

92/2002

**Raport Badawczy**

**RB/28/2002**

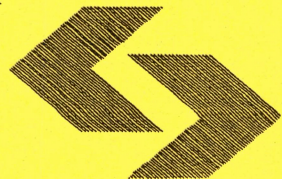
**Research Report**

**Sprawozdanie z działalności  
Konsorcjum „Bioenergia  
na Rzecz Rozwoju Wsi”  
w 2002 roku**

**W. Ciechanowicz, Z. Uhrynowski**

**Instytut Badań Systemowych  
Polska Akademia Nauk**

**Systems Research Institute  
Polish Academy of Sciences**



# **POLSKA AKADEMIA NAUK**

## **Instytut Badań Systemowych**

ul. Newelska 6

01-447 Warszawa

tel.: (+48) (22) 8373578

fax: (+48) (22) 8372772

Kierownik Pracowni zgłaszający pracę:  
Dr inż. Piotr Holnicki

Warszawa 2002

**Sprawozdanie  
z działalności Konsorcjum „Bioenergia na Rzecz Rozwoju Wsi” w 2002 roku**

**Załącznik do punktu 2.3**

**Współpraca zagraniczna**

Date: Thu, 07 Mar 2002 14:42:21 +0100  
X-Sender: ciechano@pop3.ibspan.waw.pl  
To: <raphael.edinger@daimlerchrysler.com>  
From: Wieslaw Ciechanowicz <ciechano@ibspan.waw.pl>  
Subject: methanol instalation  
CC : CiechanowiczWieslaw@acn.waw.pl

Dr. Raphael Edinger  
Assistant to Vice President Research and Technology,  
Daimler Chrysler,  
Stuttgart, Germany

Dear Doctor Edinger,

I am sorry that I have not been writing to you for such a long period.

After our workshop we have been intensively working on our main task - developing a strategy of economic and social restructurization of rural areas of Poland taking into account potentially unlimited market for methanol in the transportation sector.

Now, I am glad to inform you that the idea of large scale production of willow biomass and its conversion into methanol has been gaining still wider understanding and acceptance among both local and government authorities as well as political leaders. The elaborated bio-energy development strategy was shortly presented on March, 5 during the session of the Higher of Polish Parliament. Various aspects of the strategy are being published and discussed also in TV programs.

At present we have started cooperation with one of the biggest voivodships in Poland, namely Warminsko - Mazurskie, placed in the north-east part of our country. The authorities of this voivodship offer land, people and organizational help. Many regional associations and local authorities in other parts of the country also declared their will to join our project. So did many potential biomass and methanol producers and businessmen.

One of the problems of our present interest are modern technologies of methanol production from wet biomass - both existing and available in the near future. Could you help us, please to get information about the present state of art in the field as well as the possibility of buying a complete pilot installation? Are they already elaborated and commercially available in Germany, the USA or some other country?

Such information would help us to estimate both necessary funds as well as economic parameters of such installations - e.g. the efficiency and potential scale of methanol production.

We have been asking the same question also other people - two of them, dr. S. Babu from the USA and dr B. Foran from Australia you remember perhaps from the workshop.

Looking forward to your answer, I remain

Sincerely yours,

Wieslaw Ciechanowicz

.....  
Prof. dr hab. inż. Wieslaw Ciechanowicz

Systems Research Institute

of Polish Academy of Sciences

ul. Newelska 6, 01-447 Warszawa

e-mail: [ciechano@ibspan.waw.pl](mailto:ciechano@ibspan.waw.pl).

fax: (4822) 837 27 72 ext. 267

Dr. Raphael Edinger  
Assistant to Vice President Research and Technology,  
Daimler Chrysler,  
Stuttgart, Germany

Warsaw, 24.06.2002

Dear Dr Edinger,

I am sorry not having written to you sooner. Enclosed you will find some remarks concerning the overall scientific research program and a preliminary version of the rural area development strategy.

Following your wishes so as to be informed about the progress we had recently achieved in our work I have formulated below several general statements enlightening the situation.

In October this year the self-government election will take place. Two farmers' parties are conquering for the electors' voices. One of these parties rules our country together with the social-democratic party. The leader of this farmer's party is at the same time the Minister of Agriculture in the present government. For these people speaking about the perspectives and successes to be achieved in more than a four year horizon is of no use. This is the reason why their election program includes the ideas of production ethanol from potatoes and conversion of rape into bio-diesel fuel. So, there is indeed a barrier of conservative way of thinking of some of decision makers originated from rural parties.

