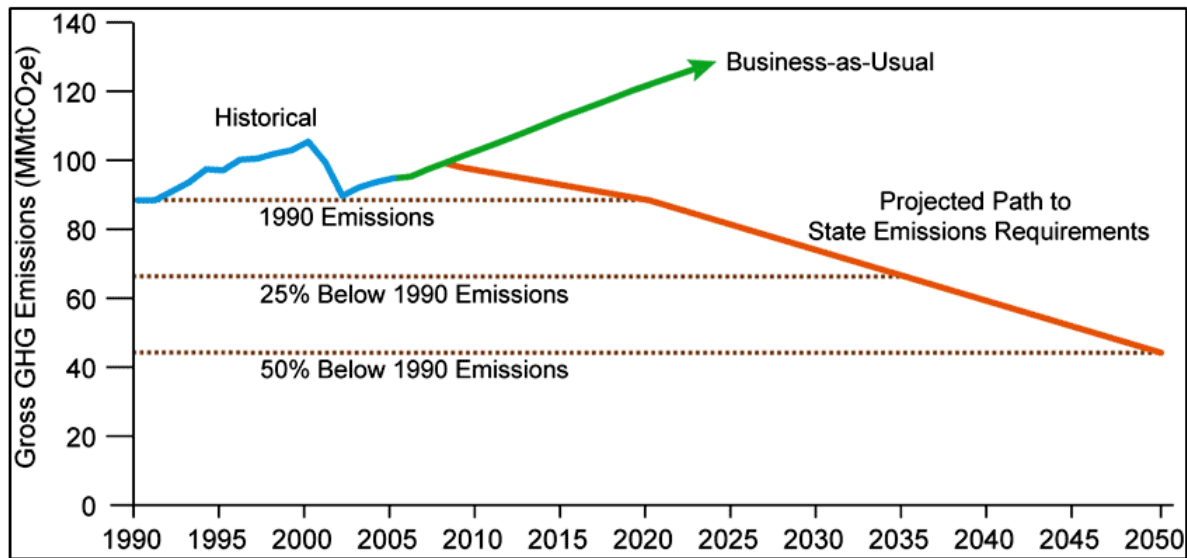


APPENDIX B: BACKGROUND INFORMATION

SUMMARY SECTION

GHG emission targets:

The GHG emission targets set for Washington State were published in RCW 70.235.020 and are shown in the following graph.



Washington's historical GHGs and statutory emissions reductions for 2020, 2035, & 2050

GHG per capita emissions:

The GHG per capita emissions for United State citizens is reported to be 24.5 tons by the World Resource Institute (WRI). For the Pacific Northwest with its significant hydroelectric power plants, the per capita GHG footprint is estimated at 19.5 tons. The GHG emissions inventory conducted by the City includes only those emissions generated within the City plus those emissions related to electrical energy generation. These emissions total only about 7 tons per capita leaving a gap of over 12 tons per person that are not addressed in this action plan. This gap can be accounted for with the GHG emissions generated by the production and distribution of all the products and services we buy, with government operations especially the military, with the entertainment and sporting world, with air travel, and with natural disasters such as forest fires. Of these GHG emission sources, we citizens can only directly control what we buy and the amount of air travel we do, all others sources are basically out of our direct control.

City of Edmonds GHG emission inventory:

The GHG inventory in metric tons (tones) using the eGrid electrical energy factor for the City of Edmonds for the years 1990, 2000 and 2005 is broken down as follows with the values for 2009 being estimated:

	<u>1990</u>	<u>2000</u>	<u>2005</u>	<u>2009</u>
Residential	70,164	108,459	124,254	129,224
Commercial	32,441	46,207	58,183	60,510
Industrial	31	49	74	77
Transportation	70,009	92,937	89,012	92,573
Waste	4,428	-2,504*	-3,333*	-3,466*
Other	<u>2,484</u>	<u>3232</u>	<u>2,941</u>	<u>3,059</u>
TOTAL	179,557	248,380	271,131	281,976

* The negative value is due to recovery of methane from landfill and used for energy generation.

