Biomass Energy in Algeria: Present status and Prospect

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JatroMed Project

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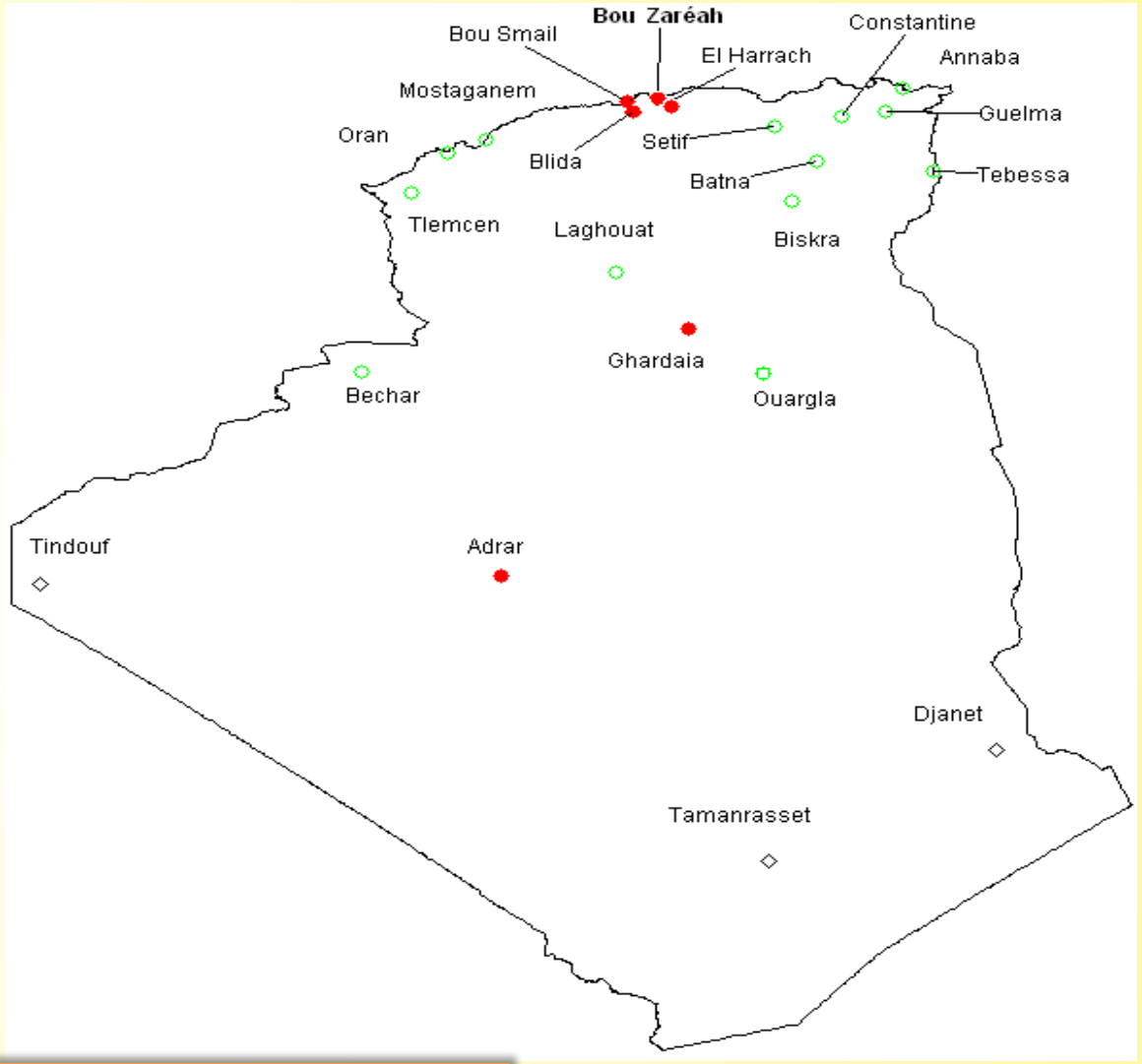
- **Algeria in few words:**
  - 35 million people;
  - 2.485 million km²
- 97% of the population have access to the electricity
- 50% of the population have access to the natural gas network

But :

- 80% of the population live on less than 5% of the territory (north of the country)
- 15% of the population live on about 8% of the territory (high plains)
- 5% (around two million people) of the population live on about 87% of the territory which represent more than two million km².



