away from obsolete, inefficient fossil-fueled plants as a source for electricity; and, eventually, full conversion to renewable and environmentally sound forms of energy.

Taken together, these measures will reduce power plant pollution. The electricity-generating sector today is the single largest source of the four pollutants responsible for the most serious local, regional, national, and global air pollution problems we face. These four horsemen of power plant pollution are: sulfur dioxide (causing acid rain and producing fine particles), nitrogen oxides (causing ozone smog), mercury (causing neurological damage), and carbon dioxide (causing global warming).

Policies to limit air pollution are fragmented and based on outdated assumptions, resulting in excessive emissions and distorted electricity markets. As a result, support continues to grow for integrated requirements to reduce the four horsemen. A major benefit of an integrated pollution cleanup approach is that it would provide a clear road map for business in planning long-term investments.

Large pollution reductions can be achieved at reasonable cost while meeting America's electricity needs by maximizing energy efficiency and reliance on renewable energy technologies. Market barriers, however, have inhibited the widespread deployment of environmentally preferred electricity demand and supply options. Two of the most effective and market-compatible public policies to address this problem are public goods or system benefits funds, and renewables portfolio standards.

A public goods or system benefits charge—a small surcharge on customers' electricity bills—can help fund cost-effective, long-term investments in energy efficiency, low-income services, and renewable energy resources. At least 20 states have some form of system benefits charge.

Renewables portfolio standards, meanwhile, encourage greater diversity of energy resources, which enhances reliability by requiring electricity providers to include a minimum percentage of renewable energy resources in the electricity mix they deliver to their customers.

RESPONSIBLE NATURAL GAS POLICY: SENSIBLE EXTRACTION, SENSIBLE PIPELINE SITING

Key Recommendations:

- Provide tax incentives for the construction of energy-efficient buildings and for manufacturing energy-efficient heating and water-heating equipment.
- Adopt a comprehensive pipeline approach ensuring that pipelines are constructed and operated in an environmentally sensitive manner, with strong safety oversight, and, whenever possible, along existing routes.
- Reject plans to construct an offshore pipeline off the Arctic National Wildlife Refuge coastal plain.
- Plan an Alaska gas pipeline if needed to deliver Prudhoe Bay gas to the lower 48 states that follows the Trans-Alaska Pipeline System and the Alaska-Canadian Highway right-of-ways; complies with all U.S. and Canadian environmental laws; has a thorough, new environmental impact statement; and incorporates the best pipeline safety and environmental measures.

- Do not drill in sensitive offshore areas, including the moratorium areas, Alaska, and the eastern Gulf of Mexico. Maintain existing protections for sensitive onshore public lands and extend protection to other special places.

Of the three fossil fuels that dominate the U.S. energy market, natural gas is by far the cleanest burning fuel. It is, therefore, a key part of NRDC's energy policy—the bridge to greater reliance on cleaner and renewable forms of energy. Increased energy efficiency in homes and factories not only would lower consumers' energy bills; it would also free up large amounts of natural gas to help meet the needs of new, highly efficient, combined-cycle (combustion and steam turbine) power plants. Stronger and better-enforced building codes augmented by tax incentives for constructing buildings that exceed code requirements would pay a double dividend: lower heating and electric bills, and less pollution.

But natural gas is not sufficiently clean to be considered the long-term answer to America's energy needs. Extracting gas, transporting it to market, and burning it all cause pollution in various forms.

NRDC recognizes the need for continued exploitation of America's natural gas resources, but believes that certain federal lands should be afforded special protection. This applies to existing protected areas, including roadless national forest areas and the Rocky Mountain Front. Additional areas that should be protected include Wyoming's Red Desert, Utah's fabled red rock country, and the area in and around Vermillion Basin in northwest Colorado.

The energy production industry and its champions in Washington sometimes assert that America's public lands natural gas resources have been put off limits, but in fact, 95 percent of onshore federal public lands in the Rocky Mountain region managed by the Bureau of Land Management (including split estate lands) remain open to exploration and production leasing. Similarly, nearly 70 percent of the nation's untapped economically recoverable offshore oil and gas resources are open for these purposes. Oil and gas development should be excluded from sensitive offshore areas, including existing moratorium areas, Alaska, and the eastern Gulf of Mexico.

Another important natural gas issue involves siting pipelines to carry gas from drilling sites to market. NRDC believes that pipelines should be constructed and operated in an environmentally sensitive manner, with strong safety measures and oversight, and, whenever possible, along existing routes. For example, plans to construct an offshore pipeline off the Arctic National Wildlife Refuge coastal plain should be rejected. Instead, if Prudhoe Bay gas supplies are needed to serve markets in the lower 48 states, any Prudhoe Bay natural gas pipeline should follow the Trans-Alaska Pipeline System and the Alaska-Canadian Highway right-of-ways; undergo a thorough, new environmental impact statement; comply with all U.S. and Canadian environmental laws; and incorporate the best pipeline safety and environmental measures.

CONCLUSION

Eventually the United States will have no choice but to turn to greater energy efficiency and renewable sources of power. Demand for fossil fuels surely will overrun supply

sooner or later, as indeed it already has in the case of U.S. domestic oil drilling. The capacity of our air and land to absorb unlimited quantities of waste from fossil fuel extraction and combustion is also limited. As that day draws nearer, policymakers will have no realistic alternative but to turn to power sources that today make up a viable but small part of America's energy picture. They also will be forced to embrace energy efficiencies—those that are within our reach today, and those that will be developed tomorrow. Precisely *when* they come to grips with that reality—this year, 10 years from now, or 20 years from now—will determine how smoothly the transition will go for consumers and industry alike.

CHAPTER 1

A RESPONSIBLE ENERGY POLICY FOR THE 21ST CENTURY

At the dawn of a new century and the beginning of a new presidency, America finds itself once again wrestling with a problem that has, off and on, been at the forefront of U.S. politics for several decades: energy. The United States has 5 percent of the world's population, but consumes nearly a quarter of the world's energy supply. We use energy to heat our homes and our businesses, power our computers and telephone systems, run our automobiles and aircraft, and drive our manufacturing plants and hospitals. In short, we have constructed an economy and a way of life that depends on the ready availability of energy.

Unfortunately, energy is expensive to produce and deliver, and its creation—or more accurately, its extraction and conversion to useful forms—is the most polluting industrial activity in the United States and other advanced countries. By the same token, however, energy can be quite lucrative for those in the business of producing and selling it, and those interests that have long profited from meeting America's energy needs are heavily invested in an energy policy that emphasizes the production and sale of energy, even at the expense of the environment.

That conflict has given rise to two distinct visions of an energy policy for the United States. One vision focuses chiefly on extracting as much energy as possible, mostly in fossil fuel form (oil, coal, and natural gas), in hopes that supply can catch up with demand. This is a policy rooted in 19th century corporate behaviors, ignoring the experiences of the 20th century and the imperatives and opportunities of the 21st century.

The alternative vision, however, calls for encouraging innovation and new technology to meet our energy needs in an environmentally responsible manner. This vision emphasizes efficient use of energy, and places priority on using energy resources that are least damaging to our environment. It promotes economic growth and American industrial competitiveness. This energy path would not force consumers to make sacrifices. Instead it relies on improved technologies that would eliminate waste while increasing productivity and comfort. This is the vision of NRDC (Natural Resources Defense Council), and it is one that recognizes the realities of the 21st century.

NRDC believes that America's energy policy for the new century must address a number of important considerations. First, energy services drive U.S. industry, sustain Americans' standard of living, and are critical to national security.[1] U.S. energy policy must continue to provide the affordable energy services that a healthy economy needs.

But energy also imposes heavy costs on American businesses and consumers—some one-half trillion dollars per year, even before recent price increases. Energy policy must be directed at providing for our needs at the lowest cost, and encouraging industrial innovation to keep America competitive with other countries.

Second, U.S. energy policy must do as little harm to the environment as is reasonably possible, both in the extraction of natural resources used for energy, and in the consumption of that energy. Some potential energy resources, most notably those in the Arctic National Wildlife Refuge and sensitive offshore and onshore public lands, are within the nation's reach, but the environmental cost of extracting them is steep—too steep in NRDC's judgment. Similarly, the pollution caused by the burning of fossil fuels must be minimized.

Third, U.S. energy policy must recognize geophysical realities. Among these: energy costs money to produce and deliver, and domestic oil resources are usually more costly than imports. Furthermore, domestic oil resources are limited, so regardless of what policy choices are made, foreign sources of oil will be at least part of the U.S. energy supply picture for many years. Also, it is important to recognize that unchecked market forces often work to create energy price spikes and valleys. As recently as two years ago, U.S. energy producers complained about low prices for natural gas and oil, and began cutting back their investments in research and production. That, in turn, helped create the market circumstances that have made energy so expensive today.

Therefore, NRDC believes that U.S. energy policy must rely on the application of technological advances already in place and readily available as a way to reduce consumption. In the short-term, the United States should reduce its dependence on heavily polluting fossil fuels—oil and coal—and increase reliance on the efficient use of natural gas as a bridge to a longer-term strategy of greater reliance on renewable energy sources and cleaner technologies. Such an approach will decrease America's dependence on foreign sources of energy in the near- and long-term, protect the environment, provide for America's energy needs, and buffer the economy against short-term swings in the market.

INCREASING ENERGY EFFICIENCY

The amount of energy used to accomplish a task—such as heating a home, commuting to work, or lighting a retail store—depends as much or more on technology and investment as on behavior. Greater investments in efficiency combined with new technologies often can reduce energy use by 75 to 90 percent, while maintaining or even increasing comfort, convenience and performance. The return on investment typically exceeds 30 percent to 50 percent per year.

For example, between 1975 and 2001, manufacturers developed a new generation of energy-efficient refrigerators that consumed 75 percent less electricity than ones built before, saving 60,000 megawatts (MW) of electricity and reducing power plant emissions. Constructing power plants to produce this 60,000 MW would have cost $50 billion, compared to the refrigerator industry's investment of less than $1 billion to produce these more efficient refrigerators. Similar advances have been achieved with clothes washers, windows, fluorescent lighting, and heating and air conditioning systems.[2]

Unfortunately, pervasive market barriers hinder the development, availability, and use of energy-efficient technologies. For example, building developers are concerned almost exclusively with keeping construction costs low, so they commonly do not install energy-efficient technology, even if the costs of doing so would be quickly recouped in lower energy bills. Furthermore, very few home-energy-rating services are available, and no rating services whatsoever are available for commercial buildings. As a result, energy efficiency in newly constructed homes and commercial buildings tends to meet only the minimum levels required by building codes.

Meanwhile, powerful players in the energy market have very real incentives to prevent the implementation of energy-efficiency programs. Oil companies, for example, have no economic reason to encourage efficiency. After all, the commodity they produce is only profitable if sold, and its price increases when demand increases. It is not surprising therefore, that the Washington champions of the U.S. oil industry focus their attention on opening up new areas for oil drilling while ignoring the long-term problem of how to curb America's voracious appetite for fossil fuels.

