



## US ENERGY POLICY AFTER FUKUSHIMA

### FDI OPTIONS FOR GERMAN COMPANIES IN THE USA

**“A global race is underway to develop clean energy technologies. We need to tap our greatest resource: American ingenuity.”**

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Presentation at 3<sup>rd</sup> GAE - Berlin

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## WHAT A DIFFERENCE A YEAR CAN MAKE

“This is our *Sputnik* moment. With more research and incentives, we can break our dependence on oil with biofuels, become the first country with 1 million electric vehicles by 2015. I’m asking Congress to eliminate billions in taxpayer dollars we give oil companies. I set a new goal: by 2035, 80% of USA electricity will come from clean energy sources.” [**wind, solar, nuclear, clean coal, natural gas**].

--- President Obama, 1/2011 State of the Union

“To create more clean energy jobs, we need more production, efficiency, incentives. That means a new generation of safe, clean nuclear power plants. It means opening new offshore areas for oil and gas development. It means continued investment in biofuels and clean coal technologies. It means passing an energy and climate bill. I am grateful to the House for passing its bill. [**2009 Waxman-Markey**]. I'm eager to advance the bipartisan effort in the Senate.”

-- President Obama, 1/2010 State of the Union

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- ✚ Energy Independence / Energy Security

- ✚ Oil & Gas

- ✚ Clean Energy Standard (CES)

- ✚ Nuclear

- ✚ E-Mobility

## 2. FDI OPPORTUNITIES FOR GERMAN COMPANIES IN THE USA

### A. National Export Initiative (NEI)

### B. ARPA-E

## A. PRIORITY ISSUES

1. **Federal Annual Budget**
  2. **Federal Annual Deficit**
  3. **Federal Cumulative Debt (80% of GDP)**
  4. **Cash-Strapped US States** (most must balance annual budgets)
  5. **Jobs, Jobs, Jobs** (9% unemployment despite 240,000 new April jobs)
  6. **2012 US Presidential Elections** (Obama versus Trump?!) ...
- 10? 15? 20? **Energy Security/Energy Independence**

## B. KEY NUMBERS

1. **160,000** - new monthly jobs to keep pace with population growth
2. **25** - Republicans seeking presidential nomination (joke)
3. **50% + 1** - votes to pass bills in House of Representatives (House)
4. **60** - votes to overcome filibuster in Senate via cloture
5. **1/6/2012** – America elects a President
6. **76** – Democratic majority in House post Obama victory
7. **50** – GOP (Republican) majority in House post 2010 elections
8. **59** - Democratic Senators post Obama victory
9. **53** - Democratic Senators post 2010 elections
10. **100** – US Senators (2 per state)
11. **435** – US Representatives (per population)

## C. OBAMA PRIORITIES

1. **Warrior in Chief** – more political capital with Congress?
2. **Climate Change** - on pause (“dead”), rely on EPA efforts
3. **Energy Policy**
  - ✚ *Blueprint for A Secure Energy Future* (4/2011)
  - ✚ **Energy Security** (domestic oil/gas)
  - ✚ **Energy Independence** (auto/truck CAFE standards, RE)
  - ✚ **Energy Efficiency** (“Battle of the Buildings”; Weatherization)
  - ✚ **Innovation** (AEPA-e grants; Innovation Hubs)
4. **Transport Policy**
  - ✚ **High-speed Rail** (strong opposition, GOP Governors)
  - ✚ **Fuel efficiency** (auto/truck CAFE, E-15 from 2001 Models)
  - ✚ **Clean Fleets Initiative** (logistics/freight companies)
5. **Exports (National Export Initiative, NEI) (2x 2010-2014, 2M jobs)**
  - ✚ **Mature Markets Initiative (MMI)**
  - ✚ **SMEs**
  - ✚ **Financing**
  - ✚ **RE & EE**
5. **Round 2 on green policy if re-elected?** (Chicago meeting with 80 philanthropists)

## D. ENERGY INDEPENDENCE

In an economy that relies so heavily on oil, rising prices at the pump affect everybody. Every time the price of a barrel of oil rises by \$10, a gallon of gas goes up by 25 cents.  
-- **Obama at Georgetown (3/30/2011)**

The USA cannot afford to bet long-term prosperity and security on a resource that will eventually run out. I announce a new goal: we can cut our oil imports by a third [**by 2025**]. This depends on two things: 1) finding and producing more oil at home; 2) reducing our dependence on oil with cleaner alternative fuels and greater efficiency.  
-- **Obama at Georgetown (3/30/2011)**

