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/

Presented at:

The UN Foundation

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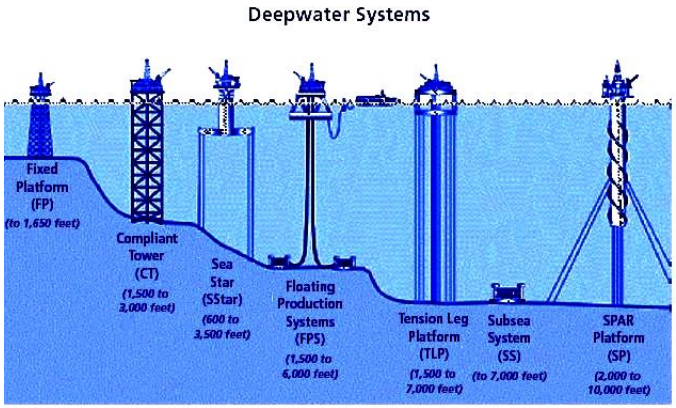


Revision: 9/11/2015

Presentation Outline

- **What Is The Goal**
- **When Will We Achieve it?**
- **Why Should We Achieve the Goal? To Avoid Chaos**
- **How Will We Achieve the Goal? Use Methods Proven “At Scale”**
- **How Will NEP Operate?**
- **How Do We Start? NEP Planning Project**

"What" Is The Goal: "When" Will We Achieve it?

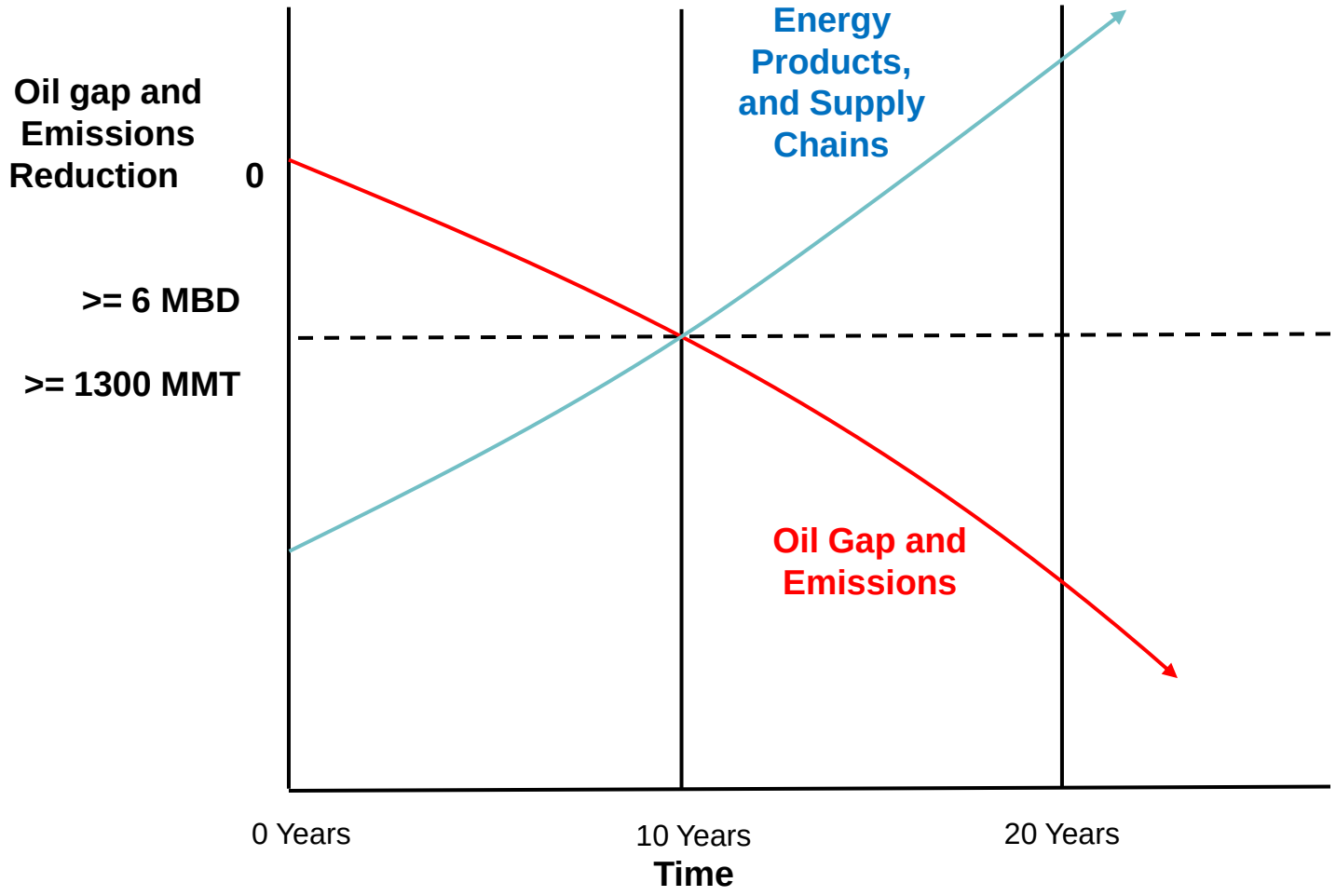
- **To eliminate the gap between U.S. oil consumption and production and reduce green house gas emissions in a decade as a milestone on the road to a sustainable energy future.**
  - **Six million barrels of oil a day** - High end of EIA, IEA forecasts for oil gap in 2025
    - **Natural gas is plentiful. "Oil gap" is our long term problem.**
  - **1,300 million metric tons of CO_2 equivalent by 2025**
    - **Goal and timeline set by Barak Obama and Xi Jinping at APEC summit**

- **Must treat energy as a matter of national security to avoid chaos**
  - **"Arc of instability" running 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 ten nations with largest oil reserves in the region** - EIA, IEA
  - **Reduced defense budgets means reduced ability to defend the oil supply**
  - **Implications for future combat are ominous, should nations see the need to militarily secure energy resources** - JOE 2010

- **Use proven methods in national security matters**
  - **"Apollo like" program planning and management achieves the goal**
  - **Supply chains built during program position U.S. for a sustainable future**
  - **Planning project prepares a NEP plan in time to impact new administration**
  - **Methods used in energy "domain" will lead to cooperation, structures, experience and momentum useful in other domains.** - NEP white paper

The Goal is a "Milestone" on the Road to a Sustainable Future

Fossil fuel and green energy interests make tradeoffs during planning process to eliminate gridlock, resolve differences and secure buy in.