At the same time, The Minister for Education being also The President of National Scientific Researches Committee supports our initiative and have declared that the Committee would be financing our works concerning creating a basis for introducing methanol as a strategic fuel for the transportation sector. On the Plenary Session of Polish Academy of Sciences he had listed our initiative as a one of the five main research programs that would be financially supported by the Committee.

What are our doings: I personally have been participating in many conferences - often as a main speaker. We are going to create a lobby in our Parliament and Senate that would popularise and represent ideas of the Consortium. We expect that such a lobby will be established in two month. At present we are formulating two research projects, to be realised at the first and to be financed by National Scientific Research Committee, namely.

1. Selecting highly efficient genetic clones of willow, which will have a great influence on creating the basis for constructing a self-financing Country Bio-Methanol Association, to be realised by Olsztyn University and Institute of Plant Genetics.
2. Elaboration of the appropriate computer system as a decision making support system concerning spatial localisation and irrigation of soil when satellite imagery will be used to provide accurate and up to date information on the type and extent of natural and cultivated vegetation throughout considered regions. This project is intending to be realised by three Institutes: Institute of Geodesy and Cartography, Institute of Soil Sciences and Plant Cultivation as well as Institute of Irrigation and Green Plants.

In the Kwidzyn region, where the research works involving willow planting have been conducted by 12 years, we are going to establish experimental plantation on the area of 200 ha. In this region we intend to establish the first methanol production facilities. Several acclimatisation plantations have already been established in the east region of Poland this year.

We intend to organise a Workshop, probably in November this year, to discuss our program, our intentions and the future co-operation. On this workshop we want to join the main actors of Consortium, namely, representatives of various Sciences, Producers and Territorial Self-Governments. It would be advantageous if Daimler Chrysler participate in this workshop, as a potential partner of our future undertaking.

One of the goals of our investigations should be finding the micro-organisms that would hydrolyse the ligno-cellulosies and ferment them to methanol. May be it could be investigated, as a European common project, together with German Institutes under the auspices of Daimler Chrysler.

Another of our future goals should be establishing The World Methanol Initiative, as a result of co-operation together with Daimler Chrysler and other institutions like Australian AUSTRADE and Gas Technology Institute, USA.

I wonder if it would be possible for you to send me some results from the conference that was held in Stuttgart in 11 -13 February this year.

We, I mean my family and myself, would like to invite you to our summerhouse where we usually spend most of the summer time.

I am looking forward to hearing from you.

With best regards

Wieslaw Ciechanowicz

Dr. Suresh P. Babu  
Director, Gas Technology Strategy  
Gas Technology Institute

Warsaw, 24.06.2002

Dear Profesor Babu,

That is a pity you are not able to visit us in the end of June. The Kwidzyn Region authorities and the Bug River Association have declared to entertain you in their regions. The Bug River Association intended also to organise for you a trip on the raft through beautiful nature along Bug River. They told me if you would come in the proper time (late spring, summer or early autumn) there would be no problem to arrange such a trip. That was the reason in my last e-mail I mentioned that we should agree the time of your stay before.

The fact is that all my suggestions concerning your stay in Poland remain actual and we will be very happy indeed having the possibility to see you as our guest in the nearest future. There is a possibility in participating in covering some of your travel expenses and you can be sure that we will try to make your stay as pleasant and fruitful as possible.

We are going to spend the summer holidays, I mean July and August, in our private summerhouse in the village which is placed nearby the Bug River. I would like to invite you cordially to us. You could rest and eventually see this part of Poland. Please choose the time and let us know it. The best time would be in July because of the weather. Please contact us possibly soon so we could organise things and eventually adopt our time schedule to the time of your visit.

We intend to organise a Workshop, probably in November this year, to discuss our program, our intentions and the future co-operation. On this workshop we want to join the main actors of Consortium, namely, representatives of Sciences, Productions and Territorial Self-Governments. May be it would be advantageous to you to participate in this workshop, as a potential partner of our future undertaking.

I am looking forward to hear from you and to meet you.

