

A National Energy Program

Treating Energy as a Matter of National Security to Avoid Chaos

Overview of NEP white paper

<http://www.ourenergypolicy.org/a-national-energy-program-the-apollo-program-of-our-time/>



Presentation at:

The UN Foundation

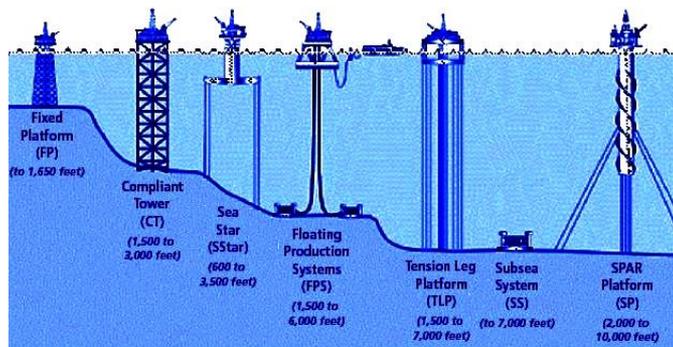
August 12, 2015

Presented by:

Lawrence Klaus



Deepwater Systems



Presentation Outline – What, When Why and How?

- **What Is The Goal**
- **When Will We Achieve it?**
- **Why Should We Achieve the Goal? Matter of National Security**
- **How Will We Achieve the Goal? Use proven methods**
- **How Do We Start? NEP Planning Project**
- **How Will We Educate Leaders of the Future? Planning and Operations Studies**

Presentation Approach

- **What, When and Why – National security matter, goal and timeline to address it**
Q&A
- **How – Structured approach used for national security**
Q&A
Refreshments and informal discussion

“What” Is The Goal: “When” Will We Achieve it?

- **To eliminate the gap between U.S. oil consumption and production and reduce green house gas emissions in a decade to place America on the road to a sustainable energy future.**
 - Six million barrels of oil a day; 1,300 million metric tons of CO₂ equivalent
 - Natural gas plentiful; eliminating the “oil gap” = energy independence
 - Goal defined in discussions with many interests developing white paper
- **It’s not just about us!**
 - Our security and stability is becoming inextricably linked to security and stability elsewhere in the world - DOD 2013 National Security Strategy
 - We must hang together or we will hang separately - Benjamin Franklin
 - **America must lead by example** to induce and enable other nations to become less dependent on energy from unstable and unfriendly nations
- **Use methods proven “at scale”**
 - “Apollo like” long term program planning and management to achieve goal
 - Supply chains built during program position U.S. for sustainable future
 - Planning project to prepare a NEP plan in time to impact new administration coming into office
 - Energy is a “domain”. Methods will be useful in many domains

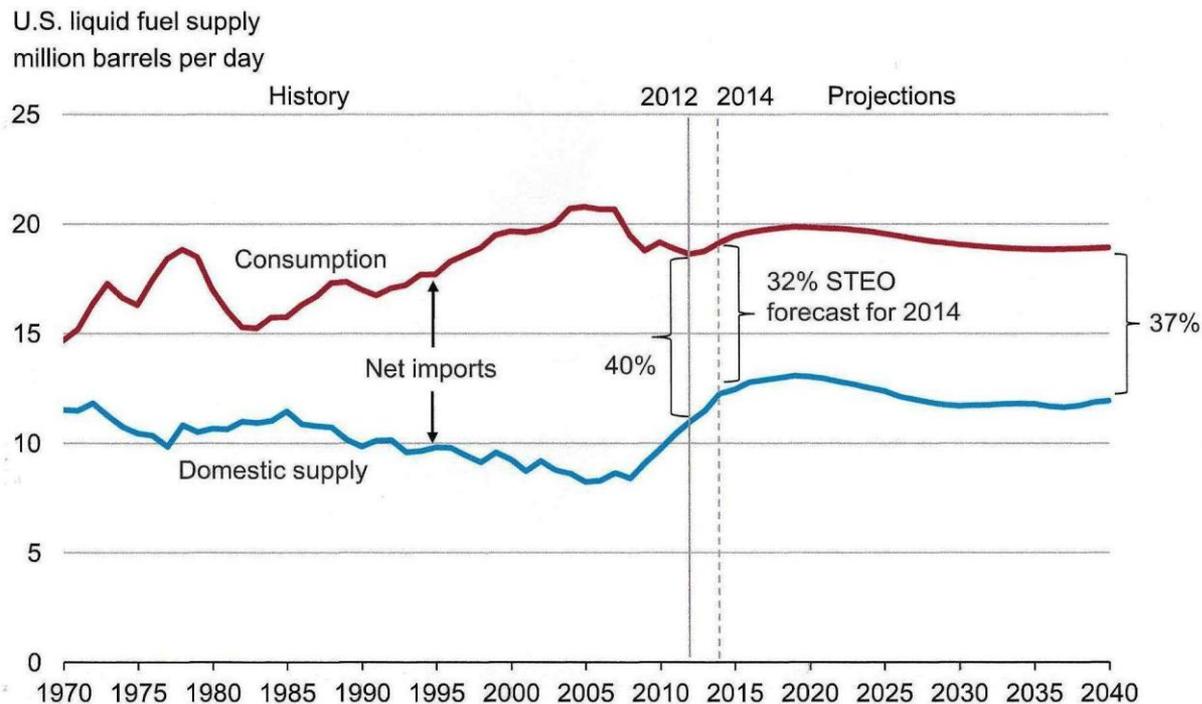
Thinking short term, making it up as we go along kicking the can creating calamities must end

Projected Oil Gap 4-7 MBD in 2025 – IEA, EIA

Risk of supply disruptions, energy crises, conflicts not considered

- **Business as usual forecasts oblivious of world events**
 - Setting oil gap objective at higher end (“at least” 6 MBD) to cover “downside risk”
 - Oil, emissions objectives and timelines set as floor not a ceiling
 - **Frontload NEP activity to avoid being overtaken by events again**

U.S dependence on imported liquids depends on both supply and demand



Source: EIA annual energy outlook 2013

Velocity in instability is ever increasing around the world

- General Raymond Odierno, Army Times

Short Term Energy Euphoria Ignores Long Term Reality

We have been on the “imported oil roller coaster” too long to have learned nothing from experience

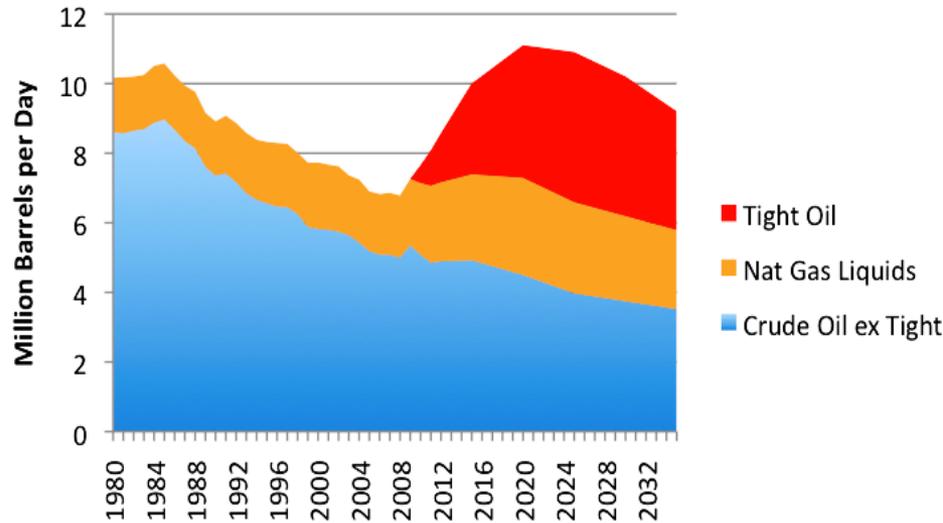
Euphoria

More oil produced at home than we buy from the rest of the world – the first time that’s happened in nearly 20 years ... The all-of-the-above energy strategy I announced a few years ago is working, and today, America is closer to energy independence than we’ve been in decades

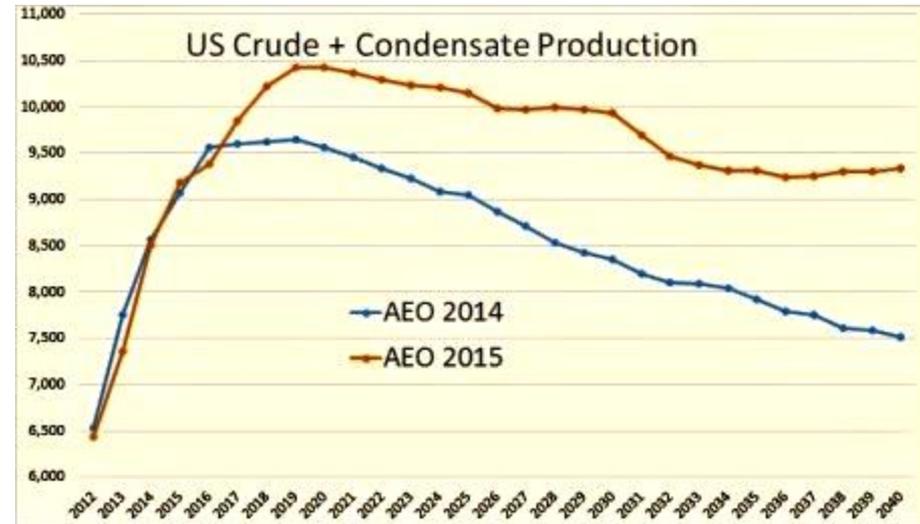
- President Barak Obama, 2014 State of the Union Address

Reality

IEA, EIA forecast U.S. oil production will peak in 2020 then decline without achieving energy independence.



