LNG tankers are immense - commonly holding 35,000,000 gallons of liquified gas - the energy equivalent of 60 Hiroshima bombs.

LNG IMPORTS:
NEITHER SAFE NOR WISE

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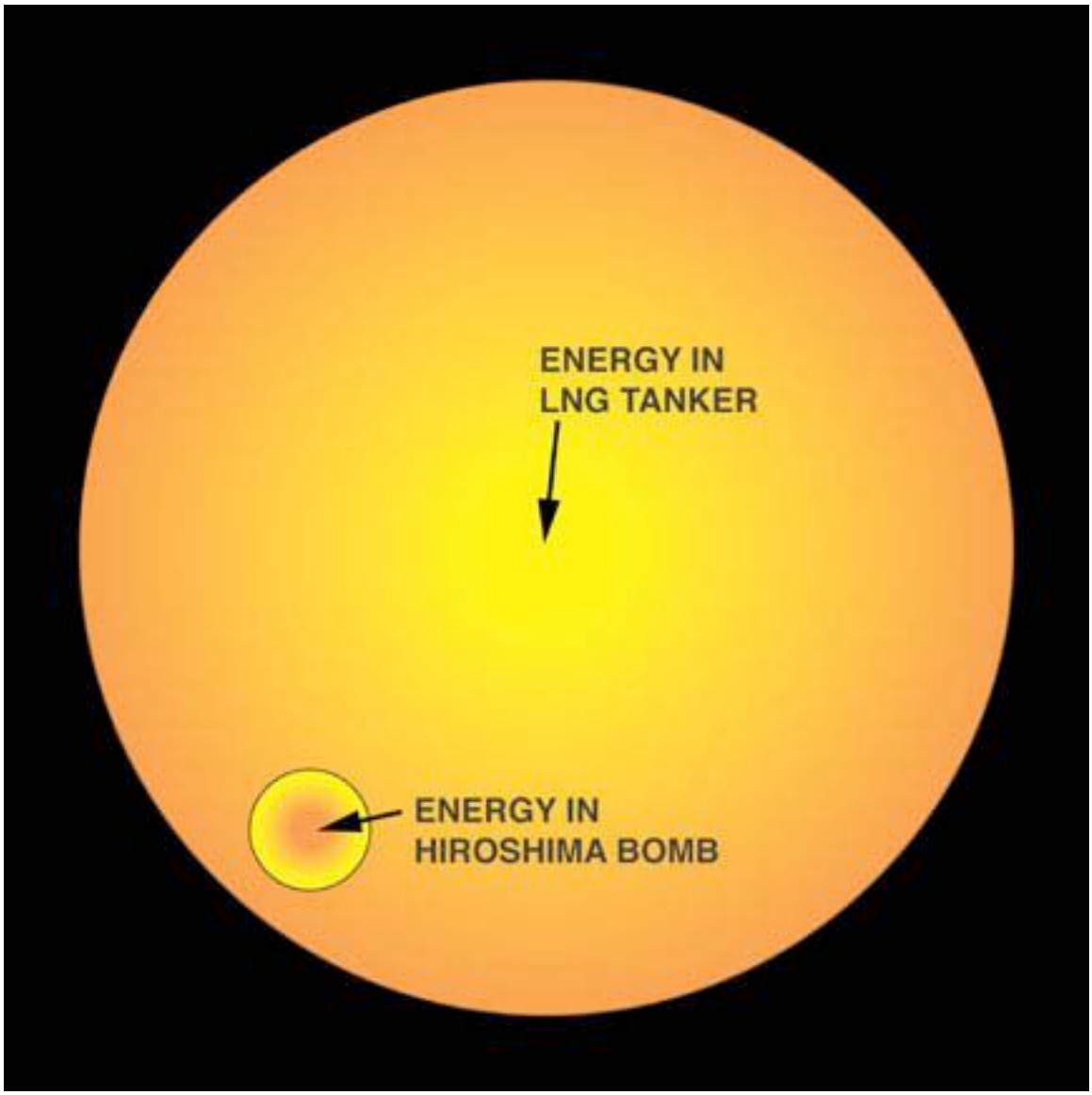
Liquefied natural gas (LNG) is considered by transportation officials to be a "hazardous and noxious substance". The Port of Astoria, and the community has been told by Calpine representatives that their proposed Skipanon LNG import terminal would be safe, and that any LNG spills would just fizz and evaporate "like 7-UP". But a just-released Sandia research lab study (SAND2004-6258) joins the voices of long-term government-funded researchers to strongly disagree. Although the operational safety of the LNG industry has been good overall, the hazards of our post 9/11 world are not operational safety but intentional acts of destruction. And LNG terminals and tankers are prime terrorist targets.