- **Reliance on fossil fuels is fueling our environmental demise**
- **NEP reduces carbon loading much faster than market forces as a national security matter**
- **Additional use of fossil fuel to achieve goal during "NEP decade" will be emissions neutral**

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

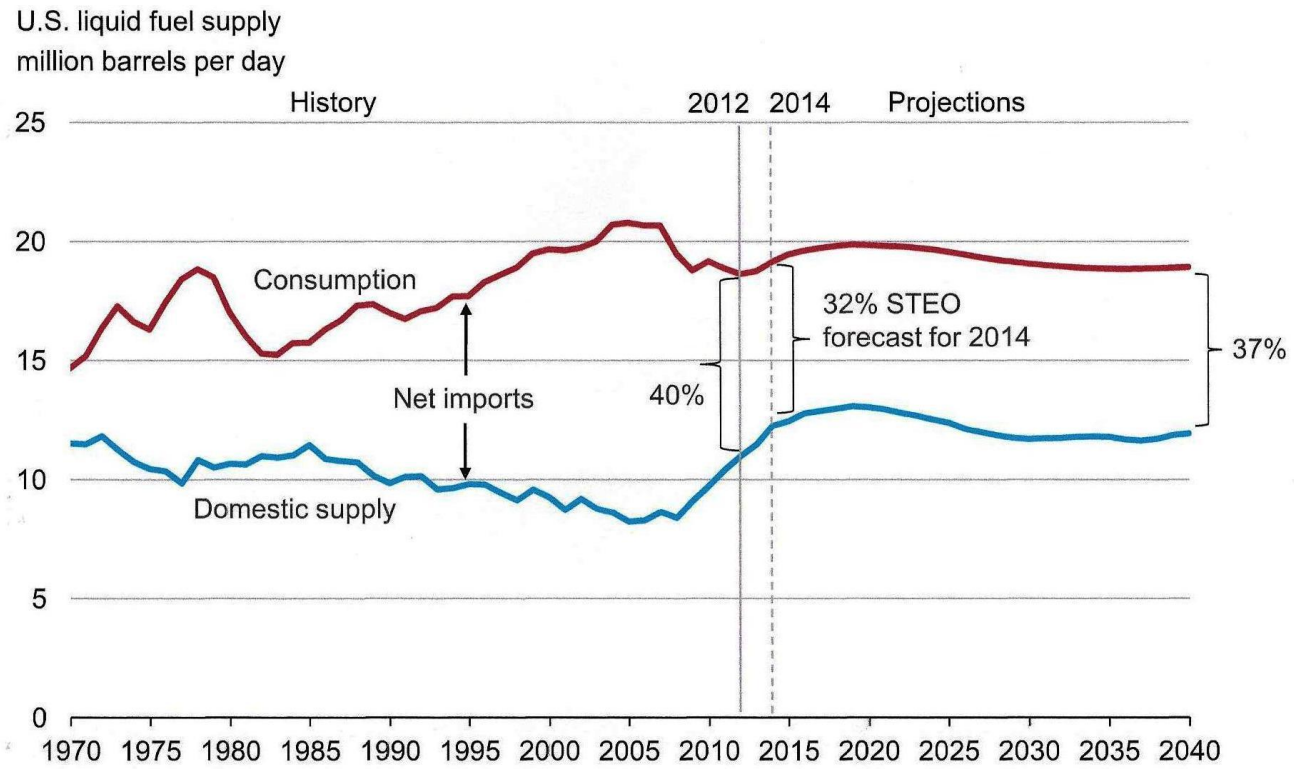
Business as usual forecasts oblivious of world events

- **Risk of supply disruptions, energy crises, conflicts not considered**
  - **Velocity in instability is ever increasing around the world**

    - General Raymond Odierno, Army Times

- **Set goal at higher end ("at least" 6 MBD) to cover "downside risk"**
  - **Oil gap, emissions objectives and timeline set as floor not ceiling**

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



Source: EIA annual energy outlook 2013

Short Term Energy Euphoria Ignores Long Term Reality

US and global weak demand and low gas prices reflects deflationary pressures, rout in commodities and growing chaos

Euphoria

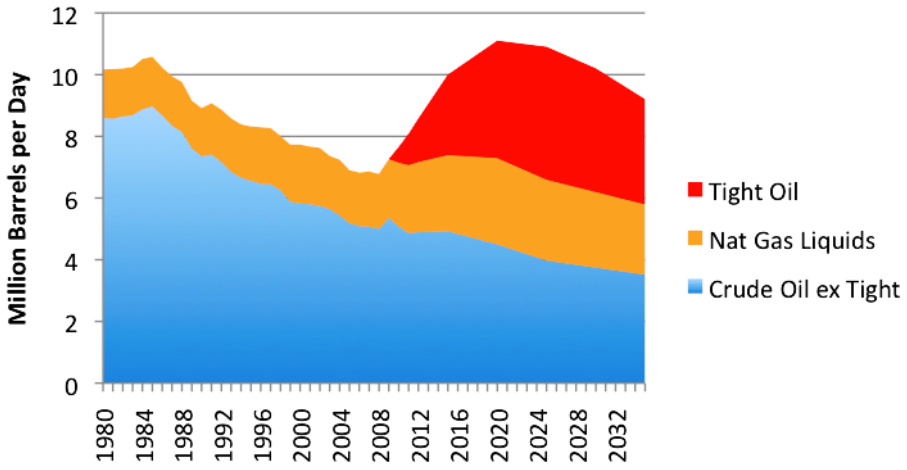
More oil produced at home than we buy from the rest of the world – the first time that's happened in nearly 20 years … The all-of-the-above energy strategy I announced a few years ago is working, and today, America is closer to energy independence than we've been in decades