IEA Forecast of US Oil Production, 2012



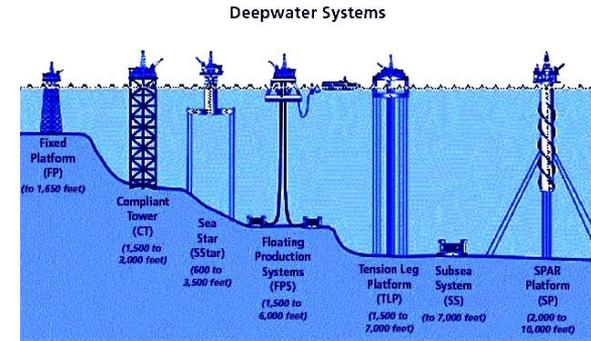
EIA Annual Energy Outlook, 2015

Tight oil is light crude in low permeability formations, often shale or sandstone, extracted by fracturing

Global Production Won't Eliminate the Oil Gap

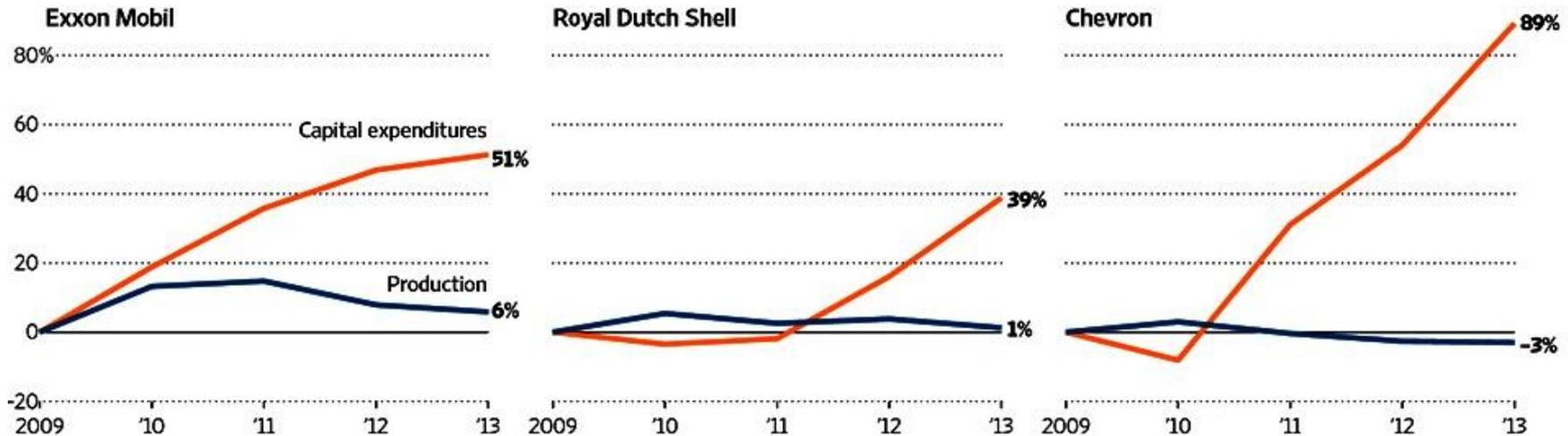
Global energy demand projected to increase one third from 2011- 2035 - IEA WEO 2013

World's major oil companies all suffer from some version of the same problem: spending more money to produce less oil. The world's cheap, easy-to-find reserves are basically gone; the low-hanging fruit was picked decades ago. The new stuff is harder to find, the older stuff is running out faster and faster. - Bloomberg Businessweek, "Big Oil Has Big Problems"



Costly Quest

Exxon, Shell and Chevron have been spending at record levels as they seek to boost their oil and gas output. It has yet to pay off. Below, change in production since 2009



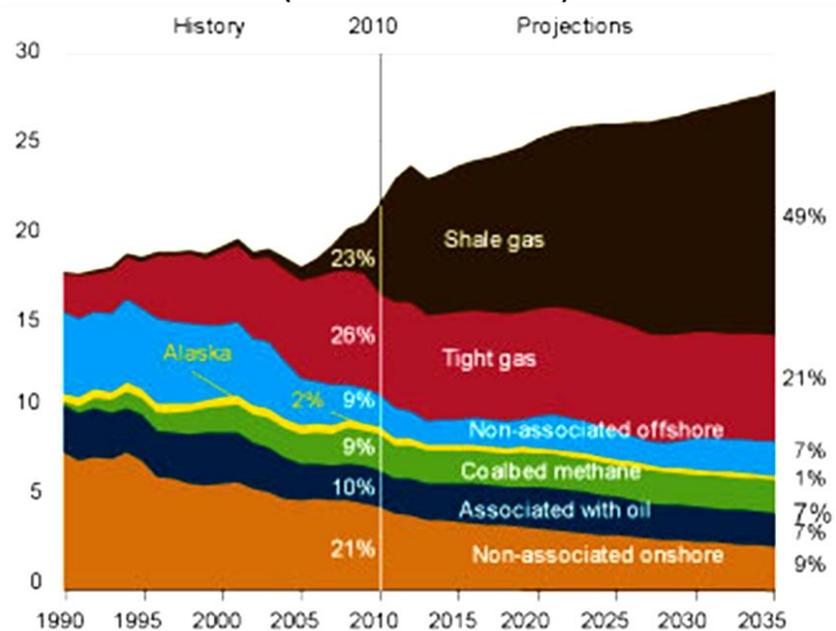
Source: the companies, reflects company 2013 estimates. - WSJ

If global economy doesn't revive, oil glut will be least of our problems

America and World Have a Long Term Oil Problem, Plenty of Gas

- America needs an open fuel standard to convert gas to liquids for transportation
 - GTL could compete in liquids market if Congress enacted an open fuel standard requiring new cars to run on all-alcohol fuels, including methanol
 - US Senate Hearing
- **If America won't use its natural gas to produce methanol others should and will**
 - Chinese company considering two Gulf Coast locations for a \$4.5 billion, 7.2 million ton methanol manufacturing and exporting plant [Appx. 800 TBD in Btu equivalent]
 - "Growing Chinese appetite ignites U.S. methanol renaissance", Fuel Fix

U.S. natural gas production, 1990-2035
(Trillion cubic feet)



Source: DOE AEO2012 Early Release Review

A barrel of oil equivalent produced in U.S. is a barrel of oil we won't have to defend

Why Should America Achieve the Goal?

Must treat energy as a matter of national security to avoid chaos

- **“Arc of instability” from North Africa to Southeast Asia [the region] could become an “arc of chaos” involving forces of many nations**
 - DOD 2010 Joint Operating Environment Report
 - **Seven of top ten nations with largest oil and gas reserves in the region** - EIA
 - **Implications for future combat are ominous, should nations see the need to militarily secure energy resources** - JOE 2010
 - **The U.S. is often dependent on same nations that pose the greatest threats to our interests** - JOE 2010
 - **Velocity in instability is ever increasing around the world**
- **Our leaders focus on pump price disconnected from national security enabling “addicts” to live in denial of the threat**
 - **“Green energy vs. fossil fuel” gridlock continues oblivious of world events**
 - **Consumers shifted back to trucks and SUV’s as gas prices stabilized** - WSJ
 - **Military in continuous action to protect oil supply as chaos grows**

