

<p>Project Title: Transforming Municipality Building to a Green Building with a Bio Diesel Production Plant</p>	<p>Country: Lebanon Municipality: Semqanieh</p>	<p>Funds requested: 118,350 Dollars</p>
<p>Direct/Indirect Beneficiaries</p> <div style="border: 1px solid black; padding: 5px;"> <p>Local communities Municipality Job seekers</p> </div>	<p>Target Area:</p> <div style="border: 1px solid black; padding: 5px;"> <p>Semqanieh municipality</p> </div>	
<p>GOALS:</p> <ol style="list-style-type: none"> 1. Reducing carbon emissions due to cleaner combustion. 2. Reducing municipality costs for cleaning blocked drains. 3. Involving citizens and stakeholders in achieving the target. 4. Supporting families by providing acceptable diesel fuel prices. 5. Gaining some revenues from selling bio-diesel and its side products. 		

SITUATION AND PROBLEM IDENTIFICATION

1. Energy poverty.
2. High electricity cost due to high diesel prices.
3. Lack of access to diesel and mainly good quality diesel.
4. Noise, soil and air pollution.

TARGETED AREA AND BENEFECIARIES

Semqanieh, Lebanon
Local communities and municipality.

METHODOLOGY

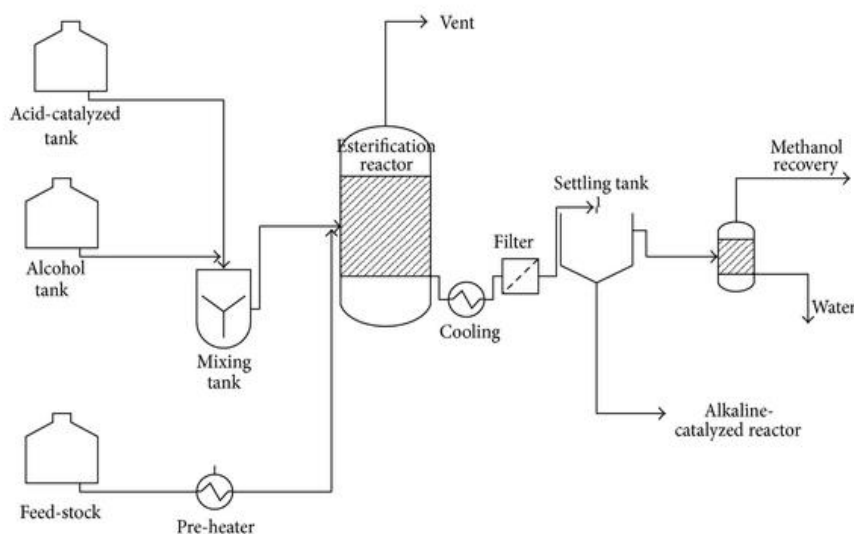
The residential buildings have an area of about 400 meters squared and consists of 4 floors and a roof with a 64-meter squared storage room attached. Thus, the plan is to transform the storage room to a bio-diesel plant where citizens can exchange their used cooking oil with bio-diesel after the process is applied. Furthermore, one of the floors can be rented as training rooms or offices for anyone who needs access to electricity and internet.

- Installing a solar system on the 400-meter squared roof of the 4-story municipality building.
- Building a bio-diesel production plant in the 64 meters storage room belonging to the building.
- Equipping one of the floors with offices and meeting rooms.
- Providing 24/7 electricity and internet in the building.
- Lighting public roads.

Process details:

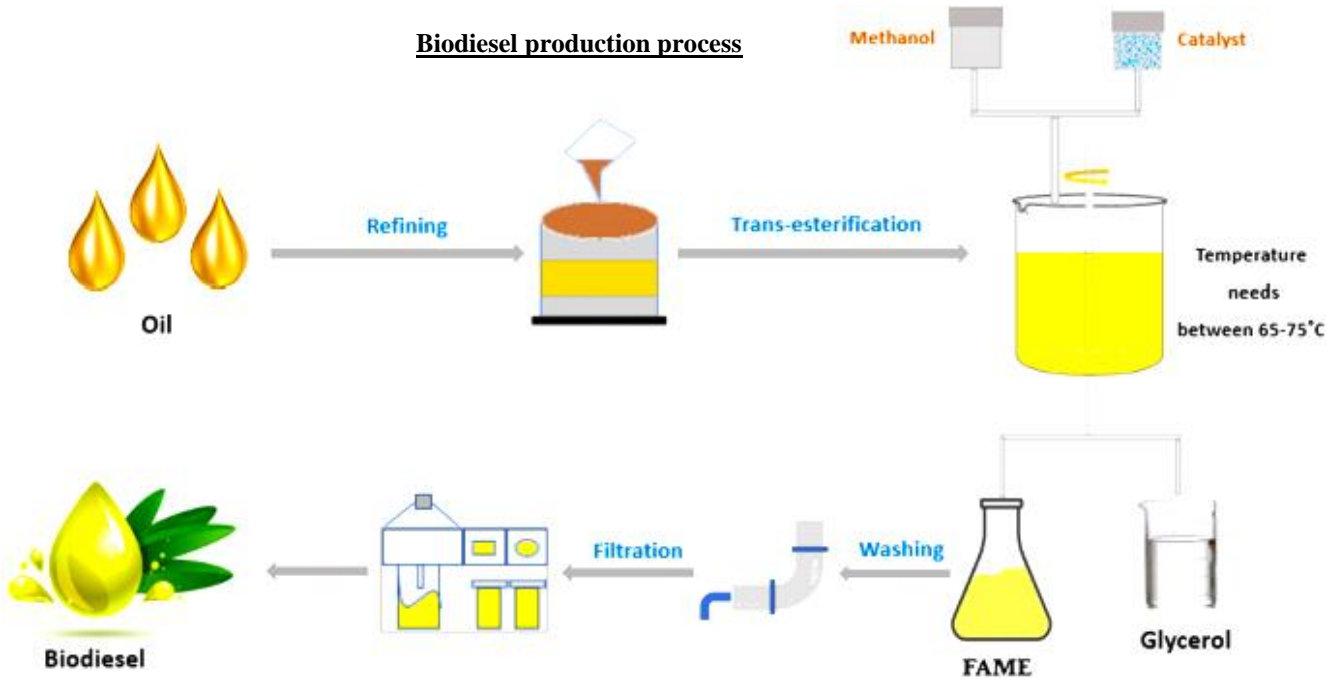
Below is a drawing of how bio-diesel production process is applied in details.

First step is to collect used cooking oil from homes, households, and restaurants. Then, the process is applied as frequently as needed based on the present scale in order to get bio-diesel fuel which can either be sold or exchanged with used cooking oil.



<u>Step</u>	<u>Description</u>	<u>Needed items</u>
Collection	Used cooking oil will be collected in a storage tank	Storage tank
Water and residue removal	Cleaning: Water removal and filtration up to 100 microns	Oil tank plus tanks for sieving
FAA testing	Lab testing, small beakers, titration, NaOH, indicator	Samples
FAA pretreatment	Determining amount of NaOH	Final oil tank
Methoxide mixing	Tank to mix NaOH and methanol, needs mixing	Small tank with mixer
Addition to filtered oil/heating	Process tank; major reaction	Cone bottom tank & plumbing at the bottom
Settling	In the process tank	
Separation	Separate the glycerin from bottom to a tank.	Tank for glycerin + methanol, (20% + oil volume)
Biodiesel recovery	Move biodiesel to a tank and filter it	Filtration: 50 microns
Methanol recovery	Distillation of glycerin layer (>76 degrees) recover methanol	
Glycerin processing	Refining; soap; compost	
Testing	Small scale: graduated cylinders, beakers	Samples

Biodiesel production process



A portable full process production plant



EXPECTED RESULTS

1. Transfer the building from being a fully diesel dependent to a solar dependent knowing that solar systems are very efficient in this area due to having an average of 300 sunny days a year. This means that the electricity will be available 24/7 in the municipality building which can be used by citizens to mitigate energy poverty challenges and give access to essentials.
2. Minimizing municipality's running costs by becoming solar dependent.
3. Less carbon emissions due to cleaner combustion.
4. Spreading awareness about recycling between citizens especially that bio-diesel is made of renewable resources.
5. Reducing water and soil pollution due to the fact that citizens previously used to get rid of used cooking oil either by throwing them in drains or in their gardens.
6. Reducing municipality costs for cleaning blocked drains.
7. Supports families by providing acceptable heating diesel fuel prices.
8. Side products like glycerol can be used later for multiple purposes if treated.

Feasibility Study

Solar system for Building + Production Plant+ Public Lightning	
108 Panels	17850\$
90 kW Lithium Batteries	13200\$
3 inverters 12 kW 3-Phase	6800\$
Accessories(galvanized steel + electric cables + combiner boxes + grounding systems)	21000\$
Installation (Assembling electric panels+ installing panels and inverters+ electric work)	5500\$
Total:	64350\$
Bio-diesel production plant(2000L capacity)	
Material for bio-diesel production plant	25000\$
Manufacturing + assembly	8000\$
Total:	33000\$
Rental Floor Equipment	
Offices (8 open+ 2 private)	8000\$
Meeting room (10-person Table +Chairs)	2500\$
Wall Dividers	4000\$
Accessories(Electrical connections +LED lights+ projector)	4500\$
Ventilation Ducts	2000\$
Total:	21000\$
Overall Total= 118,350\$	