The GHG emission targets established for the State as related to the City of Edmonds and the corresponding required reductions from estimated 2009 GHG emissions are as follows:

	<u>2012**</u>	<u>2020</u>	<u>2035</u>	<u>2050</u>
GHG emission targets for Edmonds	166,988	179,557	134,670	89,780
GHG emission reductions from 2009	114,988	102,419	147,308	192,198

**The 2012 target is not a State target, but is a City target established via the Mayor signing the Climate Protection Agreement which is based on the Kyoto Protocol.

OUR TRANSPORTATION AND LAND USE SECTION

Reduce Miles Travelled for Goods, Services and Employment

The density of housing and the convenience to public transportation are directly related to the amount of energy we all use in meeting our daily needs. Edmonds is a long-established small city that is increasingly becoming a part of the metropolitan Seattle-Tacoma-Everett area. Even though Edmonds has long accepted multi-family housing as part of its development pattern, such as condominiums and apartments, current trends point toward even greater acceptance of denser housing. Public transportation by bus, light rail, and rail can provide more convenient opportunities for residents to go to destinations in the Seattle metropolitan area, where most residents are employed, while at the same time consume less energy. Edmonds should adapt its community planning to look forward toward greater use of public transportation, especially as the light rail system extends northward to Lynnwood and the heavy rail service grows.

Better community planning with more walkable neighborhoods help people meet their daily needs for going to work, the store, schools, and parks, as well as transit stops. Communities like Edmonds can plan mixed developments that put housing within reach of needed services and correspondingly, assist business in being conveniently located. By building more homes as condominiums, townhouses, or detached houses on smaller lots, and by building offices, stores and other destinations “up” rather than “out,” communities can shorten distances between destinations. This makes neighborhood stores more economically viable, allows more frequent and convenient transit service, and helps shorten distance between destinations. Land use policies should encompass the concept of commercial and mobility hubs.

Addressing climate change through smart growth is an attractive strategy because, in addition to being in line with market demand, compact development provides many other benefits and will cost the economy little or nothing. Research has documented that more compact development helps preserve farmland and open space, protect water quality, and improve health by providing more opportunities for physical activity.

Reduce Gallons of Fuel Consumed When we do Travel

With the recent change in the requirement of vehicle fleet mileage issued by the federal government, the amount of gasoline and diesel fuel consumed will gradually be reduced as more new vehicles travel our streets. The rate at which this will occur is anyone’s guess at this point, but for estimation purposes, it is assumed that the average mileage will reach around 35 miles per gallon by 2050. The change from now till then is assumed to be linear.

OUR LIFESTYLE SECTION

OUR BUILDINGS SECTION

Electrical energy consumption for the City of Edmonds in mwh for the last 4 years is as follows:

	2005	2006	2007	2008
Commercial	105,215	103,798	106,963	106,765
Industrial	0.4	0.0	0.0	477.6
Streetlights	1,603	1,607	1,623	1,612
Residential	192,283	195,097	205,043	206,857
Total	299,101	300,503	313,628	315,712
Population	39,860	39,956	40,052	40,148
Per capita	7.504	7.521	7.831	7.864

The trend in energy consumption is still going in the wrong direction and does not show any real signs of changing. There is much need in getting people to understand their role in reducing energy consumption and to implement programs that provide some kind of incentive for residents and businesses.

An energy efficient home should consume according to experts about 6 kwh/sqft per year meaning that an all electric 2,000 sq. ft. house should annually consume no more that 12,000 kwh. A rough estimate

of homes in City of Edmonds is that they consume about 9 kwh/sqft or nearly 50% more energy than necessary. Again much effort is needed to increase the efficiency of our homes.