The Sun is Setting on the American Empire

Empire shrinks as insolvency and resistance grow

- **As our armed forces grow smaller, withdraw to the periphery and pivot to Asia, our ability to defend the oil supply diminishes accordingly**
 - **We defend everywhere. Adversaries oppose locally and improve at it**
 - **Access is not guaranteed as we move offshore withdrawing from current conflicts to periphery** - Risk of Exaggerating the China Threat, Colonel Michael Eastman , WSJ
 - **Countries with high performance weapons develop capabilities to deny our forces access into their countries and theater energy supplies [A2/AD]** - JOE 2010
 - **While the armed forces will grow smaller, it is less likely their operational tempo will decrease** - Capstone Concept for Joint Operations: Joint Force 2020, Joint Chiefs of Staff
 - **Shrunken fleet stays deployed longer and gets repaired less**
 - The Seas Are Great but the Navy Is Small, John Lehman, former Secretary of the Navy, WSJ
 - **U.S. Army to shrink to pre-World War II level** - WSJ
- **DOD treats energy tactically, strategy reserved to civilian leadership**
 - **“DOD now plans and programs to reduce demand, diversify supply and consider the burdened cost of energy in everything it does... focused on efficient mission effectiveness”** - General Ronald Keys, USAF (retired)
 - **Potential for logistics disruptions not simulated in war games and is a blind spot in planning future forces** - Operational Energy Strategy Plan, DOD
 - **DoD should develop planning scenarios for fuel needs against different potential combat concepts, absolute shortages, major price spikes, etc.**
 - “Fueling the Future Force”, Center for a New American Security

As Empire Weakens Barbarians Gather at the Gates

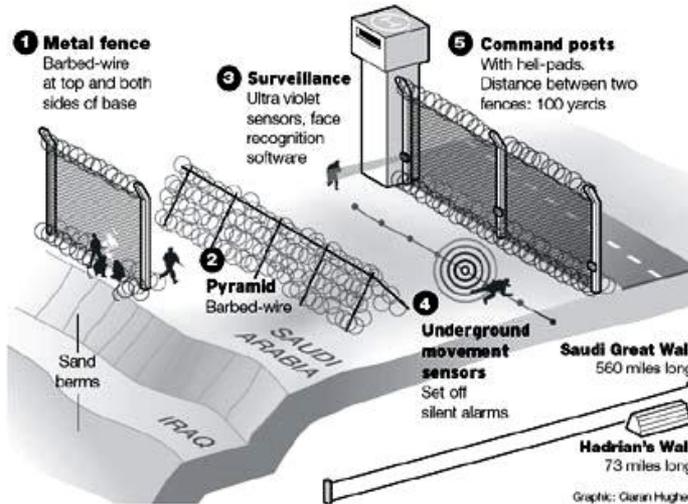
Precision air strikes remain an option... unduly reducing American ground forces risks creating a vacuum - Colonel Michael Eastman, WSJ

- **Terrorists and organized crime [non-state actors] intermingling in “shadow markets” enabling them to coordinate activities at global scale**
 - **An informal series of overlapping pipelines [supply chains] moves products, money, weapons, personnel and goods**
 - **As these markets grow, adversaries will be able to generate attacks at higher level of rapidity and sophistication**
 - Terrorist-Criminal Pipelines and Criminalized States: Emerging Alliances, NDU
 - **\$2-3 trillion growing faster than legal and commercial trade** - JOE 2010
 - **We will bleed America to bankruptcy [Thanks Big Banks and US government]**
 - Osama bin-Laden
- **Relationships between non-state and state actors provide numerous benefits to both** - Terrorist-Criminal Pipelines
 - **Wahhabi - Saud alliance older than U.S.**
 - Islamic fundamentalism would be a trace element in Islam without Saudi support
 - “Addict-Pusher” relationship induces our leaders to ignore blood in the oil
 - Drones kill fighters, not financiers
 - **Eliminate our oil addiction to drain money from states and non-state actors they support and threats they pose will diminish accordingly**
 - It’s not just about us! Lead world to eliminate addiction

Iran has stepped in with military and political solutions that quickly fill power vacuums and bring relative success to its allies - The National Interest

Our National Interest Isn't Sunni or Shiite. It's Protecting the Oil Supply

Where an increase in terrorist activity intersects energy supplies the need for immediate action may require significant conventional capabilities - JOE 2010



If proxy wars turn into regional war key energy facilities impacting oil market and global stability will be at risk.

Future Stability Of Saudi Arabia Not Assured.

Saudis trying to finish new border fence and then slam shut the gates as Yemen collapses - Reuters



ISIL fighters set Iraq's Beiji oil refinery ablaze - Al Jazeera



Fire at Libya's biggest oil terminal destroys 1.8 million barrels of oil - Reuters

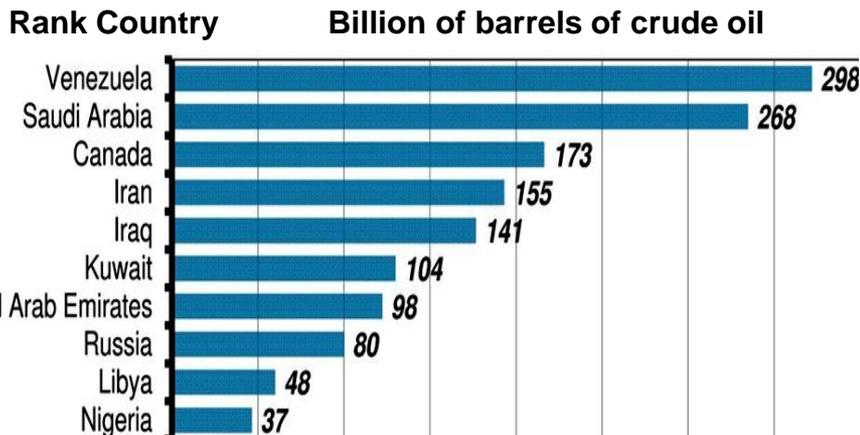
ISIL blamed for new strikes aimed at crippling Libya oil production, rather than capturing it - WSJ

Power Shifts to Energy Producers With Different Interests

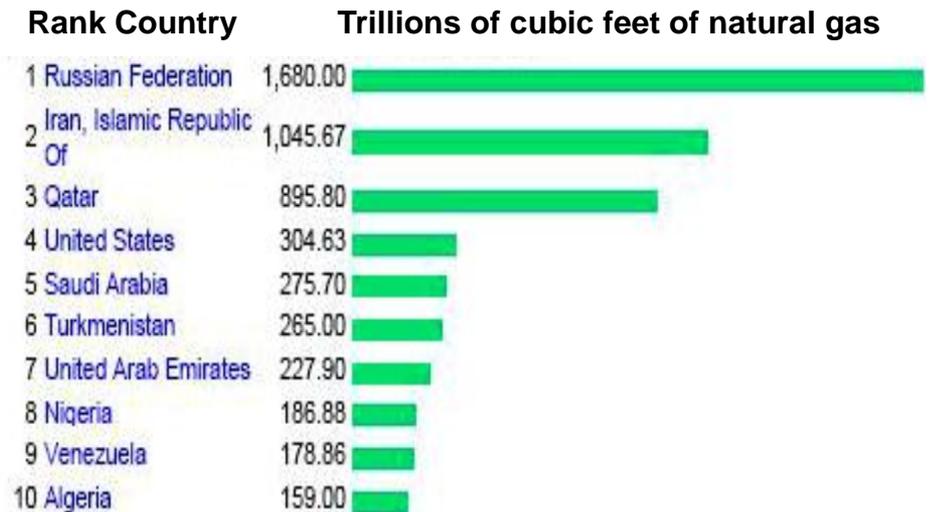
Short term issue is oil glut; long term issue is oil reserves

- Seven of top ten nations with largest oil and gas reserves in the region
 - Russia and Venezuela also in top ten
- America has losing record in major conflicts in the region since WWII and doesn't learn from history and experience
 - As we should have learned in Vietnam, invaders have to win, insurgents have to not lose until invaders leave.

Proved Oil Reserves by Country 2013
Top 10 countries



Proved Natural Gas Reserves by Country 2013
Top 10 Countries



Source: US Energy Information Administration

Control of Pipelines Shifts Power to Nations with Different Interests

- Europe gets approximately 30% of all its energy from Russia
 - Some European nations 80-90% dependent on Russia for energy needs - Eurostat, EC
 - Lifting ban on U.S. oil exports doesn't help Eastern European countries decrease reliance without building pipelines from ports to refineries - Reuters
 - Russia's strategy of buying up European oil refineries could compromise the bloc's energy security [and ours] - EurActiv.com
 - **Europe collapses if Russia cuts off energy exports in a conflict with NATO**
 - For Russia preventing Ukraine from turning West is an existential issue - Reuters
 - Ukraine should be in neither camp. It should be a meeting place, not an outpost - Kissinger
- Greece and Russia sign MOU extending planned Turk Stream pipeline to Europe through Greece, with financing from Russia - Bloomberg.com

South Stream and Nabucco gas pipelines

South Stream won competition with EU and American supported Nabucco. EU changed the rules



Turk Stream to bypass Ukraine

Russia to halt gas shipments across Ukraine to Europe when transit contract ends in 2019 - Bloomberg.com



Expanding NATO would be the most fateful error of American policy in the post-Cold War era. Such a decision may be expected... to impel Russian foreign policy in directions decidedly not to our liking - George F. Kennan, 1997

Russia's Pivot to Asia is Real - Bloomberg.com

Shifts emphasis on oil and gas supply to China/Pacific as pipeline networks grow

- Russia, China sign 30 year \$400 Billion gas/pipeline deal in local currencies - Reuters
 - Formation of potential non-dollar trading block among major players in global energy markets
 - Russia to act as intermediary for Iranian oil sales to India
- Russia and China sign about 40 agreements on energy, finance and high-speed rail cooperation, created currency swap line - Reuters



Eastern Siberia Pacific Ocean (ESPO) oil pipeline 1.6 MBD

Russia surpassed Saudi Arabia to become China's top crude supplier in May.

