Comments to Department of State Supplement Draft EIS Keystone XL Project

My name is Milt Hetrick, my number was 264. I live in Centennial, CO and was one of the group of 70 some people from the Denver-Boulder area who traveled to the Grand Island KXL Public Hearing 4/18/2013 to support our Nebraska neighbors who are against building this pipeline. **I too oppose the construction of Keystone XL Pipeline.** About 60 of us who came by charter bus had to leave before the hearing was over (around speaker # 180) to catch our bus back to Colorado– so these comments are being submitted in written form.

Summary.

- The transition from burning ancient hydrocarbons to harvesting renewable energy is the most important domestic issue facing America, North America, and the planet today.
- Any human effort that does not support or promote this transition must be critically examined.
- The Keystone XL Pipeline project is a $7 billion human effort that DOES NOT help us transition away from burning hydrocarbon.
- This $7 billion project actually contributes to and exacerbates the many problems associated with burning ancient hydrocarbons to meet our daily energy needs.
- There are viable alternatives available today. Contrary to the rhetoric of the powerful oil and gas industry 'We the People' can move away from burning their hydrocarbons and continue to have fulfilling lives for ourselves and our families. Each day there are more and more people around the world demonstrating that the sun, the wind, the water and geothermal energy within the earth are quite adequate for us to live the lives we are accustomed to today.
- STOP the Keystone XL project and promote human effort for harvesting renewable energy

Observation of the Public Hearing.

This hearing in Grand Island was an impressive public event, well facilitated by the Department of State moderator, with public representation from a broad range of perspectives. Although there were a significant number of pipelayers and welding union representatives who spoke For the construction of this pipeline, the super majority of those present, mostly Nebraska land owners and farmers were solidly Against allowing this pipeline to proceed despite its endorsement by their governor. Of particular significance was the presence of representatives from Arkansas and Michigan where tar sands oil pipeline spills have occurred within the past two years with devastating effects on the surrounding community. So there is no need to repeat any of these comments. My comments below will be limited to topics that were not discussed to my knowledge.

Personal Background.

I'm a retired aerospace engineer /physicist and a grandfather soon to be a great-grandfather. I am deeply distressed that my generation has enjoyed a relatively good life but we are not leaving our planet a better place for future generations. There are many distressing forecasts for my grandchildren and beyond – most of these can be attributed to the unsustainable behavior of humans as we burn ancient hydrocarbons for our energy needs – these devastating anthropocentric impacts to our planet include: climate change and extreme weather events linked to the increase in green house gases associated with burning and the extraction of ancient hydrocarbons, glacial and polar region ice melt that causes sea level rise and the loss of habitable coastal areas and inundation of whole islands; destruction of forests and their ecosystems causing the mass extinction of thousands of living species. Death is one thing – it's the end of life. Extinction is a whole different concept – it is the end of birth.

The transition from burning ancient hydrocarbons to renewable energy sources (such as solar, wind, geothermal, water/wave) is inevitable within 100-150 years one way or another. We can make the transition today and minimize climate change and further devastation of our planet OR we continue burning this finite supply of easy energy until it is exhausted and we are left on an Easter Island planet. It's our choice – but it's a fact that in 5-6 more generations, humans will no longer be burning ancient hydrocarbons. So the issue is simply "When will make the transition?" We can start now when it is easy OR we can start 3 generations from now when there is little 'easy energy' left to build the infrastructure required to make the necessary transition.

The Keystone XL pipeline does nothing to help us make this transition – in fact it exacerbates the problem and threatens our food security by putting the Ogallala Aquifer under the bread basket of America at risk for as long as that pipeline remains buried on top of the aquifer.