LNG tankers are huge – as long as the World Trade Center buildings were tall – and contain 35,000,000 gallons or more of LNG. That represents the energy equivalent of 60 to 80 Hiroshima bombs. Not one, but sixty to eighty Hiroshima bombs! An accident affecting even a tiny part of that energy can be catastrophic.

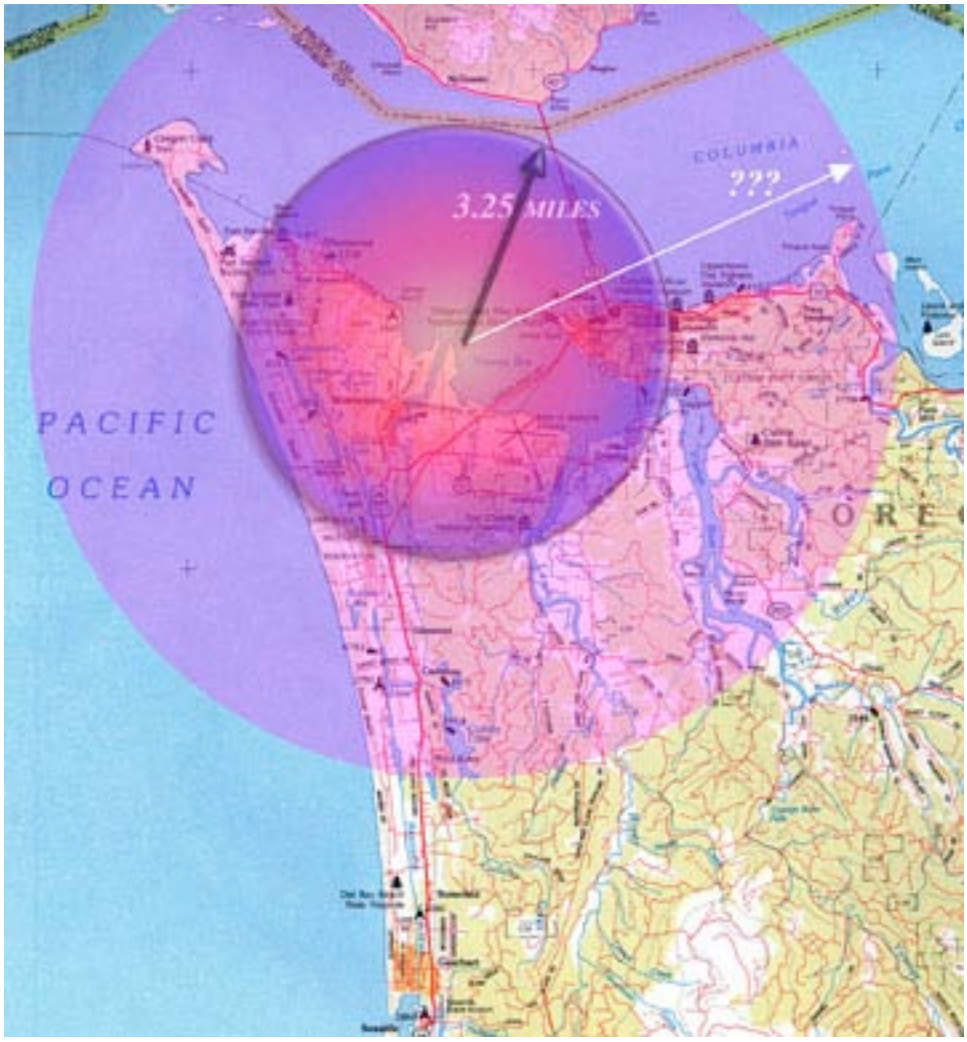


LNG is less likely to be as "explosive" as a nuclear weapon, but the far greater amount of energy, and drifting fireballs of burning gas could be even more destructive than Hiroshima.

"Terrorist attacks on tankers carrying liquefied natural gas into a U.S. port could trigger a fire that could burn the skin of people a mile away and cause major injuries and significant structural damage within about a third of a mile," says the *Washington Post* (Dec 22, '04). The Sandia report, prepared by that Energy Department laboratory, stated that, "terrorists could use rocket-propelled grenades, missiles, planes or boats to break open the tankers." The *Post* also quotes James A. Fay, a professor emeritus of mechanical engineering at the Massachusetts Institute of Technology who has studied LNG safety for 35 years, "If there were a successful attack, then the consequences can be very severe. I think this report has done a lot to get the science of this consequence analysis out on the table where everyone can see it."

An LNG spill can create major hazards that extend over considerable area. **It can cause asphyxiation, cryogenic burns, structural damage and failure, 3000ºF fireballs several thousand feet across and hundreds of feet high, fuel-air (vapor cloud) detonations or explosions that can cover very large distances, and rapid phase**

transitions (explosive boiling of the cold liquid). There remains considerable uncertainty about extent of potential hazard depending on rate of LNG release, possible ignition sources, wind direction and speed, etc. But the fine print isn't important with fire hazards of that scale. And with abutting property owner, Weyerhaeuser, having filed for a permit to expand the size of their open-flame boilers, is Warrenton a good location for an LNG terminal?