With the best regards

Wieslaw Ciechanowicz



## **The Scientific - Research Framework Program of the Consortium „Bio-energy for Rural Area Development”**

The global aim of the scientific research program of Consortium „Bio-Energy for the Rural Area Development” consist in creating the research, design and production bases for development of bio-methanol production, as well as for technology development contributing to the transformation of a rural area into the age of modernity. The tasks of this research program are the following:

- Education of the personnel for initiating, designing, running and managing enterprises dealing with both bio-mass planting as well as bio-mass conversion to methanol.
- Elaboration of the appropriate computer system as a tool for supporting decision making concerning:
  - spatial localisation and the management of the biomass to methanol conversion enterprises on different levels of organisation, both local as well as regional,
  - evaluation of economic advantage and risk aspects of the considered undertaking.
- Selecting highly efficient genetic clones of willow. This will constitute the basis for establishing a self-financing Country Bio-Methanol Association. **Obtaining such highly efficient genetic clones would be the first challenge of the Science for the country development program.**
- Developing, in the first step, a technology for biological conversion of lignocellulose to carbon monoxide or to hydrocarbons such as methane which could be used as fuels in ceramic fuel cells being the dispersed source of electric power. **It would be a second challenge for the development of the national economy related to the development of rural areas, as posed before the Science.** However, we are going to keep in the scope of our scientific program the direct biological conversion of lignocellulose to methanol. It would be a major breakthrough in research programs in the global scale. It is not impossible with the biotechnological tools now available. Nevertheless, it should be investigated in the frame of international research program.
- Implementing a production of the fuel cell-powered busses. **It is the third challenge posed before the Science, related not only to the development of the region or the whole country, but also with preserving clean air in urban agglomerations.**
- Developing a dispersed system of virtual management of the Country Bio-Methanol Association.

### **Strategy of the rural area development – a preliminary version**

The formulated strategy comprises utilisation of the production of bio-mass both in production plantations as well as after establishing production plantations on acclimatisation and experimental plantations. It means, that in the development strategy of rural areas one intends to differentiate between the development of small-area, medium-area and large-area plantations – because it would determinate the rate of obtaining the bio-power production. However, the main element of the strategy of the rural area development would be production plantations integrated with the plants converting the bio-mass to methanol.

Realisation of the strategy leading to the development of a large-area plantation, including site preparation, willow plantation establishment, planting, harvesting, as well as converting biomass to methanol, will require many endeavours such as organisation of:

- Research and Development Centre as well as Research and Design Centre.
- A company which would specialise in production of high quality cuttings, their acclimatisation, plant breeding, establishing plantations and harvesting the bio-mass.
- The Country Bio-Methanol Association as a self-financing company.

The regions of Poland which would have very small chance to engage capital investment for their development, and which are going to be taken into account in the rural area strategy at the first stage, are the following: 1. North - Eastern Region, 2. Eastern Region, known as „Eastern wall”, 3. South - Eastern Region.

We assume a three-year cycle of plantation establishment on a three-partite area, preceded with a three-year growing cycle in acclimatisation plantation and a three-year growing cycle in experimental plantation. During the three-year growing cycle of production plantation the methanol production enterprise is assumed to be build simultaneously. The increase of the plantation area will proceed as a result of introducing succeeding series of plantations.

Below, it is considered an option of establishing a self-financing Interregional Association of Bio-Methanol Producers in three stages of the development identified with the three mentioned above rural regions.

The strategy is considered in the time period from 2003 to 2038 comprising 12 three years cycles of plantation establishment.

The following figures characterise the first version of the rural area expansion strategy:

- The first production of methanol in 2009, in a volume of 10000 tons/year,
- The target total area of bio-mass plantations in 2036 – 4.48 million ha,
- The target total production of three regions, starting from 2038 - 67.5 million tons/year,
- The number of installed enterprises producing methanol with an output of 150000 tons/year in the period of 2009 - 2038 – 438,
- A value of capital engaged in establishing plantations in the period of 2003 – 2038 as well as building 438 plants in the period of 2009 – 2038, would account 55 billion of USD.

From the considered numerical example one may draw the following conclusions:

1. The state budget, as one of the strategy participants, while subsidising the rural area development, would acquire a negative balance of incomes and expenditures only in the first two three-year cycles of the development period, that is in the 6 year time. In the remaining three-year cycles a substantial surplus over the subsidy would exist
2. The three considered rural regions, being the main strategy participants, would gain the most.
3. The Bank of the Bio-Methanol Association would begin to store capital for an additional development of the regions in the 4<sup>th</sup> three-year cycle from the moment of activating the production of methanol.