When I do the math and compare the known and potential petroleum reserves on the planet with our current consumption rates, I know that my first great-grandchild who will be born in May will live to see the day when extracting oil requires more energy than the amount she can extract – the days of oil will be over in her lifetime. Oh, but what about all that coal and natural gas and all that tars sands and shale oil? When I do that math, within 5-6 generations, all of the planet's reserves of ancient hydrocarbon will be consumed. For perspective, homo sapiens emerged from eastern Africa about 6000 human generation ago. Within a period of about 12 generations, humans will have extracted and consumed/burned all the ancient hydrocarbon reserves they could find on the planet. For perspective, the Earth is expected to be habitable for life as we know it (assuming human behavior doesn't tip the scale and make it uninhabitable) for another 500 million years. That's equivalent to another 20,000,000 human generations. What do these future generations do for their sources of energy if we don't make the transition to renewable energy (solar, wind, water/wave) NOW while we have the easy energy to make that transition? For another perspective, there are 1.9 million documented living species on our planet today. All of these species live sustainably using the energy from the Sun (directly or indirectly) – all except one – homo sapiens. But we can. We must. When are we going to learn?

Rebuttals to Comments by Previous Speakers at the Hearing

I feel a need to respond to comments from four speakers before me.

1) Those of us from neighboring Colorado would say, "Yes, it's true" to the earlier Pro Pipeline speaker who pointed out that "we protestors traveled to Nebraska by burning ancient hydrocarbons." For the record, this was not our preference. The fact is there are no hydrogen fueling stations along the I-76 and I-80 corridor between Denver, CO and Grand Island, NE. This is America not Germany where they do have hydrogen filing stations along the Autobahn. If fact, there are not even any biodiesel fueling stations for buses along the way. This is America where oil and gas and now tar sands corporations still control our political and economic systems and hence control our individual freedom to choose the way we want to live. I respectfully say to that pipelayer who pointed this out that his extreme reverence for a life style that insists on burning hydrocarbons prevents the rest of us from developing the viable alternatives that other people in other countries around the planet are already pursuing. But in America, the land of the free, we do not have the freedom to make these sustainable-living choices or even ride on a bus that uses biodiesel – let alone a non-carbon based fuel such as hydrogen.

2) To the pipelayer/welder who said that "the only way to bring our troops home from the middle east is to develop our domestic /North American oil reserve" I would say, I've heard this fallacious sound bite created by the oil/gas/tar sands industry and repeated by certain media and even elected politicians far

too many times. Quite frankly this comment is ludicrous. We will stop resorting to armed force to assure our energy needs only when we transition away from these limited ancient hydrocarbons still available in the middle east and begin to utilize the free renewable energy sources that are available domestically – the sun and wind and water and geothermal. Only when we stop burning these finite ancient hydrocarbons will we be able to reduce/ eliminate our dependence on oil – foreign and domestic and stop this bullying of other nation states.

3) The notion that because U.S. welders can produce high quality welds and properly x-ray and inspect each weld (which is an agreed upon fact) assures that there will be no pipelines leaks is obviously another false statement with no basis in fact. Pipeline leaks are not just linked to failed weld joints. Leaks are more often the result of inadvertent overpressurization; or corrosion and erosion of the pipe wall from continued use (The dilbit moving through the pipe includes sediment carried with the fluid that mechanically erodes the pipe wall.) Just because U.S. welders do indeed make good welds doesn't preclude pipeline leaks. In reality, the actual welds on this pipeline will probably be made by existing Canadian welders already employed by TransCanada.

4) To those pipeline proponents who contend there is little risk of this pipeline every developing a leak because of careful monitoring and special controls. Do not be fooled by the proponent's rhetoric. This pipeline will fail and it will leak at some point just like every other underground pipeline has in the past. A typical pipeline operator will continue to operate the pipeline system beyond its original design lifetime because, "Why shut down a profit making operation before it fails?" So by definition, this pipeline will develop a leak sometime before the operator finally shuts it down completely – the free enterprise system dictates that it will be shut down only when reparation costs exceed profit. Plan on it.

Omission of Important Issues

There are several areas that were not discussed in the public hearing.

1) **TransCanada must put their money where their mouth is.**
   Based on the Kalamazoo tar sands crude leak in MI that has already cost $1B to clean up and the work is still ongoing, I would strongly suggest that TransCanada be required to place $2 Billion dollars into a "Spill Cleanup Escrow Account" before the first drop of dilbit is ever allowed to flow through the pipe should it be built. And if this economic constraint makes the project un-economical so be it.

