

ALTERNATIVE ENERGY SOURCE TO OIL IN THE GLOBAL COMMUNITY

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Abstract

The developed nations in the Northern hemisphere had close to an absolute control over the developing nations in the South in the economic and political fronts sometime for over a century. The relation of the South to the North for this considerable long period of time was therefore subordinate-super-ordinate, and was a relationship the North not only jealously guided but which was programmed to be a permanent feature in international relations. The power of oil gave the South a considerable leverage against the North and actions as well as the effort of the North at reducing the power indicated how much of a dilemma the oil issue had become to the developed nations. It can in fact be asserted that a Northern reliance on a Southern power was at variance with the existing economic relations, one that is of immense benefit and advantage to the North and of almost a total disadvantage to the South. Certain steps have been identified by this work, as strategies by the North to considerably reduce if not totally eliminate the power of oil to Southern oil producers. This indicates the weapon that oil represents against the North.

Keywords: Dependency; Global Economy; Great Power; Oil; Small Power

INTRODUCTION

The North has taken different steps at various times and at different periods of global history to reduce or completely eliminate the strategic importance of oil to the global community, thereby maintaining the status- quo. The very first step by the North which is multi-dimensional and which can be classified as internal strategies came not too long after the 1973 oil embargo. There was for instance an effort at realizing additional energy or finding alternatives to oil as a critical source of energy.

The North believes that with alternative sources, whatever power oil producing Southern nations then possessed and presently possess would have been eliminated. This however establishes the dilemma that oil dependency has become to the Western consuming nations. This is particularly so because each of the alternatives indicates an option against oil dependence. There is for instances an option between choosing an alternative that is limiting and costly or a continued dependence on the South for oil. This represents a dilemma in the dependent state of the North in oil reserves and production. The second was to work on demand restraint. Having met a brick wall on these, at least so far, the North has advanced into other areas.

There has been an effort to balkanise OPEC by working extensively towards destroying the unity and cohesion within it. It is believed that a very important if not fundamental factor that has effectively worked in OPEC's favour has been the united front by which its members approach issues. It is therefore strongly believed that if such cohesion were broken, whatever power Southern oil producing nations may possess would reduce considerably. There are three major actions that are taken in this line. First is to create division within OPEC. Second is to discourage new entrants into the organisation and third is to create more leverage for non-OPEC supplies over and above OPEC.

The third effort is destroying or at least reducing the Southern potential in oil by creating its own source of oil power. This has come from two major areas. First have been strategies at discovering oil supplies within the North such as the North Sea oil and the Caspian Sea. The second has been amassing reserves of oil through a strategic petroleum reserve policy that would enable the North meet at an immediate level, any sudden disruption of oil supplies. The fourth major effort has been interfering in domestic affairs of oil producing nations with a view to controlling activities within such nations at a level to having direct access to oil.

Cases of this include the US intervention in the Iraq-Iran war of 1980s as well as the Iraqi-Kuwait imbroglio of 1991, the 2003 US-Iraqi face-off and the US involvement in Afghanistan. This represents another dilemma. There is the option of a continued dependence on oil or intervention in domestic affairs of oil producers despite the high risk of condemnation. Equally is picking an option between a costly war like the 2003 US-Iraqi conflict and allowing for dependence on oil to continue. There is also the option of a continued dependence on Southern oil or engaging in a war with its assurance of a loss of hundreds of lives. It is worth knowing that each of these efforts is in a different phase from the others and therefore may have served as advancement one over the other. For instance the futility of alternative sources may have introduced the internal strategy, while the not too appreciable success of that measure may have introduced the desperate move as exemplified by the various interventions in oil producing nations' internal affairs. Each represents a dilemma and would therefore be critically examined.

THE IMPORTANCE OF OIL IN THE GLOBAL ECONOMY

In contradiction to assertions of writers on Great Power- Small Power relation and in agreement with the view of Becht and Belzung above, the introduction of oil as a raw material of immense value to the economies of the world has been given adequate attention by various authors to indicate the position of the raw material in changing the asymmetrical nature of international economic relations.

