

**LIST OF RESEARCH THEMES/PROJECTS TO BE SELECTED FOR IMPLEMENTATION IN 2009 MANAGED BY
SCIENCE AND TECHNOLOGY DEPARTMENT, MINISTRY OF INDUSTRY AND TRADE (MOIT)
Under the “Project on Biofuel Development until 2015 with vision to 2025” according to the Decision No. 177/2007/QĐ-TTg
dated November 20th 2007**

(Enclosed with the Decision No. 5368 /QĐ-BCT dated October 6th 2008 by the Minister of Industry and Trade)

I. R-D TASKS

No.	Name of Research Theme	Objective Orientation	Product Orientation	Implementing Unit
1	Study on the selection of some varieties of sweet sorghum with high productivity and good quality for manufacturing fuel ethanol.	<ul style="list-style-type: none">- Select and develop intensive farming procedures for some varieties of sweet sorghum with high productivity and good quality to be used as materials for manufacturing fuel ethanol.- Develop the procedures for manufacturing ethanol from sweet sorghum’s trunk and grains.	<ul style="list-style-type: none">- Select some varieties of sweet sorghum with high productivity and good quality for manufacturing fuel ethanol.- Intensive farming procedures for sweet sorghum with the trunk productivity of 30-35 tons/ha; with grain productivity of 1.8–2.2 tons/ha.- Technological procedures for manufacturing fuel ethanol from sweet sorghum’s trunk and grains on pilot scale.	Centre of Natural Resources, Vietnam Academy of Agricultural Sciences
2	Study on evaluation of Vietnam’s seaweed potential as materials for	Determine the usage potential and suggest solutions for developing seaweed sources as	<ul style="list-style-type: none">- Specify some seaweed species with high hydrocarbon content, large natural yield	Nha Trang Research and Application Institute

	manufacturing fuel ethanol (Biofuel).	materials for manufacturing fuel ethanol.	<p>and appropriate to be used as materials for bioethanol production on industrial scale.</p> <ul style="list-style-type: none"> - Evaluate current status of seaweed sources: species classification, reserves (key zone), natural exploitation possibility. - Development solutions to ensure sustainable material sources; Solutions for exploiting natural seaweed sources; cultivation model for different species of seaweed. 	
3	Study on technological procedures for using micro marine algae as materials for biodiesel manufacturing.	Select and cultivate on a large scale some Vietnam's micro marine algae species as materials for biodiesel manufacturing.	<ul style="list-style-type: none"> - A list of Vietnam's autotrophic and heterotrophic optical micro marine algae species with hydrate-carbon content and lipid content covering 30% and 40-50% of the dry weight respectively which can be cultivated on a large scale. - Develop technological procedures for cultivating 1-5 species of autotrophic and heterotrophic optical micro marine algae to be used as materials for biodiesel manufacturing. - Develop technological 	Academy of biotechnology, Academy of Science and Technology of Vietnam

			<p>procedures for cultivating potential micro marine algae species selected by bioreactor on an area of 1000-2000 m³ for autotrophic optical micro marine algae and on fermentation systems with the capacity of 2000 liters/batch for heterotrophic optical micro marine algae.</p> <ul style="list-style-type: none"> - Identify the main obstacles to the process of manufacturing biodiesel from micro marine algae biomass. - Make available the technology for producing biodiesel from selected micro marine algae to ensure a competitive price for biodiesel in comparison with other conventional types of fuels. 	
4	Study on the application of modern technology to manufacture fuel ethanol from wasted wood in paper mill.	Develop technological procedures for manufacturing fuel ethanol from wasted black wattle wood and eucalyptus wood in paper mill.	<ul style="list-style-type: none"> - Develop technological procedures for manufacturing fuel ethanol from wasted black wattle wood and eucalyptus wood. - Product: Denatured fuel ethanol meeting the quality requirement in the draft technical regulation QCVN...2007/BKHCN. 	Hanoi University of Technology