Replace fossil fuels with renewable energy resources in the generation of energy:

The Pacific Northwest with its numerous hydro-electric generating plants has a relatively low GHG emissions factor (lbs GHG/kwh) as compared to the rest of the country but cannot be complacent and must further reduce this energy factor. The strategy to do so is to shift energy sources from fossil fuels to renewable energy such as wind, solar, and geothermal. Doing this has the greatest total impact on building GHG emissions reduction but is beyond the control of the City of Edmonds. What the City can do is a) promote the buying of green power through the PUD, b) change any zoning laws to allow residential and business solar collectors and wind turbine generators, c) support any state legislation that protects easements for alternate energy sources and d) promote municipal and any other financing programs that addresses up-front costs and cost recovery upon sale of property.

Reducing the consumption of fossil fuels by utilities and energy companies rests almost entirely in the hands of federal and state legislation and the utilities. The GHG emissions reduction mandated by Washington State of 50% below 1990 levels by 2050 results in a 73% reduction from the 2009 level. For buildings the source of GHG emissions is from two main sources, electrical generation and use of natural gas in the buildings. The GHG reductions for these sources is shown in the following table.

GHG REDUCTION FOR “OUR BUILDINGS AND LAND USE”

GHG Emissions from:	2009 GHG Emissions-Tonnes	2050 Goal	Percent Reduction Required	Reduction Through Renewable Energy	Reduction Through Energy Efficiency	Total Reduction of GHG Required
Electrical Generation	129,950	32,148	75.3%	48,901	48,901	97,803
Use of Natural Gas	59,861	19,171	68.0%	0	40,691	40,691
Totals	189,811	51,318	73.0%	48,901	89,592	138,493

The reduction in GHG emissions from electrical generation is assumed for this plan, to rest half with the consumers and half with the PUD. The PUD needs to work at sourcing more renewable energy and thus reducing the emission factor while the consumers need to work at making their buildings more energy efficient. The City has literally no control over the PUD’s emission factor even though it has a major impact on the City’s GHG emissions. Consequently it is essential for the City to encourage residents and businesses to not only endorse and promote the utility’s efforts to use more renewable energy resources, but also for them to install such equipment for their own use. This endorsement needs to address zoning, financial, and easement issues.

The reduction of GHG from the use of natural gas can occur two ways; one is for the PUD to replace the coal fired electrical generation plant with a natural gas plant which would reduce its emissions factor but would not meet its requirement of using more renewable energy sources and; two, through improving the energy efficiency of buildings. The City can only affect building efficiency and therefore that is the only aspect of GHG reduction relative to using natural gas that is addressed in this plan.

Trees are valued not only for their beauty, but also for their ability to absorb carbon dioxide. Yet if their height is greater than building height, it can be a disincentive to the installation of solar energy systems because of the potential of trees blocking sunlight from solar panels. Many states have adopted legislation giving property owners an absolute right to access to sunlight (“solar easements”). However, Washington law provides only for the ability of property owners to negotiate solar easements with the owners of neighboring properties. Edmonds should encourage our state legislators to sponsor or support bills to promote renewable energy legislation that include mandating the right to solar access.

Until recently, there were two main hurdles to energy efficiency and renewable energy installation that state and federal subsidies did not address, i.e. high up-front costs, and the possibility that those costs would not be recovered if the property were sold. Actions taken in 2009 at the national and state levels have begun to eliminate these barriers by utilizing innovative energy financing mechanisms, in which cities and regional utility agencies and companies serve as the financing agent through a low-interest loan program. Individual property owners (residential and small businesses) contract directly with qualified private installers and contractors for energy efficiency, solar, and wind turbine projects. The City or other agency provides funding for the project by partnering with a utility or from a bond or loan fund that is subsequently repaid through amortized assessments on participating property owners’ annual tax bills. Under this plan, there is little or no up-front cost to the property owner, and if the property owner sells the property prior to the end of the repayment period, the new owner takes over the assessment payments which continue on the property’s annual tax bill.

