**FUEL FROM PLASTIC**

**OBJECTIVE:-**

* **Aims to produce fuel from plastics which reduces the plastic waste generation.**
* **To provide a cleaner alternative method for the production of fuel.**
* **To solve the energy crisis in the growing world.**
* **To produce fuel with low Sulphur content hence being less harmful.**
* **To know the gases evolved in the process which are used to refuel the machine.**

**METHOD OF PREPARATION:-**

**Pyrolysis: Plastics are shredded and then heated in an oxygen free chamber(known as pyrolysis) to about 400 degrees celcius. As the plastics boil, gas is separated out and often reused to fuel the machine itself. The fuel is then distilled and filtered. Because the entire process takes place inside a vaccum and the plastic is melted-not burned,minimal to no resultant toxins are released into the air as all the gases and or sludge are reused to fuel the machine.**

**DISADVANTAGES OF PLASTIC WASTE MATERIALS :-**

**Harmful Nature**

**Disposable plastics used in packaging foodstuff meant for human consumption contain harmful compounds. Improper disposal of these packaging products leads to these harmful compounds finding their way to water bodies, where they dissolve over a long time due to their non-biodegradable nature. Littered plastics are also harmful to animals because they occasionally eat them and die. Additionally, plastics fabrication involves the use of potentially dangerous chemicals, which are added as stabilizers or colorants. Most of these chemicals have not undergone an ecological risk appraisal, and their impact on human well-being and the environment is presently vague. One example is phthalates, which are used in the manufacture of PVC.**

**Environmental Degradation**

**Plastics are generally non-biodegradable; hence, they may take centuries to decay. This is due to the intermolecular bonds that constitute plastics, whose structure ensures that the plastics neither corrode nor decompose. Plastics disposed of indecently get washed away to water reservoirs. They clog waterways and float on reservoirs, polluting and making them unsightly.**

**Durability**

**Plastic is light, moldable, sturdy, and can have countless forms, but one of the most known features is its durability. Plastic is artificially created polymer compound which can survive many centuries before nature is able to degrade it (some degrade into basic ingredients and some only divide into very small pieces). This troublesome ability of plastic doesn’t have great immediate impact on our environment, but its continuous dumping into seas and land will eventually create problems for future generations. Even with all this durability, plastic products are not indestructible and it cannot be used as a basic building block for everything we need.**

**Chemical Risk**

**Not only that creation and recycling of plastic can cause serious environmental risk, but some of the additives that are infused in plastic can cause permanent harm to our metabolism. Chemicals such as phthalates and BPA are widely used as an additive that prevents degrading of plastic structure, but they also interfere with our natural hormone levels which can cause serious problems .**

**Flammable**

**This is definitely an advantage in that they can be melted down, however smoldering plastics can release toxic fumes into the environment.**

**NEED FOR AN ALTERNATIVE SOURCE OF ENERGY**

**Alternative energy is any energy source that is an alternative to fossil fuel. These alternatives are intended to address concerns about fossil fuels, such as its high carbon dioxide emissions, an important factor in global warming. Marine energy, hydroelectric, wind, geothermal and solar power are all alternative sources of energy.**

**The earliest energy source was wood for heating, light and cooking, but overuse has led to extensive global deforestation. Mostly an alternative energy source does not emit carbon dioxide or poisonous emissions into the atmosphere, with the exception of biomass fuels.**

**Existing types of alternative energy**

* [**Hydro electricity**](https://en.wikipedia.org/wiki/Hydro_electricity)**captures energy from falling water.**
* [**Nuclear energy**](https://en.wikipedia.org/wiki/Nuclear_power)**uses nuclear fission to release energy stored in the atomic bonds of heavy elements.**
* [**Wind energy**](https://en.wikipedia.org/wiki/Wind_energy)**is the generation of electricity from wind, commonly by using propeller-like turbines.**
* [**Solar energy**](https://en.wikipedia.org/wiki/Solar_energy)**is the use of energy from the sun. Heat from the sun can be used for**[**solar thermal applications**](https://en.wikipedia.org/wiki/Solar_thermal_energy)**or light can be converted into electricity via photovoltaic devices.**
* [**Geothermal energy**](https://en.wikipedia.org/wiki/Geothermal_energy)**is the use of the earth's internal heat to boil water for heating buildings or generating electricity.**
* [**Biofuel**](https://en.wikipedia.org/wiki/Biofuel)**and**[**ethanol**](https://en.wikipedia.org/wiki/Ethanol)**are plant-derived gasoline substitutes for powering vehicles.**
* [**Hydrogen**](https://en.wikipedia.org/wiki/Hydrogen_economy)**can be used as a carrier of energy, produced by various technologies such as cracking of hydrocarbons or water electrolysis.**