Saudis will need to accept renminbi for oil payments instead of just the dollar

- Bloomberg.com

Western and Power of Siberia Eastern Route to China/Pacific 68 BC

Western route could grow to 60 or 100 BCM - Reuters

Russian oil and gas pipelines through China to India ?

America Can't Sanction Geography

**Russia becoming a bridge between Europe and South/East Asia
assuming role of Central Asian trading empires of the past**

- **North-South Transport Corridor moves goods from India to Afghanistan, Central Asia and Europe through Iran, bypassing Pakistan**
 - Corridor provides access and potential for investment by India in oil rich Central Asia
 - India committed \$100 million to Chabahar unlocking funds in Iran's rupee account
 - Russia signed €70 billion in projects with Iran using local currencies
- **China rebalance from Littoral to Silk Road trade countering U.S. Naval superiority**
 - 50 nations attend signing for China led Asian Infrastructure Investment Bank - BBC News
 - China launches freight train service from northeastern city of Harbin and Europe

Previous Route	NSTC
45-60 day travel time	25-30 day travel time
40% Shorter & 30% cheaper	

**Russia, China To Build \$240 Billion
Moscow/Beijing High-Speed Rail Link**



**Travel time Moscow to Beijing down
from 5 days to 30 hours**

BRICS, SCO and EEU leaders meet at summits in Russia and we didn't notice

China's "String of Pearls" Maritime Silk Road Strategy

Protects China's energy security, negates U.S. influence and projects power overseas

- Participation in economic and infrastructure projects builds leverage that could soon subordinate U.S. relations with the same countries
 - Chinese army personnel participate in overseeing projects
 - Washington Institute for Near East Policy
 - China builds Burma and Pakistan transportation and pipeline corridors to avoid Indian Ocean and Strait of Malacca



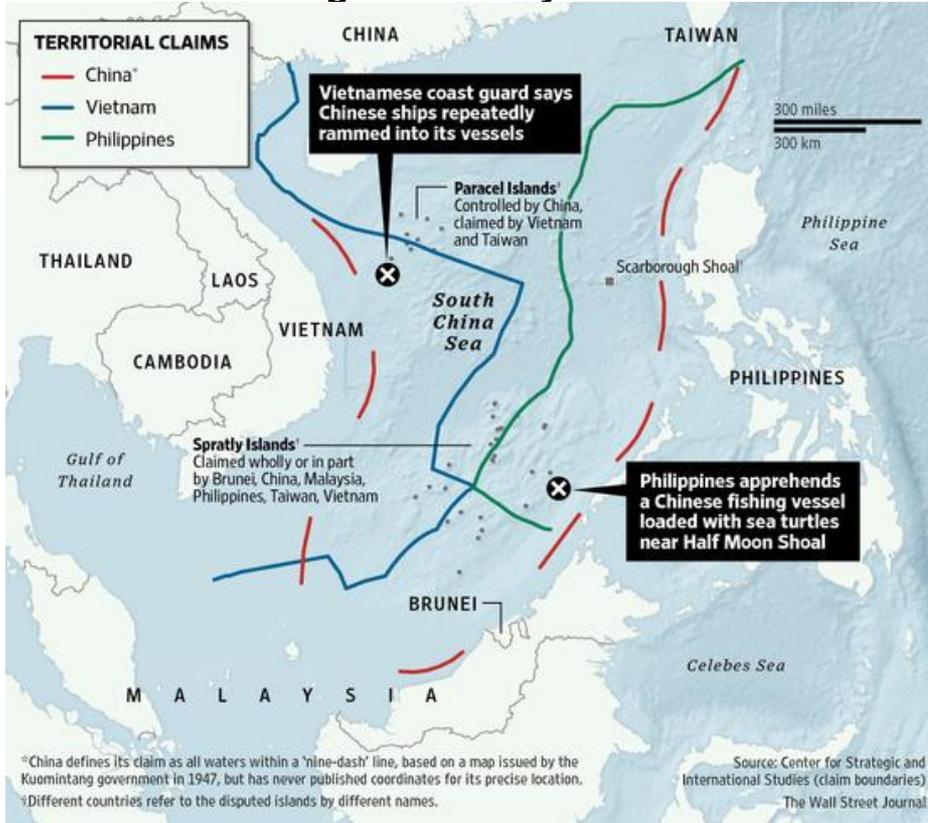
- In submarine warfare, space, and cyberspace, China can compete with U.S. on nearly equal footing - JOE 2010
 - U.S. forces may be "outgunned" by China's emerging ASCM technology
 - The Real Military Threat from China: Anti-Ship Cruise Missiles, Lyle Goldstein, Naval War College
 - U.S. facing a "Cyber Pearl Harbor" - Defense Secretary Leon Panetta, Defense.gov
 - Chinese antisatellite tests demonstrated the capability to destroy military communications satellites
 - "Antisatellite race heats up with China, Russia", Defense Systems. Com

"Marine Silk Road Bank" to be funded by Marine Silk Road Investment Management Fund

Is America's "Pivot to Asia" a Pivot from Old Energy Wars to a New Energy War in the China Seas?

China rapidly expanding offshore oil fleet – adding coast guard vessels to protect it – as it ventures farther into the sea, threatening more altercations with neighbors - WSJ

China's "Nine-Dash" chart not in accord with UNCLOS
US should sign this treaty to be credible



Dispute over territorial boundaries defining drilling rights.



Chinese coast guard vessels protecting oil rig ram Vietnamese vessel in disputed waters in South China Sea



Mature network of military facilities would extend China's ability to project power by over 800 kilometers

Sea floor thought to be repository of large oil and gas deposits in contention by nations in region 17

Must Treat Energy as a Matter of National Security to Avoid Chaos

Implications for future combat are ominous, should nations see the need to militarily secure energy resources - JOE 2010

Force won't change conditions – competent American leadership will

Force

- **Stumble into war trying to cut China off from energy in the China Seas**
 - Growing tensions in the East and South China Seas have raised the risk of a “miscalculation” spilling over into a regional conflict
 - China encirclement could spark war, The Diplomat

Leadership

- **U.S. works with China and Asia/Pacific nations to secure adequate energy sources and reduce demand to avoid a new energy war**
 - China using American made methanol is “win-win” for both nations
 - 83% of global energy demand growth in non-OECD countries - EIA
 - China net oil imports will rise from 6.3 MBD in 2013 to 9.2 MBD in 2020 - Forbes
 - China used 170 BCM of gas in 2013 will use 400- 420 BCM in 2020 - Fortune

The U.S. must take care not to repeat in its China policy the pattern of conflicts entered into with vast public support and broad goals but ended when the American political process insisted on a strategy of extrication that amounted to abandonment, if not complete reversal of the country's proclaimed objectives...

- “The Future of U.S.-Chinese Relations, Conflict is a Choice, Not a Necessity”, Henry Kissinger, Foreign Affairs

How Will We Achieve The Goal?