This means long distances to transport energy to this population.

Policies for Renewable Energies and sustainable development

Some passed laws deal with the promotion and the development of renewable energies.

Mainly there are :

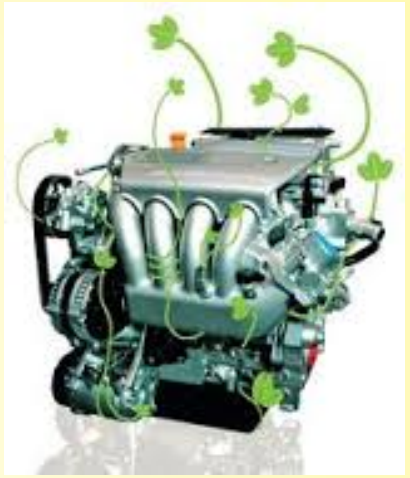
- The law on rational use of energy,
- The law on the promotion of renewable energy within the framework of sustainable development,
- The Orientation and scientific research programming law,
- The law on the protection of the environment in the frame of sustainable development,
- The law on the management, the control and the elimination of waste (garbage),
- Finance laws which establish funds for the development of renewable energies , energy efficiency and environment protection.

Objectives:

- Sustainable development,
- Improve quality of life of local inhabitants in isolated regions,
- Job creation,
- Use of indigenous materials,
- Valorization of new energy resources,
- Economy on Fossil fuel ,
- Reduction of poverty,
- Greenhouse gas reduction,
- Compliance with Kyoto protocol

Practical objectives:

- **Dispose of new fuel for transportation, electricity production, heating,**
- **Reducing the greenhouse gas emission (CH_4 for instance)**
- **Preserve fossil fuels from depletion,**
- **Reduce subsidies**



Actions undertaken:

- **Ethanol** can be produced from a variety of feedstocks such as sugar cane, bagasse, sugar beet, sorghum,switchgrass, barley, potatoes, sweet potatoes, cassava, sunflower, fruit, molasses, corn, stover, grain, wheat, straw, cotton, and other biomass.

Most of these resources are not produced in the country or are used for other purposes.

So most studies done in this subject are on dates whether rubbish dates or fruits of little market value. They concern technique of "liquid extraction" or comparison of different varieties

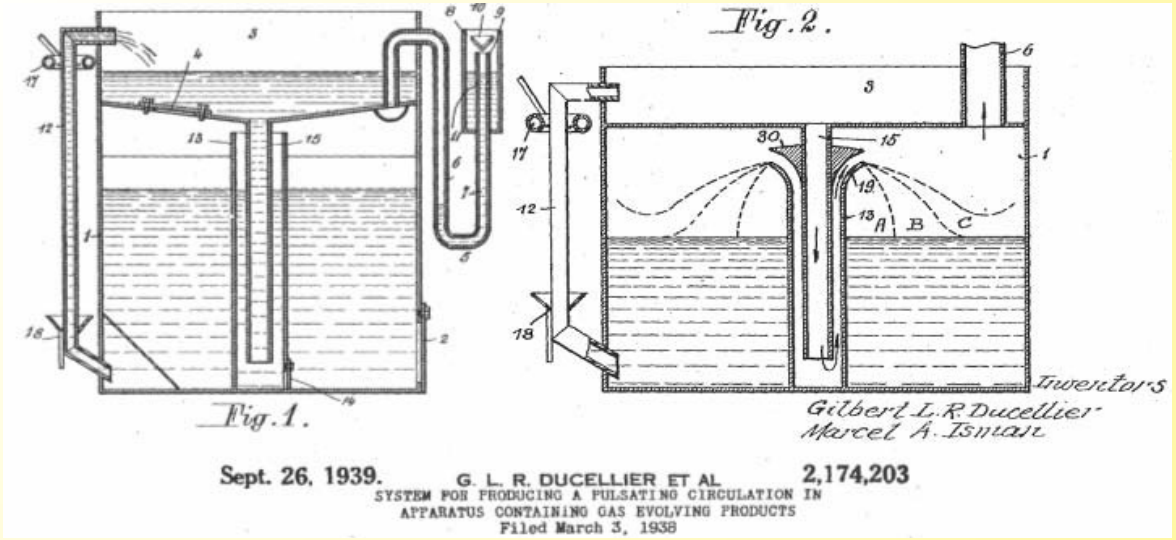
- Biodiesel has different sources of feedstocks such as soybean, peanut, corn, seashore mallow, Algae, jatropha, Mustard, rapeseed, Camelina

