

## Oceana Vision 2020: How to Eliminate our Dependence on Offshore and Persian Gulf Oil

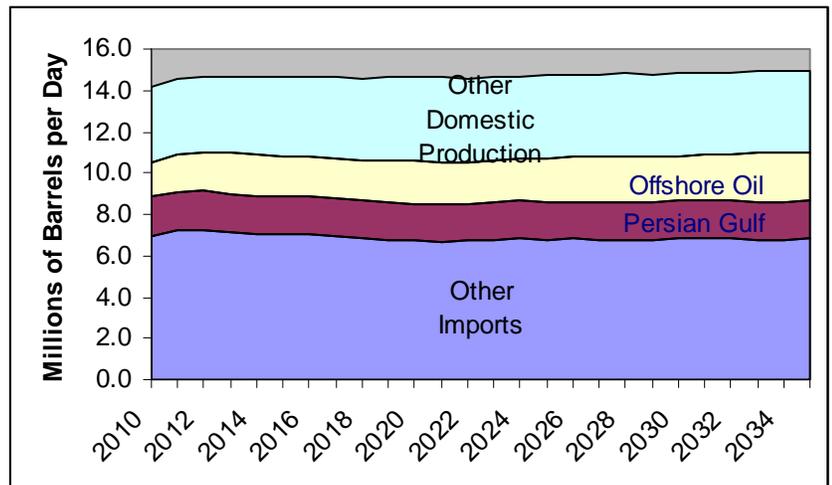
By Simon Mahan  
Kiersten Weissinger  
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The Southern Alliance for Clean Energy (SACE) has called for an elimination of offshore oil drilling as well as oil imports from the Persian Gulf by 2020. Roughly 13% of the oil consumed daily in the United States (U.S.) comes from the Persian Gulf, primarily Saudi Arabia, Iraq, Kuwait, and the United Arab Emirates. Another 7% of the U.S. oil supply comes from offshore operations in the Gulf of Mexico. Oceana has a vision in order to truly become energy independent. By harnessing a plethora of technologies and policy tools, Oceana aims to eliminate the need for oil in electricity generation, residential and commercial use, improve shipping efficiency and drastically cut light-duty vehicle oil demand as well as encourage alternative fuels. Oceana's vision will reduce U.S. crude oil consumption by 26% by the year 2020, and 74% by the year 2035 hereby achieving true energy independence.

### Environmental Sustainability

Burning coal, oil, and natural gas to generate energy releases millions of tons of carbon dioxide and other greenhouse gases annually. Carbon dioxide and other emissions drive global warming and ocean acidification. Dirty fuels also pollute the surrounding environment with toxic contaminants like mercury and lead that linger in local streams, soils, and wildlife. Fossil fuel combustion also contributes to acid rain, smog, and human respiratory illnesses. Taken together, the long list of insults that come from burning fossil fuels gives us reason enough to capitalize on clean energy opportunities, particularly energy conservation, energy efficiency, offshore wind power and biofuels.

**Table 1: Nearly 20% of U.S. Crude Oil Comes From Offshore Production and Persian Gulf Imports**



Source: Department of Energy<sup>1</sup>

### Vision Timing

The U.S. Department of Energy (U.S. DOE) estimates that by 2020, liquid fuel demand will reach 20.56 million barrels day.<sup>2</sup> In order to securely eliminate the need to drill offshore and Persian Gulf oil imports, oil consumption must be reduced by 3.87 million barrels of oil per day by 2020 (or 26% of 2020 estimated crude supply). By focusing on reducing demand in the electric generation, residential, commercial and transportation sectors while increasing energy supply from biofuels and offshore wind power, a 26% reduction in crude oil consumption can occur by 2020.

#### Shipping - 108,000 barrels per day reduction by 2011

Over 90 percent of world trade is carried across the world's oceans by some 90,000 marine vessels. Like all modes of transportation that use fossil fuels, ships produce carbon dioxide emissions that significantly contribute to global climate change and ocean acidification. In 2008, the DOE estimated that fueling these shipping vessels (or "bunkering") consumed 6.7 billion gallons of distillate and residual fuel or about 434,134 barrels per day.<sup>3</sup> Simply by slowing down and employing other operational and technological methods currently available, these vessels can reduce fuel consumption by 25% or more<sup>4</sup> thereby making it possible to achieve this reduction in a very short timeframe – by 2011.

