

TÜBİTAK MARMARA RESEARCH CENTER

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2011

Presentation Plan

- TÜBİTAK Gebze Settlement
- TÜBİTAK Marmara Research Center (MRC)
- TÜBİTAK MRC Institutes
- Marmara Technopark



History

- Foundation of TÜBİTAK, 1963, Ankara
- Mission; Developing policies for science & technology, Funding and Research.
- Foundation of Marmara Research Center, 1972, Gebze.
- Area, **8000** acres.
- Some Institutes are separated from Marmara Research Center and report directly to the TÜBİTAK Presidency.



TÜBİTAK Gebze Settlement





TÜBİTAK Marmara Research Center

VISION

To be among the leading science and technology centers of the world in the field of applied research.

MISSION

To contribute to the development of Turkey's competitive power, using science and technology.



Organization Chart

JÜBİTAK



Personnel Profile



Researcher Profile



Personnel



Researcher Profile (PhD)



Services



Projects

- Industrial
- Strategic



Industrial Services

- Testing
- Analysis
- Consultancy
- Training



Self Sufficiency Ratio





Self Sufficiency Ratio: Project Income / All Expenses

Magnitude of Ongoing Projects

Million USD





Sectoral Distribution of Projects (2010)



Certificates

- National Facility Security Certificate
- NATO Facility Security Certificate
- Manufacturing Authorization Certificate
- ISO 9001-2008 The Certificate of Quality Management System for all the Institutes and the Departments of MRC
 - ISO 14001-2004 The Certificate of Environment Management System for all the Institutes and the Departments of MRC
 - ISO 17025 The Accreditation Certificate of Service Laboratories (EI,FI,MI,CEI)



Accreditation

Number of Accredited Tests

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EU FP6 – FP7 Projects

PROJECTS





EU FP6 – FP7 Projects

Energy Institute

- 1. EU-DEEP (IP)
- 2. NATURALHY (IP)
- 3. HY-PROSTORE (SSA)
- 4. BIGPOWER (SSA)
- 5. MC-WAP (IP)
- 6. NETBIOCOF (CA)
- 7. CASES (CA)
- 8. TERMISOL (STREP)
- 9. TyGre (CP)
- 10. MCFC-CONTEX (CP)
- 11. EPHESTUS (CP)

Environment Institute

- 1. ANVOC (SSA)
- 2. SPICOSA (IP)
- 3. PREPARED (CP)
- 4. HEISST (CP)
- 5. PROMITHEAS-4 (CSA)
- 6. SEAS-ERA (CP)

Genetic Eng. & Biotechnology Institute

- 1. FAD (IP)
- 2. BRIDGE (CP)

Food Institute

1.Quality Low Input Food (IP) 2.HEATOX (STREP) 3.SAFEFOODERA (CA) 4.FOODLINK (SSA) 5.MYCOGLOBE 6.EUROFIR (NoE) 7.FERBEV (CRAFT) 8.SAFEFOODNET (SSA) 9.MONIQA (NoE) 10.SAFETechnoPACK (REGPOT) 11.MYCRORED (CP) 12.EAST-NMR (CP) 13.APIFRESH (CP) 14.EuroFIR-Nexus

Materials Institute 1.NanoStrBioSens

Earth & Marine Sciences Institute

1.FORESIGHT (STREP) 2.SCHEMA (STREP) 3.BlackSeaHazNet (IRSES) 4.EPOS (CS-CPA) 5.PRE-EARTHQUAKES (CP)



TÜBİTAK MRC Institutes

- Energy Institute
- Environment Institute
- Chemistry Institute
- Food Institute
- Materials Institute
- Genetic Engineering & Biotechnology Institute
- Earth & Marine Sciences Institute



Strategic Business Units

- > Advanced Energy Technologies
- Power Electronics and Control Technologies





MAM





Project Name: Production of Biogas From Agricultural and Animal Wastes and Utilization of Obtained Gases in Integrated Energy Conversion Technologies

Aim of the Project:

Research on biogas and energy production technologies, system simulation, decision support system modeling, designation and construction of an integrated and on a pilot scale biogas plant which has 350 kW capacity and two laboratory scale biogas units (separately agricultural and animal originated), integration with energy conversion systems, experimental studies, carried out analysis of technoeconomical and life cycle and dissemination of project results.