**COUNTRIES HAVING ALTERNATE SOURCES OF ENERGY**

**A recent study by Stanford University researchers predicted that the world could be powered entirely by renewable energy in just 20 to 40 years from now. And given that we already have the technology, it’s not that hard to imagine.**

**Almost 50 countries that would be adversely affected by climate change have agreed to make their energy production 100% renewable by the year 2050 and countries all over the world are actively embracing solar, wind, and geothermal energy.**

**Iceland**

**Iceland generates the most clean electricity per person on earth, with almost 100% of its energy coming from renewable sources that make the most of its unique landscape. It now derives all of its energy for electricity and home heating from geothermal and hydroelectric power plants.**

**Sweden**

**Sweden has always had pretty good environmental credentials and in 2015, they threw down the gauntlet with an ambitious goal: eliminating fossil fuel usage within its borders. They also challenged the rest of the world to a race to become 100% renewable. They’ve increased their own investment in solar power, wind power, energy storage, smart grids, and clean transport.**

**Germany**

**For a cloudy country, Germany looks set for a bright future with solar energy. Their renewable energy output including solar** [**has increased more than eightfold since 1990**](https://www.ecowatch.com/global-impacts-of-germanys-renewable-energy-transformation-1881953725.html)**. In 2015, they set a record for meeting** [**up to 78% of the country’s electricity demand**](https://thinkprogress.org/germany-just-got-78-percent-of-its-electricity-from-renewable-sources-ac4a323c840c/) **with renewables on one highly productive day.**

**UAE AND PLASTIC TECHNOLOGY**

**Sheikha Shamma bint Sultan bin Khalifa Al Nahyan, prominent sustainability advocate and owner of Alliances for Global Sustainability's subsidiary, said: "It was the UAE's founder, Sheikh Zayed bin Sultan Al Nahyan, who said that we must leave the land as we found it, or improve it. This collaboration between Envyron and Masdar in the Year of Zayed pays tribute to his environmental legacy. It also establishes our joint investment in the circular economy; reducing the amount of waste in our landfills and locally transforming waste plastic into energy.”**

**According to the market intelligence provider Euromonitor International, less than half of waste plastic drinking bottles are collected for recycling globally, and only seven per cent are turned into new bottles. The UAE aims to divert 75 per cent of its solid waste from landfill by 2021.**

**An initiative was announced in the UAE in 2009 to make the country free of plastic bags by 2013, but that initiative has not met its target. However, recently, the Ministry of Climate Change and the Environment in UAE, in cooperation with a number of federal and local government agencies and private sector organisations, launched the ‘Responsible Consumption for a Sustainable Future’ campaign to raise awareness on how to optimise plastic products. The campaign slogan, ‘Together to Protect Our Environment with Optimal Use of Plastics’, in conjunction with Earth Day — which aims to raise awareness and change behaviours that institutions and individuals must follow to rationalise, recycle and reuse plastic products — is a step in the right direction.**

**Several initiatives launched over the past few years have contributed towards firming the UAE’s role as a leader in plastic waste recycling. The country has also recorded the highest percentage in public awareness on how to recycle as well as highest public knowledge of recycling codes for plastic products in the Gulf Cooperation Council Countries, according to the report of the Gulf Union of Petrochemicals and Chemicals 2017.**

**It is worth mentioning that Dubai Airport lounges follow best-practices in providing glass bottles for water, instead of plastic ones. One hopes this move will spread to other institutions across the country soon.**

**IMPACT OF OUR PROJECT ON SOCIETY**

* **The plastic to fuel conversion seems like a great solution to keeping lower value plastics out of landfills. Being able to process these plastics back into raw fuel and technical nutrients is a positive step in creating a closed loop system.**
* **One of the biggest benefits to turning non-recycled plastic into energy is that it helps everyone from businesses to consumers to governments, as we start to assign value on materials that used to be treated purely as “waste.” When this value is created, a broader sector of the community starts to think about how this material can be captured and put to work, while creating a previously ignored revenue stream, one that was literally discarded, littered or buried.**
* **Plastics-to-fuel technologies are expected to be particularly helpful in places where fuel prices are high and landfill options are limited, such as island nations, for example. Communities now have the potential to create some of their own fuel locally, providing economic and environmental benefits, while removing a portion of the waste stream that potentially causes harm to oceans, rivers, waterways and reefs. Any city, not just islands, with a plastic waste problem should be considering the use of plastic-to-fuel technologies as a way to use these materials more efficiently, while reducing the waste loading impacts of that community.**
* **Plastic to fuel will help reduce the plastic waste.**
* **Provides an alternative source of fuel.**
* **Prevents environmental degradation.**