### Electric Generation - 210,000 barrels per day reduction by 2016

In 2009, some 38.8 billion kilowatt-hours of electricity were generated using petroleum-based fuels (petroleum liquids, such as oil, and petroleum coke).<sup>5</sup> Combined, petroleum-generated electricity accounted for approximately 1% of all of the U.S. electricity.<sup>6</sup> The U.S. DOE estimates that petroleum consumption for electricity generation will remain fairly stable over the next decade at a rate of approximately 210,000 barrels of petroleum per day.<sup>7</sup>

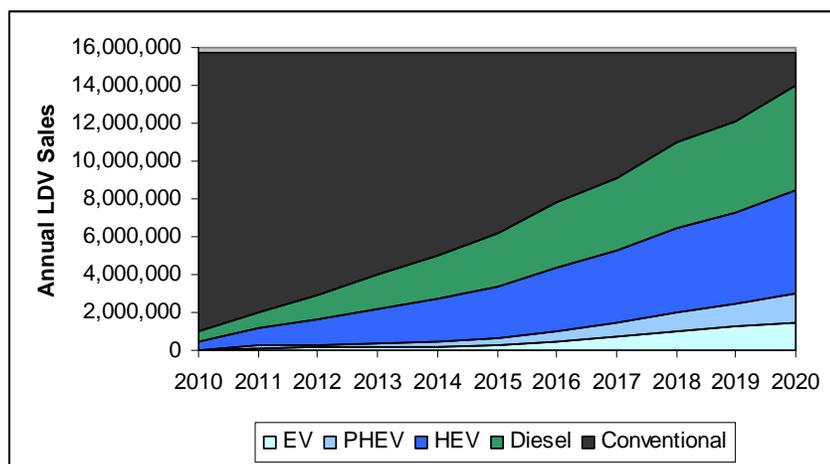
### Residential and Commercial Heating – 426,000 barrels per day reduction by 2020

All homes and businesses that rely on fuel oil for heating purposes should switch to electric-based heating. In 2005, some 22.7 million homes in the U.S. relied on petroleum products for residential purposes, primarily heating.<sup>8</sup> The U.S. DOE estimates that petroleum consumption in the residential and commercial sectors will reach approximately 950,000 barrels of petroleum per day by the end this year. This figure is expected to decline to 850,000 barrels per day in 2020.<sup>9</sup> The decline is expected in part because cheaper alternatives, such as natural gas or electricity-based heating are readily available. By modernizing 50% of homes and businesses from fuel oil to electric-based heat, residential and commercial oil-based heat demand can be curtailed significantly.

### Light Duty Vehicles – 715,000 barrels per day reduction by 2020

Unlike the electricity generation and home heating sectors, transportation accounts for the majority of the oil consumption in the U.S., and cannot completely be replaced by offshore wind energy because of the sheer size of the sector and its gargantuan energy demand. Decreasing motor gasoline consumption by 15% by 2020 will supplant 715,000 barrels of oil daily. On average, some 15.7 million light duty vehicles (LDVs), including cars, SUV's and trucks, are sold annually in the United States.<sup>10</sup> By 2020, some 172.7 million LDVs will be sold in the U.S. and will consume 6.4 million barrels of oil daily while driving approximately 2.2 trillion miles annually (assuming an average of 12,500 miles driven annually at 25 miles per gallon). One way to achieve this reduction would be to utilize diesel (45 MPG), hybrid-electric (45 MPG), plug-in hybrid electric (70 MPG) and electric vehicles (2.9 MPkWh) in substantial numbers. By gradually increasing the sales of these four technologies, some 11.9 million new plug-in hybrid-electric and electric vehicles, as well as some 63.2 million diesel and hybrid-electric vehicles could be sold by 2020. This quantity of vehicles would reduce petroleum consumption by 715,000 barrels per day over LDV's with an expected increase in fuel efficiency. Studies have shown electrification of light duty vehicles can result in significant reductions of oil consumption, similar to the results in Oceana Vision 2020.<sup>11</sup>

Table 2: Annual Sales of Light-Duty Vehicles (Oceana Vision 2020)



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### Offshore Wind Energy – 20 Gigawatts by 2020

Electricity demand will increase from the newly electrified light duty vehicle fleet, newly electrified home and business heating; meanwhile, additional electricity will need to be generated in stead of the lost oil-based electric generation. Due to the fact that most electric vehicles would be charged at night, when electricity demand is already low, has been estimated that no new electric generating power plants would need to be built in order to power a completely electrified vehicle fleet.<sup>12</sup> In order to make up the increase in demand for electricity from home heating and for replacing oil-based electric generation, approximately 20 gigawatts of offshore win farms would need to be installed by 2020.<sup>13</sup> Offshore wind energy is an obvious solution for replacing oil in these two sectors, primarily due to geography and resource availability. Most of the heating-oil demand and oil-based electricity generation is on the east coast – precisely where offshore wind farms would be situated. As a resource, offshore wind power is often strongest in the winter and at nights – when demand for home heating oil is highest.