Ikein, for instance describes oil as a critical product to Northern economy, (Doran, 1977: 58.) an assertion that Fried and Schultz (1975 p 77) Ali (1976, pp 25-27, 52, 92), Willrich (1975, p 1); Aribisala (1986, p 82); Fisher and Ridker(1973); Hansen (1974 p 88); and Frankel (1981, p 101); all agree with. The Independent Petroleum Association of America (IPAA) (2001) actually describes oil as Black gold; declaring that; *It is the energy source that dominated the 20th Century and will continue to be pivotal for the foreseeable part of the 21st Century. It is the most versatile energy source available today. It is the most political of energy sources, the resource that makes countries go to war, the resource that countries must have to wage war. It is the single largest commodity in international trade and has been one of the most volatile.* (Independent Petroleum Association of America (IPAA), 2002: 15.)

OPEC Secretary-General describes oil as a “very important product as it is today still the cheapest and most convenient source of energy” (OPEC News Bulletin, 2004, p 77). He further states that “without any doubt, the economy of the West, and indeed that of the entire world, is very much dependent on the availability of this source of energy” David West describes it as “the primary commodity, the primary energy source to the industrialised world” (OPEC News Bulletin, 2004); while Jubril Aminu another of Nigeria’s former minister of Petroleum sees oil as the most important single commodity in world commerce (OPEC News Bulletin, 2004); Don Etiebet who was also a former oil minister in Nigeria claims that oil is about the most important source of energy in the world today (OPEC News Bulletin, 2004); As far as Edmond Daukouru Nigeria’s special adviser on petroleum matters is concerned, oil is a precious product that is essential to different economies, both developed and underdeveloped (OPEC News Bulletin, 2004).

Qatar’s second deputy prime minister and minister of energy and industry, Abdullah Bin Hamad al Attiyah describes oil as the cheapest and most convenient source of energy. (OPEC News Bulletin, 2004); Saudi Arabia’s minister of oil petroleum and mineral resources, Ali I. Naimi sees oil as the most convenient source of energy (OPEC News Bulletin, 2004). and Kuwait’s minister of energy, Sheikh Ahmad Fahad Al-Ahmad Al-sabah views oil as very important and significant to the global community (OPEC News Bulletin, 2004).

The industry is a unique industry, with characteristics which distinguish it from every other sector. Oil is the lifeblood of the developed industrialized world, providing readily accessible power and heat, as well as a vast array of consumer, commercial and industrial products (Silva – Calderon, 2003, 3). Oil holds numerous benefits as a product and over other commercial energy sources such as accessibility, versatility, transportability and cost (Silva – Calderon, 2003, p 3).

Oil was the major global energy fuel and is likely to remain so for the next 30 years, at least. Fossil fuels dominated the energy supply in the second half of the last century and will almost certainly continue to do so in the second half of this century (Amuzegar, 1999, P 142). The promise of new and renewable energy sources and its great expectations were not realized and are unlikely to do so in the foreseeable future. New energy fuels, like bio-fuels proved to be uneconomical, and new energy carriers – hydrogen energy and fuel cells are still in the research laboratories rather than in markets and are unlikely to have a dent on the energy scene for years to come (Hisham, 2004, p 66). In the near future, as the stress on the world's scarce mineral resources grows stronger and supply of strategic minerals becomes more uncertain, new mineral problems of a social and political nature are bound to take shape, with even more important bearings on world affairs This situation has made the Third World, especially net producers of mineral resources, critical and important in today's world (Tanzer, 1990 p 50).

Crude oil is the most important single commodity in world commerce and it has accounted for over 50 percent by weight of all sea-borne international trade. What is more, in many applications, the most notable of which is transport, there was as at 1996 and even at present, no substitute for oil products (Rybezynski, 1996 p 3). Oil is perhaps the most important source of energy in the world today. Apart from the common energy derived from oil, more than 600,000 chemical products are said to be obtainable from the commodity. Some common by products of oil are lubricating oil, paraffin oil (kerosene), Gasoline (Petrol) etc. These do not have immediate effective substitutes.

Oil is also easier and cheaper for industrial use than coal and solar energy. Coal is difficult to extract and heavy to transport. It has been difficult discovering solar energy for industrial use due to scientific problems and the heavy cost involved. Oil therefore provides nearly half of the world's energy requirements and since 1973, energy demand has risen by an average of 2% per year (Leys, 1980, p 1002). It is estimated that by 1970, the world required an equivalence of 173 million barrels of oil per day and by 1979 the world outside the communist areas consumed 80% of the world's oil supplies (Leys, 1980). The Organisation for Economic Cooperation and Development (OECD) member countries remained heavily dependent on oil,

most of which came from OPEC. In 1981, the world outside communist areas was dependent on OPEC for three fifths of its oil supplies (Leys, 1980).