   If they do operate the pipeline for 20 years without an incident, and shut it down at the end of its design left and properly/safely decommission it, then all that money held in escrow would be returned (it's just a common practice called a security deposit).

   However, if TransCanada goes out of business or finds another loop hole to circumvent their responsibility for safe operation and safe decommissioning, the escrow account is there for 'We the People' to cover the cost of mitigating the damage their pipeline system caused. It concerns me that TransCanada has already found a loophole in U.S. law that relieves them of any responsibility for spill cleanup. It's time that we insist that the Right to put in this pipeline includes the Responsibility to do no harm to any form of life. If the pipeline is actually as safe as TransCanada and all the welders advertize, there is little to zero risk in forfeiting their escrow. If the pipeline turns out to be like all other pipeline ever constructed, 'We the People' will have some resources to dip into for reparation. Seems like a fair way to back up their "no risk" claims to me.

2) This is a non-value added human effort.

I too am opposed to this $7 billion project because it serves no value to humankind except to make a profit for a Canadian Corporation, a few temporary US pipelayers and the Gulf Coast refineries. It does not do one thing to help us transition from burning ancient hydrocarbons to renewable energy sources. With today's awareness, our top energy related priority must be to move away from burning hydrocarbons - not investing $7 Billion in more of the same unsustainable behavior.

Make no mistake, 'We the People' of this planet will ultimately pay for the $7 Billion cost of this project. The $7 billion cost will be embedded in the selling price of the hydrocarbon products made from this bitumen. And in addition, 'We the People' will pay for all the externalities – for all the costs that TransCanada ignores (e.g. the cost to repair the damage to our environment, the cost of repairing the damage from extreme weather events exacerbated by continued burning of hydrocarbons, for the health care required by those exposed to the toxic chemicals used by TransCanada and spilled and vented into our common atmosphere, etc.)

3) No Discussion of Decommissioning the Pipeline

One glaring "externality" that was not addressed adequately during the public hearing was "Decommissioning the pipeline." This pipeline at some point will fail and will leak and it will be shut down. When the pipeline is ultimately shut down because it is no longer safe to operate, it will probably just be abandoned, the steel walls will continue to corrode from the inside and from the outside. Over time (maybe 50 years) the 36 inch diameter pipe will lose its structural integrity and the ground above it will collapse releasing the residual dilbit and all its toxic materials (benzene, etc) into the sand/soil and into the Ogallala aquifer with disastrous effects.

This catastrophic pollution of the aquifer will occur unless the pipeline is thoroughly cleaned of all these toxic materials while it is still in good operating condition and can be properly flushed. If the operator waits until the pipeline has failed before they shut it down and begin the decommissioning process, then the pipeline will have to be dug up, cut into moveable sections, capped to contain the bitumen/toxic materials and the steel pipe can be safely recycled. Recycling the steel is indeed the sustainable approach. I doubt that the cost of decommissioning is included in the $7 Billion estimate.

Viable Alternatives to the Keystone XL Non-Value Added Project

So since 'We the People' are expected to ultimately pay the $7 billion (plus externalities) for this energy related project (the cost of installing this pipeline will obviously be embedded in the price of hydrocarbon products made from the Canadian Bitumen), why not spend $7 billion on developing a sustainable renewable energy capability?

There are many such so called 'green projects' we could envision. I will mention just one alternative to the Keystone XL a project that would be good for 'We the People' and for all other forms of life on the planet.

This alternative is real, it is shovel ready, it is based on personal experience of thousands of people around the world (including myself) and simply scales this personal experience up to a $7 Billion project. The project is simple: Reinvent Fire. Convert an existing home that burns ancient hydrocarbons to a home that runs totally off the Sun. Let's see how far $7 billion would go toward this goal.

Here's a brief summary of how it would come to fruition. (I have enclosed a more detailed description as backup)

Use $4 billion of the $7 billion to buy solar photovoltaic modules. $4 Billion would purchase enough solar PV modules to equip 500,000 homes so these households can harvest enough sunlight to bring the household annual electrical energy bill to zero or near zero for the next 20 years. The remaining $3 Billion would be used to generate real jobs and cover the labor cost to install these panels. That's $3 Billion to small businesses for 50,000 good paying jobs (electrical, mechanical, business administration, permitting, etc.) These 500,000 homes would receive a FREE solar system and FREE utilities for the next 20 years.