### **2010 USA Electricity Generation**

45% coal; 25% natural gas; 20% nuclear; 10% RE (mostly hydropower)

## D. ENERGY INDEPENDENCE

### *BLUEPRINT FOR A SECURE ENERGY FUTURE*

#### Strategy

1. Develop and Secure America's Energy Supplies
2. Provide Tools for Consumers to Lower Costs and Save Energy
3. Innovate to a Clean Energy Future

#### Selected Goals

- + Cut oil imports by 1/3 by 2025
- + Clean Energy Standard – 80% electricity from clean sources by 2035
- + Auto CAFE – increase to 35.5 miles/gallon (mpg) [15 km/L] by 2016
- + “Better Buildings Initiative” – increase EE of commercial facilities by 20% by 2020
- + 2011-2012 – approve projects to generate 10,000MW from RE on US lands/waters
- + Reform onshore/offshore leasing process (shorter terms)
- + 1M E-Vehicles by 2015 [Germany: 1M EVs by 2020]
- + Clean Energy Ministerial – avoid 500 mid-size power plants in 20 years
  - 2012 – UK. 2013 – India. 2014 - Korea
- + Batteries – USA market share 40% by 2015
- + 10,000 blender pumps (biofuels) in 5 years
- + EVs – convert \$7,500 tax credit to point-of-sale rebate (“\$ For Clunkers”)
- + Biofuels – break ground on 4 cellulosic/advanced bio-refineries in 2 years
- + High-Speed Rail – 80% Americans with access to inter-city transport by 2035
- + Energy Innovation Hubs – increase to 6 from 3 (industry, academia, national labs)
- + USG – new buildings to achieve zero net energy by 2030; 15% by 2015

## D. ENERGY INDEPENDENCE

### *BLUEPRINT FOR A SECURE ENERGY FUTURE*

#### 1. Develop (Safe) USA Energy Supplies [oil & gas]

- ✚ Oil & Natural Gas
- ✚ Tighter offshore drilling rules
- ✚ Reformed Minerals Management Service (MMS): \$, Leasing, Enforcement
- ✚ 5-yr plan (2012-2017) for offshore oil and gas leases
- ✚ Use It/Lose It – 70% offshore acres inactive; 57% onshore leases
- ✚ Shorter leases (standard 10 yrs) for turnover; results-based extensions
- ✚ Disclosure of “fracking” chemicals
- ✚ EPA study on effects of fracking on water resources
- ✚ DOE Advisory Board – Fracking Subcommittee (90 day review, 6-month plan)
- ✚ US oil production per day: 5.5M barrels (2003)
- ✚ US natural gas production – highest in 30 years
- ✚ US oil import level – 50% (lowest in decade)
- ✚ Deep Horizon – 5M barrels spilled
- ✚ 2011 – 30+ leases expected
- ✚ Map Mid-Atlantic for reserves
- ✚ Tap Alaska reserves (carefully!)
- ✚ Examine huge shale fields (Barnett / Marcellus)

## D. ENERGY INDEPENDENCE

### BLUEPRINT FOR A SECURE ENERGY FUTURE

#### 2. Provide Tools for Consumers to Lower Costs and Save Energy

- ✚ Cut oil imports by 1/3 by 2025
- ✚ USA gas/gallon - \$4.00. [.74€/L] Record: \$4.11 Summer 2008
- ✚ Transport - #2 budget (#1 where income < \$50,000)
- ✚ Car CAFE - 2012-2016 (35.5. mpg) [15 km/L]; 2017-2025 (9/2011)
- ✚ Truck CAFE – 1<sup>st</sup> ever 2014-2018 (7/2011)
- ✚ Batteries - \$2.4B ARRA investment [300 miles 1 charge]
- ✚ EVs - 1 M by 2015 [Germany 1M by 2020]
- ✚ Biofuels - E-15 for 2001/never models [Germany E-10 Panne]
- ✚ Biofuels – 10,000 blender pumps in 5 years
- ✚ Aviation – “NextGen” to upgrade industry (radar to satellite, biofuels)
- ✚ Federal Vehicle Fleet – 100% hybrid purchases by 2015
- ✚ Livable Communities Program – enhance access to transport (FY2012)
- ✚ High-Speed Rail – 80% access to inter-city rail by 2035 [100M new by 2050]
- ✚ Home Weatherization – 350,000+ projects via ARRA \$
- ✚ “Better Buildings” Competition - 20% increase commercial EE by 2020
- ✚ Pass HOMESTAR - point-of-sale rebate for home retrofits
- ✚ ENERGY STAR upgrades – tighten standards in 20 categories