- President Barak Obama, 2014 State of the Union Address

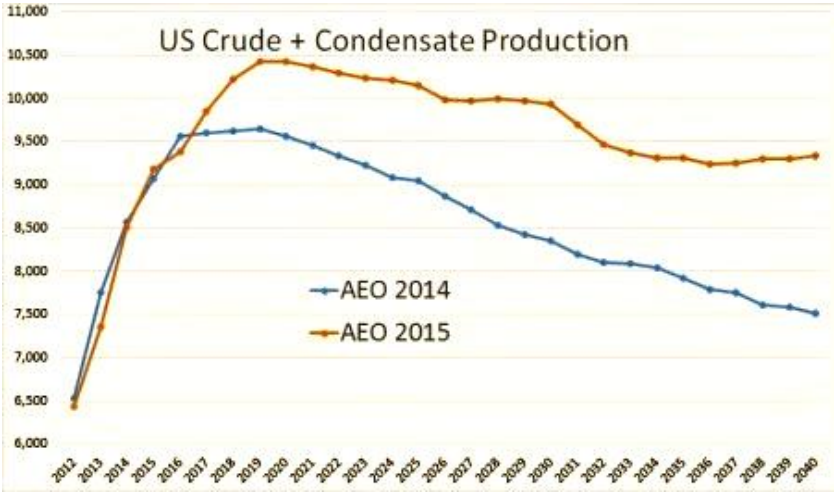
Reality

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

Frontload activity to avoid being overtaken by unforeseen events again



IEA Forecast of US Oil Production, 2012

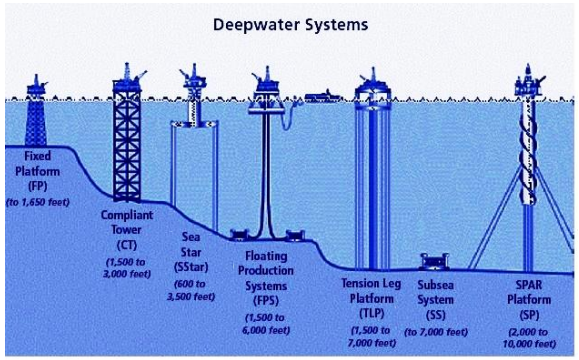


EIA Early Release Annual Energy Outlook, 201

Global Production Won't Eliminate the Oil Gap

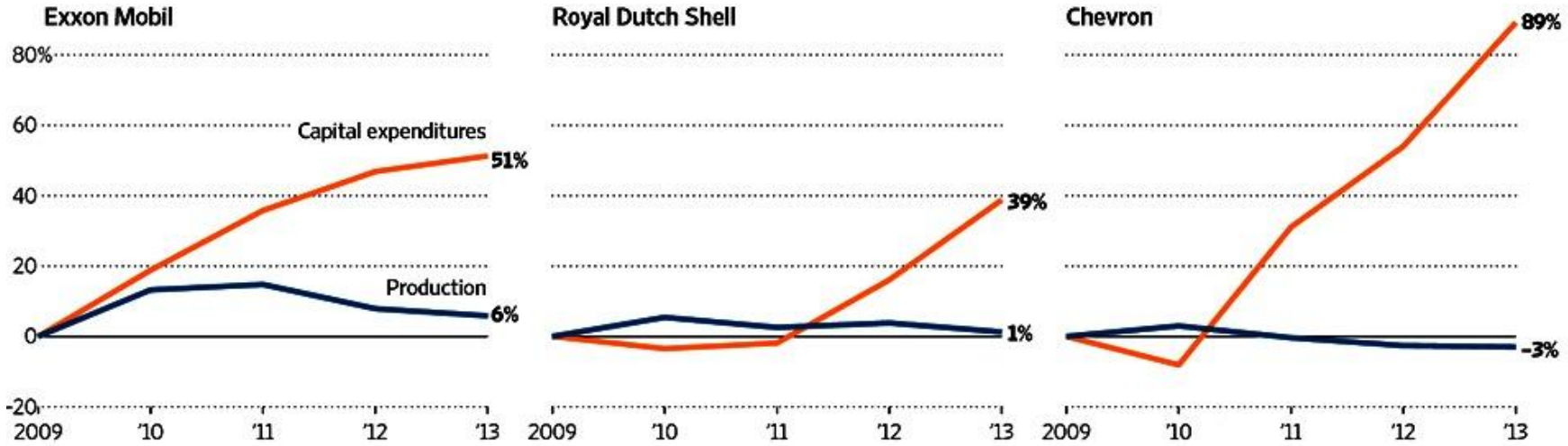
Global energy demand projected to increase one third from 2011-2035 - IEA WEO 2013

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 the least of our problems

Why Should America Achieve the Goal?

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

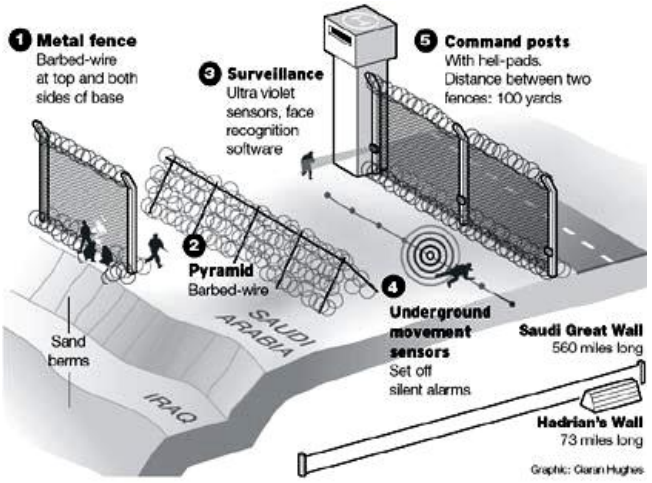
- **"Arc of instability" from North Africa to Southeast Asia [the region] could become an "arc of chaos" involving forces of many nations**
  - **Velocity of instability is ever increasing around the world**
  - **Seven of top ten nations with largest oil and gas reserves in the region**
  - **Implications for future combat are ominous, should nations see the need to militarily secure energy resources**

- **Retrenchment in defense accounts means reduced force capacity; less likely operational tempo will decrease** - Capstone Concept for Joint Operations: Joint Force 2020, Joint Chiefs
  - **Our armed forces becoming less able to defend the oil supply**
  - **Shrunken fleet stays deployed longer and gets repaired less**
    - John Lehman, former Secretary of the Navy, WSJ
  - **U.S. Army to shrink to pre-World War II level** - WSJ
  - **Countries with high performance weapons develop capabilities to deny our forces access into their countries and theater energy supplies [A2/AD]** - JOE 2010
  - **Precision air strikes remain an option… unduly reducing American ground forces risks creating a vacuum** - Colonel Mike Eastman, U.S. Army, WSJ

- **The U.S. is often dependent on same nations that pose the greatest threats** - JOE 2010
  - **US must eliminate oil addiction to drain money from states and non-state actors they support**
  - **Our security and stability is becoming inextricably linked to security and stability elsewhere in the world** - DOD 2013 National Security Strategy
  - **US must lead by example to induce other nations to reduce dependence on the region**

We Can No Longer Consider The Oil Fields Safe

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 the 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

What has to blow up before our leaders to get the point?