After installing these solar PV systems, 500,000 households would no longer have to ask their utility company to burn coal, oil or natural gas to generate the electrical power they need for their home.

But it gets better. For most of the older homes (like mine), thermal insulation and other energy saving devices could be incorporated so that these solar PV systems would actually generate an excess of power (as in our case.) I ended up having an excess of solar generated electrical power so I then installed a geothermal/geoexchange heat pump that replaced our natural gas furnace. This eliminated our consumption of natural gas. So our home no longer burns any ancient hydrocarbons – sunlight provides ALL our household energy needs.

But it can get even better. If you think these free sustainable energy systems are overly generous offers to 500,000 households, imagine a scenario where the homeowners were asked to pay ½ the cost of their new solar PV system, then 1 million homes can be converted to solar that will further eliminate the burning of hydrocarbons – all for the cost of a Keystone XL pipeline.

And it gets better still. Each home owner would then have the option to invest about $5000 to upgrade their solar PV system (e.g. add another 10-12 modules) so they could harvest 20% more sunlight. If they do so, they could produce enough electrical energy to charge a plug-in hybrid vehicle (We purchased a Chevy Volt made in the US) and drive 10,000 miles a year on free zero emission electric power – no gasoline burning involved. If we personally can do it, so can a million other people – for the cost of one Keystone XL pipeline.

> **This alternative way to spend $7 billion DOES reduce our country's dependency on ancient hydrocarbons – including oil.** Another pipeline does not.

Details of this transition project and suggested ways to fund it are described in the attachment.

Conclusion.

- **No** to the Keystone XL pipeline project.
- **Yes** to alternative projects that support the transition to renewable energy.

Respectfully,

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America XL - An Alternative to the Keystone XL Pipeline Project

$7,000,000,000
America XL
50,000 jobs

400,000 – 500,000 U.S. Homes Converted to Solar Electric

(For sustainable harvesting of sunlight)

Reduction in Coal, Natural Gas Dependency

- **Easy to add 20% more panels for plug-in hybrid or all electric car (For sustainable transportation)**

Reduction in Oil Dependency

- **Easy to leverage U.S. investment. Have Homeowners pay ½ cost and convert 1 million homes to power 1 million electric vehicles (100,000+ jobs)**

$7,000,000,000
Keystone XL
20,000 jobs

Oil Pipeline (1661 miles)

(For unsustainable burning of hydrocarbons)

No Reduction in Oil Dependency

Summary Comparison Table

	"We the People" Plan- America XL Renewable Energy I	TransCanada Plan- Keystone XL Pipeline
Type of Plan	Investment in **Sustainable** Human Behavior – Transition to renewable energy – Solar Energy	Investment in **Unsustainable** Human Behavior – Continue burning hydrocarbon
Jobs Created	50,000+ small business jobs @ $50,000-60,000/year. America XL creates between 2.5 to 10 times more jobs than Keystone XL	20,000 construction and manufacturing jobs @ unknown rate. Ref: TransCanada Brochure OR ***5,000 and 9000*** *person-years (@$50,000-$60,000 / year).* *Ref: Cornell University Study*
Cost of Project	$ 7 billion over 1-2 years	$ 7 billion over 1-2 years
Funding of Project	Funded entirely by surtax on Oil & Gas corporation profit for one year – partial repayment for externalized costs normally paid by "We the People."	Funded "normally" as embedded cost and passed along to gasoline consumers in the "free-market" system.
U.S. Dependence on Oil	**Reduction.**	**No Change.**
Benefits to "We the People" Americans	**Major** - 50,000 value-added jobs, PLUS - 400,000-500,000 households transition to solar PV systems (and near zero electric bills) for the next 20-30 years.	**No Change** - XL pipeline moves less than 3 % of our current daily consumption to Gulf Refineries.
Benefit to American Small Businesses	**Major** - $3 Billion in direct revenue to American small businesses	**Minimal** - Minimal direct benefit based on Keystone Phases I & II that have been completed.
Benefits to Oil & Gas Corporations	**Minimal**	**Major**
Benefits to the Planet and future generations	**Positive.**	**Negative.**
Materials Consumed	175,000 tons of Solar Panels – 100% recyclable	1,299,250 tons of steel pipe - No recycling
Primary Concerns	**None**	**Significant** –Ogallala Aquifer
SUMMARY	**"We the People" have choices.**	