## D. ENERGY INDEPENDENCE

### BLUEPRINT FOR A SECURE ENERGY FUTURE

#### 3. Innovate to Clean Energy Future

- ✚ 80% CES by 2035 [**RE, nuclear, coal-CCS; efficient natural gas**]
- ✚ 10,000 MW RE projects to be leased US land 2011-2012
- ✚ \$90B ARRA clean energy - 225,000 jobs; non-hydro RE to double 2008-2011
- ✚ ARPA-E (DOD) - \$400M for 100 R&D projects [**FY2012 \$650M**]
- ✚ 10 Commercial-scale Solar/Wind projects 2010 [4,000MW, 9,000 jobs]
- ✚ Wind – Cape May (MA); Consortium; MOUs [**Baltic 1, Alpha Ventus**]
- ✚ Energy Innovation Hubs (academia, industry, national labs) – 3 to 6
  1. Building Efficiency
  2. Fuel from Sunlight
  3. Nuclear Reactor Modeling + Simulation
  4. Vehicle Battery Storage (new)
  5. Critical Materials (new)
  6. Smart Grid Technology (new)
- ✚ EV infrastructure – DOE community grants (**FY2012** 30/\$10M per)
- ✚ Local government EE programs
- ✚ Rural Energy for America Program
- ✚ Industrial Technologies Program (DOE) –manufacturing techniques (**FY2012**)
- ✚ “Better Buildings” - \$100M (**FY2012**) for “Race to Green” re new codes
- ✚ E3 Program SMEs – 5 agencies (EPA, DOC, DOE, SBA, DOL) (9 states + 14)
- ✚ CCS – Interagency Task Force \$3.4B ARRA (widespread adoption in 10 years)

## D. ENERGY INDEPENDENCE

### *BLUEPRINT FOR A SECURE ENERGY FUTURE*

#### **International Activities (Sample)**






- ✚ G-20 Pittsburgh 2010 (APEC @ Yokohama) - phase out inefficient fossil fuel subsidies over medium-term
- ✚ Global Shale Gas Initiative (US Department of State)
- ✚ Unconventional Gas Census at request of APEC energy ministers (DOE)
- ✚ Global Methane Initiative – EPA + 37 nations, EU, Asian Development Bank, Inter-American Development Bank
- ✚ US-Mexico agreement to cooperate on safe development of near-border offshore areas
- ✚ US-Brazil agreement (3/11 Obama visit) to cooperate safe development of Brazil Outer Continental Shelf
- ✚ Global Bioenergy Partnership
- ✚ Electric Vehicles Initiative (Clean Energy Ministerial)
- ✚ EVs – bilateral programs with China, EU and other countries
- ✚ Clean Energy Ministerial
- ✚ Natural Gas STAR Program – EPA + 130 domestic + 8 international companies re operational efficiency and lower methane emissions. 80 technologies

## D. OIL & GAS

1. **Members:** “most discussed issue during 2-week Easter/spring recess”
2. **GOP Position**
  - ✚ Increase domestic production (“**drill baby drill!**” **Still!**)
  - ✚ Lower economic burden on consumers (#2 home expense)/companies
  - ✚ Lessen environment regulations
  - ✚ Lower taxes
3. **Democratic/White House Position**
  - ✚ Take action on market speculation
  - ✚ Repeal federal subsidies/tax breaks for largest 5 oil/gas companies
  - ✚ Tap Strategic Petroleum Reserve (SPR) if necessary
  - ✚ Invest in clean energy
4. **GOP Trio** (Senate not expected to pass)
  - ✚ Expedite leases in Gulf of Mexico & Virginia coast (**226-149** w/ 30+ Dems)
  - ✚ Department of Interior (DOI) – 60 days to decide on Gulf drilling permits
  - ✚ White House –complete 5-yr lease plan to produce 3M daily barrels by 2027
5. **US gas price (avg)** - \$4.00. Summer 2008: \$4.11 (record)
6. **US crude oil price** - \$114 to under \$100 last week

## D. CLEAN ENERGY STANDARD

### WHITE HOUSE PROPOSAL (3/2011)

1. **Definition** - CES sets annual target for electricity from clean energy sources
2. **Operation** – CES gives electric power plants clean energy credits for every megawatt-hour (MWh) of electricity they generate from clean energy. Utilities that generate more clean energy than needed could bank extra credits for later use or sell to other companies.
3. **5 Core Principles**
  -  Credit Broad Range of Clean Energy Sources
  -  Double Share of Clean Electricity over Next 25 years
  -  Protect Consumers from Rising Energy Bills
  -  Ensure Fairness Among US Regions
  -  Ensure Safety of Nuclear Fleet

## D. CLEAN ENERGY STANDARD

### SENATE WHITE PAPER (3/21/2011)

1. **Policy Goals** - lower GHG? Lower electricity costs? Spur development of certain assets? Diversify supply? Promote RE?
  