Even so, the United States has had ample experience over the past 30 years in overcoming market failures and encouraging energy efficiency. The U.S. Environmental Protection Agency and Department of Energy, state governments, foreign governments, utilities, non-governmental organizations, and other private sector organizations have developed and implemented effective programs, including both targeted incentives and minimum efficiency standards for buildings and equipment. These programs have reduced both energy use and costs. In fact, the economic benefits of efficient energy approaches typically outweigh costs by a ratio of at least 2 to 1. For example, upgrading the replacement tires used on American automobiles to roll with less friction would cost about $20 more than conventional tires for a set of four, but would pay for themselves in decreased fuel costs over the course of one year, and save more than $90 in fuel costs over the 40,000-mile life of the tires.

For simple reasons of supply and demand, high energy use in America leads to high energy prices. Moreover, much of the energy spent in the United States and around the world is simply wasted. Nearly every device that consumes energy could perform its tasks as well or better with less energy if it were redesigned with newer technology.

Given that such technologies are available today, NRDC believes that any comprehensive approach to energy must focus primarily on solutions that reduce demand. The benefits of such an approach are not just economic, of course. More efficient use of energy also is good for the environment, both because it means less—or at least slower—extraction of natural resources, and because reducing fossil fuel combustion means less air pollution.

Readily available opportunities for more efficient energy use abound, beginning in homes and offices. For example, seven new standards issued by the Department of Energy since 1997 will increase the energy efficiency of new clothes washers, central air conditioners, and other major appliances. These updated energy-efficiency standards provide a cost-effective way to save energy and save consumers money. These standards will eliminate the need to build 120 new power plants with a total capacity of almost 50,000 MW. The standards will result in net energy savings for the nation of $27 billion

dollars through the year 2030, while reducing global-warming pollution emissions by more than 500 million tons over the same period.[3] Yet, as good as these standards are, they do not come close to exhausting the potential gains. Stronger energy-efficiency requirements in building codes, combined with better enforcement and tax incentives to achieve even greater savings than the codes require, could multiply these savings many fold.

Updating fuel-efficiency standards for new vehicles to an average of 39 miles per gallon over the next decade (45 miles per gallon for cars and 34 miles per gallon for light trucks) would save 51 billion barrels of oil over the next 50 years—more than 15 times the likely yield from the Arctic Refuge.

Another example: between 1975 and the mid-1980s, federal corporate average fuel economy (CAFE) standards cut gasoline use by new cars in half, even as safety and performance improved steadily. That, in turn, contributed to the drop in world oil prices after 1980. Further large reductions in fuel consumption per car are feasible with modern technology and would pay for themselves. Updating fuel-efficiency standards for new vehicles to an average of 39 miles per gallon over the next decade (45 miles per gallon for cars and 34 miles per gallon for light trucks) would save 51 billion barrels of oil over the next 50 years—more than 15 times the likely yield from the Arctic Refuge.

Gasoline use also can be reduced by directing real estate development away from urban sprawl and toward smart growth. Smart growth suburbs reduce the need to drive by 30 percent or more, cutting household expenditures on transportation.[4] An important incentive for smart growth is to establish mortgage qualification rules that recognize the increased affordability of homes that have low transportation costs because they are located in areas with good access to public transportation.

Experience dating back to the 1970s has shown the potential for saving large amounts of energy through efficiency policies, while accelerating economic growth and producing more jobs. The up-front costs of producing and installing more efficient technologies would be slight by comparison to the trillion of dollars in savings they would yield. Successful policies include:

- Efficiency standards for appliances, equipment, and motor vehicles;
- Economic incentives to install efficient equipment currently available on the market;
- Long-term economic incentives to reward the commercialization of newer technologies;
- Research and development on new technologies and on the market barriers retarding their development; and
- Information and outreach programs to encourage accelerated investments in cost-effective energy-efficiency measures.

LEGISLATION TO PROMOTE ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY

Many of the proposals described above already have been translated into proposed legislation.

- Introduced by Sens. Robert Smith (R-N.H.) and Diane Feinstein (D-Calif.), "The Energy-efficient Buildings Incentives Act" (S. 207) would provide tax breaks for building energy-efficient commercial buildings, schools, rental housing, and new homes, cutting their energy needs by 30 to 50 percent. It also would provide tax

incentives for the purchase of energy-efficient air conditioners, heating and cooling systems, and solar water heating and photovoltaic systems.

- "The Resource Efficient Appliance Incentives Act," introduced in the last Congress by Rep. Jim Nussle (R-Iowa) and Sen. Charles Grassley (R-Iowa) with the backing of a broad, bipartisan group of stakeholders, would require new federal standards that would substantially improve the energy efficiency of new refrigerators and clothes washers, two of the largest consumers of energy in American households.
- Last Congress, Rep. Robert Matsui (D-Calif.) introduced the "Energy-efficiency Technology Tax Act" (H.R. 2380) to create tax incentives for energy-efficient technology and automobiles. The bill sought to spur investment in combined heat and power systems, geothermal power, solar hot water heaters, hybrid and electric vehicles, renewable fuels, and other energy-efficient technologies. An important shortcoming of the bill was that the proposed tax credit for hybrid vehicles was based only on the use of certain technologies and was not tied to superior emissions and fuel economy performance.
- A bill recently introduced by Sen. Jeff Bingaman (D-N.M.), S. 72, would cut the energy use of the nation's biggest consumer: the federal government. The bill would reauthorize and expand the authority of federal agency managers to contract with private companies to install and retrofit federal facilities with energy-efficient and cost-effective technology and equipment.

Conversely, Rep. Joe Knollenberg (R-Mich.) has introduced legislation to block important appliance-efficiency standards recently issued by the Department of Energy. NRDC vigorously opposes this and any other effort to impede these critical energy-efficiency measures.

CHAPTER 2

OIL

Key Recommendations for Oil Policy

- Require replacement tires to be as fuel efficient as the original tires on new vehicles.
- Raise fuel economy standards for new cars, sport utility vehicles (SUVs), and other light trucks to an average of 39 miles per gallon over the next decade.
- Provide tax credits to individuals who buy clean and efficient advanced-technology vehicles employing hybrid gasoline-electric drive.
- Expand programs to weatherize low-income Americans' housing and help pay their energy bills.
- Provide incentives for smart growth development patterns that prevent sprawl, including mortgage qualification rules that recognize the increased affordability of homes that have low transportation costs because they are located in areas with access to public transportation.
- Do not drill in the Arctic National Wildlife Refuge.
- Do not drill in sensitive offshore areas, including moratorium areas, Alaska, and the eastern Gulf of Mexico.
- Maintain existing protections for sensitive onshore public lands and extend protection to other special places.

DRILLING THE ARCTIC REFUGE WILL DO MUCH HARM AND NO GOOD

Much of the debate over energy legislation in 2001 likely will focus on oil, because the centerpiece of the Bush campaign's energy package was opening the Arctic National Wildlife Refuge coastal plain to oil drilling. Proponents of drilling in the refuge argue that its oil is needed to meet existing demand. They cite the current electricity shortfalls in California as evidence, and maintain that drilling there would decrease U.S. dependence on foreign oil and lower pump prices for gasoline. They also suggest that drilling would be restricted to a small portion of the refuge, limiting environmental damage.

In fact, drilling in the Arctic Refuge coastal plain would have no bearing on California's current crisis, would cause huge and unnecessary environmental damage, would do nothing to address our long-term need for greater energy efficiency, would not affect the price of gasoline at the pump, and would not significantly reduce U.S. dependence on foreign oil.

Drilling the Arctic National Wildlife Refuge would not lower gasoline prices. The best U.S. Geological Survey estimate is that less than a six-month supply of oil could be economically recovered from the Arctic Refuge (about 3.2 billion barrels, spread out over a 50-year period), and that it would take at least 10 years before the oil reached

refineries.[5] Claims that opening the refuge would meet an immediate need for oil are unsupported by fact.[6]

Proponents overstate how much oil would be extracted from the refuge. Proponents of drilling maintain that 16 billion barrels of oil would be pumped from the Arctic Refuge coastal plain. The claim is a gross exaggeration, and unfortunately it has been reported in a number of recent news stories without qualification. First, the figure refers to the U.S. Geological Survey's most optimistic prediction of reserves in the coastal plain and its surrounding area, including under the Beaufort Sea. In fact, the USGS calculated only a *5 percent chance* that 16 billion barrels of oil are in the coastal plain and its surrounding area. Second, only a portion of that oil could be recovered economically. The 16 billion-barrel figure relies on an estimate of what the USGS calls "technically recoverable" reserves—the "volume of petroleum representing that proportion of assessed in-place resources that may be recoverable using current recovery technology *without regard to cost"* (emphasis added).[7] Drilling proponents are not taking into account the costs of oil exploration and production, which include conducting seismic surveys; transporting, erecting and operating drilling equipment; constructing and operating necessary pipelines; and constructing and maintaining ancillary exploration and production support facilities. All of those factors would drive up the cost of extracting the oil, making most of it too expensive to produce, even if it can be found in the quantities predicted.[8] Even if there were 16 billion barrels of oil available in the refuge, more than three times as much could be saved by raising vehicle fuel economy standards to an average of 39 miles per gallon.

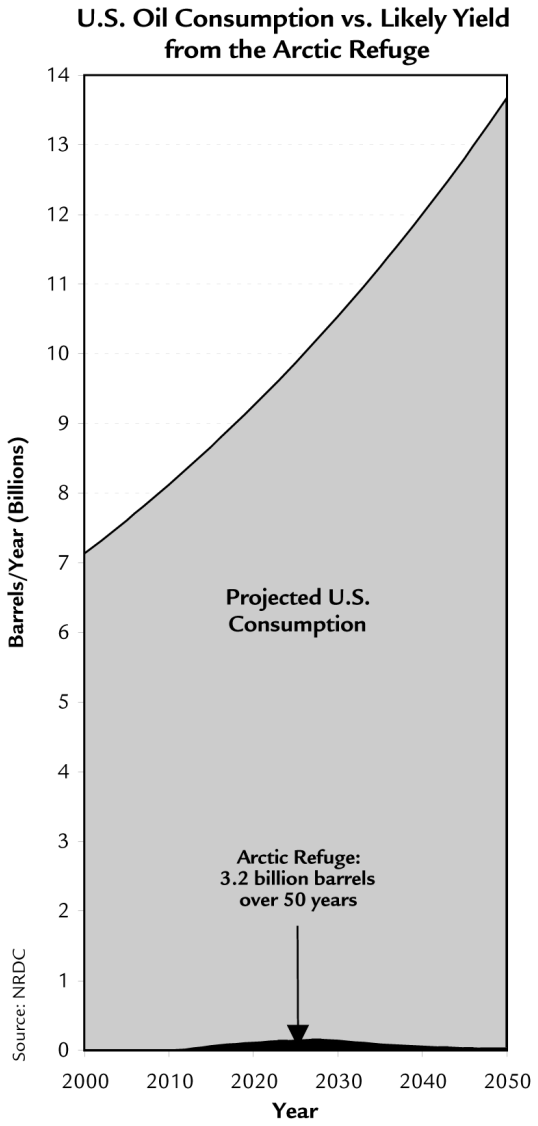

FIGURE 1 Projected U.S. oil consumption compared to likely yield from the Arctic National Wildlife Refuge. Source: NRDC (see text for references).