Detailed Comparison Table

	"We the People" Plan- America XL Renewable Energy I	TransCanada Plan- Keystone XL Pipeline
Type of Plan	Investment in **Sustainable** Human Behavior – Transition to renewable energy – Solar Energy	Investment in **Unsustainable** Human Behavior – Continue burning hydrocarbon from Alberta, Canada tar sands reserves
Jobs Created	50,000+ small business jobs @ $50,000-60,000/year. [1] This sustainable energy investment creates between 2.5 to 10 times more jobs than a similar investment in unsustainable hydrocarbon extraction /processing /burning to generate electrical power.	20,000 construction and manufacturing jobs[2] @ unknown rate. An independent assessment by Cornell University using TransCanada data supplied to the U.S. State Department for permitting purposes places the number of jobs between **5,000 and 9300** person-years @$50,000-$60,000 / year.[3]
Types of Jobs	America XL is shovel-ready. We have the skilled workforce poised to move America forward toward a sustainable future. This is value-added work for U.S. small businesses - 25,000 Installers (e.g. electrical, mechanical) plus 25,000 small business office workers (designers, bookkeepers, accountants, …) Plus local government revenue for issuing building permits and performing building inspections.	"Keystone XL is shovel-ready. TransCanada is poised to put 13,000 Americans [*hired by TransCanada*] to work to construct the pipeline - pipefitters, welders, mechanics, electricians, heavy equipment operators, among other jobs - in addition to 7,000 manufacturing jobs that would be created across the U.S." [4]
Cost of Project	$ 7 billion over 1-2 years $4 billion for Solar PV panels[5] $3 billion on installation labor	$ 7 billion over 1-2 years for the XL expansion (Phases III & IV). The total Keystone System (Phases I,II,III,IV) will have a capital investment of approximately US$12 billion.[6]
Funding of Project	Funded by surtax on Oil & Gas corporation profit for one year. **Justification** – surtax is partial compensation for known externalized costs of extracting, transporting, processing hydrocarbon materials to be burned - costs that "We the People" pay to mitigate the effects of O & G corporations' waste products. **Exception.** Hydrocarbons extracted, processed and converted into recyclable products (e.g. reusable plastic) are exempt from this surtax. **Surtax.** Surtax is subtracted from normal	Funded "normally" as embedded cost. Cost reflected in price of gasoline at the pump. **Bottom Line**: Funded by consumers of gasoline.