Economic Contribution of Outputs:

 Gaining ability of biogas production plant and skill of integration produced biogas to combustion engine. Reducing the envi impact of the wastes by producing bic





Determining techno-economical criteria to improve these systems as an application area of commercial business.

<u>Project Name:</u> Gasification of Biomass and Coal, Gas Cleaning Integration with Energy Production Systems

Aim of the Project:

 Production of electricity and heat by converting the biomass and Turkish lignites into syngas by using fixed bed and CFB gasifier and being excellence center on biomass, coal combustion and gasification technologies.

Economic Contribution of Outputs:

✓Experiments and optimization studies.

Develop market to create new job areas.

 Design and development of novel gasification technologies for different applications.

 Dissemination of the results to increase the public awareness and improve the competitiveness of Turkish Industry.





Project Name: Development of Circulating Fluidized Bed (CFB) Technology and Investigation of Biomass/Lignite Coal Combustion

Aim of the Project:

✓ To develop the CFB combustion technology in Turkey in order to benefit from the biomass potential and lignite coal resources in energy production in the short and medium term, to help the wide usage of the co-generation systems in the country, and to produce a know-how package for the better distribution of the knowledge generated in the project.

- The technology of the CFB combustion system for the co-combustion of biomass/Turkish lignites will be developed in Turkey,
- Local and regional heating and partially electricity demand of the rural areas will be met from biomass and coal combustion.
- A know-how package for the manufacturing of a CFB combustion system (technical drawing of all mechanical pieces and operating procedures of the system) will be prepared, to be used further by other manufacturers in Turkey.



Project Name: Development of PEM Fuel Cell Components

Aim of the Project:

✓ Construction of 1.5 kW PEM Fuel Cell System.

- ✓ Development of PEM Fuel Cell System.
- System integration to end products.

Economic Contribution of Outputs:

To bring the knowledge of fuel cell technologies to Turkey.

Development of innovative products for transport and stationary applications, increasing energy efficiency and reducing emissions.



Project Name: NiMH Battery Module Development for Hybride Electrical Vehicles

Aim of the Project:

Production of NiMH battery module prototype which supply 9 Ah energy capacity and 300 V nominal voltage for hybride electrical, Also include electrical and thermal management systems design for the integration of the battery module. Finally battery module test on the hybride electrical vehicle.

Economic Contribution of Outputs:

Supply the know-how for the future of the national otomotive industry to produce hybride electrical vehicles.



Project Name: Direct Sodium Borohydride Fuel Cell Production and Integration

Aim of the Project:

Production of the DSBH FC components.

- ✓ Construction of the 70-100W DSBH FC.
- ✓ Performance tests of the FC (one cell and three cells).

System integration and performance tests.

Economic Contribution of Outputs:

√95% national unique technology is used in this project.



MAM







Project Name: Greenhouse Gas Reduction in Transportation Sector

Aim of the Project:

In this project, two methods for the reduction of greenhouse gases (GHG) emissions resulting from the road transport sector are studied.
These methods are analysing biodiesel combustion and developing a hybrid electric midibus.

Economic Contribution of Outputs:

 Biodiesel and hybrid electric vehicles are very important for low emmission in the transportation sector. These technologies provide fuel economy and environmental advantages.





Project Name: E1000 Type Electric Locomotive Development

Aim of the Project:

✓The main idea of the project is developing an electric locomotive which will be completely designed and manufactured in Turkey. It is foreseen that developed locomotive will fulfill the needs of small range freight transportation and can be used in logistics village applications.

Economic Contribution of Outputs:

Knowledge and experience obtained through this project will definitely provide high capabilities on design and production of more powerful locomotives. Most of the modern railway vehicles have electric traction systems. Hence, this project will also make the production and design of Diesel – Electric Locomotive, Diesel Multiple Unit and Electric Multiple Unit feasible through domestic abilities.





Project Name: Development of PEM Fuel Cell System and Its Use in Residental Applications

Aim of the Project:

 \checkmark Intensive use of national sources for production of fuel cell components such as electrocatalyst, membrane electrot unit and bipolar plates.

√500 W polimer electrolyte membrane (PEM) fuel cell production.

Economic Contribution of Outputs:

✓Good performance in electrocatalyst, unit and bipolar pales commercial equivalents.

✓Good level knowledge and experience in production of fuel cells.