The available oil from the Arctic Wildlife Refuge is a drop in the bucket of America's energy needs. The 3.2 billion barrels that the USGS estimates would be economically recoverable from the Arctic Refuge is less than half a year's supply of oil for the United States, even at current rates of consumption.[9] Over the projected 50-year life of the oil field, the refuge would contribute less than 1 percent of the oil Americans will consume. Production of oil there would peak in 2027 at 150 million barrels a year, providing less than 2 percent of projected U.S. consumption that year (see Figure 1).

Drilling in the coastal plain would have no impact on electricity problems in California or in any other state. Less than 1 percent of California's electricity is generated by burning oil (see Figure 2), and the nationwide average is only 3 percent.[10] Moreover, as noted above, oil from the refuge would not flow to refineries for at least a decade.

Drilling in the coastal plain would spoil an irreplaceable natural treasure. America's arctic is an exceedingly fragile wilderness area that has been irrevocably altered by the heavy industry that now dominates the landscape. Oil operations in

CALIFORNIA POWER CONTENT LABEL

ENERGY RESOURCES	PRODUCT A * (PROJECTED)	1999 CA POWER MIX** (FOR COMPARISON)
Eligible Renewable	56%	12%
—Biomass & Waste	–	2%
—Geothermal	–	5%
—Small Hydroelectric	–	3%
—Solar	–	<1%
—Wind	–	2%
Coal	10%	20%
Large Hydroelectric	10%	20%
Natural Gas	16%	31%
Nuclear	8%	16%
Other	<1%	<1%
TOTAL	**100%**	**100%**

*50% of **A** is specifically purchased from individual suppliers

**Percentages are estimated annually by the California Energy Commission based on the electricity sold to California consumers during the previous year.

For specific information about this electricity product, contact (Company Name). For general information about the Power Content Label, contact the California Energy Commission at 1-800-555-7794 or **www.energy.ca.gov/consumer**

FIGURE 2 Sample California "Power Content Label" produced by the California Energy Commission. The "1999 CA Power Mix" shows the sources of electricity consumed in California. Oil generated less than 1% of California's electricity and is included in the "other" category. "Product A" is a hypothetical competing electricity product. Source: California Energy Commission.

Alaska's Prudhoe Bay emit tons of nitrogen oxides, which contribute to smog and acid rain. These same oil facilities release tons of methane, a potent "greenhouse gas" that contributes to global warming. Oil field activities also produce large amounts of sewage sludge, scrap metal, garbage, and other waste every year. Spills of oil, drilling mud, and production chemicals are routine.

The Arctic Refuge's coastal plain area, the 8 percent of the refuge where the oil companies want to drill, is the biological heart of wildlife activity. Oil development would harm the caribou, polar bear, and 135 bird species that inhabit the area. In addition, while proponents frequently assert that drilling would only affect 2,000 acres,[11] those acres would not be contiguous. According to the USGS, the oil is located in at least 35 discrete sites spread across the coastal plain, requiring the construction of roads to connect far-flung drilling sites with Prudhoe Bay facilities. Also, oil companies would have to build a new 20-inch pipeline across 135 miles of frozen ground, wildlife habitat, and dozens of rivers.[12]

Renewed calls for opening the Arctic National Wildlife Refuge to oil exploration are generally accompanied by claims that the environmental impact would be minimal, yet a review of the impact of existing oil development in Alaska tells a different story. Once part of the largest intact wilderness area in the United States, Alaska's North Slope now

hosts one of the world's largest industrial complexes. More than 1,500 miles of roads and pipelines and thousands of acres of industrial facilities sprawl over hundreds of square miles of once pristine arctic tundra, causing air pollution, spills, and waste.

GREATER EFFICIENCY

The cheaper, faster, and cleaner alternative to drilling in the Arctic Refuge is more efficient use of oil resources. NRDC's analysis found many ways to cut oil consumption:

- Ensuring that replacement tires roll as smoothly as original equipment tires would save 5.4 billion barrels of oil over the next 50 years, 70 percent more than the total amount of oil that is likely to be available from the Arctic Refuge over the same time period (see Figure 3).

FIGURE 3A

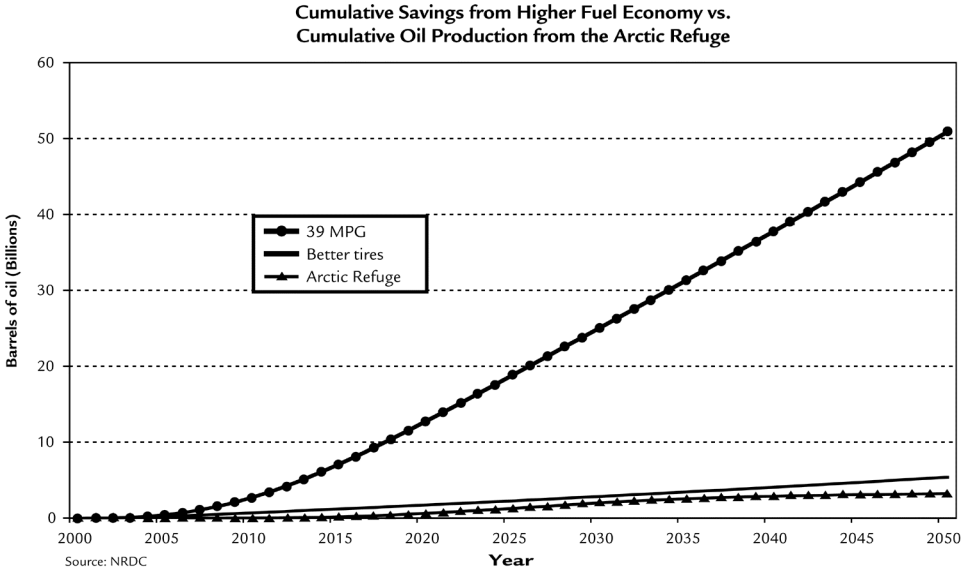

FIGURE 3B

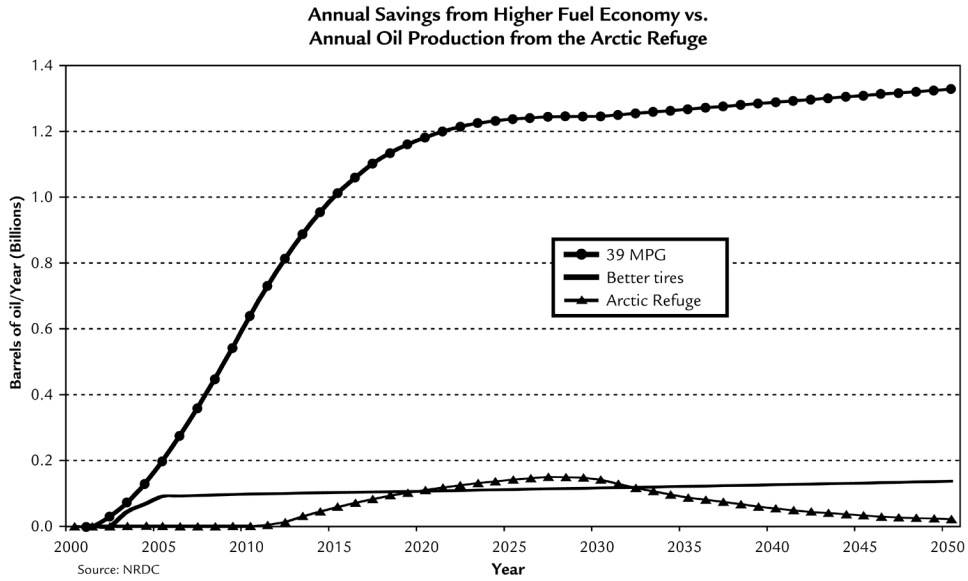

FIGURE 3 Oil savings from increasing vehicle fuel economy compared to likely oil production from the Arctic National Wildlife Refuge. The "better tires" scenario is based on making replacement tires as fuel efficient as tires supplied on new vehicles. The "39 mpg" case is based on increasing the average fuel efficiency of new cars and light trucks from 24 miles per gallon to 39 miles per gallon over 10 years. Figure 3A (top) shows cumulative oil savings versus production. Figure 3B (bottom) shows the same data on an annual basis.

Most replacement tires now on the market create more friction as they roll than original equipment tires. The increased friction lowers fuel efficiency. Automakers have an incentive to use low-friction tires on new cars to help them comply with fuel economy standards. Unfortunately, there are no standards or even efficiency labels for replacement tires, so most consumers end up purchasing less efficient tires when their original sets wear out. Michelin currently sells a line of fuel efficient replacement tires. The company has stated that the additional cost to consumers for more fuel efficient tires would be less than $2.50 per tire.[13] Meanwhile, the National Highway Traffic Safety Administration estimated that the consumer cost would be no more than $5 per tire.[14] Using that price difference as a basis of comparison, the average driver would recoup the additional expense in fuel savings over the course of one year, and would save more than $90 over the 40,000-mile life of the tires.

- Increasing fuel efficiency standards for new vehicles to 39 miles per gallon over the next decade would save 51 billion barrels of oil over the next 50 years—more than 15 times the likely yield from the Arctic Refuge (see Figure 3).

Honda and Toyota already are selling hybrid gasoline-electric vehicles that get more than 50 miles to the gallon, roughly a 50 percent improvement in average fuel economy. Ford has announced plans to use this hybrid technology to improve the fuel economy of two of its sport utility vehicle (SUV) models. Automakers should be required to use available technologies to improve fuel economy for their entire fleets, not just a few models. Such efficiency improvements would have many benefits, including decreasing demand for oil, and therefore lowering prices at the pump; decreasing the environmental harm caused during the extraction and production process; and decreasing the environmental harm from burning fossil fuels. In addition to raising standards, Congress should encourage innovation by providing tax incentives for consumers to purchase advanced-technology vehicles that are substantially cleaner and more fuel efficient than average.

Oil can also be saved by upgrading insulation and installing more efficient burners in oil-heated homes. Expanding efforts to weatherize low-income Americans' homes is a high priority because, in addition to saving oil, they improve comfort and reduce heating bills for those who can least afford to pay rising energy costs. Energy-efficiency programs covering all fuels should be tailored to meet the special needs of low-income households.[15] Federal and state investments in such programs and assistance for paying energy bills must expand significantly as fuel and electricity prices increase across the nation.