	"after- tax" profit. Basis is $.024 / gal of crude ($1 / barrel). Duration of tax is one year. Surtax is not a tax deductable business expense. **Bottom Line**: Project funded from O & G corporation profits.	
U.S. Dependence on Oil	**Reduction.** Project **REDUCES** U.S. dependence on fossil energy (coal, oil, natural gas). 400,000- 500,000 homes will transition from fossil energy to Solar Energy – their electrical bills go to near zero for the next 20-30 years.	**None.** Project results in **NO CHANGE** in Oil Dependence.
Benefits to "We the People" Americans	**Major –** As a result of the 50,000 value-added jobs, 400,000-500,000 households will receive FREE solar PV systems (and near zero electric bills) for the next 20-30 years.	**No noticeable change**. America consumes 19 million barrels of oil/ day. An additional 500,000 barrels/ day[6] from the Keystone XL pipeline is less than 3 % of our current daily consumption of oil. Refined products are sold on the world market at current prices - no significant change in gasoline prices with or without the XL pipeline.[7]
Benefit to American Small Businesses	**Major** - $3 Billion in revenue to American solar installation small businesses for meaningful value-added jobs. $450-600 million profit (15-20% of sales) for small business.	**Minimal** - TransCanada will purchase TBD pipeline associated equipment (e.g. instrumentation) from U.S. suppliers. Pipeline steel for the completed Phases I & II was imported from India.
Benefits to Oil & Gas Corporations	**Minimal** - No short term benefit to Oil & Gas Industry.	**Major** - According to the Energy Policy Research Foundation, Inc., "because of production declines in Mexico and Venezuela, U.S. refiners [along the Gulf Coast][8] are receiving reduced shipments of heavy crudes… many of whom long ago made expensive upgrades in complex facilities that favor heavy oil."[4] Keystone XL will add an additional 500,000 barrels per day in 2013 [to these Gulf coast refineries].[6] - Extraction companies in Alberta [e.g. Suncor] as well as refineries in Texas will benefit /profit from this additional means of transporting crude oil (tars sands bitumen) from Alberta to Texas.
Benefits to the Planet and future generations	**Positive.** Plan implements clean (zero emission) distributed generation of electrical power for home and transportation using existing transmission grids. Current power plants are a major source of greenhouse gases as well as mercury, sulfur… airborne contamination. - Project will save hydrocarbon reserves for future generations and for sustainable	**Negative.** Plan facilitates unsustainable extraction of hydrocarbon resources that are intended to be consumed / burned with associated ignored / externalized costs to all people and other forms of life. Proven and possible reserves will be exhausted in 100-150 years.[10]

	products such as recyclable petrochemical products (e.g. plastics) that are produced in an environmentally safe manner (not as currently produced by Formosa Plastics for example[9]) - Plan acknowledges that current economic model is broken. Important costs associated with burning hydrocarbons are ignored (externalized) and paid for by "We the People." Hydrocarbon resources are limited and too valuable to burn because they can be used sustainably in recyclable products (e.g. plastics,..) forever instead of burning / consuming these materials. - It should also be noted that this Project does not require valuable water resources. Hydrocarbon burning and nuclear power plants consume large quantities of high quality water.	
Materials Consumed	175,000 tons of Solar Panels[11] (10,000,000 panels) attached to existing roofs of 400,000 - 500,000 American homes – 100% recyclable after 20-30 years[12] Solar Panels can be removed and recycled every 20 years with the latest technology using renewable energy – forever.	1,299,250 tons of steel pipe[13] (1661 miles)[14] buried 4 feet underground. After a certain period of service (e.g. 20 years), pipe will be eroded from internal flow, corroded and unsafe to use.
Primary Concerns	**None** – This Plan to install Solar PV panels is "shovel ready" & well demonstrated around the world. -Solar PV Panels are currently available from Germany, Japan, and China (China produces 70% of the world's PV panels today). U.S. does not manufacture very many panels today – manufacturing jobs have gone abroad. A committed national transition plan such as this could bring solar panel manufacturing jobs back to America. - Research over the next 20 years can develop efficient means of recycling old solar panels using electrical power generated by current sunlight so no more hydrocarbons need to be burned to make the panels. (Cradle to Cradle philosophy)	**Significant** – Keystone XL 36" diameter Pipeline is routed directly over the enormous Ogallala Aquifer[15] - a major/ primary source of water for eastern Wyoming, most of Nebraska, much of Kansas, eastern Colorado, and the pan handles of Oklahoma and Texas. - Pipe is buried 4 feet underground (out of sight; out of mind). Detection & location of small, long duration leaks is difficult to impossible. Major leaks could be detected by monitoring flow-rate or pressure changes along line. - Pipeline includes a 110' construction right-of-way. EIS graphic implies there are plans to reclaim/replant this 1661 mile long strip to its original condition after pipeline has been buried – have not reviewed such plans. - Did not yet find any plans for decommissioning pipeline after design life, e.g. decontamination, recycling steel, reclamation, etc.