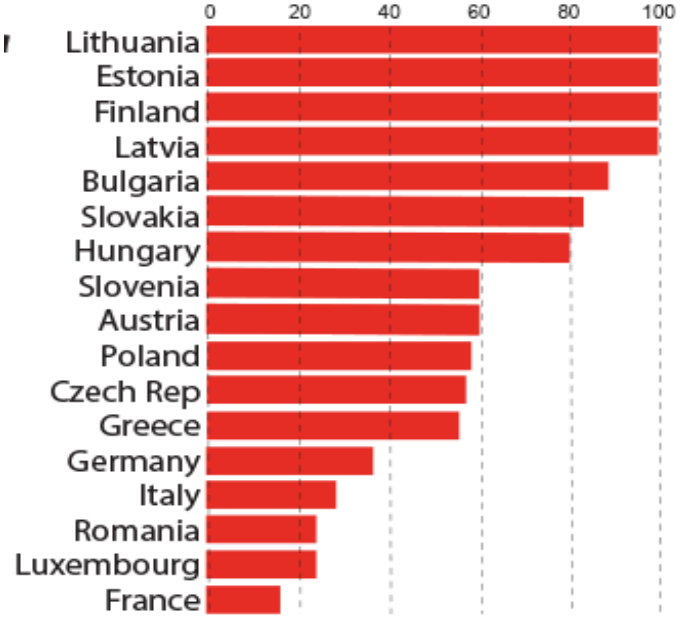
Power Shifts to Energy Producers With Different Interests

Europeans could freeze in the dark in a conflict if Russia

- **E.U. imports about 30% of its crude oil, gas and hard coal from Russia** - Eurostat
  - **Countries closer to Russian border import energy at much higher rates; could be shut off in conflict with Russia**
  - **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
  - **Mismatch between requirements of the world's consumers and refineries' capabilities**
  - **US sends diesel to Europe. Europe sends gasoline to US** - Global Refining Capacity, The Oil Drum

Gas supplied by Russia

Percent of total 2012 Source: Eurogas



Some European nations import 80-90% of their energy needs from Russia

Imports from Russia, % of total imports: 2012*			
Country	Coal	Petroleum	Gas
Austria	2.8	7.0	61.8
Belgium	21.9	9.1	23.8
Czech Republic	2.0	35.0	66.0
Finland	41.5	68.5	100.0
France	12.6	15.1	16.1
Germany	19.3	28.6	34.6
Greece	4.8	29.4	79.3
Hungary	1.9	78.6	81.4
Ireland	0.6	N.A	N.A
Italy	11.8	16.3	20.4
Netherlands	11.7	29.7	14.5
Poland	51.3	83.7	82.6
Slovakia	19.5	71.6	92.7
Spain	13.4	14.2	N.A
UK	34.8	10.1	N.A
EU27	19.2	24.5	29.4

Source: UNCTAD, BP Statistical Review

Potential for logistics disruptions is not simulated in war games and is a blind spot in planning future forces - Operational Energy Strategy: Implementation Plan, DOD

Control of Pipelines Shifts Power to Nations with Different Interests

Russia divides Europe to conquer; Germany exposes Eastern Europe

- **Greece and Russia sign MOU extending planned Turk Stream pipeline to Europe through Greece, with financing from Russia** - Reuters
- **Gazprom to build new Nord Stream-2 gas pipeline under Baltic Sea to Germany by 2020 with E.ON (Germany's largest utility), Shell, OMV** - Bloomberg
- **EU needs an energy plan and program more than we do.**
  - **US should lead by example to induce and work with other nations to plan**

Turkish Stream to bypass Ukraine

Replaces South Stream stopped by EU (63 BCM).
Enables Russia to halt gas shipments through Ukraine when transit contract ends in 2019 - Bloomberg

Nord Stream 2

Same capacity as Nord Stream. (55 BCM).
Nord Stream-2 Pipeline Expansion Hurts EU Unity,
- Andrzej Duda, President of Poland

E.ON argues that Europe's demand for Russian gas will grow as domestic production declines to 185 BCM by 2030 from 275 BCM in 2010 - Reuters

IPI-TAPI Gas Pipelines and Pak-China Economic Corridor

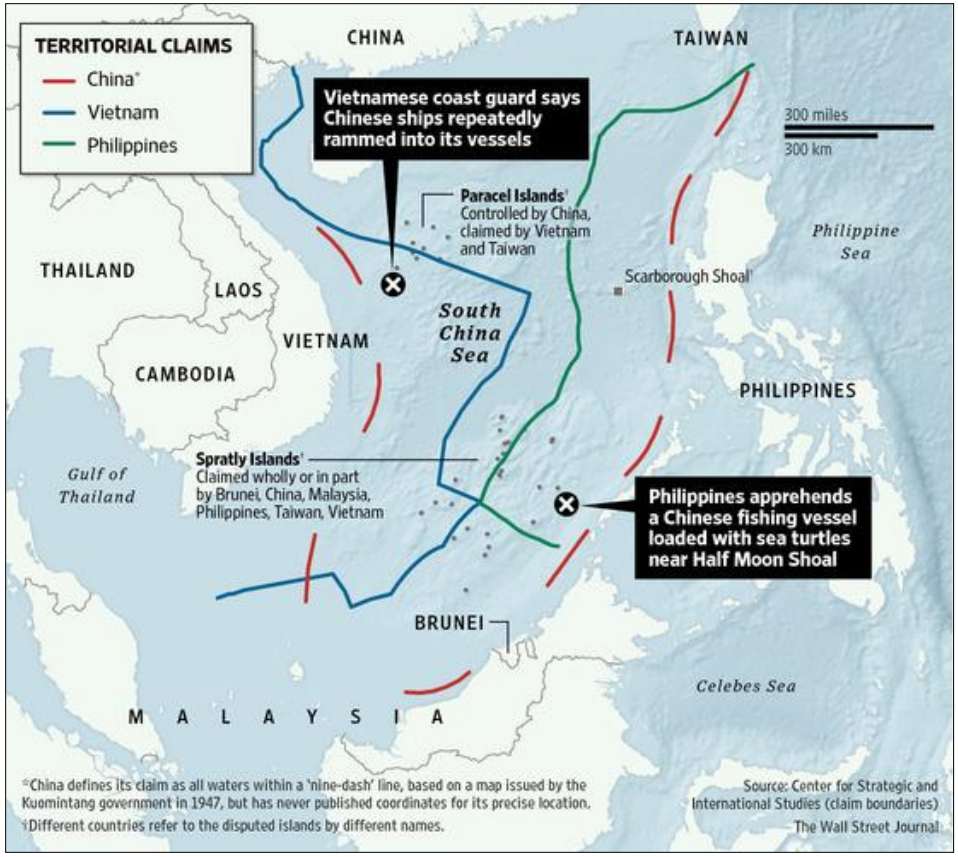
Pakistan is collateral damage in U.S. confrontation with Iran