As a result of the economic significance of this commodity, it has also acquired a great strategic significance in international politics. The focus of the world on the Middle East and especially on the Persian Gulf is mainly because these areas primarily export the largest amount of oil to non-communist countries. The West, headed by the US could not afford that these areas be controlled by the communists, during the cold war era, for this might result in a likely economic warfare by the communists to squeeze and strangle the economies of the West. Even after the cold war era, focus and attention of the United States have remained on the Middle East. This is why the United States has jealously guarded the Middle East and has persistently built military bases to act as deterrence.

Production in North America had reduced from 7, 190,000 barrels per day in 2009 to 6, 835,000 barrels per day (OPEC Statistical Bulletin 2010). Consumption had again increased by 2010, from its initial 22, 332,000 barrels per day of 2009 to 22, 857,000 barrels per day. In essence, by 2010, North American dependence on outside oil was over sixteen million barrels per day (OPEC Statistical Bulletin 2010).

Production in Western Europe which was 624,000 in 2009 reduced to 367,000 barrels per day (OPEC Statistical Bulletin 2010, p 44). Consumption also increased from 13, 899,000 barrels per day of 2003 to 14, 189,000 barrels in 2010. Western Europe therefore had a shortfall of 9, 500,000 barrels per day in 2010, for which it could only depend on the outside (OPEC Statistical Bulletin 2010).

Production in the same year (2010) in Asia and the Pacific had however, slightly increased from 7, 075,000 barrels per day to 7, 306,000 barrels per day. Consumption which was 20, 857,000 barrels everyday in 2009 had increased to 22, 400,000 barrels per day in 2010. In essence, a shortfall of about fifteen million barrels existed in Asia and the Pacific in 2010 (OPEC Statistical Bulletin 2010).

Production had slightly reduced in Eastern Europe from its 9, 937,000, to 9, 928,000 in 2010, while consumption had in the same period (2010) increased from 5, 059,000 barrels a day to 4, 932, 000 barrels per day. In spite of the increase in consumption however, there was still an excess of over five million barrels everyday to supply to outside need (OPEC Statistical Bulletin 2010).

Production reduced from 9, 539,000 barrels a day which it was in Latin America in 2009 to 9, 928, 000 barrels per day in 2010. Consumption had however slightly increased from 6,189,000 barrels a day to 6, 452,000 barrels per day. An excess of over 2,500,000 barrels therefore still existed in 2010 (OPEC Statistical Bulletin 2010).

Production of 7, 270,000 barrels a day in 2009 in Africa had however increased to 8, 385,000 barrels per day. Consumption of 2, 363,000 barrels a day of 2009 had slightly increased to 2, 506,000 barrels of oil per day in 2010. The excess of the African region by 2010 was therefore more than five million barrels a day (OPEC Statistical Bulletin 2010).

Production of 20, 451,000 barrels a day in 2009 had increased to 22, 015,000 barrels per day in 2010. Since consumption by 2010 in the Middle East was only 4, 603,000 barrels per day, an excess of over 17, 500,000 barrels still existed in the Middle East for which it could supply needy nations of North America, Western Europe and Asia (OPEC Statistical Bulletin 2010).

Invariably, by 2009, an excess of over twenty-four million barrels per day existed in the four regions that were at gross disadvantage in the international economic system that could serve as an element of power over the Northern developed nations (OPEC Statistical Bulletin 2010). By 2010, an excess of over twenty-nine million barrels existed everyday for which the Northern developed nations could not but depend on the South. It can therefore be deduced that if oil producing nations in the South had utilized the oil power as a political force rather than mainly for economic benefits which it presently represents, it is more likely than not that the dependence as illustrated above would have changed the North- South relation to the benefit of developing nations. This is because for forty four years, consumption of developed nations has not been met by production and reserves. This implies that dependence on Southern oil has remained for the past forty four years and with the exception of the 1973 event in which the oil power was utilized as a political force, the South has been incapable of utilizing the global crude oil reserves, production and consumption pattern to reverse the economic status quo. The problem at effectively utilizing the Northern dependence to Southern benefit is because oil remains the means to only an economic benefit, and does not assume its role of a political force which introduced remarkable achievements in the 1973 oil embargo days.