Use Proven Methods to Solve Today's Problems

Energy is a “domain”. Methods will be useful in many domains

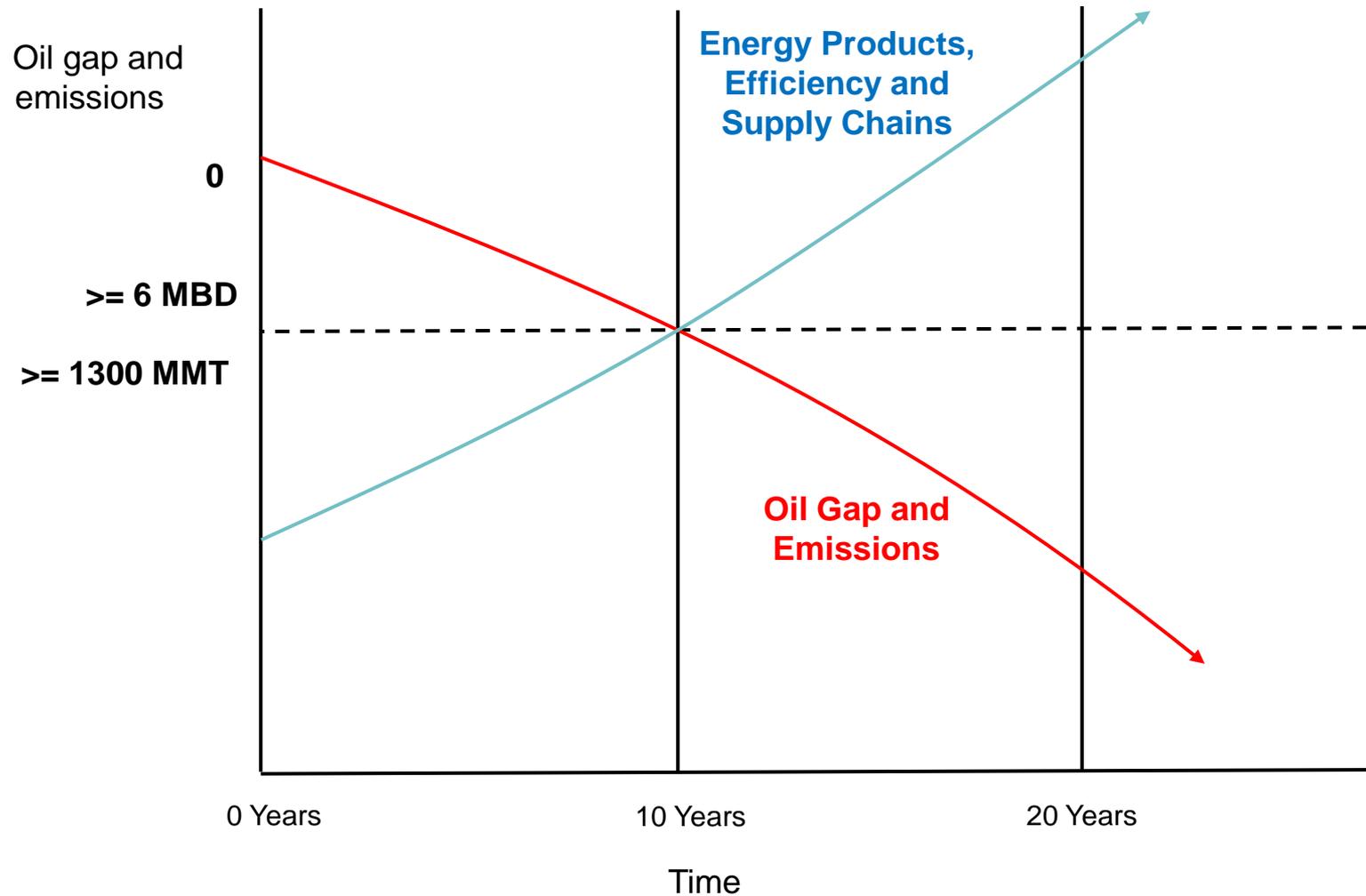
- “Apollo like” program planning and management achieves the goal
 - Eliminate oil gap of at least 6 MBD
 - Eliminate at least 1,300 million tons of CO₂ equivalent
 - Goal set by President Obama at APEC summit
- Supply chains place U.S. on road to a sustainable energy future
 - The goal is a “milestone” on the road to achieve longer term goals by mid-century though growth of supply chains built during the program
- Long term planning replaces short term thinking
 - Stop making it up as we go along, chasing rosy scenarios being blindsided by unforeseen events
 - NEP planning project prepares plan for next administration as it comes into office
 - No one could have planned the mess we are in!



The basic principles of strategy are so simple that a child may understand them. But to determine their proper application to a given situation requires the hardest kind of work from the finest staff officers. This planning meant the toilsome drudgery of grinding countless unrelated facts into homogenous substance.

- Dwight D. Eisenhower, Crusade in Europe

The Goal is a “Milestone” on the Road to a Sustainable Future



Start by Ending Project/Program Confusion

President Obama mentioned “funding the Apollo projects of our time” in energy. He then mentioned electric cars and passenger rail in the same breath as Apollo as though all were projects. - 2010 State of the Union message

Apollo wasn't a project. It was a program.

- **Programs achieve “ends” - goals and objectives**
 - Ends must be defined and agreed upon FIRST (go to the moon, build a national highway system, achieve energy independence)
- **Projects - “means” achieve ends**
 - Means (Keystone Pipeline, cap and trade, electric cars, passenger rail, etc.) then defined and ranked in achieving goals and objectives
- **Placing means before ends = Gridlock since 1973 OPEC Oil Embargo**
 - Can't see forest for the trees
 - Each interest hugs its tree and “fights below the tree line” to cut down trees of opposing interests

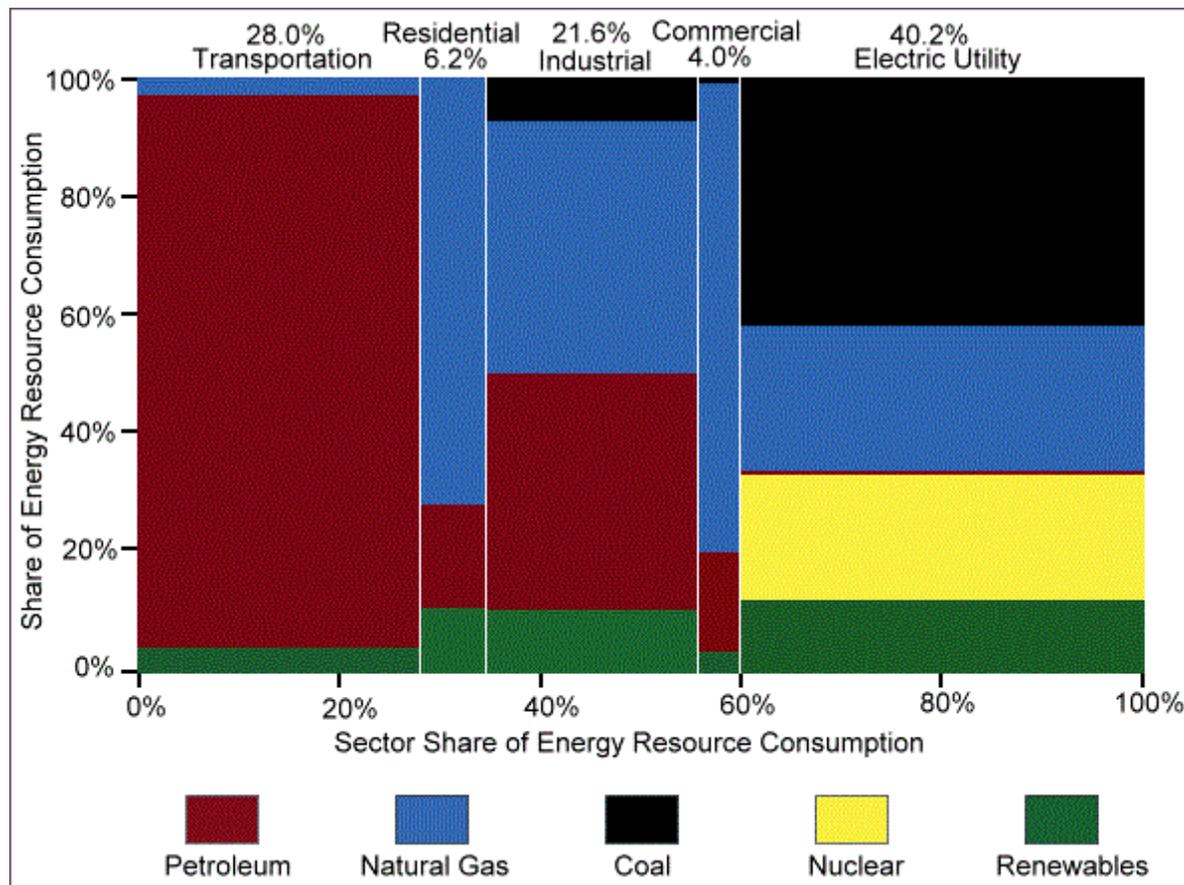
Approach: Replace Imported Oil and Reduce Emissions in Economic Sectors as Required to Achieve Goal

Replace oil in economic sectors from other sources in rank order at least 6 MBD

- Priority to sector objectives based on oil usage
- Priority to means within sectors based on contribution to objective in a decade