- **Threat of U.S. sanctions stopped IPI gas pipeline to eliminate Pakistan gas shortage**
  - **IPI has been built to Pakistan border; extended per agreement Pakistan would have gas now**
  - **Pakistan liable for large financial penalties if pipeline from its border not built by 2015**
  - **US sponsored alternative TAPI providing gas in 2018 is another American pipe dream**
  - **Iran would have built oil refinery fulfilling Pakistan's oil needs; surplus for export to China**
- **$40 Bn Pak-China Economic Corridor will turn Pakistan into regional economic hub**
  - **Gwadar Port built by China to be connected by road, rail, oil/gas pipeline and fiber links to China**
  - **China and Russia to build LNG terminals and pipelines from ports to Pakistan gas hubs**

Is America's "Pivot to Asia" really a Pivot to a New Energy War?

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

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 a 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**
  - **Every barrel of oil equivalent produced in America that is sent to Asia/Pacific, is a barrel we won't have to defend or fight over with China**
  - **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 Methods Proven "At Scale"

- **"Apollo like" program planning and management achieves the goal**
  - **Replace oil from other sources by at least 6 MBD**
  - **Eliminate 1,300 million tons of CO_2 equivalent**
    - Goal set by President Obama at APEC summit
- **Supply chains is a milestone on road to a sustainable energy future**
  - **Achieving the goal is a "takeoff "point to achieve longer term goals by mid-century**
- **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**

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

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 then defined and ranked in achieving goals and objectives (Keystone Pipeline, cap and trade, electric cars, passenger rail, etc.)**
- **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**

"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 is "placeholder" for goal to be set by next President
- Objectives/work elements defined to achieve goal by economic sector designed to meet stakeholder expectations.
  - Economic sector profiles developed and used as baselines for planning
- Means (assemblies, tasks, projects) to achieve goal defined "in tiers" "down and across" objectives using a work breakdown structure (WBS)
- Means related to performing organizations using an organization breakdown structure (OBS)
- Public/private finance sources/organizations defined by means using a financial breakdown structure (FBS)
  - FBS unique to NEP which differs from publicly funded DOD programs
  - Government "co-invests" to fill gap between business and needed investment
- A cost/schedule system developed to manage all work elements and means
- The above are structured within a management framework wherein a change in any element immediately translates into impacts on all other elements

Diverse Applications for Program Breakdown Structures

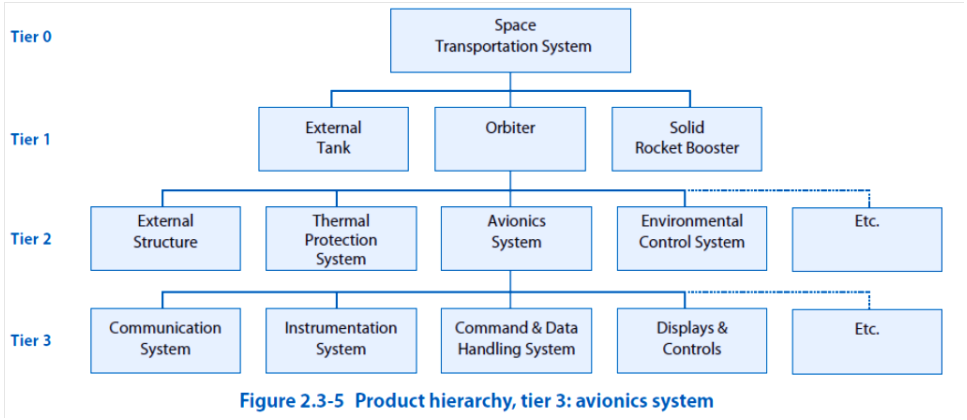
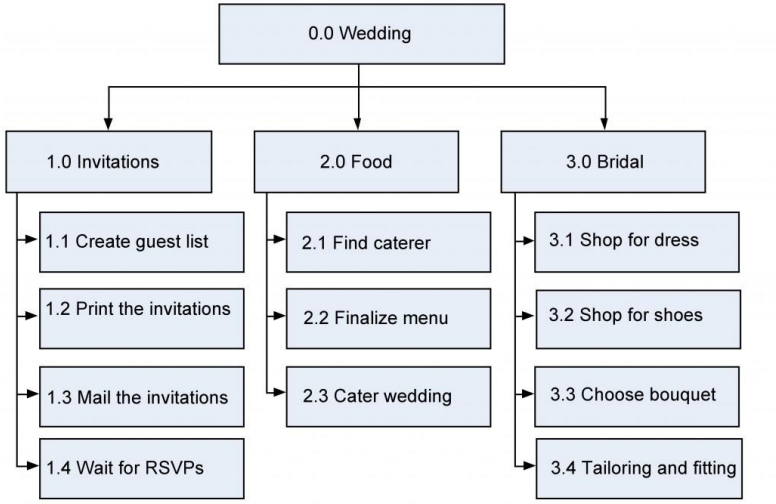
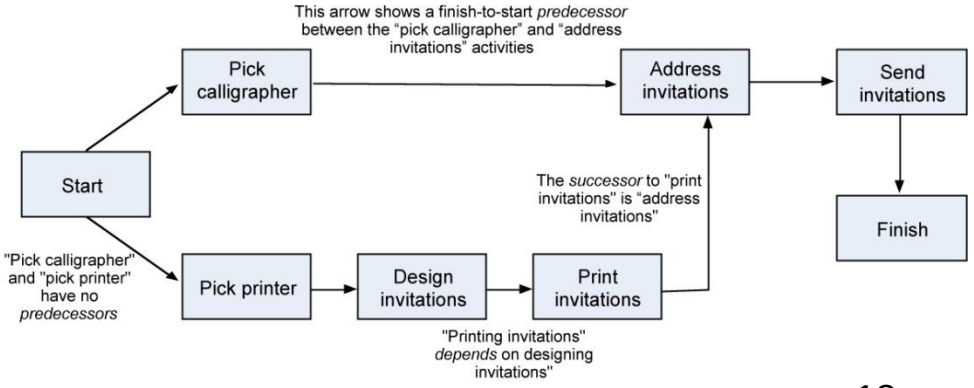