Providing infrastructure for future fuel cell R&D studies

Project Name: Underwater Telephone

Aim of the Project:

 Development of a communication system that can transmit/receive sound and telegraph (CW) signals by acoustic waves.

Economic Contribution of Outputs:

National design and development.





<u>Project Name:</u> Development of Circulating Fluidized Bed (CFB) Technology and Investigation of Biomass/Lignite Coal Combustion

Aim of the Project:

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- To help the wide usage of the co-generation systems the country.
- To produce a know-how package for the better distribution the knowledge generated in the project.

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- Local and regional heating and partially electricity demand of the rural areas will be met from biomass and coal combustion.
- A know-how package for the manufacturing of a CFB combustion system (technical drawing of all mechanical pieces and operating procedures of the system) will be prepared, to be used further by other manufacturers in Turkey.





Project Name: National ROV (Autonomous Underwater Vehicle) Development

Aim of the Project:

 Design, system integration, prototype development and sea trials of ROVs (Remotely Operated Vehicles) and AUVs (Autonomous Underwater Vehicles) as well as other marine vehicles.

Economic Contribution of Outputs:

National design and development.



Strategic Business Units

- Water and Wastewater Management
- Marine and In-land Water Management
- > Air Quality Management
- Solid and Hazardous Waste Management



<u>Project Name:</u> Determination of Air Pollutant Sources and Air Quality Level of Bay Region

Aim of the Project:

- ✓ Determination of the air quality level and pollutants emitted from the petroleum refineries, petrochemical industry, oil filling, fertilizer production and other industrial facilities located in the Kocaeli Körfez district.
- \checkmark Preparation of suggestions for improvement of air quality.

- A high value input with respect to human and environmental health condition.
- Economically the cheapest treatment technique is to prevent occurrence of illnesses. In that sense, expenses shall decrease with the increasing air quality.



Project Name: Monitoring Territorial Inputs and Water Quality in İzmit Bay and Development of Advices for Pollution Prevention

Aim of the Project:

Supporting marine water quality monitoring database of İzmit Bay with up to date data and monitoring the water quality of the bay.

- Basic data for amendment is obtained by the continuous monitoring of Bay water quality.
- The impact of changes in domestic and industrial inputs on the bay wate quality and the ecosystem can be monitored with a cause-effect approach and necessary precautions can be taken.
- Obtained data has been an input to bay water quality and ecosystem models.





Project Name: Low Cost Treatment Technologies for Turkey & A Full Scale Application for the Marmara Region

Aim of the Project:

Improvement of artificial wetlands designed for organic material removal for better removal of nitrogen and phosphorus.

- There is a potential decrease of investment amounts to natural wastewater treatment from 2,5-3,5 billion TL to 0,8-1,2 billion TL. Possible savings can go up to 6 billion TL when operation costs are also considered.
- An alternative solution is developed for treatment of wastewaters at rural areas.
- Protection of watersheds, groundwater sources and wildlife is provided.


Project Name: Control and Management of the Harmful Aquatic Organisms and Pathogens Transferred by Ballast Water

Aim of the Project:

- ✓ To determine current situation and risk at the Turkish ports related to ballast water transfer.
- ✓ To determine the national liabilities, responsibilities and activities in order to implement the Ballast Water Convention (2004) after it's ratification by Turkey.
- ✓ Determining the necessary administrative/technical infrastructure.

Economic Contribution of Outputs:

 Harmful impacts on Turkish marine ecosystem, fishery, tourism and public health caused by the harmful aquatic organisms transferred by ballast water will be avoided.





<u>Project Name</u>: Investigation of Water Pollution in Sazlidere, Alibey and Elmali Reservoirs and Determination of Advices for Their Sustainable Use

Aim of the Project:

- ✓ Research, monitoring and control of limnology properties of drinking waters and potable waters of Sazlıdere, Alibey and Elmalı Reservoirs.
- Monitoring lake waters and other water inputs to the lake with respect to time.

- ✓ Prevention of pollution.
- ✓ Conservation of water quality, decreasing treatment costs.
- ✓ Providing water consumption at drinking water standards.



Project Name: Management of Animal Wastes

Aim of the Project:

 Increasing the capacity of animal waste utilization within the basis of a healthy environment, economic and social benefits.

Economic Contribution of Outputs:

✓400 billion USD value addition is expected to be gained to Turkish economy by conversion of animal wastes to fertilizer in Turkey.