2. **Design Questions**
  - ✚ **Threshold** – none in White House proposal [2009 Senate Draft: 4 M megawatt-hours of electric power per year (or more); excluded Hawaii.
  - ✚ **Qualifying Resources** – what is in/out? Credit for Energy Efficiency measures? [none mentioned in White House proposal]. Selection basis? GHG profile? Other criteria (eg PM from biomass combustion; spent fuel from nuclear power; land use changes)
  - ✚ **Crediting and Timing** – is 2035 proper time horizon? 80% proper target? Credits cover federal and state mandates or separate?
  - ✚ **Effect of CES on Specific Technologies** – value and expected value will drive investment and development and use. How might CES affect dispatch order of existing generation? What should the 2035 mix be?
  - ✚ **Other Measures** - Alternative Compliance Payments to account for different resource profiles (West with large reserves of cheap hydropower); waivers for “Acts of God”; can Grid handle such greater power loads? Technological hurdles?
  - ✚ **CES Interaction with Other Policies** –how to address those permitting challenges? What is effect on domestic clean energy technology manufacturing and jobs?
  
3. **Public Comments** - 260 substantive sets, more less substantive.

## D. NUCLEAR

1. **Safety & Operational Review** - 30, 60, 90 days (Nuclear Regulatory Commission)
2. **Georgia** – USG conditional loan guarantee (8/2010)
3. **Clean Energy** – strong political support as “clean energy source”
4. **Fukushima Who?** – no significant change in direction (**vgl. Germany**)
5. **Storage** - unresolved for long-term (decades) (Yucca Mountain)
6. **New Regulations** - expected in coming months. Example: storage of spent rods
7. **Blue Ribbon Commission on America’s Nuclear Future** - soon to issue interim report re commendations for managing used fuel
8. **US Nuclear Industry** - 65 nuclear power plants (104 reactors). 17M US residents within **19 miles** of nuclear plant. 110M within 50 miles. Nuclear Regulatory Commission: US citizens stay at least 50 miles away from Fukushima
9. **NRG** – abandons plans for largest nuclear project (2 reactors) in Texas. “Too risky and uncertain post Japan.” Loses \$331M. Project shaky prior. Texas has surplus electricity and low natural gas prices. NRG: need CES to proceed
10. 4 conditional loan guarantees (2005 EPAct) – 2 gone (Calvert Cliffs, MD – Constellation Energy) . 4<sup>th</sup> in South Carolina?
11. Missouri – rejected proposal to pass-through costs re new nuclear plant (**vgl. EEG**)
12. **Germany** – Ethikkommission (Toepfer) – Ausstieg bis 2012 wenn nicht vorher

## D. E-MOBILITY

1. American Recovery & Reinvestment Act (ARRA)
2. Vehicle Technologies Program (VTP)
3. Advanced Technology Vehicles Manufacturing Program (ATVMP)

### ARRA – Transport & Energy Programs

#### TOTAL - \$16.8B (DOE/EERE)

- **Transport: \$2.8 B**

- ✓ Advanced Battery Manufacturing Grants - \$2B
- ✓ Transport Electrification/Education - \$400M
- ✓ Clean Cities (Alt Fueled Vehicles Pilot) - \$300M
- ✓ Vehicle Technologies Program - \$110M
- ✓ Fuel Cell Markets- \$41M