Figure 2.3-5 Product hierarchy, tier 3: avionics system



- **Break assignment down into <u>manageable</u> tasks**
- **Define each task with clear <u>objectives</u>**
- **Assign a <u>deliverable</u> to each task**
- **Assign an <u>execution time</u> to each task**
- **Assign a <u>cost</u> to each task**
- **Assign <u>resources</u> to each task**
- **Define <u>relationships</u> between tasks**
- **Define <u>schedule</u> for completing tasks**

1.1 print invitations
1.2 send invitations



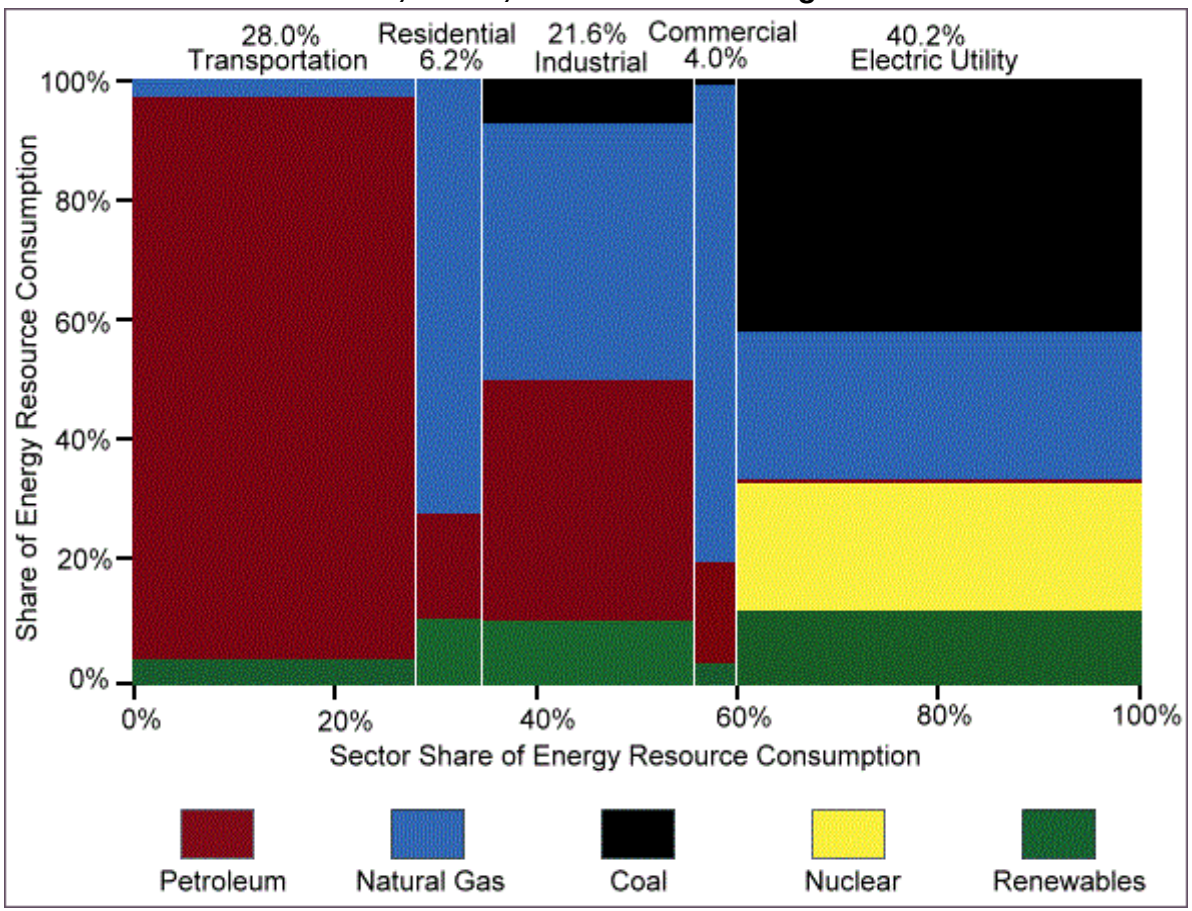
Achieving the Oil gap and Emissions Reduction Goal