As an example, if a program were developed with \$2 million of initial capital with an average loan amount of \$20,000 (as estimated in a similar program in Berkeley, California), then 100 installations could be established. As loans were paid back, the principal could be reinvested in the program allowing additional installations to occur in the future. Interest payments received under the program would be returned to the original funding source as investment earnings. The design and startup time for implementing an energy financing program is estimated to take 12 to 18 months.

Improve energy efficiency of and within buildings:

Increasing the efficiency of existing buildings is the most cost-effective approach for reducing GHG emissions; it’s the low hanging fruit. Programs that promote energy efficiency upgrades for home remodeling, such as increasing insulation and sealing heating ducts, have demonstrated

energy savings of up to 20%. A report on energy efficiency published in 2009 concluded that the nation's consumption of energy in 2020 could be cut by about 23% through investment in energy efficiency. Homes account for 35% of the possible gains and the commercial sector for 25%. These figures do not include the possible savings when the expected carbon emissions pricing takes effect.

The strategy for improving building energy efficiency will primarily be through retrofitting existing buildings due to Edmonds being largely a built-out community. Major improvements in energy efficiency can result from (1) adding insulation and sealing; (2) upgrading windows, doors, and skylights; (3) replacing incandescent light bulbs with fluorescent or LED bulbs; (4) upgrading heating, ventilating, air conditioning, and water heating equipment and appliances with newer Energy Star models; and (5) reducing "phantom consumption" of electricity by electronic equipment.

The federal and state governments have numerous weatherization programs to assist and provide incentives to upgrade homes and small businesses. First the federal government has a two year incentive program of providing tax credit to residents and businesses for 2009 and 2010 to offset the costs of upgrading buildings to become more energy efficient. And secondly, the Snohomish County Weatherization Program exists to assist low income households by performing cost-effective weatherization measures that they could not otherwise afford to install. These measures reduce home energy use and lower the household's utility bill and need to be promoted by the City.

With Edmonds being a mostly built-out city, retrofitting of existing buildings is the prime method of increasing energy efficiency which mandates that an incentive program be established to assure GHG emission reduction goals will be met. To ultimately reach the 50% reduction of community wide GHG emissions from 1990 levels by 2050 but which is actually over 70% reduction from 2009, building energy efficiency must be improved by a minimum of 50% in conjunction with a reduction of the GHG energy factor discussed earlier. To reach this goal, a specific building retrofitting program must be established for the community of Edmonds.

Another issue of building energy efficiency is water consumption. One of the largest single purpose utilization of electricity in Snohomish County is related to the pumping, treatment and disposal of water and wastewater. Water conservation not only minimizes the need to find new sources and expand infrastructure, but also saves energy to treat and convey water and wastewater. It has also been proven that employing water conservation techniques and using native plant materials is less expensive than securing and providing new water supplies.

Require the design and construction of new and remodeled buildings meet greenest possible building standards:

Some new commercial, mixed-use, and residential buildings can be expected to be built as

redevelopment takes place within the mostly built-out community of Edmonds. Utilizing new construction designs and techniques plus new building materials can, according to the Leadership in Energy and Environmental Design (LEED) standards, significantly reduce resource consumption and the creation of waste in our dwellings and commercial buildings. The strategy is for the City to change and enforce new building codes that lead to more energy efficient buildings and to require energy audits at time of sales.

New building designs, construction techniques and building materials, known collectively as “green building” have proven that significant reduction can occur in the use of resources and the creation of waste. Green building programs throughout the world have proven to be extremely effective in reducing the energy load buildings put on utilities. Seattle, Austin, Melbourne, Heidelberg, and Freiburg are but a few examples where LEED requirements were instituted on new and large remodel construction leading to energy savings of 20% or more compared to building-as-usual. The average premium for adding green building features is less than 2% of construction costs, and can result in cost savings of 20% over the life of a structure. For example, an initial investment of \$100,000 in a new commercial building costing \$5 million would result in a savings of \$1 million in today’s dollars over the life of the building.