Project Name: Urban Wastewater Management Along Coastal Areas of Turkey

Aim of the Project:

- ✓ Update/review the hot spots and sensitive areas of the coastal areas of Turkey based on scientific data evaluation methods.
- ✓ Determination of the risk of eutrophication and to develop eutrophication coast models.
- Development of best urban wastewater treatment applications and investments.

Economic Contribution of Outputs:

✓ Tourism, fishing wastewater management activities in coastal areas of Turkey will be supported.





Strategic Business Units

- Process and Inorganic Technologies
- Polimer and Organic Technologies







Project Name: OptimizatiIntraocular Lens (IOL) Production Proses and Synthesis of Oligomers and Monomers for the Preparation of UV-Curable Formulations

Aim of the Project:

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 \checkmark Improvement and optimization of the

UV-curable Intraocular Lens (IOL) manufacturing process.

 \checkmark Synthesis of oligomer and monomers and also preparation of UV-curable formulations to produce IOL by using our own domestic synthesized materials.

Economic Contribution of Outputs:

 \checkmark Developing appropriate formulations with domestic materials will lead industry take a strong position and also will reduce dependence on foreign firms.

 \checkmark Synthesis of UV-curable monomers and oligomers will provide industry to accumulate knowledge on UV-curable systems.

 \checkmark This type of projects can provide knowledge about the ongoing R & D activities in Turkey.



 \checkmark A small number of sources, making use of experienced personnel, knowledgeable staff to gain new knowledge and experienced staff will contribute to the creation of a sub-structure.

Project Name: Development of Water Based Environmentally Friendly Roadway Markers and Increasing the Performance of the Cold Applied Solvent Based Roadway Markers

Aim of the Project:

- To do appropriate studies to meet the needs of the General Directorate of Highways.
- To develop water based and environmentally friendly roadway markers that meets the requirements of the KGM's specifications.
- To upgrade the performance of cold applied solvent based roadway markers is another work package of the project.
- To achieve the collaboration of the universities, paint producers and research institutions for supplying the needs of the KGM within the recent world research bias.

Economic Contribution of Outputs:

 Development of water based environmentally friendly prototype road marking paints.



Increasing the performance of the cold applied solvent based road marking paints by taking different climate zones in Turkey.

Project Name: Establishment of Organic Light Emitting Device (OLED) Technological Infrastructure

Aim of the Project:

- Synthesis and characterization of metal, small molecule organic compounds and polymers
- Experimental and theoretical studies to determine the electrochemical properties of the synthesized molecules.
- Photophysical characterization.
- OLED fabrication and characterization.

- Enormous energy saving for the society.
- Environmental impact associated with the reduction of the need for electricity (less air pollution, depletion of non-renewable sources of energy, less greenhouse effect).
- Creation of new lighting industry. New methods of power distribution and conduits. New jobs created.
- New architectural designs enabled (lower ceilings, lighting, wall/ceiling panel lighting, space saving in airplanes and tall buildings, etc.)
- Quality of lighting improved.







Project Name: Production of Technological Products from Turkey's Bentonites

Aim of the Project:

✓ Updating Turkey's bentonite reserves.

 \checkmark Characterization of bentonite deposits.

 \checkmark Forming a bentonite bibliography.



 \checkmark Developing production process of twelve commercial products.

 \checkmark Production process of five commercial products is being optimized in flexible pilot plant (Bleaching Earth, Solvent Base Bentonite, Water Base Bentonite).

 \checkmark Dessiccant Clay and Drilling Bentonite.

Economic Contribution of Outputs:

 $\sqrt{30.000}$ ton production capacity on annual basis for the five commercial products together with 90.000 million Euro income and recruitment of at least 250 staff.



 \checkmark 100 million economic income thanks to the development of related technologies of advanced products at the designed pilot plant.

Patents and intellectual property rights for the products to be produced.

Strategic Business Units

- Food Science and Technologies
- Nutrition and Functional Foods
- Food Microbiology and Biotechnology



<u>Project Name</u>: Investigation of Regional Food Products and Novel Value-added Formulations

Aim of the Project:

The strategic objective of the project is to improve the economical welfare in the South East Anatolia region through promoting and assessing of the regional products into value added products such as: seven different grape varieties (ATFI, Mazruna, Black Kerkuş, Kerkuş, Zeyti, Verdani, Karfoki) in Mardin and Batman, bittim in Mardin and Siirt, pistachio in Gaziantep and Siirt, acorns in Mardin, Batman, Şırnak.