Energy Consumption by Sector and Energy Source, 2012

Source: DOE, EERE, Vehicles Technologies Office

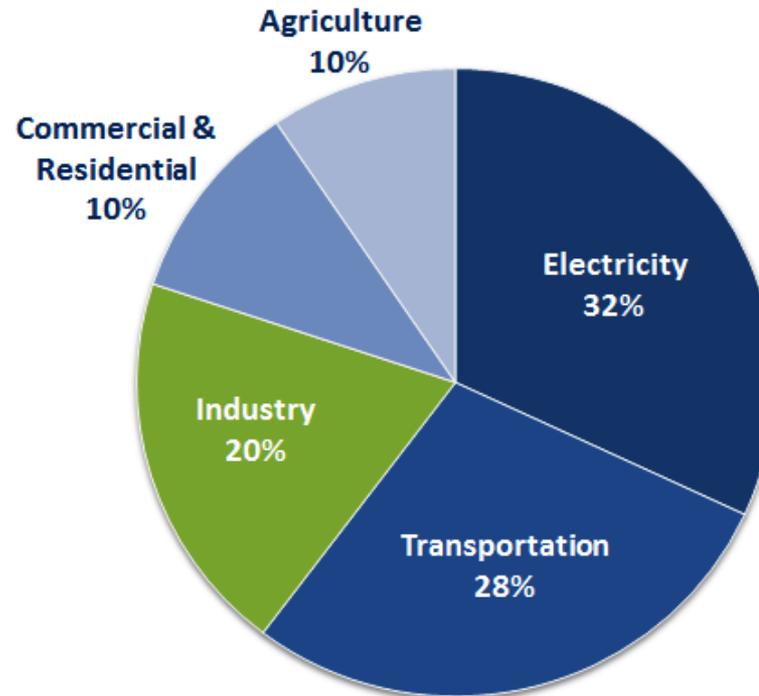


Reduce GHG emissions in Economic Sectors at Least 1,300 MMT

Achieve President Obama's goal: GHG emission 26-28% below 2005 levels by 2025

- Priority to sector objectives based on potential emissions reduction
- Priority within sectors to means based on contribution to objective in a decade

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2012 6,526 Million Metric Tons of CO₂ equivalent

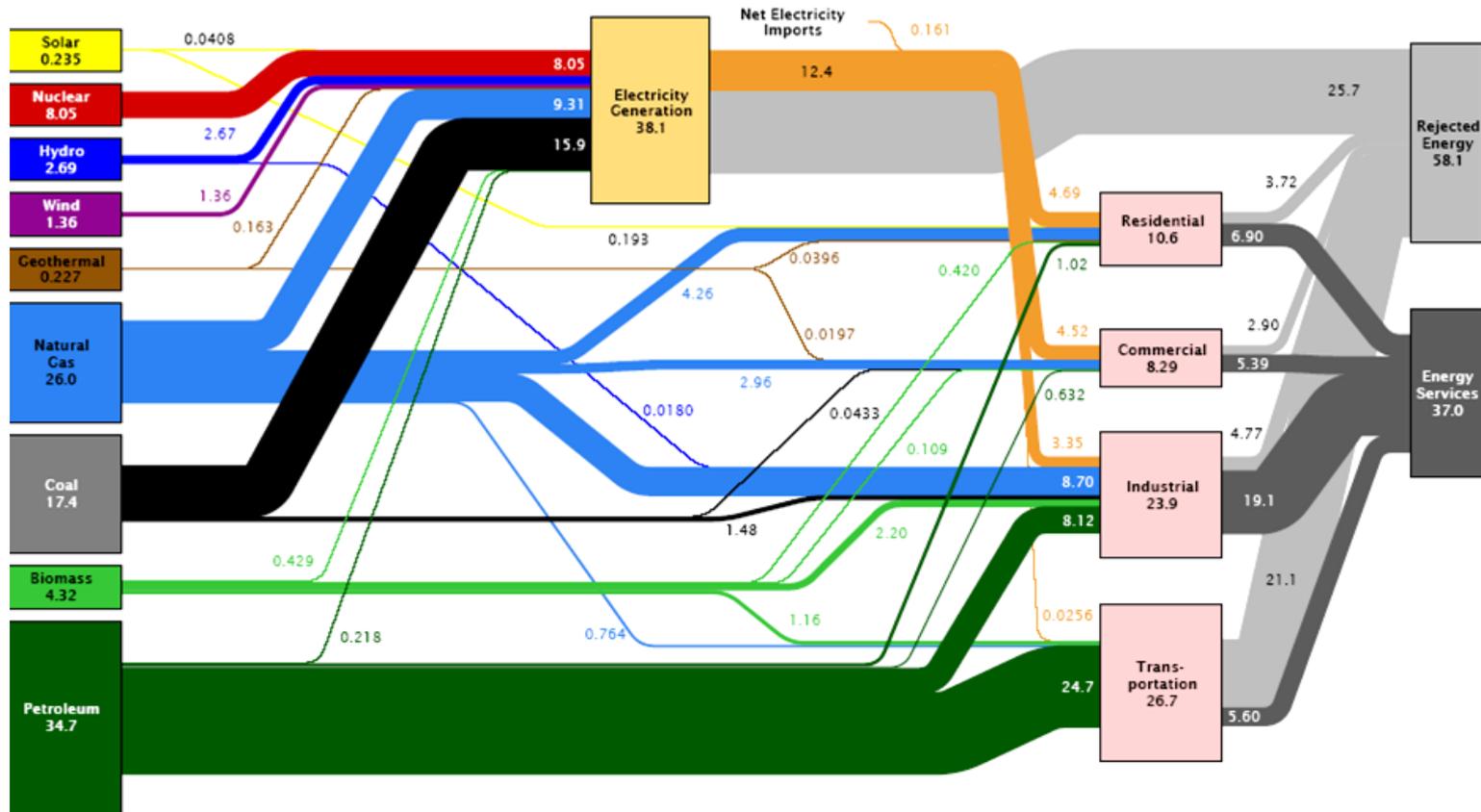


Source: All emission estimates from the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012

Energy Efficiency Potentially Largest Source of Energy Production and Emissions Reduction

$$\text{Energy Efficiency} = \text{Energy} - \text{Emissions}$$

- **Rejected energy equal to 58.1% of energy used** - Lawrence Livermore National Laboratory
 - Priority to sectors and means based on contribution to the goal
- **U.S Army “Net Zero” Program covering waste, energy and water is a model for cross market development.**
 - Waste reduction is life and death to military; dollars and cents to civilians



“Apollo like” Program Planning and Management

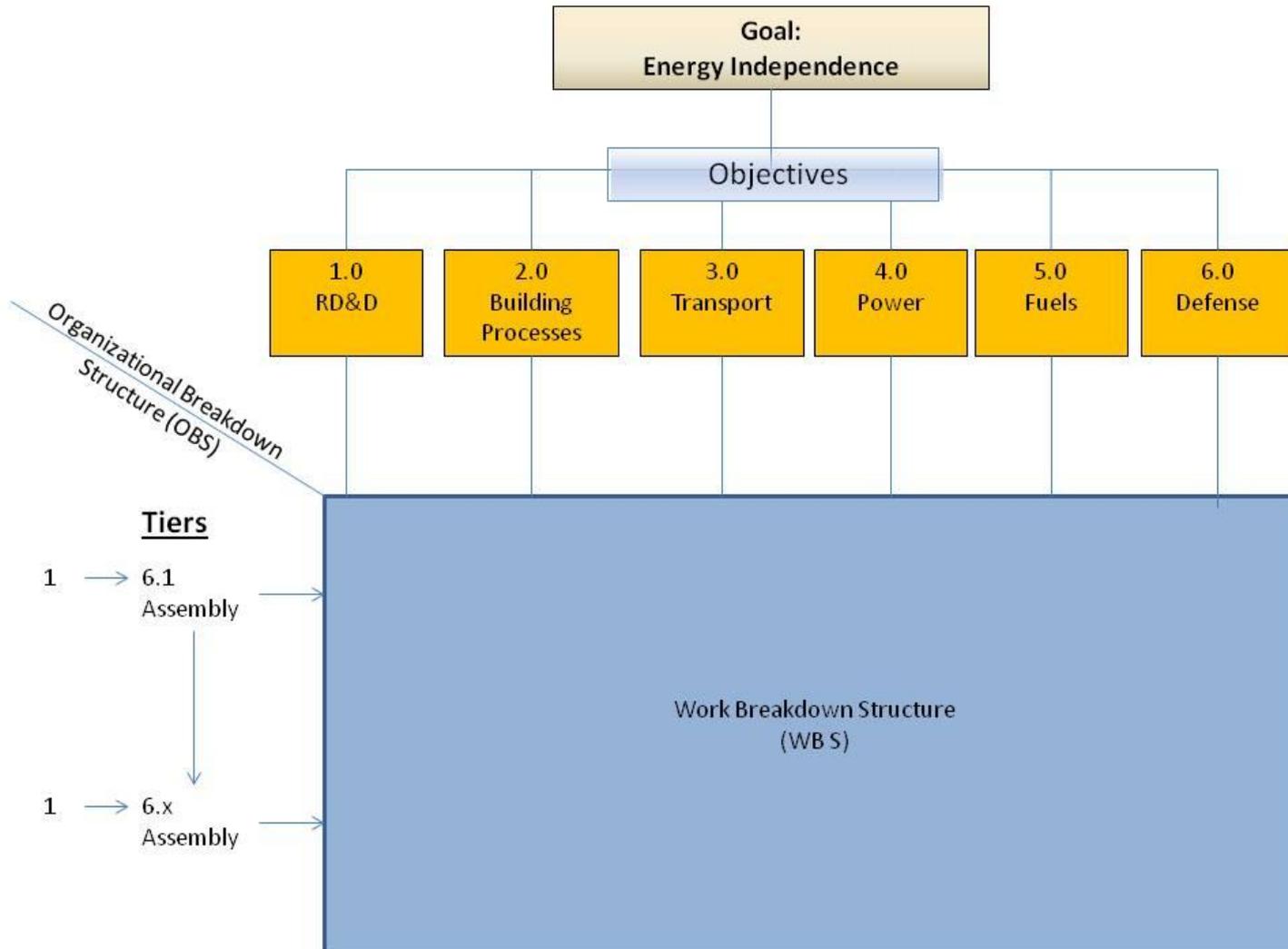
Method to define and achieve goals and objectives from inception to completion

