International Partnership for the Hydrogen Economy Ministerial Meeting

Remarks

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Practical interest towards hydrogen utilization in the previous century had 3 periods of development.

The first period belongs to 1920s - 1940s when the first scientific and technical fundamentals for utilization of hydrogen as a fuel were set and the first demonstrations of real hydrogen-fuelled units were conducted.

Among them are the hydrogen engines of Zeppelin dirigibles, and a diesel hydrogen-fuelled engine for LEILAND bus.

In Russia, in 1941 the motor engines GAZ-AA were converted in blockade Leningrad to hydrogen-air fuel from aerostats of airborne protection.

Further on, this experience was used in over 400 vehicles.

The first Russian developments of wind-hydrogen units, where hydrogen was an accumulator of energy utilized in engines in the absence of wind, also belong to this period of time.

The 1970s marked the second stage, when the energy crisis and aggravation of big cities' environment renewed interest to hydrogen and, primarily, to its application on the city transport.

By the beginning of 1980s, a considerable scope of activities for the development of production, storage, transportation and distribution technologies allowed for trial operation of gasoline-hydrogen-fuelled car Volga in Russia.

At the same time (1982), the first in the world hydrogen-fuelled micro-bus Kvant-RAF on the basis of alkaline hydrogen-air fuel cells was manufactured.

These works demonstrated the positive prospects of the urban transport conversion to gasoline-hydrogen fuel (5% of hydrogen content).

This led to the reduction of gasoline expenses by 35-40% and a considerable lessening of harmful emissions.

During this period, Russia also faced the creation of the first in the world laboratory aircraft TU-155 with hydrogen gas-turbine aviation engines, a unique cryogen hydrogen complex at Baikonur cosmodrome and rocket complexes of *Energiya-Buran* system.

Alkaline fuel cells for energy supply of Buran space system, moon rover and submarines.

Along this, extensive activities for hydrogen infrastructure development were effected.

These were, primarily, activities related to the establishment of efficient metal hydride units and hydrogen accumulation alloys, the systems of hydrogen production and storage, experimental hydrogen-oxygen steam generators.

Currently, activities for hydrogen technologies in the Russian Federation are effected in several directions.

One of the key directions is implementation of projects under the Federal target scientific and technical programme *Research and Innovations in Priority Trends of Scientific and Technical Development* for 2002-2006, financed by the Ministry of Industry, Science and Technologies from the state budget.

These are projects for the development of solid polymer fuel cells for new generation vehicles, jointly implemented by research organizations under the guidance of the State research centre *Physics and Energy Institute*, and the project for the creation of technologies for hydrogen production and utilization in energy and on transport, jointly implemented by research organizations under the guidance of the Russian research centre *Kurchatov Institute*.

Activities for alloy carbonate fuel cells within the framework of the RF Ministry of Atomic Energy programmes are underway.

Activities for high temperature fuel cells within the framework of the Russian Academy of Sciences are carried out.

The Russian space corporation *Energiya* proceeds with the work for the creation of more effective alkaline fuel cells of the new generation.

In 2003 at the Moscow motor show they demonstrated VAZ model with the engine operating on the basis of improved alkaline fuel cell.

A number of works are effected with the financial support of the Russian Foundation for Technological Activities, OAO Gazprom, RAO Norilsky Nickel.

International cooperation is of considerable importance in the implementation of some hydrogen technologies development trends.

The most important among them are the Russian-American project of high temperature helium reactor, multiple works implemented under the International Scientific and Technical centre, cooperation within the 6^{th} Framework Programme of the European Union for Research and Development in Sustainable Energy Systems and many other projects.

In June, it was stated at the Evian summit of G8 heads that the development of hydrogen technologies was one of strategic trends in the future energy development.

We hope that the establishment of International Partnership for the Hydrogen Economy will give a new impetus to hydrogen technologies development and will allow for the creation of new and more effective mechanisms of international

cooperation in this exceptionally vital field of the world development.