REFUGE OIL WOULD NOT SIGNIFICANTLY REDUCE U.S. OIL DEPENDENCE

Oil is a global commodity whose price is determined primarily by international markets. This will continue to be true regardless of the level of domestic oil production. In other words, as long as U.S. oil markets remain open, the price of gasoline in Chicago, Detroit, and Washington will fluctuate with global oil prices, even if the United States did not import any oil. Therefore, changes in domestic oil production would only affect oil prices to the extent that they influenced the global supply-demand balance. Given that the

United States produces only about 12 percent of global petroleum supplies, even major changes in domestic production would have a marginal effect on global markets. Over the long-term, the U.S. share of global production will inevitably decline further. The United States has less than 3 percent of world oil reserves, while Persian Gulf OPEC members control about two-thirds of proven reserves. Opening the coastal plain of the Arctic National Wildlife Refuge to oil exploration would not appreciably change this situation. It would expand global oil reserves by a mere 0.3 percent.[16]

By contrast, the United States accounts for about 26 percent of world petroleum demand.[17] Given that, it is clear that the United States could have a much greater impact on oil prices worldwide by cutting American demand than it could by trying to increase domestic supply. Indeed, untapped energy efficiency is in great supply, while untapped U.S. oil is increasingly rare, because most of America's accessible oil resources already have been exploited.

For example, corporate average fuel economy (CAFE) standards helped double vehicle gas mileage efficiency from 1975 through the late 1980s, reducing the impact of high oil prices on consumers. Congress enacted the standards in response to the oil crises of the 1970s, and strengthened standards could protect U.S. citizens from fluctuations in oil prices. Unfortunately, since 1995, legislative riders attached to transportation funding bills have prohibited the Department of Transportation (DOT) from even examining the need to raise CAFE standards. Because of the riders and the growing market share of SUVs, the average fuel economy of all new passenger vehicles is at its lowest point since 1980.[18] Fortunately, debate over the CAFE rider in Congress in 2000 led to a compromise that will allow DOT, in conjunction with the National Academy of Sciences, to study the technical and economic feasibility of raising standards.

Nearly 30 years after the first OPEC oil embargo, the United States is still dependent on petroleum for 97 percent of its transportation energy needs. As a result, two-thirds of America's oil consumption goes to fuel transportation. With average efficiencies declining for new vehicles, and a 21 percent increase in miles driven between 1990 and 1998, U.S. dependence on petroleum to fuel our transportation needs is increasing.[19]

CHAPTER 3

ELECTRICITY

Key Recommendations for Electricity Policy

- Establish a national "system benefits" fund to promote energy efficiency, support research and development, and maintain universal service.
- Establish a federal "portfolio standard" to ensure that renewable energy steadily increases its market share at minimum cost.
- Extend the renewable-energy-production tax credit, which encourages greater reliance on emerging renewable energy sources.
- Provide tax incentives for advanced energy-efficient buildings and appliances.
- Strengthen energy-efficiency standards for appliances and buildings.
- Establish comprehensive limits on air pollution from power plants covering emissions of carbon, nitrogen, sulfur, and mercury.
- Require full disclosure to customers about the sources and environmental impacts of their electricity.
- Reject new subsidies for so-called "clean coal" technology and nuclear power, and eliminate existing subsidies.

The second major form of energy that will be much affected by the coming policy debate is electricity. Electric power is produced in the United States by a variety of means. Chief among them is burning coal, which accounts for 51 percent of total generation. Other significant sources are nuclear power, which provides approximately 20 percent of the nation's electricity; natural gas, which provides 15 percent; and hydroelectric power, which provides 8 percent. Significantly, a negligible share of electricity is generated from oil, about 3 percent[20]—one of many reasons why drilling for oil in the Arctic National Wildlife Refuge would have no effect on electricity supply now or in the future.

THE CALIFORNIA CRISIS

The coming debate over energy policy will take shape in the shadow of the California electricity crisis. The California crisis has become a political crisis over the price and reliability of energy throughout the West, producing headline news nationally. The conventional wisdom is that electricity consumption in California is surging out of control, and the Internet and a booming economy are frequently invoked as explanations. In fact, from 1990 through 1999, the California electricity system's peak demand grew less than 2 percent per year—to about 50,000 megawatts (MW), with 41,000 MW representing total demand on the three large investor-owned systems.[21] Total statewide

consumption of electricity increased less than 1 percent per year from 1990 through1998, less than one-third the rate of the 1980s.

The fact that the current crisis was not created by disproportionate increases in consumption by Californians is cold comfort for consumers, particularly those with modest incomes. Already experiencing sticker shock over their latest monthly gas bills, consumers worry as electricity distribution companies demand permission to pass high electricity costs on to customers.

These distributors are reacting to unprecedented wholesale gas and electric prices. Some examples:

- Electricity that normally costs 2 cents to 3 cents per kilowatt-hour has sold in recent months on Western wholesale markets for more than $1.50 per kilowatt-hour. The average summer wholesale price was at least 15 cents per kilowatt-hour, and that figure more than doubled again in December and January.
- Natural gas prices, which normally range from $2 to $3 per million BTUs, climbed in January to nearly $10 per million BTUs nationally, with prices peaking above $50 in Southern California. Natural gas futures on the New York Mercantile Exchange remain above $5 through March 2002.

No single factor explains these extraordinary, and closely linked, price increases in two of our most essential commodities. The upswing in natural gas prices most prominently reflects a prolonged contraction in exploration and storage due to low commodity prices, coupled (in the Southwest) with reduced pipeline capacity as a result of an explosion last summer.[22] Much costlier natural gas has, in turn, driven up the operating cost of electricity generation. High electricity prices also reflect reduced Northwest hydropower production due to low rainfall, a generally overstressed power grid, widespread failures to hedge spot-market prices with long-term contracts, and reduced investment over the past decade in both energy efficiency and generating capacity throughout the West. As if all that were not enough, investigations continue of alleged anti-competitive practices by many market participants.

Pointing to the gap between runaway wholesale electricity costs and state-frozen retail electricity rates, the West's two biggest electricity distribution companies—PG&E and Southern California Edison—claim losses in excess of $12 billion since May 2000 on unreimbursed wholesale electricity purchases. (Consumer advocates counter that these losses are in part offset by gains on power sold in California by generating companies owned by the same parent companies that own the utilities.) Among other responses, the California Public Utilities Commission temporarily raised electric rates by about 10 percent overall.

California already has acted to reduce its exposure to volatile short-term electricity markets by providing for a more balanced portfolio of longer-term purchase contracts. Looking ahead, the fastest, cheapest, and cleanest response to the electricity crisis is to take advantage of the state's many immediate opportunities to ramp up its energy efficiency and renewable energy investments. These measures already are contributing more than 15,000 megawatts to the Western power grid, which never needed them more. The California Energy Commission recently issued emergency upgrades for efficiency

standards governing new buildings, which will yield the equivalent of two giant coal-fired power plants (1,000 MW) in the next five years. Also, the Legislature has created a new 10-year investment fund for sustainable energy technologies that exceeds $5.5 billion. The California legislators could do more by making a large investment from California's budget surplus in energy efficiency and renewable energy. California also is expanding its assistance to low-income households, for whom the recent price increases have been especially painful.

Energy efficiency and renewable energy investments already have made significant contributions to California's economy and electricity grid. Since 1990, energy-efficiency investments have reduced statewide electric bills by more than $2.8 billion. As a result, according to the California Energy Commission, "California continues to lead the nation in maximizing the amount of Gross State Product produced per unit of energy."[23] The RAND Corporation has pegged savings from 20 years of energy-efficiency programs in California at about $1,000 per capita, with cumulative utility investment for such purposes averaging only about $125 per capita.[24] The RAND study and other independent reviews agree that California still has many untapped and inexpensive opportunities to get more work out of less electricity.

Thanks to a 1998 auction for new renewable capacity, more than 500 MW of urgently needed supply are now being added to the California system, with nearly 100 MW already installed, more than 400 MW expected by the end of 2001, and at least 900 additional MW available for near-term purchase.

Renewable energy also is a critical part of California's energy portfolio; about one-ninth of the state's supply is now generated from wind, solar, geothermal, or biomass resources. Thanks to a 1998 auction for new renewable capacity, more than 500 MW of urgently needed supply are now being added to the California system, with nearly 100 MW already installed, more than 400 MW expected by the end of 2001, and at least 900 additional MW available for near-term purchase. The new capacity has short lead times. The 50 winning bidders are scheduled to be operating by the summer of 2002.

California also needs more highly efficient natural-gas-fired power plants. NRDC and other environmental groups support the ongoing additions of such plants, which have had no difficulty meeting California's siting requirements. Since April 1999, nine plants totaling nearly 6,300 MW have received siting approval. Six are under construction, and at least three are expected to be on-line by the end of this year (2,368 MW). At least 14 more plants capable of generating about 7,000 MW are poised to follow, rebutting claims that environmental safeguards are somehow preventing additions of generation capacity. The new plants (both renewable and fossil) are dramatically cleaner than their aging gas- and coal-fired competitors across the Western power grid. Indeed, the capacity additions anticipated over the next several years are both clean and large enough to begin improving air quality by displacing those dirtier competitors during at least some hours of the year.

Nonetheless, President Bush said recently, "If there's any environmental regulations… preventing California from having a 100 percent max output at their plants—as I understand there may be—then we need to relax those standards." But as reported by the *Los Angeles Times* on January 25, Richard Wheatley, spokesman for Houston-based Reliant Energy Co., which operates four Southern California power plants, said that the assertion that environmental regulations are holding back output "is absolutely false. We're making every megawatt available on request. We factor the air quality regulations into our daily operating basis, and they are not causing us to withhold power." The *Los*

Angeles Times summarized its findings as follows: "California regulations have not short-circuited the amounts of electricity produced, according to power company representatives." The *Times* could find only one small, obsolete plant that had to suspend operations temporarily to comply with air quality standards, and it accounted for less than 0.2 percent of California's peak power needs.

The Los Angeles Times *could find only one small, obsolete plant that had to suspend operations temporarily to comply with air quality standards, and it accounted for less than 0.2 percent of California's peak power needs.*

NATIONAL ELECTRICITY POLICY

In the long-term, the best path for California is the best path for America: strong clean air standards, increased reliance on energy-efficiency measures, a shift away from fossil fuels as a source for electricity, and, eventually, full conversion to renewable and environmentally sound forms of energy.

Electricity poses two principal long-term problems for America's energy policy. First, its production today usually involves burning fossil fuels, an inherently polluting process. Second, as recent events in California demonstrate, the current structure of the electricity marketplace makes consumers vulnerable to price spikes and market-driven shortages. President Bush's energy plan emphasizes extracting fossil fuels to generate electricity, perpetuating both problems. The goal of U.S. electricity policy should be to minimize the life-cycle costs of the reliable energy services that a healthy economy needs. This means promoting improved efficiencies of electricity use and substituting renewable resources for fossil fuels, while ensuring that fossil fuels needed during the transition are extracted and burned as cleanly as possible.