### Biofuels – 2,451,000 million barrels per day production by 2020

Biofuels include ethanol and biodiesel and are already in use currently. Even modest increases in biofuel supply can result in significant reductions in oil consumption. Requiring a 15% gasoline-ethanol blend and a 20% biodiesel-diesel blend<sup>14</sup> would result in significant oil reductions. Combined, these small increases in required blends in ethanol and biodiesel would result in a nearly 2.5 million barrels per day demand for renewable liquid fuels by 2020. The production of biofuels should be made a priority; but not at the expense of consumers by over-reliance on food-related feedstock like

corn. Non-food related feedstock include biomass such as switchgrass and crop residue like stalks and straw. The Department of Energy has created the National Biofuels Action Plan to identify resource potential and policy recommendations to reach 35 billion gallons of biofuel production by 2022 – which is very similar to the Oceana Vision 2020 plan.<sup>15</sup> The National Renewable Energy Laboratory has identified cellulosic ethanol (non-food sourced feedstock) as a potentially significant source of biofuels in the near future with resource potential up to 3.91 million barrels of oil-equivalent per day production only from domestic sources.<sup>16</sup>

By implementing Oceana Vision 2020 over the given timeframes, it is expected that some 6.9 billion barrels of oil will be conserved or offset. By 2020, Oceana's plan will reduce oil demand by approximately 1.5 million barrels per day, and will leverage approximately 2.5 million barrels per day of renewable liquid fuel supply from ethanol and biodiesel. This reduction will, in turn, eliminate the need for offshore oil drilling and Persian Gulf imports, and cut total crude oil consumption by an estimated 26%. Such a huge reduction in total oil consumption will be particularly beneficial for the environment. Oceana's reliance on increasing renewable energy supply from offshore wind energy and biofuels further underscore the sustainability of this plan as opposed to increasing fossil fuel supply from other sources, like coal or natural gas.

### **Technological Capability**

All of the technologies and techniques necessary to achieve Oceana's plan to eliminate offshore oil drilling and Persian Gulf oil imports have proven track-records and are readily available. A variety of international shipping companies have proven that slowing their fleets requires no retrofits, cuts fuel consumption and can save on fuel costs. Nearly 99% of all electricity comes from other sources than petroleum-based fuels showing the non-essential nature of oil-based electric generation.<sup>17</sup> Over 47 million homes rely on electricity as their primary source of home heating; thus conversion from fuel oil-based heating to electric heating is technologically possible.<sup>18</sup> Offshore wind farms have been operational in Europe for nearly the past 20 years. Light-duty vehicles, like the hybrid-electric Toyota Prius<sup>19</sup>, the diesel Volkswagen Jetta TDI<sup>20</sup>, the 2011 plug-in hybrid-electric vehicle Chevy Volt<sup>21</sup> and the all-electric 2011 Nissan Leaf<sup>22</sup> are available currently or for presale. The DOE estimates that nearly 349 million barrels of liquid fuel supply will come in renewable forms, like ethanol and biodiesel, this year.<sup>23</sup> The ramp-up of all these currently-existing technologies and techniques will be a challenge; however, with the numerous public and private investment strategies as outlined below, Oceana believes the needed quantity of these technologies (and others not explicitly identified here) will be achievable.

### **Public/Private Investment Strategy for Oceana Vision 2020**

#### *Universities and Utilities*

The University of Delaware has created a "vehicle to grid" program whereby connections are added to cars so that excess electricity generated by electric cars can be returned to the grid. Delaware has passed a law requiring electric utility companies to compensate electric vehicle owners for the electricity that they have returned to the grid at the same rate that car owners pay for the electricity used to charge their car batteries.<sup>24</sup> Delaware's success should be replicated nationwide between public universities and private, or non-profit utilities.