Economic Contribution of Outputs:

 Use of regional products in new food products (such as bakery products) and new product formulations, improvement of the quality in regional products, determination of nutritional, chemical and physical properties of products.





Project Name: Improvement of the Quality Of Turkish Green Tea and Development of New Products

Aim of the Project:

✓ Strategic objective is to attract consumer interest and increase consumption and economical value of Turkish green tea. It is aimed to improve the quality and develop new products.

Economic Contribution of Outputs:

✓ Bioactive components of Turkish green tea were determined, production parameters were standardized and shelf life studies were performed. Tablet green tea, cold green tea drink and green tea powder were developed as value added products.







<u>Project Name:</u> A Clinical Study on Raw and Sun Dried Apricots: Determination of Some Physiologic Properties and Evaluation According to the Healthy Nutrition

Aim of the Project:

✓ Determining the effects of apricot on health and nutrition by a clinical study.

- ✓An increase on the production and consumption rate of apricot is expected.
- ✓An increase on the activities based on improvement of agricultural products are expected.





<u>Project Name:</u> Improvement of Scientific Infrastructure of the Culture Collection of the Moulds Specific to Turkey

Aim of the Project:

- ✓The main objective of the project is to improve TÜBİTAK MRC Mould Culture Collection which is an important biological bank microflora and represents Turkey's microflora load.
- ✓Increase the use of biological resources, both nationally and internationally.

- Results of this project provides safety native mould culture for the usage of academic and industrial studies.
- This Culture Collection Center could give services to universities, different research centers and private sector.



Project Name: Effect of Further Processing on Aflatoxin in Hazelnuts

Aim of the Project:

 $\sqrt{10}$ It was aimed to determine the effect of further processing (roasting, blanching and sorting) on reduction of aflatoxin minimization in hazelnuts.

Economic Contribution of Outputs:

 \checkmark Results of this project was used to provide scientific information to DG SANCO-FVO* for Codex Alimentarius studies on max. aflatoxin levels in ready to eat hazelnuts and its products.

 \checkmark This project has both scientific and socio-economic contributions to hazelnut industry which realizes the 75% of hazelnut exportation worldwide and provides 2 billion USD/yr income to Turkish economy.







Project Name: Maintaining Quality Parameters of Original Brand of DİA-SA Food Products Using Chemical and Microbiology Analyses

Aim of the Project:

- ✓To keep under control own trade products in order to decrease or remove the possible risks to human health.
- To develop new analytical methods for new parameters and criteria that is added to Turkish food codex.

- ✓ Approximately 90% of selling of food in Turkey is occur in big chain markets.
- Reaching of own trade products to high quality contributes to preventing of illegal production because of the cost advantages.
- \checkmark The risk that threat human health is reduced.



<u>Project Name</u>: Preparation of Dry Soup Mix Formulations from Kenger (Gundelia tournefortii L.) and Capers (Capparis spinosa L.) Plants

Aim of the Project:

✓The determination of nutritional and functional properties of Kenger and Capers plants growing in Elazığ region and preparation of dry soup mix formulations from these plants.

- ✓The developed dry soup mix formulations were aimed to be used by the supporter directed to the industry in Elazığ region.
- ✓ Furthermore, it is expected from this project to create new employment fields in the region.
- \checkmark The project is secured by a patent.



Project Name: Evaluation of Apricot in the Context of Health and Nutrition – Clinical Study

Aim of the Project:

 Determining the effects of apricot on health and nutrition by a clinical study.

- ✓ The main aim of the project is to increase/support the production rates and consumption of apricot which is one of the main export products of Turkey.
- ✓In terms of the aim, the outputs have been used by the Ege Exporters Associations.





Strategic Business Units

- Ceramic, Coating, Electromagnetic-Electronic Materials, Sensor and Metal Technologies
- > Aluminum, Casting, Nanotechnology-Composite and NDT & Acoustic Technologies
- > Technological Support





Project Name: Development of the Technology for Production of the Intraocular Lenses

Aim of the Project:

✓ Development of the technology for production of the intraocular lenses based on PMMA and HEMA materials.