The LEED rating system offers four certification levels for new construction -- Certified, Silver, Gold and Platinum -- that correspond to the number of credits accrued in five green design categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality. LEED standards cover new commercial construction and major renovation projects, interiors projects and existing building operations. Standards are under development to cover commercial "core & shell" construction, new home construction and neighborhood developments.

OUR ENVIRONMENT SECTION

The Problems, the Solutions, the Benefits:

Edmonds is blessed with a wonderful natural environment. Situated on the eastern shores of Puget Sound, it enjoys world-class vistas of water with the backdrop of the Olympic mountains, technicolor sunsets, and the everchanging play of light and shadows. The once abundant natural vegetation of the coastal area and its hinterlands, the marine marshes, and the year-round streams provided an ideal habitat for wildlife. Add to these features a mild and temperate climate. No wonder that from its early days Edmonds has been called “The Gem of Puget Sound.”

As Edmonds developed in the early years of the 20th century, the native trees were felled and gave way to the orchards that fed the growing city of Seattle. Pockets of second growth forests remain, woodlands, wetlands, and marshes have been preserved, and today restoration and enhancement of these natural features and wildlife habitats are being pursued actively.

Today Edmonds is a near built-out urban community of 40,000 people facing the challenge of absorbing over 5000 more inhabitants within the next few years. This will mean adjusting to the need for some

higher density neighborhoods. Because of the City's commitment under the Mayors' Climate Protection Agreement, we must do our part to help achieve the City's goals of reducing greenhouse gas emissions by 2040. At the same time, we must preserve Edmonds' quality of life and small-town charm.

Here in Edmonds we can do our part to lessen our impact on the natural environment and help achieve our goals of reducing greenhouse gas emissions. We can encourage our citizens to grow their own food and support local food production; we can

maintain and improve our wonderful urban forests with which we are blessed [name them, give no. of acres]. In order to achieve both of these ends, we need to adopt policies that strike a sensible balance between the right to direct sunlight (solar access) and the right to trees regardless of height.

Solar access is the availability of, or access to, unobstructed, direct sunlight. Access to sunlight is essential to advance solar energy generation and use. [give source] Solar access laws are enacted usually at the state level. Most states have some in place. California leads with probably the most comprehensive set of state laws designed to encourage solar access and prevent restrictions on solar energy systems. A more detailed account of solar access legislation is give in Section ? "Our Buildings." However the legislation deals with the right to sunlight for solar energy systems you install on your property, not for growing your own veggies and fruit.

Grow our own food

The Post Carbon Institute, an environmental organization established to focus on Peak Oil and climate change related issues, has said that one of the most important things we as individuals can do to reduce dependence on fossil fuels, and thus to save energy, is to grow our own food. Vegetables and fruit trees need about eight hours of sunshine. Yet there is no legislation in place to guarantee solar access to the gardens we develop and maintain to grow food in our own yards. Perhaps this is because the "grow-your-own" movement is relatively new, recently given legitimacy and top billing by Michelle Obama's well publicized digging up part of the White House lawn to plant her veggie garden.

Edmonds is well endowed naturally to grow food. The time is ripe to capitalize on the movement that is sweeping the country to promote home food production. We should recapture that part of our history as an orchard town. We are all stewards of the land, and in digging in the dirt we come to appreciate that oneness with nature and the interdependence on the many elements that we must protect to ensure a stable food supply.

Enhance our urban forests and landscapes

Forests, plants, and garden landscapes have the capacity to remove carbon dioxide from the atmosphere and store it as carbon in wood, leaves, and roots. Preserving and, where possible, expanding our urban forests and encouraging home food production, private low-impact landscaping, and the planting of street and parking lot shade trees will increase the City's carbon sequestration capabilities. City parks comprise ? percent of Edmonds land area. These are all candidates for management practices and uses that enhance carbon sequestration.