A burning vapor cloud from an LNG tanker at the Skipinon site could extend beyond Astoria.

Even this new report may significantly underestimate potential damage. It assumes that only three of the five or more holds of a tanker might be affected, and that the hole through which LNG would be released would not be larger than 5 meters^2 – although a hole ***twenty*** times as large (100 meter^2) had already been blown by terrorists in the double-hulled Limberg oil tanker, (below). And the amounts of LNG involved are 100 to 1000 times as large as any real tests which have ever been performed. The firestorms from bombing Dresden and Tokyo in WWII were not predicted from the effects of dropping a few single bombs.

This 30' (100 meter^2) hole blasted by terrorists through the double hull of the French oil tanker Limburg indicates that LNG can be spilled far more rapidly than by the 5 meter^2 opening used in government safety studies.

The Sandia report also largely ignores airborne attacks on tankers (where tanks are unprotected by the ship's double hull), and the potential use of fuel-air bombs to disperse the LNG more explosively into the air.

The tops of LNG tanker holds are far more vulnerable to terrorist actions than the lower parts, which are protected by double hulls and greater amounts of insulation.

Fuel-air bombs are shockwave bombs that could cause dispersal and detonation of a tanker of LNG like atomic bombs are used to detonate larger hydrogen bombs. (A GOOGLE on "fuel-air bombs" will give you immediately two *New Scientist* articles – "First Test for US Monster Bomb" saying it "creates a mushroom cloud and a shockwave similar to that of a small nuclear explosion" and a second, "Experts Fear Terrorists Are Seeking Fuel-Air Bombs" telling where terrorists can obtain either large or shoulder-rocket launched versions. Reading these reports do not dispel fears of LNG terminal hazards.

The "superbomb" fuel-air explosives get their destructive power by dispersing their "fuel" into the air before detonation. Use of their shock blast to disperse LNG tanker cargo into the air before detonation has the potential for the same action on vastly larger scale.