Eliminate oil gap of at least 6 MBD

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

Energy Consumption by Sector and Energy Source, 2012

Source: DOE, EERE, Vehicles Technologies Office



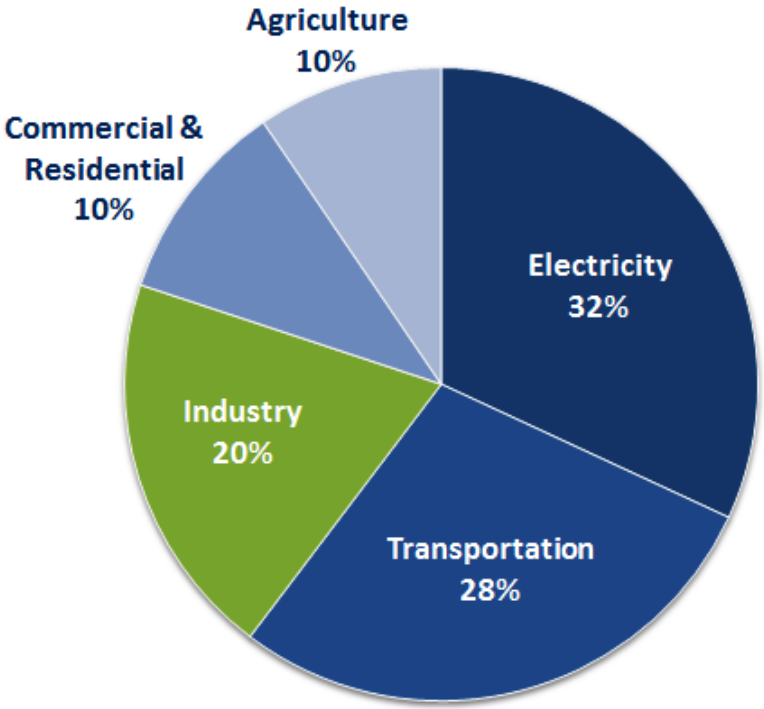
Reduce GHG emissions in Economic Sectors at Least 1,300 MMT

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

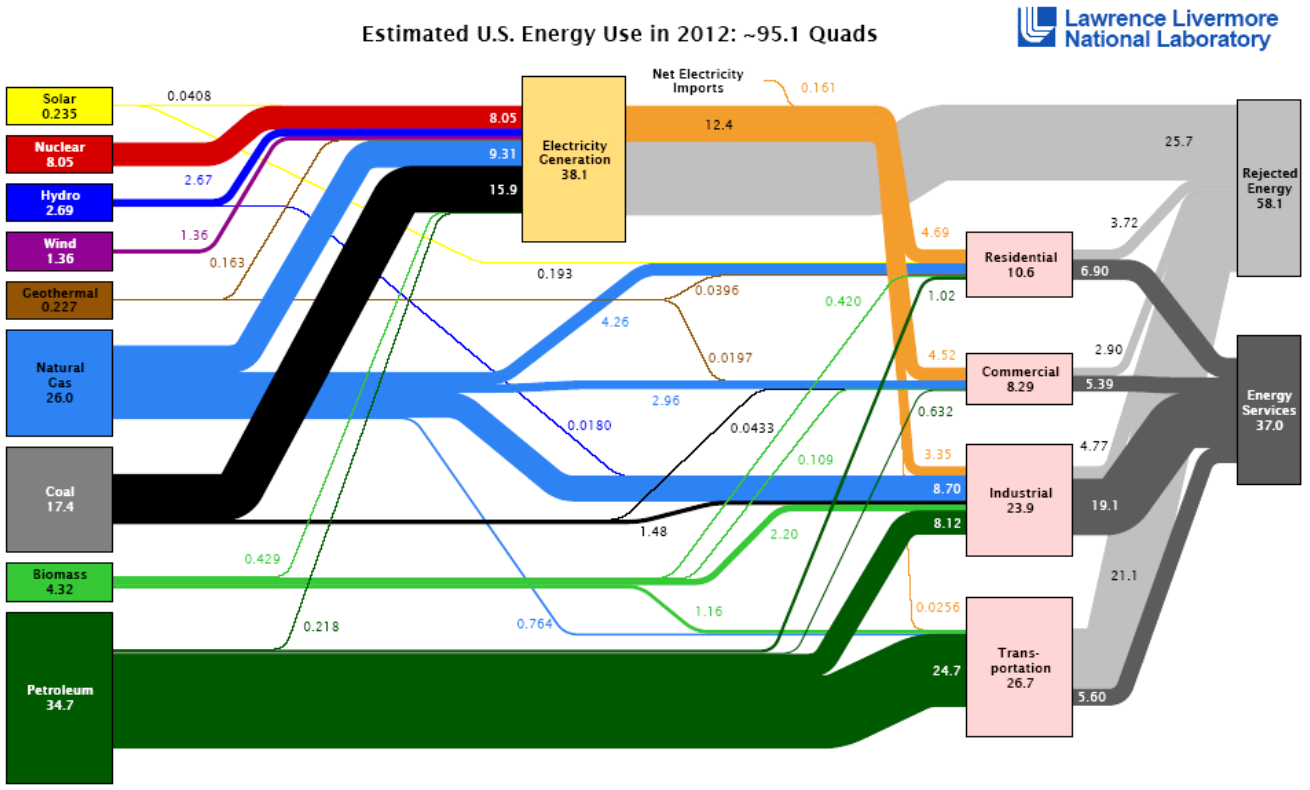
6,526 Million Metric Tons of CO_2 equivalent



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

Energy Efficiency Potentially Largest Source of "Found "Energy" and Emissions Reduction