Economic Contribution of Outputs:

The technology developed does not include any mechanical treatment in the production process of ther intraocular lenses and results to the higher optical quality of the lenses when comparing with the same produced in the USA and Europe.





Project Name: Hamitabat Power Plant Gas Turbine Parts Development

Aim of the Project:

✓ Instead of using completely imported gas turbine parts, the project aims producing these parts and improving power plant technology studies in our country.

- ✓ Customer made a profit of 1.000.000 USD with this project.
- ✓ If this project will be applied across the country, nearly 100 million USD profit also be made.
- ✓ With a 5% effiency improvement, country wide fuel saving is about to 1 billion USD per a year.
- ✓ Still working on various projects with HEAŞ.



Project Name: Wear Resistant High Temperature Superalloy

Aim of the Project:

✓ Producing a heat and corrosion resistant alloy which will be used at Ereğli Demir ve Çelik T.A.Ş. hot mills.

Economic Contribution of Outputs:

✓ Produced parts last 4 times better than the original ones and customer gains a profit of 1.500.000 TL for replacement and maintenance costs.



Project Name: Chromium-Nickel-Iron Alloy Skids

Aim of the Project:

 Developing a high temperature resistant NiCrFe and CrFe base material.

Economic Contribution of Outputs:

✓ Produced parts last 4 times better than the original ones and customer gains a profit of 1.500.000 TL for replacement and maintenance costs.



Project Name: Cobalt Base High Temperature Skids

Aim of the Project:

✓With a 70% usage of scrap, this project aims to develop and produce co based superalloy skids that will meet the requirements of continuous iron and steel production industry.

- ✓ Produced parts last 4 times better than the original ones and customer gains a profit of 1.500.000 TL for replacement and maintenance costs.
- \checkmark Using scrap material provides additional profit and recycle process.



Project Name: Development of Hard Coatings to Increase Service Life of Aluminum Extrusion Dies

Aim of the Project:

- ✓ Establishment of wear test apparatus.
- ✓ Wear tests of different hard coatings.
- ✓ Characterization studies after the wear tests.
- ✓ Data analysis to determine the optimum plating and coating parameters.

- The hard coatings will provide the increase of die life used in the extrusion process.
- ✓The cost of extrusion process will reduce.



Project Name: Synthesis and Coatings Technology of Boron Based Antifouling Materials

Aim of the project:

- ✓ Synthesis of various boron compounds having antifouling activity
- ✓ Development of processes aimed at industrial production
- ✓ Testing of the antifouling performance of these compounds.

- Increase of knowledge and experience regarding value added boron products
- \checkmark Production of boron based antifouling paints in Turkey.



Project Name: Magnesium Alloy Development and Production of Parts for Automotive, Electronic and Defense Industries

Aim of the Project:

✓ Magnesium, with a density of 1.74g/cm³ (2/3 of aluminum, 1/3 of titanium and 1/4 of iron) is the lightest of all structural metals. Therefore, there is increasing interest in using magnesium alloys especially in electronics, transportation, air-space and defense industries where weight is important. Aim of the project is to be able to develop and produce wrought magnesium alloys which can be used for the industries mentioned.

Economic Contribution of Outputs:

✓1500 mm wide magnesium alloy AZ31, AZ61, AZ91, AM50 and AM60 sheets of 4-8 mm thickness were produced by twin-roll strip casting first time by TÜBİTAK MRC Materials Institute in Turkey. These are the first industrial scale and widest magnesium alloy sheets that have been produced by this method in the world by year 2008.



Project Name: Development of Functional Nanocoatings on **Textiles**

Aim of the Project:

✓ Imparting functional properties to textiles using nanotechnology.

 \checkmark Development of hydrophobic, oleofobic, antibacterial, resistant, UV blocking, fire retardant coatings.

Economic Contribution of Outputs:

Improvement of the functional qualities of textiles bv usina nanotechnology methods.

 Contributions to economy (reducing energy and water consumption) and environment (reducing chemicals and wastes).



✓ Turkish textile sector will increase its share in the world textile market by the developed technological products.





Spray test of hydrophobic coated textile

Spray test of uncoated textile

Project Name: Development and Applications Add-on Composite Armour

Aim of the Project:

✓ Fabrication of add-on composite armour systems and all subcomponents which are used for vehicle and human protection. Add-on composite armours are against ammunitons of kinetic and chemical energy and also blast effect. All the add-on composite systems will be tested and application possibilities will be researched.

