

## Investigation of biodiesel produced from used frying oils for usability of an alternative fuel in a diesel engine

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### Abstract

In this study, it was aimed to investigate biodiesel production from waste oil which is harmful to the environment and human health and its usability as an alternative fuel in an internal combustion engine. For this purpose, biodiesel was produced from used frying cotton oil by transesterifikasyon method. B10 (10% biodiesel + 90% diesel fuel) and B40 (40% biodiesel + 60% diesel fuel) blends were prepared by this biodiesel. These fuel blends and D2 (diesel fuel) fuels were subjected to fixed cycle and different loads performance and emission tests in water cooling diesel engine which has tree cylinder, four stroke and direct injection. Test results showed that according to diesel fuel, biodiesel fuel blends were resulted in decreases in engine performance , carbon monoxide ( CO ) and carbon dioxide (CO<sub>2</sub>) , increases in oxygen (O<sub>2</sub>) and hydrocarbon ( HC). B10, B40, B60 and D2 fuels nitrogen oxide (NO<sub>x</sub>) emission values which were very close to each other.

**Keywords:** Biodiesel, Diesel engine, Engine performance, Exhaust emissions.

## 20 YILLIK BİR PROJESİYONDA YENİLENEBİLİR ENERJİ KAYNAKLARINDAN ENERJİ ÜRETİMİNİN ENERJİ PİYASALARI VE POLİTİKALARINA ETKİSİ

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### ÖZET

Yapılan çalışma enerji üretim teknolojilerinin önümüzdeki yirmi yıllık süreçte yenilenebilir enerji üretimine ne ölçüde kaymasının beklendiği ile ilgili tahminlerin gözden geçirilmesi, ve bu geçiş esnasında izlenen enerji politikaları ile enerji piyasalarının bu durumdan nasıl etkilenebileceğinin tahmini ile alakalıdır. Bu çalışma yapılırken yenilenebilir enerji kaynaklarının mevcut durumu gözden geçirilmiş, bu kaynakların gelecekte kullanımına etkisi olacağı düşünülen mevcut AR-GE çalışmaları verilen teşvik ve taahhütler sıralanmış ve konu ile ilgili bu verilere göre bazı yorumlar yapılmaya çalışılmıştır.

**Anahtar Kelimeler:** Enerji Politikası, Enerji Piyasası, Yenilenebilir Enerji

### ABSTRACT

In this study a review of the estimations of the transition to conventional energy production technologies to renewable energy production technologies for next twenty years period has been made. Current situations of the renewable energy technologies are reviewed at first and R&D efforts, subsidies, commitments for renewable energy production have been listed and explained and all the subjects are rounded up by adding some comments

**Keywords:** Energy Policy, Energy Market, Renewable Energy

**ENERJİ VERİMLİLİĞİ VE SÜRDÜRÜLEBİLİRLİK AÇISINDAN ELEKTROKİMYASAL SİSTEMLERİN İNCELENMESİ**

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**ABSTRACT**

*Energy is essential to economic and social development and improved quality of life in all countries. Much of the world's energy, however, is currently produced and consumed in ways that could not be sustained if technology were to remain constant and if overall quantities were to increase substantially. The need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency in energy production, transmission, distribution and consumption in the country. Energy efficiency is rapidly becoming a critical policy tool around the World to help meet this substantial growth in energy demand.*

*The existing energy system in the world today is largely based on combustion of fossil fuels—petroleum, natural gas, and coal—in stationary and mobile devices. It is clear from that petroleum, natural gas, and coal are the three largest sources of primary energy consumption in the US. Fuel cell is recognized as the most promising technology in the context of decreasing oil resource consumptions and greenhouse gases emission due to some key advantages such as low operating temperature, wide range applications, high power densities and high energy efficiencies.*

*Fuel cell is an energy conversion equipment to convert the chemical energy of fuel into electrical energy, water and heat with electrochemical processes. Although they are not heat engines, they can be considered as the thermodynamic systems because of production of heat during the exothermic electrochemical reactions. High temperature Solide Oxide Fuel Cells (SOFC) with high power density, it is generally coupled with power generation systems such as Integrated Gasfication Combined Cycles (IGCC) called as “Cogeneration Systems”. Cogeneration is the combined production of two form of energy –electrical or mechanical power plus useful thermal energy- in one technology. Therefore, the principle technical advantage of cogeneration systems is their ability to improve the efficiency of fuel use.*

*A PEM fuel cell produces approximately equivalent amount of waste heat and electric power output under steady-state operating conditions, thus its energy efficiency is generally limit to about 50%-60%. Heat pumps offer one of the most practicable solutions to recover the waste heat as well as prevent the greenhouse effect; offering energy efficient and environmentally friendly heating and cooling in applications ranging from domestic and commercial buildings to process industries. The organic Rankine cycle (ORC) system has superior performance in the area of recovering low temperature waste heat, such as (ORC) has been successfully coupled with SOFC, MCFC or PEMFC to recover the exhaust from fuel cells. The PEM fuel cell coupled with ORC is a feasible scheme for enhancing the energy conversion.*

**Keywords: Fuel cells, power cycles, recovery of the waste heat,**

**ANALYSIS OF THE EMISSIONS OF GREENHOUSE GASES OF TURKEY WTH CONSIDERATION OF LONG-TERM ENERGY POLICIES**

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**ABSTRACT**

*As a developing country, energy has particularities that are evaluated both necessity and strategically important in Turkey. Over the world, Turkey also should be interested and directed the issues of secure and steady energy supply, efficient usage of the energy, mitigation of the effects of greenhouse gases, new and renewable energy resources instead of fossil energy resources in the state policies.*