The current approach to meeting America's needs for electric energy services unnecessarily burdens our health, environment, and economy. Current policies do not effectively address the problems of inefficiency, over-reliance on nonrenewable energy supplies, or excessive air pollution. NRDC believes that a comprehensive energy policy for the electricity sector must:

- Support and expand existing investments in energy efficiency and other public benefits.
- Accelerate the role played by renewable energy supplies.
- Reduce air pollution to provide a clean and level playing field for competition.

The electricity generating sector is the single largest source of the four pollutants responsible for the most serious local, regional, national, and global air pollution problems we face: sulfur dioxide, nitrogen oxides, mercury, and carbon dioxide—the dominant greenhouse gas. Electric power plants release more than two-thirds of total U.S. emissions of sulfur dioxide, and more than one-third of each of the other three pollutants. These four horsemen of air pollution are responsible for a plethora of health and environmental harms:

- **Fine particles** that contribute to tens of thousands of premature deaths in the United States each year;
- **Smog** that plagues our major cities, and causes severe respiratory problems for children and seniors;
- **Acid rain** that still damages lakes, streams, and forests;

- **Regional haze** that, among other things, spoils trips to national parks for millions of visitors annually;
- **Nitrogen emissions** that contribute to over-fertilizing estuaries, including the Chesapeake Bay, Long Island Sound, Pamlico Sound, and the Gulf of Mexico, leading to dead zones where aquatic life perishes;
- **Mercury contamination** of lakes and streams that has prompted 40 states to issue ongoing advisories about the fish that store this toxin; and
- **Carbon dioxide-driven climate change** that threatens to create disruptive weather patterns and sea-level rise that human civilization has never before experienced.

This plague of pollution problems is a product of the "grandfather" loopholes in current federal law that allow 30-, 40-, and 50-year old plants to continue operating without meeting modern performance standards. The patchwork of lenient or nonexistent rules at the state and local level has created pollution havens where grandfathered plants can engage in domestic environmental dumping, distorting fair energy markets.

As we move to modernize the electricity market economically, we must require modern environmental performance measures. Many states are experimenting with competitive markets for energy services. But fair competition is impossible in an environment where air pollution performance requirements differ vastly among competitors. Because all markets are connected by wires, different pollution standards promote a "survival of the filthiest" market, where plants that are the dirtiest offer power at the cheapest prices and increase their market share.

These market distortions do not deliver consumer benefits. The price differences caused by different pollution requirements are quite small, usually 0.2 cents to 0.3 cents per kilowatt-hour or less, but these small differences are enough to give dirtier producers a decisive market advantage. The market distortions also discourage investment in renewable resources and in new, cleaner, more efficient generation.

Under the current rules, an entrepreneur who seeks financing for a clean, high-efficiency natural gas plant can point out that it emits no sulfur, no mercury, and much less nitrogen oxides (NO_x) and carbon dioxide (CO_2) than the competition. But, with the partial exception of sulfur (for which allowance programs exist under the acid rain law), this superior environmental performance has no economic value in the marketplace. A financier wants to know whether the plant can be run more cheaply than the competition. If the competition is a group of grandfathered coal-fired power plants, the answer often will be "no" and the new plant may not attract financing.

To address the egregious health, environmental, and economic flaws in the current air pollution control programs, a number of bills were introduced in the last Congress. Notable examples include the "Clean Energy Act of 1999" (S. 1369) introduced by Sens. Jim Jeffords (R-Vermont) and Joseph Lieberman (D-Conn.), and the "Clean Smokestacks Act" (H.R. 2900) introduced by Reps. Henry Waxman (D-Calif.) and Sherwood Boehlert (R-N.Y.). These bills would have established industrywide caps on emissions of each of the four horsemen pollutants: sulfur dioxide, nitrogen oxides, carbon dioxide, and mercury. The caps on sulfur dioxide, and nitrogen, would provide building blocks for meeting health-based smog and fine particle standards and would reduce acid rain further. The

mercury cap would require reductions from the largest single remaining U.S. source of this pollutant: power plants. The carbon dioxide cap would return emissions to 1990 levels—the target set in the 1992 Rio Climate Treaty that the United States has ratified.

A renewed effort to enact similar legislation is expected in this Congress because both the president and the chairman of the Senate Environment Committee have endorsed the concept of integrated requirements to reduce the four horsemen of power plant pollution.* A major benefit of the integrated pollution cleanup approach is that it would provide a clear road map for business in planning long-term investments.

The history of clean air progress has developed as a series of unconnected initiatives typically focused on a single pollutant. Today we can survey the next 10 to 15 years and be confident that additional measures will be pursued to reduce the four horsemen pollutants. But if we pursue the traditional approach, it is impossible to predict with confidence, when, how deep, and in what order these important steps will occur.

As a result, business planners must approach today's investments by making educated guesses about environmental requirements. Billions of dollars are changing hands as power plants are sold under state restructuring programs. One thing is certain: someone is guessing wrong. By enacting integrated cleanup programs, Congress could provide certainty and reduce the tendency to prolong dependence on existing outmoded plants through the traditional process of applying end-of-pipe cleanup devices normally aimed at controlling only one pollutant. Similarly, local citizen groups reacting to proposed new power plants in their areas would have confidence that the proposed new and cleaner plant would in fact contribute to reducing overall regional and national emissions, rather than simply adding to the existing burden of excess pollution.

In short, we know we need to reduce a range of damaging pollutants from the electricity generating sector; we know how to do it; and we know that failure to take the needed steps will increase damage, prolong uncertainty, and encourage unfair competition.

ELECTRICITY FROM COAL

Mining and burning coal is not only the most common method of producing electricity, it is also the most polluting. Mining techniques ravage the land and create serious water pollution, and burning coal is the largest source of air pollution in the United States. During the presidential campaign, candidate George W. Bush proposed investing $2 billion over 10 years to research so-called "clean coal" technologies, and said he would support permanently extending an existing tax credit for research and development of new, cleaner technologies.[25]

*President Bush abandoned his campaign pledge to control carbon dioxide emissions from power plants in a dramatic about-face made public on March 13, 2001. In a letter to four republican senators, the president said he no longer supports mandatory limits on carbon dioxide, citing "energy shortages," among other factors. Nonetheless, a bipartisan group of senators and representatives is proceeding to advance comprehensive power plant cleanup legislation in Congress.

NRDC opposes incentives for the use of coal-based technologies because their likely result is to subsidize more polluting coal plants at the expense of cleaner resources: efficiency, renewables, and gas-fired plants. Coal technology subsidies would not ensure additional electricity or reduced pollution. Therefore, existing coal subsidies should be abolished, and proposals for new subsidies should be rejected.

NRDC strongly opposes efforts to weaken provisions of the Clean Air Act that protect public health by requiring fossil-fuel-fired power plants to install adequate pollution control devices when first constructed or significantly modified. Rather, NRDC believes that Congress should adopt comprehensive caps on carbon, nitrogen oxide, sulfur dioxide, and mercury emissions from fossil-fuel-fired power plants, more than 90 percent of which come from coal-fired electric generation.

ELECTRICITY FROM NUCLEAR POWER

In 1999, the 103 civilian nuclear power plants operating in the United States generated nearly 20 percent of all electricity consumed in the United States that year.[26] But no new nuclear plant has been ordered in the United States since 1978, and every plant ordered after 1973 was canceled or abandoned.[27]

Contrary to nuclear industry claims, nuclear power is neither clean nor green. Nuclear reactors do not emit the traditional air pollutants produced by fossil-fuel powered electricity plants, such as sulfur dioxide, which causes acid rain; nitrogen oxides, which lead to urban smog; or carbon dioxide, a major cause of global warming. However, nuclear reactors do harm the environment. For example:

- The process of enriching uranium for use as a fuel in nuclear power plants requires significant amounts of electricity, much of which is produced by aging coal-fired power plants in the Midwest. As a result, the uranium-enrichment process produces the same types of traditional fossil fuel air pollutants cited above.
- Many nuclear power plants have "once through" cooling systems. These systems require up to two-and-a-half times as much water as fossil fuel plants with similar cooling systems. Taking in vast amounts of water for cooling and discharging heated water can seriously harm water resources and aquatic ecosystems.
- While nuclear power plants produce relatively small amounts of solid waste, their radioactive wastes pose health risks that exceed that of any other source of electricity. Because the federal government has not yet approved a site for long-term storage, these wastes may be stored on site for a century or more, which may preclude any future re-use of contaminated lands.
- Among the various sources of electrical power, nuclear power creates the greatest risk of major, destructive acts of terrorism.[28]
- Nuclear plants produce highly fissionable material in their waste systems that could be diverted by terrorists for use in nuclear bombs.

Many states are requiring or encouraging electric utilities to sell all their power plants, including their nuclear power plants. Sale of nuclear plants by utilities to more experienced owners has the potential to provide safety and consumer benefits, but the new

owners must not be shielded from competition. Moreover, the Nuclear Regulatory Commission and state regulatory agencies must require that the new owners maintain stringent safety measures.

ELECTRICITY FROM HYDROPOWER

Hydropower generates about 8 percent of America's electricity, with substantial annual variations depending on rainfall.[29] Although hydropower emits no air pollution, it is not necessarily an environmentally preferred resource. Dam construction and operation inevitably alter ecosystems on land and in water, disrupting the life cycles of numerous aquatic species and damaging habitat for other wildlife. The impacts of large dam construction are wide-ranging, but even smaller dams can cause considerable damage. In the Pacific Northwest, NRDC has supported replacement of four poorly sited dams with such environmentally preferred resources as energy efficiency and wind power.

Hydropower that is certified by the Low Impact Hydropower Institute can be considered an environmentally preferred resource. The institute certifies hydropower facilities based on objective environmental criteria, including river flows, water quality, fish passage and protection, watershed protection, threatened and endangered species protection, cultural resource protection, and recreation. NRDC encourages electricity customers who can choose their electricity supplier to include certified hydropower along with other environmentally preferred resources in their electricity purchases.

ELECTRICITY FROM NATURAL GAS

In 1999, natural gas provided approximately 15 percent of the nation's electricity.[30] The cleanest of the fossil fuels, it is an important part of the short-term strategy for meeting America's power needs because it can serve as a bridge to the development and implementation of renewable energy sources.

Natural gas is less polluting than other fossil fuels because it burns more cleanly and contains little, if any, ash, heavy metals, or other impurities. When burned in high-efficiency, combined-cycle units (combining a combustion turbine and a steam turbine) that extract additional electricity from their own waste heat, natural gas provides the basis for the best available fossil fuel combustion technology. However, it is still a transition technology because the process of exploring and drilling for gas is destructive; gas is non-renewable; and even the cleanest burning plants produce some air pollutants, including carbon dioxide, the greenhouse gas most responsible for global warming.