With the Calpine site located just off the approach path to two runways of the Astoria airport, it is doubtful that any security against airborne attacks is possible without permanently closing the airport. Is that a reasonable trade off for energy we neither need nor can afford to pay for?

How can a tanker unloading site located almost on the glidepath to the Astoria airport be considered safe from either accidents or terrorist action?

These kinds of security and safety issues are serious enough that the only urban LNG terminal in this country, in Boston, has been shut down twice – after 9/11, and during the 2004 Democratic Convention. This was based on action by Richard Clarke, then America's top counterterrorism official, who had knowledge that *al Qaeda* operatives had been smuggled into the US in LNG tankers and that "had one of the giant tankers blown up in the harbor, it would have wiped out downtown Boston". Dr. James Fay, in his study of potential LNG spills in Boston Harbor, similarly states that "The fire that would ensue from a boat bomb

attack on a tanker would be of unprecedented size and intensity. Like the attack on the World Trade Center in New York City, there exists no relevant industrial experience with fires of this scale from which to project measures for securing public safety."

In February, 2004, Boston fire officials testified that they are unprepared to deal with the potential disaster stemming from such an explosion. "We feel that the risk is more than the Boston Fire Department could deal with," said Fire Commissioner Paul Christian. Prof. Jerry Havens, a long-time researcher on LNG hazards, also addressed LNG pool fires in the Jul/Aug '03 *Bulletin of Atomic Scientist*, "We do know some things about such fires. They could not be extinguished and would have to burn themselves out. Unlike some flammable liquids such as crude oil. the gas would burn itself out only when it was totally consumed."

Terrorist attacks against LNG facilities have significant probability. If our nation shifts to dependence of massive imports of LNG through less than a dozen terminals, simultaneous attacks on these facilities could cause long-term disruption of energy supplies, major shortages in peak seasons, as well as major destruction of surrounding areas. There are currently 96 LNG storage tanks in the US, and all are of unsecure double-wall steel, which can easily be breached by a shoulder-launched rocket, causing additional local destruction.

The consequences of a terrorist act against an LNG tanker, the Sandia report states, also include disruption of future LNG deliveries, denial of future operations at other waterways, denial of future operations at receiving terminal, loss of use of infrastructures or properties, economic losses and loss of energy supplies, as well as public deaths and/or injuries. In other words, once people find out the real hazards implicit in these facilities, they will not allow them anywhere.

Has the Warrenton Fire Department more resources than the City of Boston? Has the Astoria airport been informed about impacts on their operations? Have we been told the Astoria bridge would likely be closed during any upstream tanker transits to Port Westward? What about shipping closures if one, two, or three terminals are approved? Have the Cities of Warrenton, Hammond, Astoria, and even Gearhart and Seaside been informed of the possible scale of fireballs from a tanker "explosion"?

There are only two reasonable alternatives on dealing with LNG imports. The first is remote siting of terminals, away from population areas (even Warrenton and Astoria). With that option, however, the major security hazards of terrorist ship attacks and foreign trade deficit remain.

The second option, focusing on renewable energy and energy efficiency rather than imports of LNG for meeting our energy needs, is the only safe option. Two-thirds of NW electricity comes from renewable sources, and half of the NW energy "supply" over the last twenty years has come from energy efficiency. It is the only way to go, and time for us to give some leadership towards more responsible ways of living.

LNG SAFETY:
CAN WE DEPEND ON GOVERNMENT REGULATION?

Can we depend on government regulation for safety in siting LNG terminals? FERC (the Federal Energy Regulatory Commission) claims it has sole jurisdiction over terminal siting. Of course, it does not even consider tanker hazards at all in approving terminal siting. And tanker hazards themselves assume only one of 5 tanks would be breached in an accident. Existing hazards tests haven't tested even one percent of the amount of LNG carried by current tankers. The NFPA standards FERC uses for human safety (developed by LNG industry representatives, with no public review) would still result in second degree burns on all exposed skin within a matter of seconds. In 2003, FERC even relaxed rules regarding siting of LNG facilities near population areas – based on a Quest Consultants study which has since been largely disowned by its authors.