#### *Loan Guarantees*

The high initial capital cost can be prohibitive for much of Oceana's vision, particularly fleet modernization, offshore wind energy and home and business upgrades. Loan guarantees, or offering government loans at a low rate (potentially at zero interest) can rapidly encourage investment. From a fiscal standpoint, loan programs are minimal cost since the bulk of the funding will be repaid by loan recipients. Loan guarantees should be made available for each of the sectors outlined in Oceana's Vision for any retrofit or modernization necessary.

#### *Tax Credits*

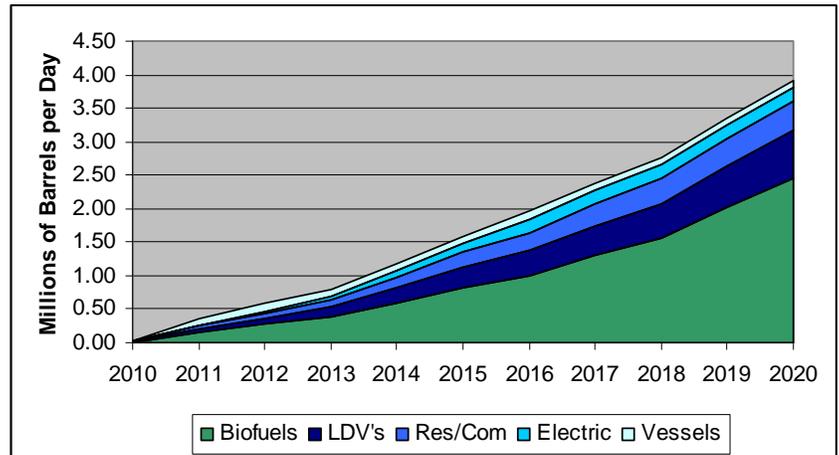
Tax credits are another mechanism that can encourage specified policy outcomes. Significant tax credits exist for manufacturers of advanced energy technology (like batteries for hybrid-electric vehicles or offshore wind turbines) and advanced fuel vehicles. Wind energy relies on a production tax credit that reduces a company's tax base to aid in the profitability of wind power. The biodiesel tax credit has recently lapsed and could be reinstated. Tax credits could also be extended to modernizing any petroleum-based residential or commercial system (like HVAC or water heaters) to electric-based systems.

### **Estimated Costs of Implementation**

Much of Oceana's plan is expected to result in a net cost savings over the next decade. By 2020, Oceana's plan will reduce oil consumption by a total of 6.9 billion barrels. This oil could cost consumers some \$690 billion over that time period.<sup>25</sup> Assuming a \$10,000 retrofit per household, and 22.7 million households modernizing to all-electric heating; approximately \$113.5 billion will be spent by 2020 on this portion of the plan. Assuming each of the 63.2 million new HEV

and diesel vehicles have a \$3,000 premium, and each of the 11.9 million PHEV or EV light duty vehicles have a \$7,500 premium, consumers will pay an estimated \$279.2 billion in additional vehicle costs. Building 20 gigawatts of offshore wind capacity by 2020 is estimated to cost another \$60 billion. Assuming biofuels cost the same as the gasoline or diesel replaced, some \$385.7 billion of consumer expenditure will shift to biofuels away from oil products (a neutral expenditure). The total cost of the Oceana plan would therefore cost approximately \$838.3 billion over 10 years, minus the \$690 billion in oil-fuel expenditure for a cost of approximately \$148.3 billion. The associated decrease of 6.9 billion barrels of oil consumption certainly would have environmental and health benefits, like cutting carbon dioxide emissions that cause climate change and ocean acidification as well as cutting and black carbon emissions that can cause asthma and other health problems. Quantification of these costs is beyond the scope of this analysis.

**Table 3: Annual Oil Consumption Reduction (Oceana Vision 2020)**



**Oceana Vision 2035**

After achieving Oceana Vision 2020 and cutting crude oil consumption by approximately 3.9 million barrels per day, the next challenge will be to completely eliminate all oil imports and maintain a ban on offshore oil drilling in the United States. Oceana Vision 2035 envisions cutting crude oil demand by approximately 74% of expected crude oil supply, or a reduction of nearly 11 million barrels per day in 2035.

According to the Department of Energy, oil demand in the year 2035 for residential, commercial, electric generation, shipping, motor gasoline and diesel fuel is expected to reach 14.25 million barrels per day. Oceana Vision 2020 would eliminate 3.9 million barrels of oil demand per day by 2020.