New combined-cycle natural gas plants reach 55 to 60 percent efficiency and produce virtually no sulfur oxides or volatile organic compounds. Emissions of nitrogen oxides and particulate matter are extremely low. Carbon dioxide emissions are about 60 percent lower than for coal-fired power plants. High efficiency and relative ease of permitting (due to the lower emissions) have made these plants the top choice for developers. Virtually all of the new fossil-fuel-fired plants currently proposed for construction in the

Northeast and the West are natural gas fired, and the vast majority are high efficiency, combined-cycle units.

[Because natural gas also is used for non-electrical applications, it is discussed in detail starting on page 23.]

NEW, ENVIRONMENTALLY PREFERRED ELECTRICITY SUPPLY OPTIONS

Most of the electricity in the United States is generated by burning fossil fuels, such as coal, oil, and natural gas. Unfortunately, this burning produces from one-quarter to two-thirds of the sulfur, mercury, nitrogen oxides, carbon dioxide, and particulate matter emitted into the atmosphere. These air pollutants cause a range of problems, including acid rain, ground-level ozone (smog), global warming, and cardiopulmonary health problems.[31]

Conversely, many renewable energy resources have a much less significant impact on the environment than fossil fuels and nuclear power. Renewable energy also adds much-needed diversity to the nation's electricity mix, improving reliability, dampening fuel price shocks, and contributing to economic development. The construction time for renewable generation facilities is measured in months, not years as with conventional sources. The most important sources of renewable energy are:

Like geothermal and landfill methane, wind at prime sites is on the verge of matching or beating current fossil-fueled generation prices.

Wind: State-of-the-art wind power plants use large spinning blades to capture the kinetic energy of wind and convert this energy into electricity. Wind and landfill methane are the most economically competitive and promising renewable technologies. Like geothermal and landfill methane, wind at prime sites is on the verge of matching or beating current fossil-fueled generation prices. In 1999, there were more than 2,500 megawatts (MW) of installed wind capacity in the United States—one-quarter of installed capacity worldwide. The use of wind power is growing rapidly in the United States and around the world. In just the last few months, a 300 MW wind farm project on the Oregon-Washington border was announced, as was a 260 MW project at the Department of Energy's nuclear test site in Nevada. Both should be supplying badly needed power to the Western grid by the end of the year.

Biomass: Biomass includes landfill methane and other fuels derived from timber, agriculture, and food processing wastes, as well as fuel crops that are specifically grown or reserved for electricity generation. Biomass technologies use combustion processes to produce electricity and vary widely in their environmental impacts. Environmentally preferred biomass technologies can have no climate change impact and very low air pollution emissions.

Geothermal: Heat from the Earth's core can be converted into electricity, and already accounts for 5 percent of California's electricity supply. Like wind power, new geothermal facilities are increasingly competitive with fossil-fueled power plants.

Solar: The ultimate source of most of the world's energy is the sun, which provides the Earth with light and heat. Two technologies are used to convert solar energy into electricity: photovoltaics (PV) and solar-thermal. When sunlight strikes a PV cell, it excites electrons, generating an electric current. Solar-thermal technologies use the sun's heat to create steam to drive an electric generator.

Electricity produced from wind, solar, geothermal, and biomass provides a little more than 2 percent of the U.S. total. The generating capacity of these resources was about 13,700 MW in 1999.

Renewable resources are becoming increasingly cost-competitive. For example, wind-generated electricity today costs only about one-tenth of what it cost in the early 1980s (4 cents to 5 cents per kilowatt-hour (kWh) versus 40 cents per kWh). Costs are expected to decline by an additional 20 to 40 percent by 2005. In California, competition for renewable energy investments in 1998 drove the above-market premium for new renewable resources lower than anyone expected: an average of less than 0.5 cent per kWh.[32]

ENVIRONMENTALLY PREFERRED DISTRIBUTED GENERATION

Distributed power generators are relatively small power plants located at or very near the point where the electricity is used. Small, clean distributed generators can economically reduce demand on the grid, improve reliability, and reduce environmental harm. Examples include small-scale solar, wind, fuel cells, and combined heat and power generators—also known as co-generators.

Since co-generators produce both heat and power, the useful output from a unit of fuel can be doubled, effectively halving the air pollution. NRDC believes that more applications for this technology should be encouraged, but this is technically challenging. These units are more complex than those that produce just heat or electricity, and sizing, installing, and maintaining them properly takes skills not commonly found in-house at most businesses.

One of the best distributed power generators is the fuel cell. It produces electricity from chemical reactions, much like a battery. Unlike a battery, it does not run down as long as it is supplied with hydrogen, which is commonly derived from natural gas or other fuels. Fuel cells are highly efficient and produce virtually no emissions. They also are quiet and reliable, and have no moving parts.

High-tech computer and medical centers and remote lighting and telecommunications are examples of niche applications where fuel cells and solar power, respectively, make good economic sense. Many consumers already are choosing these technologies for their environmental and reliability advantages.

Not all distributed generators are clean, however. For instance, diesel generators—the most common form of distributed generation—emit more than 110 times as much nitrogen oxides and particulate matter as new central station power plants. NRDC supports air regulations to ensure that dirty distributed generators do not become a popular choice. California and Texas are now developing emission standards for distributed generators. Currently, most generators smaller than 1 MW fly below the regulatory radar screen.

RESOLVING INEFFICIENCIES IN THE ELECTRICITY MARKETPLACE

Pervasive market barriers have inhibited the widespread deployment of environmentally preferred electricity supply options. Two of the most effective and market-compatible

public policies to address this problem are public goods or system benefits charges, and renewables portfolio standards.

A public goods or system benefits charge—a small surcharge on customers' electricity bills—can help fund cost-effective, long-term investments in energy efficiency, low-income services, and renewable energy resources that provide net benefits to consumers in the form of lower energy bills and a cleaner environment. California recently renewed its system benefits charge, which will raise more than $5 billion over 10 years. The money will provide production credits for new and refurbished renewable energy, rebates, and other economic incentives for emerging renewable technology, customer credits for purchasing renewable power, and support for biomass and solar projects. At least 19 other states have some form of system benefits charge.

Renewables portfolio standards, meanwhile, encourage greater diversity of energy resources by requiring that electricity providers include a minimum percentage of renewable energy resources in the electricity mix they deliver to their customers.

While these policies have been employed in some states, national implementation would be more effective. NRDC therefore supports federal legislation that would provide national system benefits charges and renewables portfolio standards. NRDC also endorses federal tax incentives with similar goals, including the bipartisan effort in a proposed Senate bill, S. 207, to provide urgently needed support for dramatic improvements in the design of new buildings and equipment.

Federal legislation also is needed to ensure that adoption of these clean forms of generation actually leads to improved air quality. Between a recent surge in proposed new combined-cycle natural gas turbines and the potential for rapid growth of renewables and clean distributed generation, there is the potential for new, cleaner power plants to force older, dirtier plants to reduce operations or close down. This creates a tension: If the process of displacement can be guaranteed, then new power plants mean cleaner air, but their siting can cause additional harm to nearby residents and the local environment. If the older plants are not displaced, then new power plants will only mean more pollution and more siting problems. The most effective way to ensure that overall pollutant emissions are reduced is to establish national caps on power plant emissions, as described above.

Finally, national surveys show that consumers want to purchase electricity with minimal environmental impacts, but they lack credible information upon which to base their decisions. Therefore, it is crucial that there be full disclosure to customers about the sources and environmental impacts of their electricity so they can make educated choices.

CHAPTER 4

NATURAL GAS

Key Recommendations for Natural Gas Policy

- Provide tax incentives for the construction of energy-efficient buildings and for manufacturing energy-efficient heating and water-heating equipment.
- Adopt a comprehensive pipeline approach ensuring that pipelines are constructed in an environmentally sensitive manner, with strong safety oversight, and, whenever possible, along existing routes.
- Reject plans to construct an offshore pipeline off the Arctic National Wildlife Refuge coastal plain.
- Plan an Alaska gas pipeline if needed to deliver Prudhoe Bay gas to the lower 48 states that follows the Trans-Alaska Pipeline System and the Alaska-Canadian Highway right-of-ways; complies with all U.S. and Canadian environmental laws; has a thorough, new environmental impact statement; and incorporates the best pipeline safety and environmental measures.
- Do not drill in sensitive offshore areas, including moratorium areas, Alaska, and the eastern Gulf of Mexico.
- Maintain existing protections for sensitive onshore public lands and extend protection to other special places.

Another major energy source for the United States is natural gas. It is used in a variety of applications, including as a source for heating, as fuel for electricity generation, and even as a power source for buses and other motor vehicles. As noted earlier, it is the cleanest burning fossil fuel, particularly when modern equipment is used. But as with other fossil fuels, extracting natural gas and transporting it to market can harm the environment.

Still, it is preferable to burning other fossil fuels, and it therefore must be regarded as the bridge fuel to a future energy system that relies on renewable and environmentally friendly sources of energy. Replacing about one-third of the existing coal-fired electricity generation with high-efficiency gas would require about 4 trillion cubic feet of gas per year (Tcf/yr). That conversion, coupled with projected growth in demand, both for new generation and for other uses of gas, could increase gas demand in the United States by some 36 percent. With strong energy efficiency and renewable energy programs, most or all of the demand growth could be avoided. For example, tax incentives for the construction of energy-efficient buildings and for manufacturing energy-efficient heating and water-heating equipment could save 300 Tcf of natural gas over 50 years. Nonetheless, additional supplies of natural gas still will be necessary to replace a share of dirtier coal-fired electricity.[33]

Without successful efficiency measures, the demand for natural gas could increase even more. The Energy Information Administration's (EIA) conventional forecast is that domestic natural gas production will increase from 18.7 Tcf in 1999 to 29 Tcf in 2020, a growth rate of 2.1 percent per year. At the same time, EIA expects natural gas imports to increase from 3.4 Tcf in 1999 to 5.8 Tcf in 2020. Domestic consumption is projected to reach 30 Tcf in 2013 and increase to 35 Tcf by 2020.[34] Over the next 20 years, natural gas consumption is likely to outstrip domestic production, requiring additional imports primarily from Canada.[35]

Much of the debate over natural gas revolves around where to drill for it. Despite assertions from industry and its supporters on Capitol Hill, it is not necessary to drill in sensitive areas to meet America's energy needs. For example, industry is pressing to drill in sensitive areas of the Outer Continental Shelf, including offshore Alaska, the eastern Gulf of Mexico, and areas where a moratorium on drilling has been in place for many years. But such drilling is unnecessary because 70 percent of the nation's estimated undiscovered, economically recoverable Outer Continental Shelf oil and gas is located *outside* of these protected areas.

Oil companies currently reinject gas produced in Prudhoe Bay because there is no way to transport it to market.