Some of these crops are not produced or developped in the country. Others require a high level of irrigation to give a satisfactory yield.

Jatropha Curcas L. might be an interesting crop as a potential feedstock for biodiesel production due to its high oil content and ability to grow in less than ideal conditions (poor soil, low irrigation, hot weather,).
The extraction technique might be of rudimentary tools.
It is not a competing food use. Its by-products might be of great interest.

- **Biogas is methane produced by the process of anaerobic digestion of organic material. It can be produced either from biodegradable waste materials or by the use of energy crops fed into anaerobic digesters to supplement gas yields.**
- **The solid byproduct, digestate, can be used as a biofuel or a fertilizer**

- **Late 1930's, digestion of manure was done under the guidance of two teachers of the National School of Agriculture of Algiers.**



- 1948: construction of a digester in the Institut National Agronomique (higher education school) and start the **first experimental car running on biogas**.

- 1949: 08 40 m^3 tanks were built to produce about 30 000 m^3 of biogas per year and operating up to 1960. Using 260 tons of manure per year of substrate livestock; cattle, horses and pigs. **Ensure the gas supply needs of the boarding kitchen (200 students), laboratory and 02 tractors.**

- 1953 : 03 other digester tanks of 14 m^3 were built at the Agriculture School of guelma. **Domestic use** (cooking and heating of the school for 80 people))

- Starting in the 80's, the Renewable Energy Development Center (CDER) puts down a program to develop biomass from which several digesters were experimented . In order to optimize the anaerobic digestion, the system were connected to solar water heater s which heat the digesters through heat exchanger and assure a stabilized temperature of 37° C.

- An other example is a pilot project on a farm in which biogas is produced using manure with stabilized temperature in the digester . The production covers the need for cooking and heating.

- **Sewage effluents can be digested in sewage treatment plants. Green and municipal solid wastes can also be converted into biogas in solid waste digester units.**

- This is practiced at a sewage treatment plant at Baraki near Algiers. Dimensioned to treat 150000m³/day of waste water, it might generate up to 41000 Nm³/day of biogas, enough to provide 50% of the electricity need of the plant.

- Some other sewage treatment plants of lesser capacities are under construction and the biogas expected will be enough, for most of them, to provide energy for the plant (Sedrata plant case).

It should be noted that the primary purpose of these installations are intended to remove contaminants from waste water and household sewage in order to have an environmentally safe fluid waste

- **Biogas** can be directly captured in landfill sites.

  Landfill sites might be built on purpose of producing biogas or just as storage center of solid municipal waste.