The required comparatively high investment capital as well as the long investment cycle of establishing the enterprises which would plant biomass and convert it to methanol, causes that the time of capital recovery would be substantially long, particularly in the initial years of the development. On the basis of the performed analytical consideration we conclude that the suggested solution of the problem could be the establishing the self-financing interregional association for methanol production with the government financial support in the first stage of development. However, this system should satisfy, among others, some conditions stated below.

The first condition is to achieve highly efficient genetic clones of willow, (30 tons of dry wood per hectare), as well as to achieve a high efficiency of bio-mass conversion to methanol (up to 50%).

The second condition is the necessity of transferring some part of enterprise income of the first region production system in order to contribute partially in the investments in this region.

The third condition involve the legislative support on the Parliament through exempting the Country Bio-Methanol Association from specific tax duties in the first phase of its development.

The fourth condition involve establishing of the association bank so that the profit earned on interest rates from investment capital could contribute in increasing the investment capital of Country Bio-Methanol Association.

It is recommended to co-operate in the future with:

- Daimler Chrysler consortium, as the future recipient of the methanol,
- Australia, by means of a state trade organisation AUSTRADE, planning to grow the bio-mass on the area of 30 million ha, as a partner in entering the world market of methanol,
- Gas Technology Institute, USA, as a partner helping with capturing high-tech power technologies, being simultaneously possible shareholders in the organised undertaking.

The intention of this co-operation could be The World Methanol Initiative.

To: Guenther FISCHER <fisher@iiasa.ac.at>  
From: Wieslaw Ciechanowicz <ciechano@ibspan.waw.pl>

Dr. Guenther FISCHER  
International Institute for  
Applied Systems Analysis  
A-2361 Laxenburg, Austria

Warsaw, 04.03.2002

Dear Doctor Fischer,

Thank you very much for your kind letter and your very interesting conference paper. Unfortunately we were not in a position to translate your paper into Polish for the Polish edition of selected papers presented on our Workshop "Bioenergy for Rural Development". We hope that it will be possible to include your paper -not only the abstract - in the next, complete edition of the Workshop materials.

After our workshop we have intensively worked on our main task - large scale production of willow biomass in rural areas of Poland. I am glad to inform you that we have started cooperation with one of the biggest voivodships in Poland, namely Warminsko - Mazurskie, placed in the north-east part of our country. The authorities of this voivodship offer land, people and organisational help. Many regional associations and local authorities in other parts of the country also declared their will to join our project.

Would you mind informing us whether the project under consideration could be realised by realised by IIASA and the Polish side. In our opinion this project is very important not only for Poland. Thus, the second question is whether in your opinion it would be possible to obtain some funds from UE for such a project - to be eventually realised by a large international group of people and organisations.

Hoping to receive your opinion soon I remain

Sincerely yours

Wieslaw Ciechanowicz

Wybrane fragmenty e-maila  
From: Barney Foran To Ciecchanowicz Wieslaw

Hello Wieslaw,

Work is going well and I am getting back into our biofuels work with a few interesting advances:

1. I am having some interesting enquiries from the managers of pension funds who potentially have \$600 billion (Australian dollars) at their disposal looking for real projects. My estimate of \$200 billion to implement the biofuel economy over 50 years (\$4 billion per year) does not seem excessive to them although there is many years of work to do.

2. Government attitudes are getting warmer but they are still transfixed by ethanol which has a much lower energy profit ratio

3. Soon will have developed a new version of my OzECCO model and will be trying to undertake many more simulation experiments to answer some of the more involved questions.

I have a number of questions:

1. There is a potential that I could visit you in Poland on Saturday and Sunday 21/22 of September on my way to Italy where I have to be near Pisa on Tuesday 24th. September. Would you be around in that period and available for a good talk about developments.

2. What are the developments with the publication of the conference papers from your meeting last year. There were so many good papers particularly in the deep process areas that I would like to have access to. Will they be published soon and how do I get a copy of the book.  
I hope all is well with you

Best Wishes  
Barney

-----Original Message-----

**From:** Wieslaw Ciecchanowicz [mailto:CiecchanowiczWieslaw@acn.waw.pl]

**Sent:** Thursday, 28 March 2002 21:46

**To:** Barney Foran

**Subject:** Best Wishes