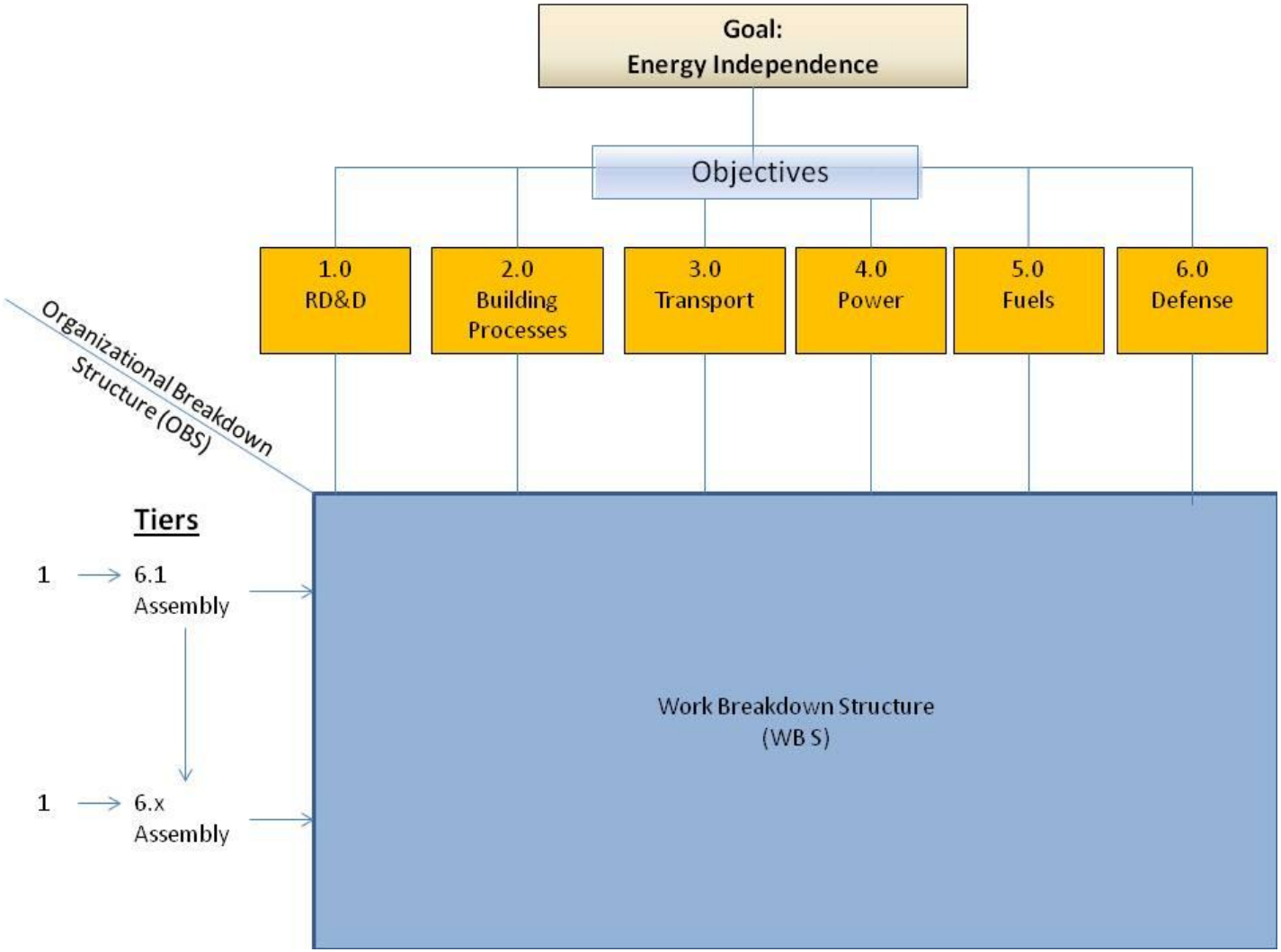
- **Rejected energy equal to 58.1% of energy used** - Lawrence Livermore National Laboratory
  - **Burdened cost of energy lost in process that does no productive work**
  - **Priority to each sector based on potential to produce energy and reduce emissions**
- **DOD has overriding interest and capabilities; could take leadership role**
  - **Waste reduction is life and death to military; dollars and cents to civilians**
  - **U.S Army "Net Zero" Program covering waste, energy and water is a model for cross market development and proves it can be done**



Proposed NEP Program Breakdown Structure

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

Scenarios for top level assemblies for each objective in NEP white paper



Build Supply Chains for a Sustainable Energy Future

Example: Transportation Sector Supply Chain

- **Transportation sector 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 (Aerospace, Shipping, Railroads etc)**

What is needed is an integrated, multi-pronged approach that cuts across Administrations and covers transportation fuels and vehicle

- Fuel Choice for American Prosperity, Institute for the Analysis of Global Security

What is Supply Chain Planning and 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**

Transportation Sector **Power and Fuels Sectors**

Vehicles **Customer/System Interface (Charging/Fueling Stations)** **Power/fuels**

Planning Transportation Sector Supply Chains

Priority in "rank order" to contribution to sector 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: Retrofit existing vehicles and gas station network**
  - **Alternatives "to" and "from" conventional fossil fuels (Biofuels, GTL, CTL)**
  - **Need for 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

How Will NEP Operate?

Public/Private Sector Partnership – Not Government Agency

- **Outside government, freed from political interference and earmarking**
  - A Business Plan for America's Future, American Energy Innovation Council
  - **Managed by business and military professionals from stakeholder groups**
    - **Brings interests together to expedite R,D&D**

- **Must provide real business opportunities, not government supported "Hobby Shops" to secure real business participation to achieve goal**
  - **Hobby Shop: 153,000 gas stations, 20,000 for all other fuels in U.S. in 2015** - NGT News
  - **Example of real business opportunity: Solve "chicken and egg" NGV problem**
    - **NEP brings fleet operators, oil/gas downstream operations, automotive, financial interests together to plan and finance conversion of economic number of vehicles (possibly one million trucks) to support building core national NGV fueling network**
    - **Fueling network to built by large energy producers**
    - **Existing gas station owners within network grid given opportunity to participate**

It wasn't my job to tell industry how to do its job; it was our function to show industry what had to be done and then do everything in our power to enable industry to do it - including stepping in if the marketplace couldn't deliver fast enough

- Donald Nelson, Director of the War Production Board, Freedom's Forge, Arthur Herman

How Will We Start? NEP Planning project

- **Produce a plan to impact next administration coming into office**
  - **Planning of each objective by stakeholders involved in implementation**
    - **Stakeholders will have incentive to work with constituencies in Congress**
  - **Options**
    - **Government project with assistance from industry, financial sector, universities, national laboratories**
    - **University or think tank project with assistance from government, industry, financial sector, national laboratories.**

- **"Plan B" for energy on separate track from our current track – gridlock**
  - **President Roosevelt's actions prior to Pearl Harbor an example**
    - **Saw danger and prepared for war on a separate track in a nation living in denial**
  - **Hopefully, NEP won't require another unforeseen calamity to be implemented**
    - **At a minimum, project will provide planning facility to deal with unforeseen events**
    - **Problems exist that require long term planning that are not currently considered as national security matters**

- **Project has to start somewhere**
  - **NEP white paper presents a goal, objectives and implementation scenarios "for discussion purposes" to begin the project.**

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: Coalition of the Willing

Small team sets up project and recruits participants

Stakeholders/participants in project provide funding and in-kind services

Whitewashing the fence

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

Short list of skill 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 and think tanks with relevant departments**

"We have found that it is most effective and efficient for us to focus our efforts on established organizations, such as think tanks, universities, business associations, and bipartisan policy groups"

- Email from William M. Colton, Vice President, Corporate Strategic Planning, Exxon Mobil Corporation

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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