Impact to Local Public Utility Companies	**Minimal but in the direction of Sustainability**. Installing solar panels on homes is referred to as "distributed electrical power generation." Although it is a good thing for "We the People," the local Utilities companies see it differently because there will be some decrease in their revenue and profit. Nevertheless, this Project assists Utilities meet their local/state Renewable Energy Standard (RES) requirements. - Solar and Wind power generation requires a different approach to energy storage, a rapidly emerging technology. This Project provides an incentive for Utilities to transition from energy generation to energy storage and distribution.	**No significant impact** on fuel supply for Utility Companies. Most power plants currently consume coal and natural gas and water to generate electrical power
Possible Modifications to Plan	**Mod # 1.** Have participating homeowners pay 50% of the solar PV system cost (i.e. leverage the $7 billion investment). Twice as many (1 million) homes could transition from unsustainable hydrocarbon generated electrical power to sustainable solar power. **Result. Additional reduction in U.S. dependence on hydrocarbons.** **Mod # 2.** If homeowners invest $5,000-$6,000 for additional PV panels, they can harvest additional sunlight to provide sufficient power for 400,000-500,000 plug-in hybrid or all electric town cars (range 100 miles). A half million families could then avoid rising gas prices for the next 20-30 years. **Results. Additional reduction in U.S. dependence on oil. Stimulus for U.S. production of hybrid & all electric cars – more jobs.** **Mod # 3.** Combination of Mod # 1 and Mod # 2. **Result: 1 million homes and 1 million cars could transition from burning hydrocarbons to harvesting current sunlight for energy needs – with no significant sacrifice in life style. Twice as many jobs and twice the stimulation for U.S. automakers to produce new hybrids**	**Mod # 1.** Re-route pipeline to eastern border of Nebraska and avoid the Ogallala Aquifer. Will result in additional length and cost with no change in through-put. Note: This re-routing to the eastern border of Nebraska to avoid the Ogallala Aquifer had been requested earlier by the Governor of Nebraska but TransCanada refused to consider it until Nov 2011[4] – too late. The State Department recommended denying the TransCanada application. President Obama rejected the pipeline when pressured by the Republican controlled congress to go forward immediately. The Republican members of congress (along with many Democrats) are being lobbied heavily by Oil & Gas lobbyists – because the steel pipe is a long lead item, a significant amount has already be manufactured and probably delivered by the supplier in India – TransCanada anticipated a favorable response to their Keystone XL project. Estimated cost of the steel pipe is around $1 billion.

	and all electric vehicles.	
SUMMARY	**"We the People" have choices.** Make no mistake, no matter which option we choose, or allow to be chosen for us by our elected officials, or chosen for us by for-profit corporations, "We the People" will ultimately be paying for the entire project. Make no mistake, when for-profit corporations "cook the books" and ignore costs (i.e. externalize costs) to make their product appear profitable, "We the People" always end up paying these hidden costs in addition to the corporations' profits. Compiled by: Milt Hetrick, Feb 2012.[16]	

[1] Person years, i.e. 50,000 people for 1 year or 25,000 people for 2 years.

[2] **TransCanada's Keystone XL Pipeline –** Know The Facts, May2011, http://www.transcanada.com/docs/Key_Projects/know_the_facts_kxl.pdf

[3] "Based on jobs information provided by TransCanada for the FEIS, KXL US on-site construction and inspection creates only 5,060-9,250 person-years of employment (1 person-year = 1 person working full time for 1 year). This is equivalent to 2,500-4,650 jobs per year over two years" **Pipe dreams? Jobs Gained, Jobs Lost by the Construction of Keystone XL,** Cornell University Global Labor Institute, Sept 2011. http://www.ilr.cornell.edu/globallaborinstitute/research/upload/GLI_KeystoneXL_Reportpdf.pdf .

[4] **Keystone Pipeline Project**, http://www.transcanada.com/keystone.html "On Nov. 14, TransCanada announced it supports proposed legislation within the State of Nebraska to move the Keystone XL pipeline project forward. If passed, this legislation…will ensure a pipeline route will be developed in Nebraska that avoids the Sandhills."

[5] A Solar Photovoltaic Panel (PV) converts light into electrical power. California maintains a list of approved solar PV suppliers. http://www.gosolarcalifornia.org/equipment/pv_modules.php 70% of the world's solar PV panels are being manufactured by China today.