The Federal Department of Transportation's record is no better. Their standards regarding the siting of new LNG terminals are based on the Pipeline Safety Act of 1979. The author of that law, Representative Edward J. Markey of Massachusetts, testified in June, 2004 that, "the Secretary of Transportation has chosen to largely ignore this law." Specifically, congressional intent that all LNG terminals be remotely sited, assessment of consequences of terrorist attack against an LNG tanker or terminal, safety of LNG tankers, and facility operator funding for security costs are important issues he indicates are being ignored.

On Jan. 14, '04, a coalition of 18 Members of Congress from coastal areas filed a legal brief stating that a provision accompanying the recently passed omnibus appropriations bill should not be interpreted as giving the Federal Energy Regulatory Commission (FERC) sole power to approve the location of Liquefied Natural Gas (LNG) facilities. "We must ensure that our communities are protected, particularly in a time of terrorist threats and other dangers," Sen. Edward Kennedy said. "The best way to address public safety concerns is for federal officials to work jointly with state and local public safety officials on the needs of our communities. We must ensure that impacted communities have a voice in the siting of these facilities."

"After September 11th, we simply cannot afford to ignore the risks from attack scenarios involving LNG tankers or facilities that previously might have seemed unrealistic," said Rep. Stephen Lynch. "To that end, we must be far more cautious and deliberate before constructing any new LNG terminals in the United States. In the future, I believe that our energy and security needs would be best served by building offshore terminals to keep tankers and infrastructure farther away from population centers."

Ecology and Environment, an environmental consulting firm specializing in assisting in regulatory approvals for siting LNG facilities, gave a briefing to the Oregon Department of Energy recently. Their representatives indicated that 49 new LNG terminals are in various stages of application; that probably only six or eight will be approved, and that they felt it unlikely any of those will be on the East or West Coast. Why? The Gulf Coast has shallow waters for remote off-shore terminals, has existing distribution pipelines, and is already trashed by the oil industry. Why not the East or West Coast? Too many people with too much to lose, and with the will to prevent such hazardous facilities from being approved.

LNG:
GLOBAL AND POLITICAL ISSUES

Wastefully using up our own natural gas and petroleum supplies, is one thing. (The industry says our supplies are "maturing". That's double-talk for having sucked them dry.) But when we're buying replacement energy from other countries, we're in a different ball game, with different problems.

First is the issue of security. Shipping 35,000,000 gallon tankers of flammable fuel on an 8000 mile supply line over open ocean and through pirate-infested waters around starving nations isn't the same as driving a tank truck from Portland to Astoria. The *Institute for the Analysis of Global Security's* website has a whole list of studies of the issues of terrorism and LNG shipping. "LNG Tankers Make Spectacular Targets for Terrorists", "Radical Islam and LNG in Trinidad and Tobago", etc. One of them starts out, "As the risk of maritime terror attacks on tankers grows, all eyes are on the area surrounding the Malaccha Straits. . ."

The *New York Times* (Aug 20, '04) states, "Like oil deposits, big gas reserves are often found in politically troublesome places. Because few of the world's gas-rich countries are stable, open democracies, there is a danger that gas revenue will flow into the coffers of corrupt, brutal governments, or that gas supplies will be disrupted by domestic instability the way oil exports have been in Venezuela, Nigeria, and elsewhere." Indonesia is currently the largest LNG exporter, and also the world's largest Muslim nation. And Muslim nations (and others) are not particularly happy with the U.S. Government's recent actions and attitudes.

Tankers needed to convey LNG supplies cost over $1 billion dollars. It doesn't take a major breach to engulf a ship in flames and destroy both ship and contents. The *Sandia LNG Report* explains the vulnerabilities quite well - flammable insulation, cyrogenic cracking, brittleness of hulls at cyrogenic temperatures experienced during a spill. And it wouldn't take many terrorist attacks on U.S.- bound tankers to cut off supplies to this country or for every shipping company or insurer to back out of the U.S. market.