Some have also suggested that natural gas production is a reason to drill in the Arctic National Wildlife Refuge. In reality, industry interest in the Artic Refuge is driven by its desire to produce oil, not gas. The Arctic Refuge is estimated to contain less than 7 Tcf of natural gas resources, about a three-month supply by the time the resources could be developed.[36] By comparison, the Prudhoe Bay production area is estimated to contain 32 Tcf to 38 Tcf of natural gas resources.[37] Oil companies currently reinject gas produced in Prudhoe Bay because there is no way to transport it to market. If a natural gas pipeline were built to connect Prudhoe Bay to the lower 48 states, it would take at least 30 years before all of the natural gas could be brought to market.

Domestic natural gas exploration has rebounded from historic lows in early 1999, when 371 natural gas drilling rigs were reported in service as wellhead prices fell below $2 per Tcf. As wellhead gas prices recovered, and then doubled, natural gas exploration surged; 840 natural gas drilling rigs were reported in service in November 2000.[38] Rising natural gas prices are driving the renewed interest in natural gas exploration in existing production regions in Oklahoma, Texas, and Kansas.[39] Shortages of skilled labor and reluctance to invest in new drilling equipment currently are limiting natural gas production, indicating that access to public lands is not a constraint.

Most onshore and offshore federal public lands—the property of all Americans—are managed by the U.S. Forest Service, the Bureau of Land Management, and the Minerals Management Service.[40] Despite oil industry assertions that onshore and offshore federal public lands are closed to exploration and production of oil and natural gas, 95 percent of federal public lands in the Rocky Mountain region managed by the Bureau of Land Management (including split estate lands) are open to exploration and production leasing.[41] Similarly, more than 80 percent of estimated undiscovered, economically recoverable offshore gas resources are open to exploration. Few federal onshore lands are off limits to *any* harmful activity, including oil and gas leasing and development. Many have already been leased and developed, and as a result, once undisturbed rural areas and spectacular wild lands have been transformed by industrialization, their wilderness values

destroyed, and a host of publicly owned resources degraded, if not permanently lost. Under President Bush's proposed energy plan, industry would be allowed to plunder some of the last, best vestiges of America's magnificent natural heritage.

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CONSEQUENCES OF DEVELOPMENT

When widespread oil and gas leasing occurs in the Rockies, the result is heavy-duty industrialization. Well fields, which can cover extensive acreage, are accompanied by a dense web of power lines, pipelines, waste pits, and new or upgraded roads, along with processing plants and other production facilities. All this activity displaces deer, antelope, and other wildlife species from their native ranges and has ruined wilderness values on millions of acres. Every year, visibility is significantly impaired in many places on many days by emissions from industrial operations. These same emissions have contributed to acidification of sensitive bodies of water.

SPECIAL PLACES AT RISK IN THE WESTERN UNITED STATES

The areas of focus for natural gas exploration in the lower 48 states onshore include the Rocky Mountain region, where in addition to reserves associated with oil deposits, unconventional resources such as tight sands and coalbed methane are attracting particular attention. The Bureau of Land Management (BLM), as of July 2000, had issued 12,000 drilling permits for coalbed methane exploration in the Wyoming Powder River Basin to 112 companies, with 6,000 wells drilled and 2,500 in production. This amount of activity significantly exceeds previous forecasts for coalbed methane exploration and production. According to a 1995 BLM forecast, approximately 5,000 coalbed methane exploration wells would be drilled; two years ago the forecast jumped to 10,000; and last year, to 15,000. By mid-1999, the forecast hit 30,000, and, by the spring of 2000, 50,000 to 70,000 wells were projected for the Powder River Basin on private, state, and federal lands.

Natural gas production on some public lands will continue to be necessary, but some areas within the federal public lands system merit special protection. Existing protection for areas such as the Rocky Mountain Front and roadless national forest areas should be maintained. Other unique and irreplaceable areas also merit protection, even though they currently are open to exploration and production.

For example, hidden away in the southwestern part of Wyoming, the Red Desert boasts a unique and spectacular landscape—one of the most remarkable in North America. The area has stunning rainbow-colored rock formations, towering buttes, prehistoric rock art, and outstanding wild lands. It is home to the largest pronghorn antelope herd in the lower 48 states as well as a rare desert elk herd. For centuries, the Red Desert has been a sacred place of worship for the Shoshone and Ute tribes, and it contains remnants of the Oregon and Mormon Pioneer trails. Oil wells, pipelines, excessive roads, and other industrial facilities already mar some of the surrounding desert land. In response to industry applications to lease, the Interior Department recently

committed the BLM to develop a proposal that focuses on protecting the area's outstanding natural, cultural, and aesthetic wonders.

Another example, Utah's fabled red rock country, is one of the last unspoiled wilderness areas outside of Alaska. Its red-hued massive cliffs, arches, towers, and other rock formations support bighorn sheep, mountain lions, pronghorn antelope, peregrine falcons, golden eagles, and other wildlife species, as well as ancient Native American ruins. Last year the BLM attempted to lease more than 30,000 acres of sensitive, unique wild lands in red rock country—bringing them closer to industrialization and the certain destruction of their wilderness, wildlife, and other values.

Still another special place is the area in and around Vermillion Basin in northwest Colorado—one of the state's most stunningly beautiful and isolated regions. Its wild landscape is dotted with banded cliffs, desert mountains, and rugged badlands. The area is surrounded by oil and gas development that threatens to encroach into Vermillion Basin. Despite the passage of time, the basin looks much as it did when the Ute Indians' ancestors first hunted and lived there. If oil and gas development pressures are permitted to intrude further on the unique *de facto* preserve, the landscape will be changed forever.

OFFSHORE LEASING, EXPLORATION AND DEVELOPMENT

From Big Sur to the spectacular coast of Maine, to the Florida Keys and back to Alaska's Bristol Bay, some of America's most important national coastal treasures have been protected so far from offshore oil and gas development by Congress and by two presidents—George H.W. Bush and Bill Clinton.

Large reserves of natural gas are located in the federal waters of the central and western Gulf of Mexico, which are open to oil and gas leasing. This area is estimated to contain 60 percent of the undiscovered economically recoverable oil resources and 80 percent of the undiscovered economically recoverable gas resources estimated to be available in the entire U.S. Outer Continental Shelf (OCS), according to the Minerals Management Service.[42] Thus, protecting sensitive offshore areas, including the moratorium areas, offshore Alaska, and the eastern Gulf of Mexico, still leaves the vast majority of the nation's Outer Continental Shelf oil and gas available to industry.

Some argue that natural gas development on the Outer Continental Shelf should be promoted, including in the moratorium areas, most notably off the Atlantic and the west coast of Florida. They argue that the risk of oil spills is negligible, and that environmentally sound development can take place. Their argument ignores the reality that oil spills are not the only environmental concern related to OCS development. Offshore gas development, like oil development, causes substantial environmental damage. Furthermore, leases for natural gas exploration also could open the door to oil development.

Beginning in the George H.W. Bush administration and continuing throughout the 1990s, the Interior Department emphasized the need to proceed on a consensus basis with OCS activities. NRDC strongly agrees with this approach and submits that consensus has been clearly established on the appropriateness of OCS activities in most areas of the country. This consensus has been reflected in the consistently broad, bipartisan support for the existing congressional moratoria on leasing outside the central and western Gulf

of Mexico. The moratoria have been endorsed by an array of elected officials from all levels of government and diverse political persuasions, from former Gov. Christine Todd Whitman of New Jersey to Gov. Jeb Bush of Florida and Gov. Gray Davis of California.

Political support for the moratoria stems from concern over the severe environmental, social, economic, and cultural damage associated with offshore oil and gas development, including:

Onshore damage: The onshore infrastructure associated with offshore oil or gas causes significant harm to the coastal zone. For example, OCS pipelines crossing coastal wetlands in the Gulf of Mexico are estimated to have destroyed more coastal salt marshes than can be found in the stretch of land running from New Jersey through Maine.[43] Moreover, the industrial character of offshore oil and gas development is often at odds with the existing economic base of the affected coastal communities, many of which rely on tourism, coastal recreation, and fishing.

Oil spills: If offshore areas are leased for gas exploration, there is always the possibility that oil also will be found, creating the risk of oil spills. According to MMS statistics, some *3 million gallons* of oil spilled from OCS oil and gas operations in 73 incidents between 1980 and 1999.[44] Oil is extremely toxic to a wide variety of marine species, including marine birds, mammals, and commercially important species of fish. In the wake of the devastating Exxon Valdez oil spill, scientists at the National Marine Fisheries Service's Auke Bay Lab found that concentrations of polycyclic aromatic hydrocarbons (PAH)—the most toxic component of oil—as low as 1 part per billion were toxic to juvenile pink salmon.

Water pollution: Drilling muds are used to lubricate drill bits, maintain downhole pressure, and serve other functions. Drill cuttings are pieces of rock ground by the bit and brought up from the well along with used mud. Massive amounts of waste muds and cuttings are generated by drilling operations—an average of 180,000 gallons per well.[45] Most of this waste is dumped untreated into surrounding waters. Drilling muds contain toxic metals, including mercury, lead, and cadmium. Significant concentrations of these metals have been observed around drilling sites.[46]

A second major polluting discharge is produced water, the water brought up from a well along with oil and gas. Offshore operations generate large amounts of produced water. The Minerals Management Service estimates that each platform discharges hundreds of thousands of gallons of produced water every day.[47] Produced water typically contains a variety of toxic pollutants, including benzene, arsenic, lead, naphthalene, zinc, and toluene, and can contain varying amounts of radioactive pollutants. All major field research programs investigating the fate and effects of produced water discharges have detected petroleum hydrocarbons, toxic metals, and radium in the water column down-current from the discharge.[48]

Air pollution*:* Drilling an average exploration well generates some 50 tons of nitrogen oxides, 13 tons of carbon monoxide, 6 tons of sulfur dioxide, and 5 tons of volatile organic hydrocarbons. Each OCS platform generates more than 50 tons of nitrogen oxides, 11 tons of carbon monoxide, 8 tons of sulfur dioxide, and 38 tons of volatile organic hydrocarbons every year.[49]

COMPREHENSIVE PIPELINE POLICY

The siting of natural gas pipelines must be conducted in an environmentally sensitive way. Efficient, combined-cycle natural gas power plants produce more pollution than renewable energy sources, but much less than oil- or coal-fired plants. For this reason, NRDC views them as an important bridge to a cleaner energy future. Natural gas pipelines are necessary to fuel these plants, but they must be sited so as to preserve fragile ecosystems.

The siting of new pipelines should follow existing rights-of-way whenever possible to take advantage of existing infrastructure and avoid environmental damage from construction or inadequate maintenance. For example, NRDC strongly opposes a pipeline that would carry Prudhoe Bay gas that goes "over the top" offshore from the Arctic National Wildlife Refuge in Alaska to the MacKenzie Delta in the Northwest Territories in Canada. If natural gas reserves presently reinjected into the ground at the Prudhoe Bay production area are to be recovered, any natural gas pipeline should follow the existing Trans-Alaska Pipeline System and the Alaska-Canadian Highway right-of-ways; comply with all U.S. and Canadian environmental laws; undergo a thorough, new environmental impact statement; and incorporate the best pipeline safety and environmental measures.