			<ul style="list-style-type: none"> - Report on economic and environmental assessment. 	
5	Study on the creation of microorganism species able to use diversified carbon sources for the production of fuel ethanol from botanic biomass.	Create microorganism species able to use diversified carbon sources to manufacture fuel ethanol from botanic biomass on industrial scale.	<ul style="list-style-type: none"> - Separate successfully PDC gene and ADH II gene from <i>Zymomonas mobilis</i>. - Design successfully the vector demonstrating PDC gene and ADH II gene in the selected host species. - Demonstrate PDC gene and ADH II gene in the host species, evaluate through enzyme transformation activity and ethanol content. - Microorganism species which are able to ferment ethanol from C5 and C6 sugar. 	Institute of biotechnology, Hanoi University of Technology
6	Study on current status of biofuel industry in Vietnam and proposals of support policies for the development of biofuel in Vietnam.	Develop and propose policies to support the biofuel development in Vietnam.	<ol style="list-style-type: none"> 1. A report on the present legal system which governs all activities of investment projects on biofuels production. 2. Specific tax policies applied to biofuels manufacturing projects. 3. Supporting policies to the infrastructure inside and outside of biofuels manufacturing projects. 4. Supporting policies on developing material regions, 	Research Institute of Policies and Strategy, MOIT

			<p>finance, etc.</p> <p>5. Propose the issuance of legal documents on policy mechanism to encourage biofuel development, etc.</p>	
7	Study on technology and equipments to transform diesel engines of medium and high speed ships into engines using vegetable oil – DO mixture.	Assess the possibility of using the mixture of vegetable oil and DO as fuel for the diesel engine of medium and high speed ships.	<ul style="list-style-type: none"> - Technological procedures for the mixture of vegetable oil and DO meeting the fuel standard for diesel engine ships. - Model of injecting fuel mixture. - Solution on the transformation of diesel engine into fuel-mixture engine. - Report on the results of testing engine using fuel mixture of vegetable oil (5-10%) with catalysis and DO. 	Not yet selected
8	Study on the synthesis of super solid acid catalysis for the production of biodiesel fuel blend stock.	Study technological procedures for synthesizing super solid acids from domestic material sources to produce biodiesel fuel blend stock.	<ul style="list-style-type: none"> - Technological procedures for manufacturing super solid acid catalysis from domestic material sources for biodiesel production. - Technological procedures for manufacturing biodiesel fuel blend stock (B100) with super solid acid catalysis on the basis of catalytic vapor fixed at the atmospheric pressure. - Sample product: catalysis; 	Hanoi University of Technology

			<p>biodiesel fuel blend stock (B100) meeting the Vietnamese standard TCVN 7717:2007.</p> <ul style="list-style-type: none"> - Fundamental standard on the quality of super solid acid catalysis in place. 	
9	<p>Study on the production of heterogeneous catalysis for the synthesis of biodiesel fuel blend stock from used cooking oil and <i>Pangasius bocourti</i> (catfish) fat.</p>	<p>Study on the production of heterogeneous catalysis from medium capillary aluminum compound and application in biodiesel manufacturing industry.</p>	<ul style="list-style-type: none"> - Technological procedures for producing heterogeneous catalysis for the synthesis of biodiesel fuel blend stock. - Technology of synthesizing quality biodiesel fuel blend stock from used cooking oil and <i>Pangasius bocourti</i> fat on heterogeneous catalysis. - Fundamental standard on the quality of heterogeneous catalysis in place. - Training 2 petrochemical engineers and 1 MSc. 	Hanoi University of Technology
10	<p>Study on technology of manufacturing biodiesel fuel blend stock from animal fat.</p>	<p>Take full advantage of animal fat as by-products, including fat from <i>Pangasius hypophthalmus</i>, <i>Pangasius bocourti</i>, etc. to produce biodiesel and help to minimize environmental pollution.</p>	<ul style="list-style-type: none"> - Make available technological procedures for pilot manufacturing biodiesel from animal fat (fat from <i>Pangasius hypophthalmus</i>, <i>Pangasius bocourti</i>,...) - Have the product of biodiesel fuel blend stock met the standard TCVN 7717:2007. 	Not yet selected