None of this makes for energy security. The only alternative is military action to secure the supply lines. Does any of this sound like Iraq? Does it stand the same potential for spectacular failure? The sad thing is that it isn't necessary. Remember the sun, and insulation.

The second major global LNG issue is national bankruptcy. Not individual, but of our whole country. Recent articles in the *Economist* echo the predictions by Stephen Roach, chief economist at investment banking giant Morgan Stanley, who recently said, "America has no better than a 10 percent chance of avoiding an economic "Armageddon." The issue is debt and trade deficits. The *Boston Herald* (Nov. 23, '04) says, "Twenty years ago, private debt was 50% of our economy. Now it is 85%." Our current accounts trade deficit is near 6% of GDP, and our foreign liabilities are projected to reach 28% of GDP by the end of this year. "To finance our current deficit with the rest of the world, we have to import $2.6 billion in cash. Every day. That's equal to 80% of the entire world's net savings." Since 1960, the U.S. dollar has lost 70% compared to the Yen and the Deutschmark/Euro. And nobody in government seems to care.

Our country's immense foreign trade deficit is causing economists to fear a major plunge in the value of the dollar even greater than its 70% loss since 1960.

America's imports are 50% bigger than its exports, and a major shift such as proposed LNG energy imports will significantly worsen that imbalance. We used to pay for imports with exports of manufactured goods. Now most manufacturing has moved to other countries, and we have little with which to pay for our increasing imports. As the dollar drops, LNG imports will either become too expensive, causing default on the whole energy import system, with no efficiency/renewable system in place, or we will have to pay twice the cost for other imports to pay for the LNG.

The third global issue is corporate abuse of power. The human rights record of global corporations is frightening. Amnesty International reports ongoing investigation since 1992 revealing serious human rights violations, including torture, kidnapping, and murder, in the Aceh natural gas field area of Indonesia, the world's largest LNG exporter. They report claims that Exxon/Mobil, operator of the fields, financed police "protection", provided "crucial logistical support . . . ," that their buildings and facilities were used for interrogating and torturing local people, and that their equipment was used to dig mass graves." Equally disturbing reports come from Nigeria, concerning Royal/Dutch Shell's control of oil fields, not to mention U.S. military action in Iraq to ensure U.S. corporate control of oil. Meeting our energy needs through institutions whose sole mandate is greed can only expand and worsen these problems – at home, as well as globally .

But for me, the true bottom line on global issues is that LNG imports represent immorality – first of wantonly depleting our own resources, and secondly of moving to deplete the resources of the rest of the world without taking a single thought about our responsibility to live more simply or act more efficiently. 83% of LNG is used up in liquification, transport, conversion to electricity, and distribution. Does that make sense?

In essence we are stealing resources from others – at gunpoint as in Iraq, or through barely more subtle processes elsewhere. That corrupts us, as well as our government. (Watch Hazel Henderson's *Ethical Marketplace* series premiering on PBS in January to see how fraudulent IMF growth projections intentionally put developing countries under the control of exploitive corporate economics.)

And the core reason to oppose LNG imports is that it represents a world-view out of touch with physical reality and with the reality of how our lives and actions affect and connect with other people and other life. We are fed by the gifts of others, and when we cut ourselves off, we harm ourselves as well as them.