- **PHEV: \$2.4B**

**\$29 B** Energy Efficiency  
**\$21 B** Renewable Energy  
**\$10 B** Grid Modernization

## D. E-MOBILITY: EV DEPLOYMENT PILOTS



## D. E-MOBILITY: BATTERY MARKET SHARE

### USA Battery Manufacturing Global Capacity

Today: **2%**

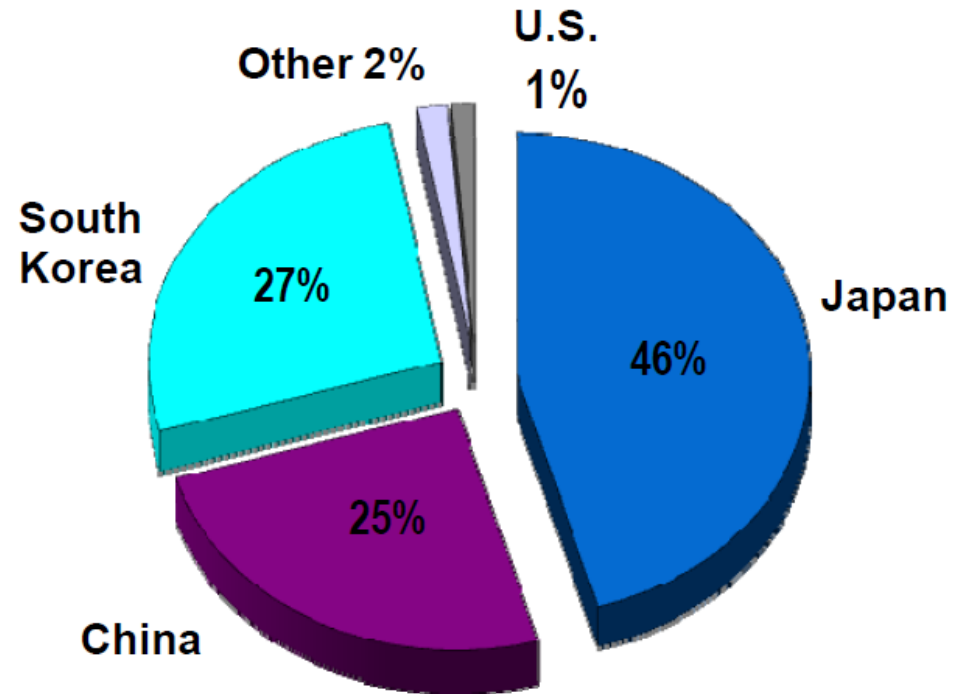
Via ARRA & private investment...

By 2012: **20%**

By 2015: **40%**

### Lithium-Ion Battery Manufacturing 2009

(consumer electronics)



- Cell materials & fabrication = 75% PHEV battery cost
- To lower costs need new materials with increased energy density (to lower material needs, cell count, cell/pack hardware)

## D. E-MOBILITY: BATTERY MANUFACTURING FACILITIES

Company	Location	Total Investment	Cell Manu.	Pack Assembly	Description
 Johnson Controls	Holland, MI Lebanon, OR	\$600 M	✓	✓	Li-Ion: Nickel Metal Cobalt
 A123 SYSTEMS	Romulus & Brownstown, MI	\$500 M	✓	✓	Li-Ion: Iron Phosphate
 <b>cpi</b> compact power inc. <small>a subsidiary of LG Chem</small>	St. Clair & Holland, MI	\$390 M	✓		Li-Ion: Mixed Manganese
 GM	Brownstown, MI	\$236 M		✓	
 SAFT	Jacksonville, FL	\$191 M	✓	✓	Li-Ion: Nickel Metal Cobalt
 DOW KOKAM	Midland, MI	\$490 M	✓	✓	Manganese Spinel
 EXIDE BATTERIES	Bristol, TN & Columbus, GA	\$70 M	✓	✓	Spiral Wound AGM and Flat Plate Batteries
 EAST PENN manufacturing co., inc.	Lyon Station, PA	\$98 M	✓	✓	Advanced VRLA and the Ultra Batteries
 EnerDel <small>Lithium Power Systems</small>	Indianapolis, IN	\$180 M	✓	✓	Li-Ion: Nickel Metal Cobalt

## D. E-MOBILITY: VEHICLE TECHNOLOGIES PROGRAM

### Vehicle Technologies Program (VTP)

<http://www1.eere.energy.gov/vehiclesandfuels/>

*Develop efficient, environmentally-friendly transportation technologies. Develop technologies with greater mobility and energy security with lower costs and less effect on environment.”*

#### Program Areas

1. Hybrid & Vehicle Systems
2. Energy Storage
3. Power Electronics & Electrical Machines
4. Advanced Combustion Engines
5. Fuels & Lubricants
6. Materials Technologies
7. Analysis & Tools
8. EPAAct Transportation Regulatory Activities
9. Clean Cities
10. Research Partnerships

#### Strategic Areas

1. Vehicle Electrification
2. High-Efficiency Engines
3. Advanced Lightweight Materials
4. Fuels and Lubricants
5. Deployment and Education