Economic Contribution of Outputs:

✓New projects are gained after this project is done, for examples "Armouring of reception room of Turkish President" and "Protecting vehicles against mine attacks".





Project Name: Research of Domestic Feasibility of Composite Brake Shoe

Aim of the Project:

✓ Development of production technique, a low coefficient of friction composite brake shoe.

Economic Contribution of Outputs:

✓Annually 160.000-170.000 number of imported railway brake shoe when domestic produced it would save at least 650.000 USD per year.

✓The product is high potential for export to Middle East and European countries.





Project Name: Superalloy Turbine Blade Upgrading and Prototype Production

Aim of the Project:

- ✓Turkey is dependent on foreign sources about superalloy processing except small budget applications by TÜBİTAK MRC.
- Turkish heavy industries superalloy turbine blade needs will be provided by only local facilities after essential knowladge, device and technical background about superalloys and turbin blades are composed.

- ✓ A gas turbine systems replacement parts cost about 15.000.000 TL. In this project these parts is produced at half price.
- ✓Also new replacements parts life is extended and will be serve as a model to other power plants achieving a great economical gain.



Earth & Marine Sciences Institute

Strategic Business Units

- Earthquake Processes
- Geophysical Processes
- Geologic and Geochemical Processes



> Techniques Applied







Earth & Marine Sciences Institute

Project Name: Multidisciplinary Earthquake Research in High Risk Regions of Turkey Representing Different Tectonic Regimes (TURDEP)

Aim of the Project:

 \checkmark

 \checkmark

Investigation of earthquake practice and continuous monitoring of using different methods in Ma Eastern Mediterranean, Eastern Anatona



and Aegean Regions of high earthquake risk with multi parameter observation networks.

Economic Contribution of Outputs:

Outputs obtained within the framework of the project provided base information to update the earthquake map of Turkey. Outputs were obtained to update the active faults map based on seismology. Decision making authorities were continuously informed on this subject with the multi-parameter pre-earthquake reliable information.



Earth & Marine Sciences Institute

Project Name: Determination of Underground Coal by Applying Integrated Seismic Methods and Investigation and Modeling of Coalbed Gas Potential of Soma Tertiary Basin

Aim of the Project:

 \checkmark

To develop an "Integrated seismic method" for relatively fast, cheap and economical exploration of lignites in Turkey and to investigate the coal bed gas potential of these lignites. Soma Lignite Basin is selected as a pilot study area for the development of the discussed methods.

Economic Contribution of Outputs:

Customer will be capable c coal exploration in a faster cheaper manner by the developed method and the will contribute to



and time consuming drilling activities.



Genetic Engineering & Biotechnology Institute

Strategic Business Units

- > Animal Biotechnology
- Medical Biotechnology



- Enzyme and Microbial Biotechnology
- > Plant Biotechnology





Genetic Engineering & Biotechnology Institute

Project Name: Cloning of Native Anatolian Cattle Breeds

Aim of the Project:

 \checkmark To set up cloning technology and optimize methods to clon native cattle breeds.

 \checkmark To apply cloning technology in order to clon native Turkish Grey cattle which is found in region and west Anatolia.



Economic Contribution of Outputs:

✓ The native farm animals are resistant to harsh environmental and poor feeding conditions. Moreover, the disease registrations suggest that they show resistance to some important diseases. That means, with changing environmental conditions and emerging diseases, they might gain advantage and importance over economically important productive breeds.



 \checkmark This cloning technology will help to recover the decreasing population numbers of the native Anatolian breeds and revive their role in the economy.
Project Name: In vitro Conservation and Preliminary Molecular Identification of Some Turkish Native Domestic **Animal Genetic Resources (TÜRKHAYGEN-I)**

Aim of the Project:

Establishment of bio-banks for the preservation of genetic materials (DNA, cell, tissue, embryo, sperms) from 1500 individuals from 5 domestic animal species (cattle, sheep, goat, horse and buffalo) and genetic characterization of these native breeds.

Economic Contribution of Outputs:

✓ Native farm animals used for several products such as meat, milk and wool are breeds resistant to environmental conditions (dry climate, high altitude etc.) and diseases.

In recent years, climate change conditions and contagious diseases are threatening culture breeds and increasing the

importance/value of



native breeds.