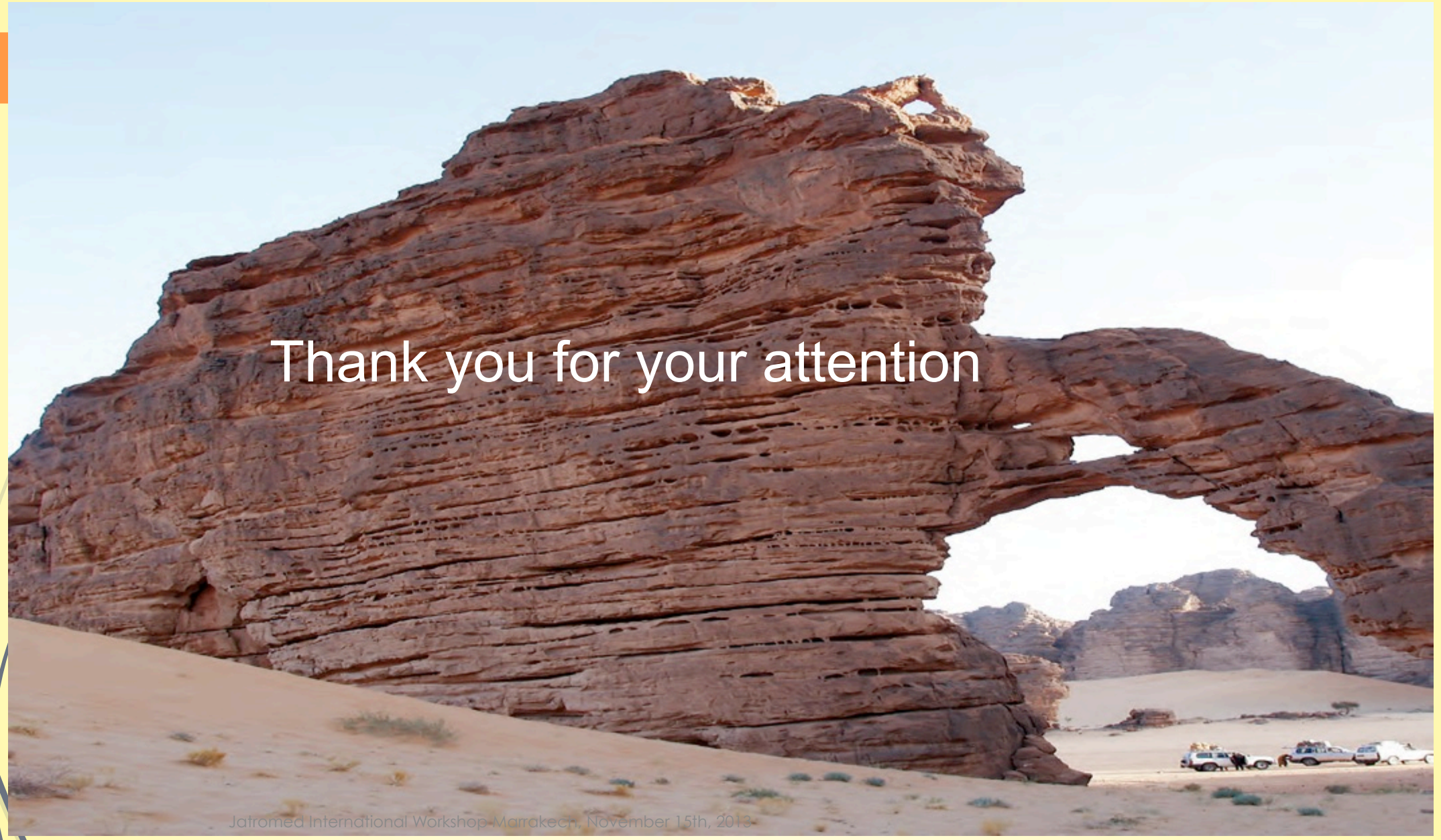
- Complying with new regulation, some municipalities are building landfills which protect the environment and transforming discharge dumps in order to minimize the risk of pollution. Consequently biogas is generated. All these landfills are equipped to capture the gas generated and to burn it by flaring (Ouled fayet landfill, Oued smar landfill, etc).

Here also, it should be noted that the primary purpose of these installations are intended to minimize the rejection, to the atmosphere, of the methane which is a high cause of pollution.

- “Anaerobic digestion “ is managed by three ministerial sectors that is to say environment, agriculture and energy.
- In order to satisfy all parties, more technical problems should be revolved. To this objective, a scientific research program was put down and it includes :
- Axis 1 –Resources
- Axis 2 –Bioconversion process
- Axis 3 –waste energetic treatment and recovery

The financing for any project might come from:

- National Fund for scientific Research,
- Energy efficiency Fund,
- Renewable Energy Fund,
- Environment protection fund.



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