## D. E-MOBILITY: ADV. TECH. VEHICLES MANUFACTURING PROGRAM

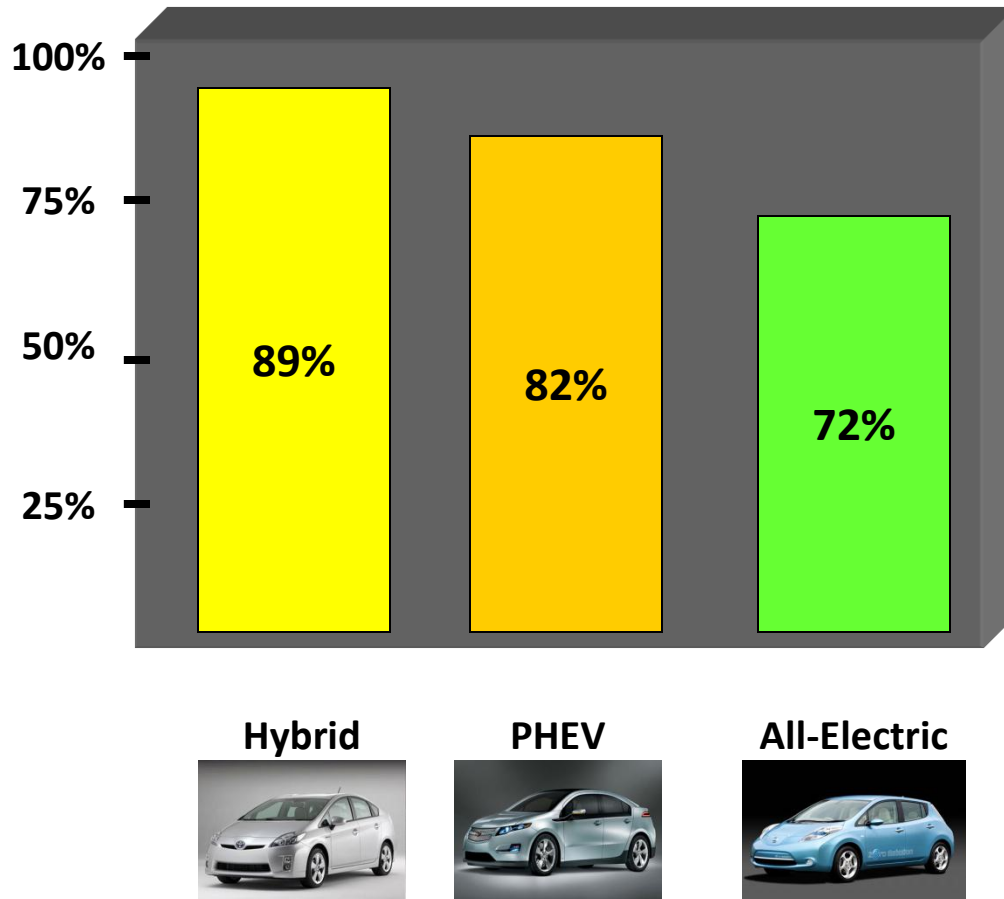
### Advanced Technology Vehicles Manufacturing Program (ATVMP)

Program	Loan Amount	Jobs (created/saved)	Agreement Date	Project #
<b>Ford Motor Company</b>	\$5.9 billion	33,000	Sept 2009	13
Fisker Automotive	\$529 million	2,000	Apr 2010	2
Nissan NA, Inc.	\$1.4 billion	1,300	Jan 2010	2
Tesla Motors	\$465 million	1,500	Jan 2010	2

- Energy Independence & Security Act of 2007 (EISA) (Section 136)
- **\$7.5B** appropriated (9.30.2008) to support **\$25B** (max) direct loans
- Reequip, expand, build manufacturing plants re adv vehicle components.
- \$10 million to DOE to administer program
- Higher fuel economy (125% of 2005 base year CAFE standards)
- Loan not intended to finance R&D costs

## D. E-MOBILITY: WHAT IS ON MIND OF CONSUMERS?

### Vehicle Awareness



### Perceptions

#### Half or more think...

- EVs cost more
- EVs not available in preferred model
- EVs emit lower CO<sub>2</sub>

#### Split perceptions...

- EVs less reliable (35%)
- EVs not as safe (20%)
- EVs cost less to maintain
- 50 = max range (38%)