- **The President defines a goal and timeline**
 - Goal in white paper used as “placeholder” for goal to be set by next President
- **Objectives/work elements to achieve the goal designed by stakeholders.**
 - Sector profiles produced and used as baselines for planning
- **Means (assemblies, tasks, projects) defined in tiers “down and across” objectives in a work breakdown structure (WBS)**
- **Means related to performing organizations in an organization breakdown structure (OBS)**
- **Public/private finance sources/organizations are defined by means in a financial breakdown structure (FBS)**
 - **FBS unique to NEP which differs from publicly funded NASA and DOD programs**
 - **Public sector finances difference between private sector and needed investment**
- **A cost/schedule system is developed to manage all work elements**
- **The above are structured within a management framework wherein a change in any element immediately translates into impacts on all other elements**

Proposed NEP Program Breakdown Structure

White paper provides goal, objectives, scenarios and methodology
“for discussion purposes” to begin NEP planning project

Scenarios broken down to top level assemblies in white paper



Proposed Objectives

- **Building & Processes Sector:**
 - Replace oil use in energy efficient buildings and processes to meet end user needs and achieve the goal.
- **Transportation Sector:**
 - Replace oil use in energy efficient motor vehicles and build supply chains for the conventional and alternative vehicles fleet to meet customer needs and achieve the goal.
- **Power Sector:**
 - Build a safe, secure, energy efficient, 21st century power sector that replaces oil use by end customers and reduces emissions to meet the goal.
- **Fuels Sector:**
 - Build an energy efficient, fuels sector that replaces oil use and reduces emissions to meet the goal and will always be able to provide fuel for cars on our roads and tanks on the battlefield.
- **Defense Sector:**
 - Replace oil use in an energy efficient U.S. military that has the operational energy security to go and win America's wars without initial access to theater bases and energy supplies if required.
- **Energy Technologies Research, Development and Deployment:**
 - Develop and deploy energy technologies in “rank order” to achieve sector objectives as required to achieve the goal.

Plan and Build Supply Chains for a Sustainable Energy Future

Goal is “milestone” on road to achieve longer term goals

- What is supply chain management?
 - “Cradle to grave” planning, implementation and control of flow of information, materials, products and services from raw material to customer fulfillment and life cycle support and waste reduction/recycling
- Supply chain work elements built “down and across” objectives
 - Example: Transportation Sector Supply Chain

Transportation Sector

Vehicles



Power and Fuels Sectors

Customer/System Interface
(Charging/Fueling Stations)



Power/fuels

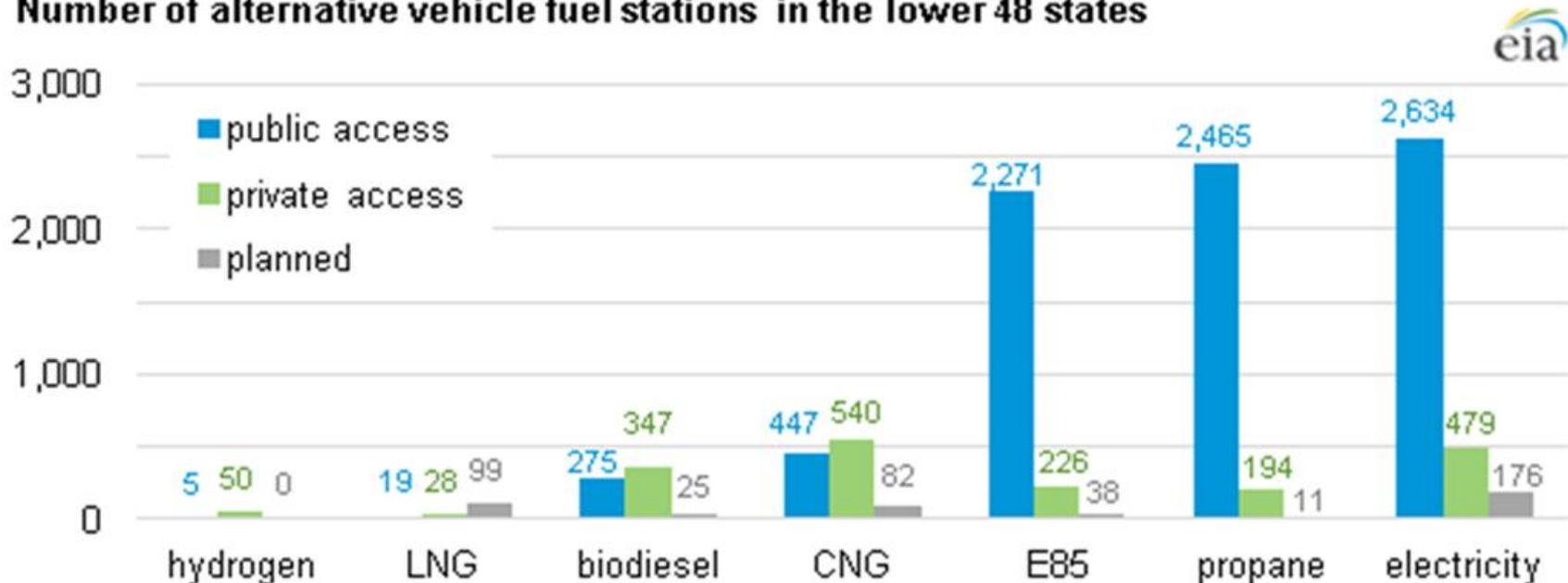


Alternative energy supply chains require a great deal of R,D&D

Example: 160,000 gas stations in US; less than 10,000 all other fuels

- **Government programs are “Hobby Shops”**
 - Fragmentation + inadequate funding + bureaucracy + poor deployment
- **Business community requires real business opportunities to participate**
 - **Ex: Solve “chicken and egg” problem for NGV’s - fueling stations vs. vehicles**
 - NEP brings together fleet operators, oil and gas, trucking and financial interests to plan conversion of an “economic number” of vehicles support building NGV fueling network
 - Government “greases the wheel” to fill gaps, eliminate roadblocks and facilitate R.D&D

Number of alternative vehicle fuel stations in the lower 48 states



Source: U.S. EIA, based on DOE Alternative Fuels & Advanced Data Center, March 2012.

LNG is liquefied natural gas, CNG is compressed natural gas, and E85 is a gasoline-ethanol blend.



Russia's National Natural Gas Vehicle Program

Converts to gas to have more oil and equivalent to sell long term

- **Creates national “supply chain” for NGV market development**
 - Constructs CNG and cryogenic filling stations, gas liquefaction and other facilities
 - Cooperates with 31 regions to develop NGV market
 - Creates infrastructure to boost consumer demand, diversify gas powered machinery and equipment
 - Optimizes law regarding NGV market and creates efficient government regulation mechanisms

- **Expands presence in NGV sector internationally with pilot projects**
 - “Value added services” make gas commodity more competitive

- **By 2020 goals planned as proportion of:**
 - **CNG to conventional fueled vehicles (Forecast 10.4 BCM)**
 - Public transport and municipal vehicles – 50%
 - Local freight transport and lightweight commercial vehicles – 30%
 - Private vehicles – 10%
 - Agricultural equipment – 20%
 - **LNG to conventional fueled vehicles (Forecast 5.2 BCM)**
 - Agricultural equipment – 20%
 - Long distance motor vehicles – 30%
 - Rail transport – 2%
 - **Milestones for future development**

Transportation Sector Supply Chain

- **What is needed is an integrated, multi-pronged approach that cuts across Administrations and covers transportation fuels and vehicles**
 - Fuel Choice for American Prosperity, Institute for the Analysis of Global Security
- **Transportation receives top priority based on oil usage**
 - **70% of all the petroleum used in U.S.**
 - **96% of energy used in the transportation sector is oil**
 - **Concentrate on motor vehicles - 59% of oil use in sector for light duty cars and trucks** - Blue Print for Securing America's Energy Future, US Chamber of Commerce
 - **Other vehicle types may be included with support from related industries (Aircraft, Ships, Rail, etc)**

Planning Transportation Sector Supply Chains

Priority to means within sectors in “rank order” to contribution to objective in a decade