*In this research, Turkey's existing scenario and mitigation scenario about Energy planing by using LEAP (Long-EnergyAlternatives Planning System) Model are evaluated. In this way, analysis have been made on Energy Demand and the supply of the demand and emissions of the greenhouse gases in Turkey for 2030 by using 2010 that has been taken as the reference year for the scenarios.*

**KeyWords:** LEAP, Renewable, Mitigation, new technologies

**TÜRKİYE'DE YENİLENEBİLİR ENERJİ'NİN MEVCUT DURUMU VE AR- GE ÇALIŞMALARI**

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**ABSTRACT**

**Renewable Energy Current Situation of Turkey and R&D Activites**

*After the scientists are declared that renewable energy issue would be obligation, people's interest in this subject has increased and accelerated. Ever- increasing energy demand is getting higher and higher, Countries are in the competition with each other for renewable energy investments due to harm of the fossil fuels. In this case renewable energy current situation of Turkey and Research and Development activities have been analyzed. In sector based, given detailed information about current situations and the future plans have been discussed. In other part of this case renewable energy R&D activities have been explained and in sector based, given detailed information about current situation. Result and Suggestions part include generally assessment and some suggestions have been presented about how renewable energy R&D activities can be more efficient.*

**Keywords:** energy, renewable energy, fossil fuels, renewable energy r&d

## TÜRKİYE'DE ENERJİ SEKTÖRÜNÜN GİRDİ-ÇIKTI ANALİZİ İLE İNCELENMESİ

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### ABSTRACT

*Electricity has been basic and very important input for economic activities. As economic dependency grows much stronger with rapidly evolving technology, energy and electricity has become an inevitable part of social life. Electrical power consumption continues to be one of the most important indicators of economic and social development. Since Energy sources is used by the manufacturing sector as well as other sectors, the understanding details of forward and backward linkage effect has an important place for understanding for economic progress. The better we understand the dependency on energy and other sectors and sub-sector, the more successful energy policies we can define. Input-output analysis focuses on sectors and in particular the exchange of intermediate inputs across sectors as well as the economic structure of mutual dependencies between units of production and consumption. In this sense, the input-output analysis provides good understanding of production structures and the process of determining the various development strategies and policy recommendations concerning the functioning of the national economy. Especially, studying the linkage structure with focus on domestic production and imported intermediate inputs produces very important valuable results*

*In this study, we have used Statistics Institute of Turkey in 1998 and 2002 input-output tables to understand the domestic production and imported intermediate input linkage to the cross-sectors to determine the effect. We have used key sector Hirschman Analysis to study the energy sector and other sectors an examined input-output relationship of the sectors. In addition, we have studied the efficiency values of the sectors by using data envelopment analysis (DEA) on 1998 and 2002 input-output table. Also, we have focused on the production and transformation of the structure of foreign trade in Turkish Economy.*

**Keywords:** Input-Output Analysis, Energy Sector, the key industry, data envelopment analysis.

## MESLEK LİSELERİNDE YENİLENEBİLİR ENERJİ EĞİTİMİNE AİT MÜFREDATIN GELİŞTİRİLMESİ: ALPER PROJESİ

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### ABSTRACT

#### **Development of Renewable Energy Education Curriculum in Vocational High Schools: ALPER Project**

*It is obvious that renewable energy and energy efficiency concepts should be included at various levels in education. This type of education at each grade is a need for creating a consciousness among the societies to have a more sustainable environment. Renewable energy laboratory activities traditionally have not been part of the K-12 curriculum but can take part inside the courses: Physics, Mathematics, Chemistry, Biology, Environmental chemistry.*

*In the case of vocational education, the main aim is to have a technically skilled manpower. Therefore, systematically identified and developed instructional and competency based educational systems are needed to meet industry needs. In this type of education, students should learn, see and experience how something is used, installed, operated, and maintained.*

*ALPER project, which has been done under Leonardo Dan Vinci Program Transfer of Innovation Projects, aims at developing a renewable energy education curriculum to vocational high schools. In the present study, main aim is to share the first results of ALPER project to the people who involve in renewable energy concepts.*

**Keywords:** vocational education, renewable energy, curriculum development

## GÜNEŞ ENERJİSİ İÇİN YAPAY SİNİR AĞLARI İLE ANTALYA İLİNİN SICAKLIK TAHMİNİ

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### ABSTRACT

#### **Temperature forecast of Antalya city by using artificial neural networks for solar energy**

*In this study of the Mediterranean city of Antalya, which is one of the biggest and sunniest provinces were estimated temperature. The causing relative humidity at the temperature and pressure data were used as input data. In this method of predicting the Artificial Neural Networks (ANN) were used. Input data using a three-tier network and three algorithms to solve this model, a model was created and made. The algorithms used Levenberg-Marquardt (LM), Resilient (RP), Gradient-Descent (GD) algorithm. The input data model, humidity, pressure and temperature history data. Performed and the results predicted by the model formed three root mean square error (RMSE) and the mean square error (MSE) values were calculated. Although there is a lot of literature ANN temperature forecasts were made for the first time with an estimated temperature of Antalya city.*

**Keywords: ANN, humidity, pressure, temperature, RMSE, MSE**