**Think** = ≥ 50% “strongly agree”/“agree”

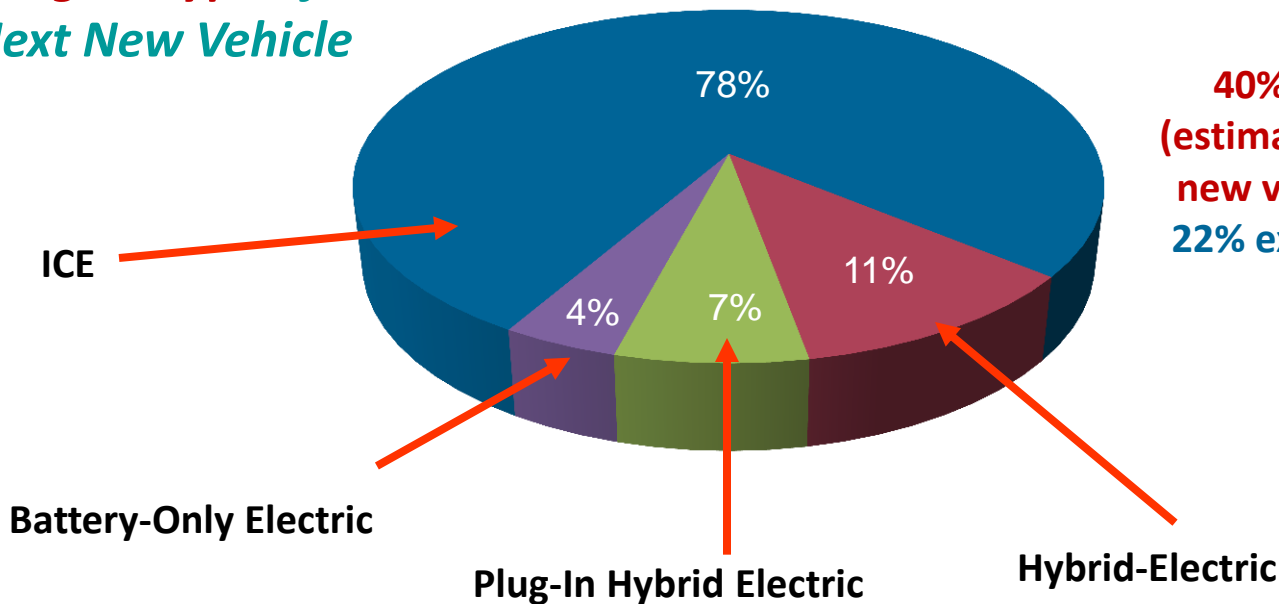
## D. E-MOBILITY: PURCHASE NEW VEHICLE IN 5 YEARS?

### Next New Vehicle Acquisition

*“Household: Do you intend to purchase a vehicle in next 5 years?”*



### Engine Type of Next New Vehicle



**40% of U.S. households (estimate) intend to purchase new vehicle in next 5 years. 22% express interest in non-ICE engine type.**

*\* Engine type of next new vehicle derived from purchase likelihood scores after vehicle information is presented. The respondent is assigned the engine type of the vehicle with the highest score.*

## Pros of “Green” Vehicle

1. Reduces U.S. dependence on foreign oil (26 %)
2. Lowers emissions and air pollution
3. Higher fuel efficiency
4. Combats global warming