Project Name: The Production of Cryopreserved Ram Sperm and Sexed Bovine Embryos by Using Modern Biotechnologic Methods

Aim of the Project:

 \checkmark Investigation of new methodologies for long-term cryopreservation of gametes and embryos, genome-wide effect of cryopreservation using chip technology.

Economic Contribution of Outputs:

✓ Protocols developed under the context of project will be used in Lalahan Livestock Central Research Institute in production of sexedand frozen-embryos. This will eliminate the Turkey's dependence on abroad and by producing these high value and sexed-embryos in our country economic benefit will be obtained. Artificial insemination of sheep will have a wider use with the introduction of developed techniques for cryopreservation of ram sperm. The genetically high value ram semen would be sold by Lalahan Central Research Institute when necessary.



Project Name: Analysis, Conservation and Management of Large Mammals in Context of National Strategies on Conservation of Biodiversity and Genetic Resources

Aim of the Project:

 \checkmark The establishment of DNA and cell banks for conservation of the genetic resources, identification of existing biodiversity, genetic characterization at species and subspecies level, population size estimations against overhunting.

Economic Contribution of Outputs:

 \checkmark The genetic characterization at species and subspecies levels may reveal some distinct genotypes that will add great value to hunting prices donated to the local economy.

 \checkmark The genetic tet panels for species identification has value as service income.







Project Name: Development of Diagnostic Kits for Hepatitis B Infection by Using Serological and Molecular Techniques

Aim of the Project:

 \checkmark Development of ELISA kits by using monoclonal antibodies and molecular diagnostic techniques by using real time PCR for diagnosis of HBV, HCV and HIV.

Economic Contribution of Outputs:

 \checkmark Prototip of ELISA kits were produced.





Project Name: Determination of Cultivation Methods for Turkey's Geophytes and Bringing of New Species and Cultivars to the Related Sectors

Aim of the Project:

✓Conservation of Turkey's geophytes, development of new varieties by using Turkish natural resources, characterization of new varieties and deterr biological activities for pharmaceutical purposes.



Economic Contribution of Outputs:

 $\sqrt{850}$ geophyte taxons of Turkish Flora will be identified and each taxons will be conserved *ex-situ* in the "Garden of Turkey's Geophytes".

 \checkmark Identification and registration of Turkey's geophyte genetic resourses.

 \checkmark Development of new geophyte varieties for the sector.

✓Additionaly, for the purposes of advertisement and education "Catalogue of Turkey's Geophytes" will beprepared.





<u>Project Name:</u> Development of Molecular Markers Genetically Linked with Yellow Rust Resistance in Winter Bread Wheat (*Triticum aestivum* L.)

Aim of the Project:

✓ Identification of molecular DNA markers linked with yellow rust resistance. Obtained markers will be used for fast genotyping of Turkish wheat varieties regarding rust resistance genes at seedling and r stages. The information is valuable to select genotypes for gene pyramiding in plant b programs.

Economic Contribution of Outputs:

✓ Molecular markers will provide quick genotyping of Turkish wheat varieties regarding yellow rust resistance genes at seedling and mature plant stages.





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Project Name: To Remediate the Hydrocarbon Polluted Areas by Use of Plants, Algae and Microorganisms

Aim of the Project:

 $_{\checkmark}$ To determine the genetic basis of bioremediation capacity of local plant, algae and bacteria species with the hope of contributing to the solution of petroleum hydrocarbon contamination.

Economic Contribution of Outputs:

, The organisms could be used for bioremediation.







Ready To Market Technologies

- > Enrichment of foods by some vitamins and minerals
- Development of olive production process for export
- Apricot halva and paste
- > The formulation of fried oil from mixture of palm oil & vegetable oil
- Starter cultures for especially fermented products
- Wine production
- Development of trans-fatty acid free margarine formulation
- Development of formulation for long shelf life bread, ready-to-eat meals and ready-to-cook meals prototype production
- Development of trans-fatty acid free shortenning formulation
- Pulse laser harmonic generator
- Chemical gas adsorbing puring and decontamination powder
- Rescue and security radar prototype
- Microwave non destructive testing tomography prototype
- Confocal laser raman photoluminesans mikrospectrometer
- Ultrasonic non destructive testing transducers



Under surface tomography system prototype



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MARTEK



Thank You

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