CHAPTER 5

CONCLUSION

As the debate over America's energy policy is joined, the president and Congress will confront a series of crucial choices. Will we set America on a path that allows for tomorrow's energy needs, or will we simply continue to drill and burn our way through precious natural resources with no regard for the energy future our children will face? Will we respect the environment or ravage it in pursuit of the last drop of available oil? Will we focus attention on energy efficiency as a way to cut demand and prices, or will we submit our children to a future in which they are even more dependent on foreign oil because American demand has depleted American supply?

The debate will play out in the context of the controversy over the Arctic National Wildlife Refuge and in the shadow of the California electricity crisis. But these two issues also are metaphors for the larger questions confronting policymakers. The Arctic Refuge frames fundamental choices about whether we will sacrifice our environment so that the energy industry can extract every cent of profit while we delay prudent action until we are forced to curtail our energy use. The California experience is widely portrayed as a choice between rolling back environmental standards or limping by on inadequate supplies of power.

Unfortunately, these two issues have been badly misrepresented and distorted by political partisans and the energy industry, who appear bent on creating and exploiting a crisis mentality as a way to win a political battle that could mean billions of dollars of profit for energy conglomerates. The truth is:

- Increasing fuel efficiency standards for new vehicles to an average of 39 miles per gallon over the next decade would save 51 billion barrels of oil over the next 50 years—more than 15 times the likely yield from the Arctic Refuge.
- Drilling the Arctic National Wildlife Refuge is no answer whatsoever to California's current problems.
- Drilling the Arctic Refuge will have a negligible impact on America's dependence on foreign oil.
- Drilling the Arctic Refuge will not solve America's long-term energy needs.
- The answer to California's long-term needs—indeed, the answer to America's long-term needs—is to pursue and achieve much greater energy efficiency, to work toward much greater reliance on renewable and clean sources of energy, and to rely more in the meantime on natural gas as a bridge to the future.
- California's electricity crisis is not the product of environmental regulation. It is in large measure a result of letting short-term thinking substitute for a balanced portfolio of investments in sustainable energy resources.

Eventually the United States will have no choice but to turn to greater energy efficiency and renewable sources of power. Demand for fossil fuels surely will overrun supply sooner or later, as indeed it already has in the case of U.S. domestic oil drilling. The capacity of our air and land to absorb unlimited quantities of waste from fossil fuel extraction and combustion is also limited. As that day draws nearer, policymakers will have no realistic alternative but to turn to sources of power that today make up a viable but small part of America's energy picture. They also will be forced to embrace energy efficiencies—those that are within our reach today, and those that will be developed tomorrow. Precisely *when* they come to grips with that reality—this year, 10 years from now, or 20 years from now—will determine how smoothly the transition will go for consumers and industry alike.

ENDNOTES

[1] Energy services means heating, lighting, mechanical, and other essential functions that energy in its various forms helps to sustain

[2] Steve Nadel, American Council for Energy-Efficient Economy, *Summer Study on Energy Efficiency in Buildings* (1998).

[3] U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy "Energy Department Adopts Air Conditioning and Three Other Appliance Standards To Save Consumers $19 Billion and Help Cut Electricity Demand." DOE Press Release, January 18, 2001. See also U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, *Energy Conservation Program for Consumer Products: Clothes Washer Energy Conservation Standards*, 66 Fed.Reg. 3314 (January 12, 2001); *Energy Efficiency Program for Commercial and Industrial Equipment: Efficiency Standards for Commercial Heating, Air Conditioning and Water Heating Equipment*, 66 Fed.Reg. 3336 (January 12, 2001).

[4] David Goldstein, "Mortgages Can Remove the Incentive for Sprawl," *Earthword*: *The Journal of Environmental and Social Responsibility*, Issue #4.

[5] U.S. Geological Survey, The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska. USGS Open File Report 98-34 (1999).

[6] If America opened the Refuge to drilling tomorrow, approximately 10 years would pass before the first oil from that region flowed through the Trans Alaska Pipeline System (TAPS), is loaded into tankers, and then delivered to West Coast refineries. It would take approximately 15 more years before the region reached maximum production levels.

[7] U.S. Geological Survey, The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska. USGS Open File Report 98-34 (1999).

[8] The U.S. Geological Survey's best estimate of the economically recoverable potential of the Arctic Refuge is 3.2 billion barrels at a price of $20 per barrel in 1996 dollars. Adjusting for inflation since then and accounting for the fact that Arctic oil sells for $2.50 to $6 less per barrel than West Texas Intermediate, the benchmark for the world oil price, implies that the 3.2 billion barrel figure corresponds to a world oil price of at least $25 per barrel in today's dollars.

[9] U.S. Geological Survey, The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska. USGS Open File Report 98-34 (1999).

[10] Energy Information Administration, *Electric Power Annual 1999: Volume I* DOE/EIA-0348(99)/1 (August 2000).

[11] Eric Pianin, "Norton Argues for Arctic Drilling," *The Washington Post*, January 20, 2001, p. A16. Then-secretary of the interior nominee Gale Norton said, "I have been told production there would impact only about 2,000 acres in an area well over the size of many of our states."

[12] Kenneth J. Bird USGS, Assessment Overview, The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska. USGS OFR 98-34 (1999).

[13] Comments of Clarence Hermann, Michelin Tire Company, submitted in response to U.S. Department of Transportation National Highway Traffic Safety Administration, *Consumer Information Regulations Uniform Tire Quality Grading Standards: Request for Comments* 59 Fed.Reg. (April 25, 1994).

[14] U.S. Department of Transportation National Highway Traffic Safety Administration, *Consumer Information regulations Uniform Tire Quality Grading Standards,* 60 Fed.Reg. 27472 (May 24, 1995).

[15] Examples include California's AB 1890 and AB 1002, which provide for statewide, needs-based low-income energy services funded through a small surcharge on electricity and natural gas bills.

[16] Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*. 1999 Annual Report DOE/EIA-0216(99) (December 2000).

[17] Energy Information Administration, *International Energy Annual 1999* DOE/EIA-0219 (99) (February 2001) Tables 1.2 and 3.5.

[18] U.S. Environmental Protection Agency, Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2000. EPA420-R00-008 (December 2000).

[19] U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 1998*, Table 4-13; Federal Highway Administration *Highway Statistics Summary to 1995* 050-001-00323-6 (January 2000), Table VM-201A; Federal Highway Administration *Highway Statistics 1999* (2000) Table VM-1.

[20] Energy Information Administration, *Electric Power Annual 1999: Volume I* DOE/EIA-0348(99)/1 (August 2000).

[21] California Energy Commission, *California Energy Demand: 2000-2010,* 200-00-002 (June 2000).

[22] California Energy Commission Staff Report, *California Natural Gas Analysis and Issues* P200-00-006 (November 2000).

[23] California Energy Commission, *The Energy Efficiency Public Goods Charge Report: A Proposal for a New Millennium* P400-99-020 (December 1999), p. 12; data on net benefits are from NRDC, *Investments in the Public Interest* (January 2000).

[24] RAND, The Public Benefits of California's Investments in Energy Efficiency (March 2000), p. xiv.

[25] Gov. George W. Bush, "A Comprehensive National Energy Policy," September 29, 2000.

[26] Energy Information Administration, *Electric Power Annual 1999: Volume I* DOE/EIA-0348(99)/1 (August 2000).

[27] Ralph Cavanagh, "Electric Power Marketing in an Increasingly Competitive Era," 5 *Yale Journal on Regulation* (Summer 1988).

[28] Amory Lovins and Hunter Lovins, Brittle Power: Energy Strategy for National Security, Brickhouse (1982).

[29] Energy Information Administration, *Electric Power Annual 1999: Volume I,* DOE/EIA-0348(99)/1 (August 2000).

[30] Energy Information Administration, *Electric*

Power Annual 1999: Volume I, DOE/EIA0-348(99)/1 (August 2000).

[31] U.S. Environmental Protection Agency, *National Air Quality and Emissions Trends Report, 1998,* EPA 454/R-00-003 (March 2000).

[32] California Energy Commission, Renewable Energy Program Annual Project Activity Report to the Legislature, 500-00-021 (December 2000).

[33] Interlaboratory Working Group, *Scenarios for a Clean Energy Future* (Oak Ridge, Tennessee; Oak Ridge National Laboratory and Berkeley, California, Berkeley National Laboratory (ORNL/CON-476, LBNL-44029)) (November 2000). The "Advanced" electricity scenario shows total gas demand increasing from current levels of about 22 Tcf to 26 Tcf in 2010, while total CO_2 emissions are reduced.

[34] Energy Information Administration, *Annual Energy Outlook 2001,* DOE/EIA-0383(2001) (December 2000), p. 29.

[35] Canada has proven natural gas reserves of 63 Tcf and assessed additional reserves of 603 Tcf. Energy Information Administration, *Annual Energy Outlook 2001,* DOE/EIA-0383(2001) (December 2000), p. 30.

[36] John Schuenemeyer, USGS, Assessment Results, The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska. USGS Open File Report 98-34 (1999). Chapter RS Table RS14.

[37] T.J. Glauthier, deputy secretary of energy, testimony before the Senate Committee on Energy and Natural Resources, September 14, 2000.

[38] Energy Information Administration, *Annual Energy Outlook 2001,* DOE/EIA-0383(2001) (December 2000), pp. 30-32.

[39] Jim Yardley, "Oil Patch Comes To Life As Natural Gas Prices Climb," *New York Times,* December 16, 2000 pp. A1, A16. In December 2000 some 1,090 drilling rigs were reported in service, with more than 800 drilling rigs exploring for natural gas, a significant increase over a year ago when fewer than 400 drilling rigs were reported in service, but still modest in comparison to the 1970s and 1980s when more than 4,500 drilling rigs were reported in service.

[40] The Bureau of Land Management (BLM) is responsible for administering oil and gas exploration and production leasing on all onshore BLM lands, while the Mineral Management Service of the Department of Interior manages oil and gas leasing on the outer continental shelf surrounding the US coastline. They are separate sections of the Department of Interior.

[41] The Rocky Mountain region consists of Colorado, Montana, New Mexico, Utah and Wyoming—the five Western states that are significant oil and gas producers.

[42] U.S. Department of the Interior, Minerals Management Service, *Outer Continental Shelf Petroleum Assessment 2000* (2000) p. 5, and *Gulf of Mexico Assessment Update*. Assumes mean estimates of undiscovered, economically recoverable resources at $18/barrel oil; $2.11/Tcf gas.

[43] Boesch and Rabalais, eds., "The Long-term Effects of Offshore Oil and Gas Development: An Assessment and a Research Strategy." A Report to NOAA, National Marine Pollution Program Office at 13-11.

[44] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), pp. IV-50.

[45] MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), p. IV-50.

[46] Id.

[47] *Id*., p. IV-32.

[48] *Id.,* p. IV-32-33.

[49] *Id*., p. IV-40.