Oceana Vision 2035 relies on the DOE estimate that 3.91 million barrels of domestic oil will be produced per day onshore in 2035. This oil is expected to go toward industrial feed-stocks where there are not yet substitutable petroleum alternatives and specialty transportation fuels. All other liquid-fuel consumption will either be significantly curtailed, or replaced by biofuels or hydrogen. To achieve Oceana Vision 2035:

**The shipping industry will achieve a 75% reduction in fuel consumption; and,**

*A study by the International Maritime Organization shows the maritime vessel fleet could cut fuel consumption by as much as 75% with current technology.<sup>26</sup>*

**The remaining United States residential and commercial users of oil for heating purposes will modernize to electric-based heating, solar heating or geothermal heating; and,**

*This would account for some nearly 23 million units converted to non-oil based heating by 2035.*

**No oil-based electric generation stations will be in operation in the United States; and,**

*Since oil-based electric generation is often the most expensive form of electric generation, cutting oil-based electric generation should be done as quickly as possible.*

**Light duty vehicle fuel consumption will decline by 3.76 million barrels per-day (a 41% reduction); and,**

*Starting in 2021 and thereafter, vehicles that rely solely on gasoline cannot be sold. Between 2021 and 2035, biodiesel, biodiesel hybrid-electric, plug-in biodiesel hybrid-electric, electric and hydrogen fuel cell technologies should be readily available to the entire transportation sector (not just light duty vehicles) to replace the need for gasoline-based vehicles.*

**Offshore wind power capacity will increase to 150 gigawatts by 2035; and,**

*To supply a significant portion of the new electricity demand by 2035 (caused by the increased use of electricity in heating and transportation sectors), the United States should install 150 gigawatts of offshore wind farms. Installing this amount of offshore wind energy would generate enough electricity to power approximately 117 million completely electric vehicles.<sup>27</sup>*

Building this much offshore wind energy is possible, as the European Union is expected to have 150 GW of offshore wind farms built by 2030. Such a venture is expected to create approximately 300,000 jobs annually.

**Biofuel supply will increase to 7.9 million barrels per day.**

A study, commissioned by Sandia National Laboratories and General Motors, identifies some 90 billion gallons of domestic biofuel production potential by 2030 (or nearly 5.9 million barrels of production per day),<sup>28</sup> therefore the additional biofuel need would be supplied by imports (imports of biofuels would represent about 25% of daily consumption in 2035 – a far cry from current import rates for crude oil).

Table 4: Oceana Vision 2020 and 2035 Would Significantly Cut Oil Consumption with Minimal Associated Costs

	Shipping	Res/Com	Electric	LDV	Biofuels	Total Displacement	Additional Cost
2020	-25%	-50%	-100%	-15%	308%	-26%	21%
Barrels/Day	-108,533	-426,185	-209,248	-715,098	2,451,835	3,910,899	\$143 billion
2035	-75%	-100%	-100%	-41%	592%	-74%	-9%
Barrels/Day	-325,600	-788,227	-219,318	-3,757,986	5,924,259	11,015,390	-\$374 billion

*Costs here represent expenditure for each Vision minus the anticipated status quo cost for the oil avoided by each plan*

Achieving Oceana Vision 2035 would eliminate the need for offshore oil drilling as well as eliminate oil imports, making the United States truly energy independent. Oceana Vision 2035 would cost a total of \$4.2 trillion over 25 years, but the avoided oil purchases equals approximately \$4.6 trillion resulting in a total cost savings of \$374 billion over 25 years.

**Conclusion**

In light of the recent Gulf oil spill, concerns over national oil consumption and the safety of offshore exploration and drilling, particularly in the Gulf of Mexico, have pushed alternative energy sources to the forefront. The development of a clean energy economy will not happen overnight. As time goes on, renewable energy resources will replace increasing amounts of fossil fuel use.

Oceana’s plan for a clean energy future will drastically reduce national oil consumption, first by 2020 and then by 2035. By reducing oil consumption in the international shipping, electricity generation, home and commercial heating, and light duty vehicle transportation sectors, Oceana’s plan will provide a holistic, step by step process to eliminate offshore oil drilling and imports from the Persian Gulf. A plethora of sources including offshore wind-generated electricity, biofuels, and electric vehicles will pave the way to an oil independent future for the United States.

## Supporting Materials - References

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