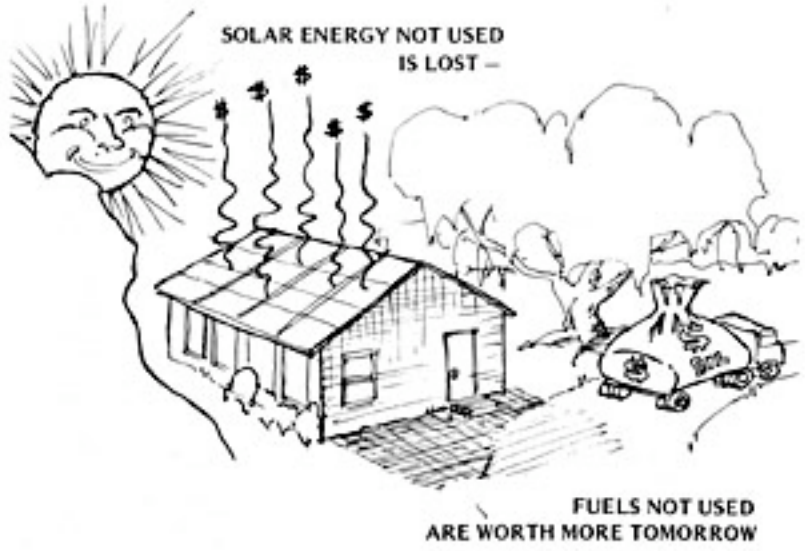
OUR *SAFE* ENERGY OPTION:
RENEWABLES AND ENERGY-EFFICIENCY

It isn't true, as Calpine has said, that we will have to depend on heavily polluting coal-electric plants for our energy, or face major shortages, if we don't support their LNG facility. There is a viable alternative for meeting our energy needs that is simple and proven – energy efficiency and renewable energy. It's far cheaper, it doesn't have security risks, it's under our own personal control, it doesn't cause foreign trade deficits, and we already know it provides local jobs. We can all feel snug and secure in a well-insulated, wood-heated house, even when the power goes off in a storm.

We hear little about efficiency and renewables because it generally doesn't offer huge profit opportunities for large corporations. Calpine and others promote what they think can make them rich, not what is wise to do. It is foolish to undergo huge risks for a corporate-based energy policy when there are far better alternatives available.

Two-thirds of NW electric production is still renewable hydro - from our liquid sunshine. Solar space heating and electricity, hybrid or high-mileage vehicles, better refrigerators, lighting, clothes washers and dryers, more efficient motors and industrial processes, and better insulated houses can have immense impact. Energy efficiency improvements over the last 25 years now save Americans more than $430 billion a year on energy purchases, and have provided 50% of "new" electric energy in the NW over the last 20 years. And there's room for much more.

The sad truth is that we're still pretty lazy in regards to energy use. Recycling beverage cans into aluminum uses 95% less energy than smelting new aluminum from ore. But we still throw away the cans. Merely turning on the "energy-saver" switches on office computers in the NW would save enough energy to run 60,000 homes. Doubling the national motor vehicle efficiency standards would take nothing more than the technology of my 13 year old Honda Civic VX, and would save immense amounts of both energy and pollution.



Renewables and energy efficiency are cheaper, and don't use up our remaining fossil fuel resources.

Renewables and energy efficiency also operate on startlingly different economics than fossil fuels such as oil and LNG. Each day's solar energy not used is lost. In contrast, fossil fuels not used today are worth more tomorrow. [image] After 20 years of using fossil fuels, we end up where we are today, with the oil and gas wells going dry, no reserves available, and broke from paying ever-higher energy bills. **After 20 years using renewables and energy efficiency, *we would still have those fossil fuel reserves*, plus they would be worth more.** And most of the renewable and efficiency measures would still be in place, meeting our needs with even less cost into the future. Manzanita's award-winning Bank of Astoria building shows that these techniques can be used successfully even on the Oregon Coast.

Success of the renewables/efficiency option has been proven and fine-tuned over the last 20 years. Amory Lovin's *Winning the Oil Endgame*, like studies by the American Council for an Energy-Efficient Economy and others, details how we can displace oil completely over the next few decades, while saving $70 billion a year. And not have to go to war with the rest of the world to steal their resources.

The international award-winning Bank of Astoria in Manzanita shows that energy efficiency can be a source of community pride as well as continuing to save energy year after year.