11	Study on the development of technological procedures for manufacturing biodiesel fuel blend stock from wasted vegetable oil sources.	Evaluate the sources of wasted vegetable oil in Vietnam and develop complete technological procedures for manufacturing biodiesel fuel blend stock from wasted vegetable oils.	<ul style="list-style-type: none"> - Make available statistics on domestic wasted vegetable oils to be used for the production of biodiesel fuel blend stock. - Technological procedures for manufacturing biodiesel fuel blend stock from wasted vegetable oils. - Analysis and assessment results of the quality of the produced biodiesel fuel blend stock in accordance with the standard TCVN 7717:2007. 	Sub- institute of material technology, Institute of science and technology of Army
12	Study on the technology of manufacturing biofuels from wasted vegetable oils of food processing industry by cracking method on multi-capillary solid acid catalysis.	Develop technological procedures for manufacturing biofuels from wasted vegetable oils of food processing industry by the method of catalysis cracking on new materials.	<ul style="list-style-type: none"> - Create new multi-capillary catalytic systems with catalytic activity, high product selection level, stability and low cost. - Provide procedures for manufacturing biofuels from wasted vegetable oils to get products composed of liquid petroleum gas (LPG), liquid fraction LPO (gasoline, Kerosene, diesel) with equivalent quality as that of the products from petroleum. - Have 3 to 5 articles published on the local and foreign magazines. 	Academy of Chemistry, Academy of Science and Technology of Vietnam

			- Training: 2 – 4 graduate theses to be completed, training for masters and doctors.	
13	Study on assessment of the potentials for manufacturing biofuels from biomass.	Assess the potentials for biofuels production in Vietnam in order to propose the planning and development of biofuel feedstock regions.	- Have a general report on the potentials of feedstocks for biofuel production in Vietnam.	Research Institute of Policies and Strategy, MOIT

II. PILOT MANUFACTURING PROJECTS

No.	Name of Project	Objective Orientation	Product Orientation	Implementing Unit
1	Improvement of technology for manufacturing additives from industrial alcohol in order to increase octane number for gasoline.	Combine the usage of industrial alcohol and some chemicals as additives in order to increase octane for gasoline.	<ul style="list-style-type: none"> - Make available the additive formula for using industrial alcohol (96%V) and other chemicals to increase octane for gasoline. - Automatic blending procedure with the capacity of 50 mil liters/year - Have a report on the results of pilot usage on small scale to assess trading possibility. 	Not yet selected
2	Assessment of the trading possibility of gasoline blended with 5% of ethanol (E5) thru the pilot production of 500,000 liters.	Improve the production technology of E5 gasoline (blending, storing and delivery) and test on a large scale to assess the trading possibility of E5 gasoline.	<ul style="list-style-type: none"> - Technology of producing gasoline blended with ethanol E5 from domestic materials with an output of 0.5 mil liters/year in place (using the blending technology on twisted pipeline). - Evaluation Report on the effects of the product to engine on big experimental scale. - Evaluation Report on the product trading possibility. 	Biofuel Joint Stock Company in cooperation with Institute of Industrial Chemistry
3	Improvement of technology for manufacturing biodiesel from Vietnam's Jatropha	Have a complete technology for manufacturing biodiesel from Vietnam's Jatropha oil in place.	<ul style="list-style-type: none"> - Make available complete technological procedures and equipments for manufacturing biodiesel fuel blend stock from Vietnam's Jatropha oil. 	Not yet selected

	oil.		- Make available technological procedures for recovering glycerin and solvent.	
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