Trees are very much part of Edmonds urban landscape. Just as the Sound and mountain views are prized in parts of our City, the trees are the view in other parts. The sun-dappled ravines with their leafy canopy are cherished neighborhoods. In any solar access policy, we should not adopt a one-size-fits-all approach. We have to find the right balance of preserving the character of our neighborhoods and the right to the sun.

Adopt solar access and tree policies

Because solar access laws are usually enacted at the state level, we should press our state legislators to introduce or support solar access legislation. It could be argued that we already have a *de facto* solar access provision as far as buildings are concerned in that we govern building height, setbacks, and percentage of lot covered; but we have nothing concerning trees. Attempting to develop a code to govern siting and height of trees would be highly controversial and unduly time consuming. Edmonds should not attempt to do this. However, adopting the principal of “the right tree in the right place” would go a long way to resolving the issue.

Mitigate the impacts of climate change

Our natural systems, as well as the built environment, are being affected by climate change in ways we are only beginning to understand. The University of Washington Climate Impacts Group’s report of February 2009 predicts that the impacts of climate change will be primarily:

- 1) medium sea level rise for 2100 of 2 inches to 13 inches (depending on location), or the small possibility of up to 35 to 50 inches from the melting of the Greenland ice cap (depending on location);
- 2) increasing intensity of winter storms, bringing storm surges over Puget Sound; and
- 3) more rainfall in winter instead of snow, causing winter flooding and less snowpack, leading to decreasing summer water supplies.

Concerns about rising sea levels are well founded. A three-foot rise would inundate much of Edmonds’ Puget Sound coastline. More frequent winter storm surges and bluff erosion can be expected. Decreasing and unreliable water supply in the Cascade catchment area owing to less mountain snowpack will force water conservation upon us.

All too often the general sentiment is that what might happen 100 years down the road is of no concern to us today. We shouldn’t be planning for more than 20 years ahead. Wrong. Decisions we make today will have an impact well into the 22nd century. In the interest of energy saving and conservation of materials, building developments we are considering now should have a life expectancy of at least 100 years.

Edmonds is particularly vulnerable to a rise in sea levels and winter storm surges. We could lower the risks of damage and devastation by rezoning land use in the susceptible areas; by strengthening sea

walls and armoring embankments; and by designing our buildings to allow storm surge waves to pass through the lower levels of the structures. We must keep abreast of what others are doing to deal with the threat of rising sea levels and draw upon their expertise.

One thing we know for sure is that climate change is resulting in water shortages in many parts of the country, Washington east of the Cascades being one of them. Although the Pacific Northwest is still expected to have sufficient rainfall during the winter months, we can expect an unreliable water supply from our catchment areas in the Cascades because of earlier melting of a diminishing snowpack. As well as setting goals to reduce our energy consumption, we must set goals to reduce our water consumption.

One of the greatest uses of water during the dry summer months is for maintaining grass in public sports fields and private yards, as well as for watering our gardens. A recent NASA-sponsored study estimates that there are 49,000 square miles of lawns in this country, an area nearly the size of Greece. This requires 200 gallons of water per person per day. [cite Planning magazine article] In addition it requires the energy to pump the water, the gas to power the lawnmowers, and often the treatment with chemicals that find their way into our waterways and pollute them.

We cannot deny the joy of walking barefoot over a well-kept lawn, or as children, romping and doing handstands on the lawn or playing frisbee on the grass. But let any lawn we have be small – small enough to mow with a handmower.

Our veggie gardens and fruit trees need watering during the summer months. Rain barrels will capture water from our roofs during the rainy season and this can be released slowly as needed to our thirsty plants. Chances are the water captured in the barrels will not be enough for all of our summer needs, but it will reduce the amount we have to draw from City sources.

OUR ECONOMY SECTION