The implication of this is that the Northern advanced nations became increasingly under pressure at alternative sources of energy to gradually but consistently reduce the element of power that oil had become in the global community. It is in this sphere that the alternative source of oil rests, and this paper therefore intends not only look at those different alternatives the North had found to oil but to equally ascertain how credible those alternatives are.

ALTERNATIVE SOURCES OF ENERGY

Large price increases in natural crude have automatically provoked substantial investments in research and technology for alternative sources of energy as well as additional exploration expenditures outside the OPEC area. New sources of energy are expected to take over

completely from oil and as such cancel the power that the South presently has over the North. The alternative sources are numerous ranging from nuclear power to coal, gas, wind power, hydropower and solar power.

Nuclear Power

Nuclear power has been perceived as an opportunity to diversify outside petroleum and thereby enhance the security of energy supplies and the autonomy of consumer nations. Nuclear power provided about 6 percent of the globe's energy between 1997 and 1998 through 438 nuclear reactors, with an additional 33 new reactors under construction (Kegley and Wittkopt, 2001, p 375).

Even though, nuclear power was once viewed as the leading alternative to fossil fuel dependence, this is no longer so, due to a number of reasons each of which represents the dilemma that oil dependence represents to the Western World. In the first place, there are serious technical and financial problems, which have inadvertently forced some countries to either reduce or abandon their programs. (Kegley and Wittkopt, 2001). There is therefore the option of continued dependence or picking an alternative in nuclear power with its attendant financial problems. Secondly, the political climate has turned markedly against nuclear power, with safety a principal point of contention. There have been well-publicized nuclear accidents that have glaringly indicated the danger that a reliance on nuclear power portends. In the United States, there was an accident at the Three Mile Island nuclear power plant in Pennsylvania in 1979, while there was another at Chernobyl in Ukraine in 1986. There have been not less than five major accidents between 1995 and 1999 at Japan's fifty-two nuclear power plants (which supply about a third of Japan's electricity) (Kegley and Wittkopt, 2001). Vital Signs could not but therefore agree that a while "a few governments still support nuclear power ...the number is dwindling with each passing year." Invariably, oil has continued to represent a dilemma to the Northern developed nations as dependency has not reduced through intensive efforts at applying nuclear power as an alternative. This is equally true of other alternatives that have been discovered by the North to reduce the oil power of the Southern oil producing nations.

Another very big and fundamental problem of nuclear power is how and where to dispose highly radioactive nuclear wastes. In spite of the fact that some radioactive nuclear wastes remain dangerous for hundreds of thousands of years, no safe procedure for handling the wastes has yet been devised (Kegley and Wittkopt, 2001). All these have made nuclear power a very poor alternative to oil, which although poses its own threat to the environment, is still safer and undoubtedly cheaper, relatively to nuclear power. It also emphasizes the dilemma of dependence as the option lies in choosing between a continued dependence on oil or

disposing highly radioactive nuclear wastes, especially as such wastes potent great danger for hundreds of thousands of years.

Coal

Kegley and Wittkopt identify coal, natural gas, hydropower and nuclear power as the principal alternatives to oil. While coal is viewed as the chief fossil fuel alternative to oil, especially since most of it is consumed where it is produced thus making it less susceptible to supply disruptions, it is a major pollutant of the atmosphere (Kegley and Wittkopt, 2001). In fact, it is described by Dunn as “the releasing of 29 percent more carbon per unit of energy than oil and 80 percent more than natural gas (Kegley and Wittkopt, 2001). It actually accounts for 43 percent of annual global carbon emissions.” Invariably Kegley and Wittkopt could not but conclude, “as a result of environmental concerns and tighter regulations, coal is a poor alternative to oil worldwide” (Kegley and Wittkopt, 2001).

Natural Gas

In the case of natural gas, there is a general consensus that it is cleaner and more convenient to use than either coal or oil. It is however difficult getting gas from the wellhead to consumers. This is because pipelines, which are the preferred method of transport, are massive and expensive engineering projects that also pose environmental dangers and thus encounter resistance (Kegley and Wittkopt, 2001). In addition to the concern of transportation, there are cost considerations, which have all limited the development of natural gas as an alternative source of energy to oil.