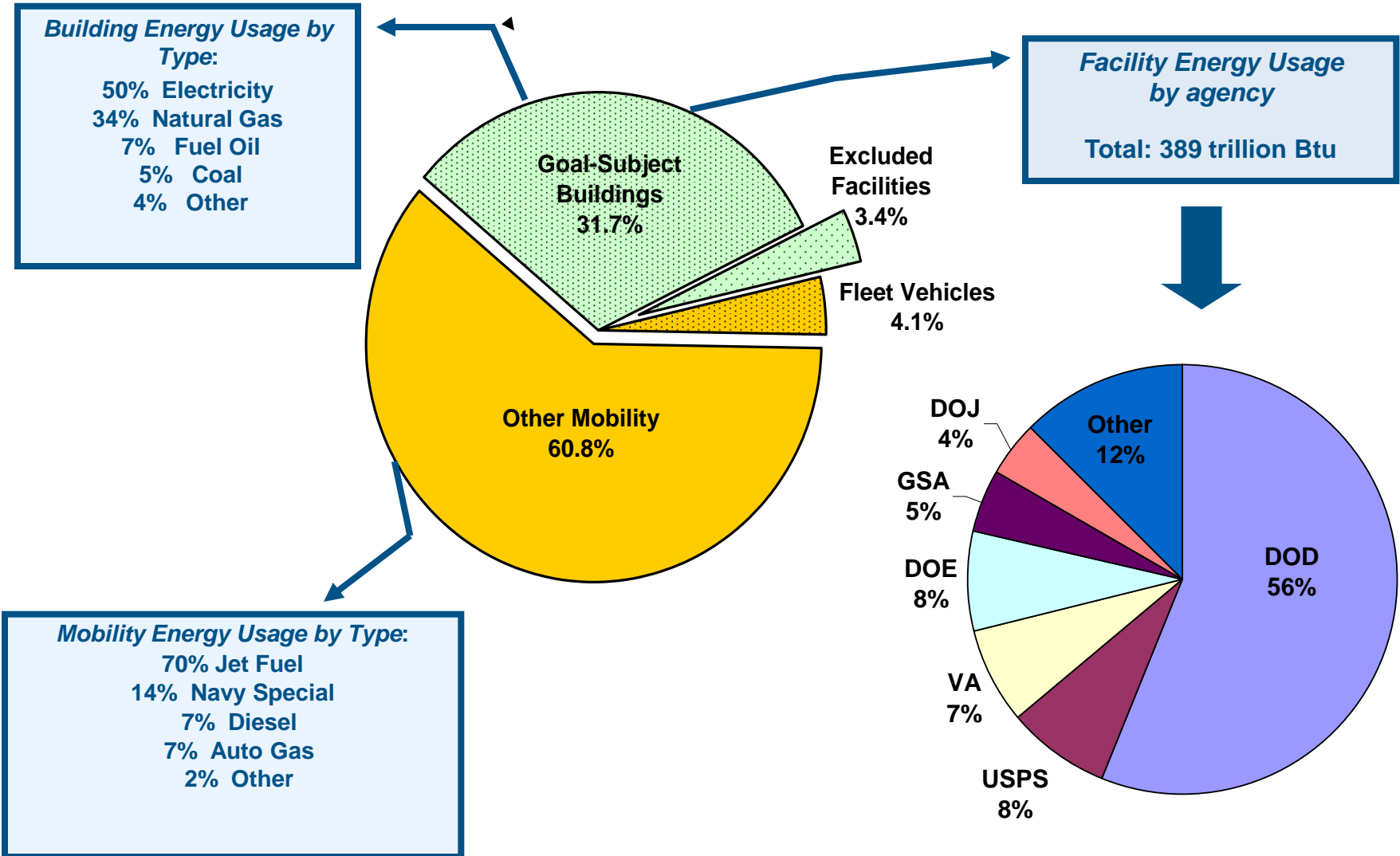
## Cons of “Green” Vehicle

1. High purchase price
2. Inadequate refueling or recharging infrastructure
3. Limited driving range
4. Few choices available
5. Underpowered
6. Unproven reliability
7. Not enough room for passengers or cargo
8. Battery disposal for hybrid or electric vehicles
9. Safety concerns

## 2. FDI OPPORTUNITIES FOR GERMAN COMPANIES IN THE USA

1. National Export Initiative (NEI) (SMEs, EE/RE)
2. EVs – production, components, community infrastructure, batteries
3. ENERGY STAR (appliances) – new standards
4. ENERGY STAR (buildings + commercial products) – in process
5. Building codes (residential, commercial, industrial) – state/local
6. Offshore Wind Power
7. SunShot – Federal/State cooperation to lower solar costs (modules) 75%
8. Executive Order (EO) 15314 (10/2009) - “integrated strategy re sustainability.”  
Federal agencies to boost EE, lower GHG, reduce water use, eliminate waste, increase RE, construct high performance buildings, sustainable procurement. Must disclose actions online [[RGIT Paper](#)]
  - ✚ GHG – cut 28% by 2020
  - ✚ Fleets - 100% hybrid purchases from 2015
  - ✚ Buildings EE – \$5.8B spent last 2 years. From 2020 all new are zero-energy
9. Energy Innovation Hubs
10. ARPA-E grants / E3 Program
11. Homes/Weatherization (zero energy)
12. E-Mobility (platform, map, standards, regulations, technology)
13. HOMESTAR (EE measures/devices)
14. Biofuels (blender pumps, cellulosic plants & processes)
15. Transport & High-Speed Rail (hybrid trucks and delivery vans)
16. DOE Industrial Technologies Program

# USG FEDERAL ENERGY FOOTPRINT



**USG operates 500,000+ facilities (3B sq ft), consumes 1.6% of Nation's total energy use, \$24.5 B in annual energy costs**