[6] **Keystone Pipeline System – Feb 2011.** http://www.transcanada.com/docs/Key_Projects/keystone.pdf

[7] "TransCanada does not set oil or gas prices. In fact, the price of international oil prices has no impact on the operation of our pipeline and we do not profit from changing market changes. Prices are set on a global level. Recently, for example, oil that is imported and sold on the U.S. Gulf Coast is trading for just over $102 U.S. per barrel. Western Canadian oil is currently trading for $68 U.S. per barrel." **TransCanada's Keystone XL Pipeline –** Know The Facts, May2011, [Note: Alberta, Canada bitumen is worth less than the light sweet crude from the North Sea because refining costs are higher]

[8] "**Koch Brothers Positioned To Be Big Winners If Keystone XL Pipeline Is Approved**," by David Sassoon, **InsideClimate**, **Reuters**, Thu Feb 10, 2011 2:03am EST, http://www.reuters.com/article/2011/02/10/idUS292515702420110210

[9] The manufacturing practices of current Petrochemical corporations include disposal of their waste products into the atmosphere, into the water and into the soil causing significant health issues for humans (neurological, pulmonary, cancer, …) and non-humans as described in the series of books by Diane Wilson, e.g. "An Unreasonable Woman: A True Story of Shrimpers, Politicos, Polluters, and the Fight for Seadrift, Texas."

[10] Worldometers.net has a simple first order method of seeing the size of the hydrocarbon energy reserves as well as our consumption rate for each source of energy.

[11] Assumed 35 lb / panel

[12] Design life for solar PV panels is typically 20-30 years before significant degradation in performance

[13] Assumed to have ¾" wall thickness and density of 503 lb/ft^3

[14] **Keystone Gulf Coast Expansion (Phases III and IV), "**The proposed Keystone Gulf Coast Expansion Project is a 1,661-mile (2,673-kilometre), 36-inch crude oil pipeline that would begin at Hardisty, Alta. and extend southeast through Saskatchewan, Montana, South Dakota and Nebraska. It will incorporate the 298-mile (480-kilometre) portion of [the completed] Keystone Phase II through Nebraska and Kansas to serve markets at Cushing, Okla. Keystone Phase III will continue south from Cushing to a delivery point near terminals in Nederland, Texas to serve the Port Arthur, Texas marketplace. Also proposed is an approximate 47-mile (76 kilometre) pipeline to transport crude oil from Liberty County, Texas to the Houston, Texas area [read as Koch brother's refineries]."

Ref: **Keystone Pipeline System – Feb 2011.** TransCanada In business to deliver
http://www.transcanada.com/docs/Key_Projects/keystone.pdf

[15] Ogallala Aquifer, Water Encyclopedia, http://www.waterencyclopedia.com/Oc-Po/Ogallala-Aquifer.html

[16] The author of this table, Milt Hetrick, is a retired engineer/physicist who is not affiliated with any political party nor employed by anyone. He enjoys stepping out of the sandbox he played in most of his life to "reframe" what he observes happening today. Envisioning a sustainable future has become his life's work.

As an "independent observer" but an integral member of the interdependent web of life on Planet Earth, he remains confident that humans can continue to thrive on this planet for hundreds of millions of years – but only if they develop a new standard of ethics – some call it Ecomorality: the Ethics of Sustainability and Evolving Consciousness.

> With a new ethic, humans can continue to evolve in consciousness, express their creativity in concert with the Cosmos for hundreds of millions of years simply by "borrowing and returning" all Earth materials rather than "stealing and consuming."
>
> A primary focuses of the new ethic is first on population control, then on harvesting daily sunlight for food energy and human "tool" energy, then on collective learning /education (something homo sapiens are really good at by the evidence of their evolving awareness & consciousness), then on unlimited (but sustainable) creativity and enjoyment (another outstanding capability of homo sapiens).
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> To do this, humans must re-learn to live using current sunlight (as does all other life on the planet) – any non-renewable energy extracted from Earth is replaced in like kind for future generations; all materials extracted (including non-renewable hydrocarbons) are recycled – every atom – for future generations. Humans can and must transition from being consumers/dumpers to being respectful, responsible borrowers/returners.