Hydropower

Hydropower, which harnesses water to generate electricity and supplied one-fifth of the World's electricity as at 2001 (Kegley and Wittkopt, 2001), has no serious pollution problems. It however has negative environmental consequences. Unfortunately again, hydropower supplies about 3 percent of the United States' energy needs and the equivalent of oil would be slightly more than one million barrels. It is also a renewable energy source based on one of the cheapest commodities, water, and is highly efficient. The problem is that virtually every dammable stream and river in the United States has been dammed for power. Hydroelectric dams are restricted to areas of high rainfall and many of these areas are remote from centers of population. Invariably, it is projected that gradually, the United States is approaching the limits of the potential of this source of electricity and that by the first five years of this century, even if the capacity is doubled, hydro electric power will probably account for no more than 1 to 2 percent of the

nation's energy needs (Kegley and Wittkopt, 2001). Kegley and Wittkopt have therefore identified three major limitations of hydropower. The first is limited water availability; the second problem is prohibitive financial costs, while the third is the controversy about land management and soil loss due to dam construction. Invariably therefore, hydropower is a poor alternative to oil (Kegley and Wittkopt, 2001). The dilemma here lies in picking an option of a continued dependence on oil or a dependence on hydropower in spite of its large limitations.

Photo Voltaic (PV) Cells

Photo Voltaic (PV) cells have many useful small power applications. Most important it can provide electricity in small amounts to many households in the World that lacks it. All these will however only make a small dent in the global energy scene (Kegley and Wittkopt, 2001). Much promise has been credited to hydrogen as a source of energy in the future. President George W. Bush pledged in his 2003 State of the Union Address "the first car driven by a child born today could be powered by hydrogen and pollution-free." This has however been found to be most unrealistic and unjustified. The most ambitious use of hydrogen is in a car powered by a fuel cell, a battery like device that turns hydrogen into electricity while emitting only heat and water vapour. Hydrogen can also be burned directly in engines much like those that run on gasoline, but the goal is fuel cells because they get twice as much work out of a pound of hydrogen (Kegley and Wittkopt, 2001).

Hydrogen

The problem with hydrogen is its source. The main source of hydrogen is natural gas, which is not only in short supply, but which is equally cumbersome to convert and may have better use. Waiting in the wings is coal, burned in old power plants around the World that are already the focus of a dispute over their emissions (Kegley and Wittkopt, 2001). The long-term hope is to make hydrogen from emission-free "renewable" technologies, like windmills or solar cells. In fact, hydrogen may be an essential step to translate the energy of wind or sunlight to power to turn a car's wheels. However, electricity from renewable technologies is costly. In the US, hydrogen is five times more expensive than gasoline when produced from wind and 17 times when produced from solar (Baker et al, 1998, p 183).

A likely source of hydrogen is from a machine called an electrolyser, which is like a fuel cell in reverse. The fuel cell combines oxygen from the air with hydrogen to produce an electric current, with water as a by-product, while an electrolyser runs an electric current through water to split the water molecule into its constituent hydrogen and oxygen atoms. The problem is that

if the electricity came off the national power grid to run an electrolyser, about half of it, on average, would be generated by coal (Baker et al , 1998).

Another problem is emissions, according to the US DOE, an ordinary gasoline powered car emits 374 grams of carbon dioxide per mile, or 1.6 kilometres, when driven, counting the energy used to make the gasoline and deliver it. The same car powered by a fuel cell would emit nothing, but if the energy required to make the hydrogen came from the electric grid, the emissions would be 436 grams per mile. Similarly, the car would not emit nitrogen oxides, a precursor of smog, but the power plant would (Kegley and Wittkopt, 2001). Al-Khatib, the Vice-Chairman of the World Energy Council had to declare in July 2004 “correspondingly an energy future, with hydrogen as its main fuel source, has to be viewed (at least now) with scepticism. It is not likely to come, if it comes before the middle of this century” (Kegley and Wittkopt, 2001). All of these represent the dilemma in the alternative of hydrogen. With all its limitations there is the need to pick an option between a continued dependence on oil or a reliance on an highly limited alternative in hydrogen.

Wind Power

Wind power on the other hand, which was the fastest growing energy source in the 1990s and which is expanding by 25 percent yearly, however generates less than 1 percent of the globe’s electricity, at least by 2001 as noted by Kegley and Wittkopt (2001).. Wind power is intermittent and correspondingly cannot be relied on as a permanent electricity supply without adequate storage. This storage will make it uncompetitive. Wind power can still be competitive and useful in countries with proper wind regimes, only as a limited source of electricity to augment existing electricity sources and save on use of fossil fuels. Its presence will add to energy security and energy independence in many countries, but only to a modest extent (Kegley and Wittkopt, 2001). This represents the dilemma that lies in this option.