- Make “apples to apples” comparisons to prioritize each supply chain
 - How Much, How Fast, How Clean, What Risk, What Cost?
- **Gas:** CNG uses existing gas production and distribution system
 - Gas is “transition fuel” – plentiful, low cost, shorter term
 - Need engine conversion, new fueling station network
 - Reduces emissions by substituting less polluting means for oil
- **Electricity:** EV’s use existing power grid
 - Electricity longer term requires extensive R,D&D
 - Need “competitive” vehicle batteries, charging systems and fueling network
 - “Buying new” costs more than conversion
 - EV’s have range problem
 - Eliminates emissions
- **Liquids:** Use existing vehicles and gas station network
 - Alternatives “to” and “from” conventional fossil fuels (Biofuels, GTL, CTL)
 - Need R&D, new plants, pipelines, freight transportation varies with fuel
 - Methanol requires little change in existing system, but has range problem
 - Emissions reduction varies by liquid
- **Hybrids:** Transitional vehicles
- **Other:** R,D&D continuous process to bring new technologies to market as they become commercially viable - NEP white paper

Transportation Sector Supply Chain – Department of Defense

NEP “military compatible” structure integrates military and civilian efforts

- **Over 70% of tonnage to position U.S. Army into battle is fuel**
 - **Number of convoys to transport an ever increasing requirement for fossil fuels is a root cause of casualties** - Energy Security: America’s Best Defense, Deloitte
 - **Green energy vs. fossil fuels not issue, reduce tonnage of all liquid fuels**
- **Focus on R&D of much more energy efficient and alternative vehicles**
 - **Example: Oshkosh Defense HEMTT A3 Diesel Electric Tactical Truck**
 - Improves fuel efficiency up to 20%
 - 100 kW of clean, exportable AC power, enough to run a field hospital
 - Single-unit, power-generating solution, eliminates need for additional vehicles
 - **Example of DOD “co-investment” used in NEP**
 - **Public sector finances difference between private sector and needed investment as a matter of national security**

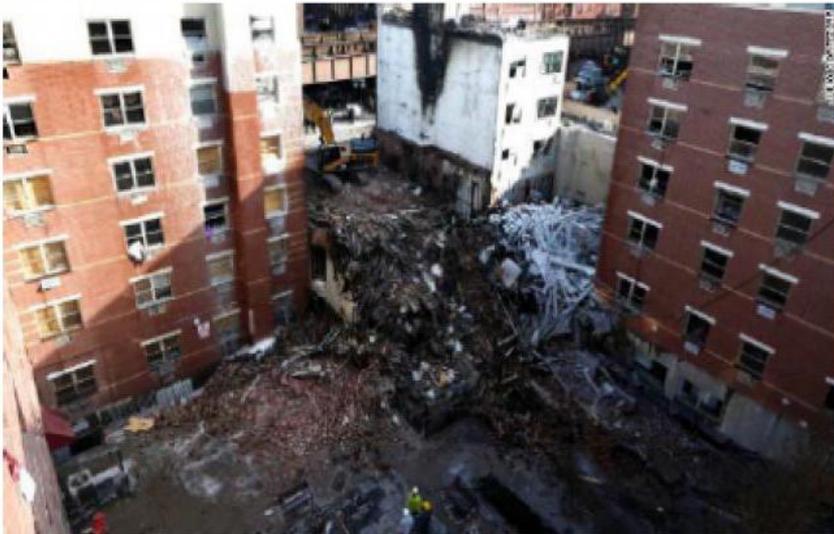


HEMTT A3 Diesel Electric Heavy Expanded Mobility Tactical Truck

Off-road hauling capability and self-contained ability to generate 100 kW of clean exportable AC power

Transportation Sector Supply Chain Includes Roads

- Highway Program “First Generation” National Infrastructure Program
 - Gasoline tax becoming obsolete: more efficient vehicles pay less at pump; hybrids much less; electric cars pay nothing
 - Must “pay as you go” by vehicle type, weight, how much and where vehicles drive to equitably pay to maintain roads
- Infrastructure 2.0: \$3.6 trillion in infrastructure investment needed by 2020
 - American Society of Civil Engineers, Infrastructure Report Card
 - National infrastructure investment “programs” with sound revenue streams replace fragmented “projects” spending that can’t provide needed investment
 - Quants don’t pour concrete: Jobs for the 99%, productive investments for 100%
 - The challenge ahead is the challenge of sharing prosperity



New York explosion exposes nation’s dangerous and aging gas mains



A 93-year -old water main breaks above UCLA 34

How Will We Start? NEP Planning project

- **Produce a plan available to impact next administration coming into office**
 - Planning of each objective by stakeholders involved in implementation
 - Options
 - **Government project:** assistance from industry, financial sector, universities, etc. national laboratories, think tanks
 - **University or think tank project:** assistance from government, industry, financial sector, national laboratories.
- **“Plan B” for energy on separate track from our current track – gridlock**
 - Example: President Roosevelt’s actions prior to Pearl Harbor
 - Saw danger and prepared for war on a separate track in a nation living in denial
 - Project analogous to the “advisory” NDAC formed by President Roosevelt in 1940
 - **Hopefully, NEP won’t require another calamity to be implemented**
 - At minimum, project provides contingency plan to deal with unforeseen events
- **Have to start somewhere**
 - **NEP white paper presents a goal, objectives, implementation scenarios, methods “for discussion purposes” to begin the project.**
- **Achieving energy independence right place to start**
 - Methods used in the energy domain lead to cooperation, structures, experience, momentum useful in other domains.
 - NEP white paper

When the evils that arise have been foreseen, they can be redressed, but when having not been foreseen, they are permitted to grow in a way that everyone can foresee them, there is no remedy - Niccolo Machiavelli, The Prince

NEP Planning Project: Start up and Operation

**Small group established to set up project and recruit participants
Stakeholders/participants in planning provide funding and in-kind services**

Whitewashing the fence



Illustration from *Tom Sawyer*
Courtesy The Mark Twain House, Hartford

If you was to tackle this fence and anything was to happen to it – ”
“Oh, shucks, I’ll be just as careful. Now lemme try. Say – I’ll give you the core of my apple.”

Short List of Skills sets for NEP planning project

- Supply Chain Management and Logistics (military, civilian)
- Program and project management (military, NASA, aerospace)
- Investment , Commercial banks, Public finance
- Energy business and finance
- Accounting
- Coal, Oil and Gas industries (strategic planning and operations)
- Conventional and alternative automotive industries
- Industrial processes equipment and energy systems
- Residential, Commercial and industrial buildings energy systems
- Utility transmission, distribution systems and regulation
- Highways
- Solar, Wind, distributed generation
- Environmental management, engineering, impact mitigation
- Environmental and regulatory law
- Universities with relevant departments

How Will We Educate Leaders of the Future?

Planning and Operations Studies

- **Education**
 - Teach “hard skills” not taught in public policy programs to enable students to become competent leaders
 - Examples: comparative public, private, military organization; systems engineering; program and project management; supply chain management and logistics; infrastructure economics; management information systems; accounting and finance.
 - Courses not found at one institution: integrate courses from multiple institutions
- **Projects**
 - Center for developing plans and programs in national interest
 - Students work on real world projects, gain experience, build relationships
 - NEP planning first project
 - Civilian/military interaction in classroom and projects builds understanding/ cooperation
- **Research and Development**
 - Develop courses, seminars, briefings and documents to support education program and inform national discourse
 - Students participate in R&D

The basic principles of strategy are so simple that a child may understand them. But to determine their proper application to a given situation requires the hardest kind of work from the finest staff officers. This planning meant the toilsome drudgery of grinding countless unrelated facts into homogenous substance. - Dwight D. Eisenhower, Crusade in Europe



Lawrence Klaus began his career as an architect in the offices of Emery Roth & Sons working on projects including working drawings for the World Trade Center. As a research engineer in the Boeing Aerospace Group (ASG) he designed and implemented automated business systems concerned with the design, manufacture, test, delivery, and installation of major military missile, space, and associated programs. He also participated in internal business planning to define ASG program management and information systems capabilities with civilian applications. At Peat Marwick Mitchell (now KPMG) he designed PPB and management and reporting systems for federal government agencies. This included projects such as design of a program planning system for regional plans for the Public Health Service. He founded and was president of Development Management Consultants Inc. and planned and managed company operations on dozens of projects working with utilities, lenders, contractors, non-profit organizations and government. This work included projects such managing local and federal disaster rapid emergency mass home repair. As a manager in the network systems group of Unisys Corporation he worked with company engineers to design networked PC to mainframe systems that integrated company and vendor software and hardware. This included projects such as the user friendly IDEAS online education system for the Air National Guard. As a consultant at Synergic Resources Corporation (now Navigant Consulting) he worked on energy efficiency projects for utilities such as MidAmerican Energy. As an independent consultant has worked on projects related to energy policy, networks and distributed generation. Mr. Klaus holds a B.S, Bachelor of Architecture and M.B.A. from the City College of New York.

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