Solar Power

Solar Power comes in several forms, and there are three major and conventional types of solar power that can be identified; the collection of sun rays to heat and cool buildings; the generation of elective power from photovoltaic or solar cells made of thin waters of silicon; and the use of wind and tide to generate electricity (Stobaugh and Yergin Eds. 1990, p 174).

The source of solar power, which is the sun, is abundant and it neither degrades the landscape as dose the mining of coal or the drilling for oil, nor does it pollute the rivers, streams or the air. Unlike nuclear power, it threatens no great disasters and needs no pipelines to transport it, as does natural gas. Its greatest shortcoming however, is that unlike oil, it is not

useful in all areas, as some areas are more favoured by sunlight than others (New York Times, 1980. January 15.) It therefore becomes clear that solar power cannot be a good alternative to oil. This again indicates an option of continued oil dependence or a reliance on solar power with its numerous limitations.

Bio-energy

During 2002, the EU Commission proposed that there would be a 20% use of substitute fuels in road transport by the year 2020. The short-term target is to reach 2% by 2005 and 5.7% by 2010. The Commission proposed that alcohol (ethanol) will be blended into petrol and that diesel oil will be partly replaced by vegetable oil derivatives (New York Times, 1980. January 15.) Looking at EU Commission's proposal, Al-Khatib views the solution from two approaches; the use of pure vegetable oils and bio-diesel (transesterified vegetable oil or animal fat). He then declares that:

“Bio energy in the form of ethanol and similar fuels (from corn or other agricultural products) are unlikely to provide an alternative to oil. Cultivation of crops for use as fuel requires substantial land that otherwise is available for food, or other uses. With present technologies, ethanol is more expensive than gasoline. It also requires substantial inputs of fossil energy for production and conversion into fuel. ...of course, ethanol production does provide a measure of energy security but at a price” (New York Times, 1980. January 15).

Renewable sourced energy supply

Slesser, King and Crane investigates the possible outcome of a fraction of fossil energy consumption being directed to building a renewable sourced energy supply, initially by replacing fossil and fissile generated electricity, and then when that has been achieved, by expanding the investment and using the electricity to make hydrogen as the basis of a new fuel source (Kegley and Wittkopt, 2001).

In 1992, globally, just less than 1 percent of fossil fuel consumption was used to maintain and expand the World's electricity production system (not the fuel to run it, but the fuel to build it). Scientists then explored 1 percent, 2 percent, 4 percent, 8 percent, and 16 percent as the fractions (“royalties”) of energy diverted to building the renewable alternatives. They used a mix of 51 percent photovoltaic, 9 percent wind and 40 percent nuclear to replace the fossil sources. The Scientists found that the higher the royalty, the more rapid the move towards a physically sustainable energy supply. Royalties of 8 percent and 16 percent even manage a full substitution by hydrogen in the developed world within the time frame of their study (105 years), but at a huge cost to the material standard of living.

In concluding therefore, the Scientists state that 'to answer questions posed at the outset, can renewable energy fuel the world? The answer is probably yes, but the time horizon is of the order of a century or more. In the meantime, we shall need all the oil and gas we can lay our hands on to keep the system going and build the renewable or replacements'.

CONCLUSIVE REMARKS

Prospects for the rise of new energy sources in the years to come are not promising, mainly because existing energy resources (particularly fossil fuels) are abundant, highly concentrated, cheap and tradable. On the other hand, the alternatives, particularly new and renewable energy are disbursed, intermittent and correspondingly expensive. No doubt some of the new energy sources like wind power are becoming competitive and certain applications of solar energy for water heating in sunny countries and for small electricity production by PV Cells are becoming common. However this is a small niche in a very large market (Al-Khatib, 2004, p 2000).

None of these sources of power that can therefore be used to generate electricity however hold the answer for transpositions as all cars, trucks, buses, diesel locomotives and ships in the United States and the whole of the North, are for the immediate future dependent on oil. No other energy commodity offers quite the same qualities of transformability and transportability as oil is the largest single source of energy in the world and together with gas it supplies more than half of the world's energy requirements (Al-Khatib, 2004). In spite of the introduction of various alternatives, oil is forecast to remain the single most important source of energy well into the 21st century. This might explain why there was the need for the employment of restraining demand as a strategy of undermining the Southern oil power.

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