Distinguished Chairman Lehtinen!

Ladies and Gentlemen!

I have a very great pleasure to welcome you all on the name of the Tanner Academy and Väinö Tanner Foundation on this already traditional Tanner Lecture. The Tanner Lecture of 2011 is dedicated to "Energy and Well-being". This year's topic is a logical consequence of the Tanner Academy activity development and is well connected with the topics of the previous lectures. I would like to remind you that our previous Tanner Lecture in 2008 was dedicated to the "Challenges of the Climate Change" that is intimately connected to the problems of energy. They are like twins. In 2008 we had excellent speakers and the Tanner lecturer was Nobelist Dr. Rajendra K. Pachauri, who severs as the chairman of the intergovernmental panel of climate change.

Also this year we have excellent speakers and we have this year Tanner lecturer chairman Dr. Jorma Ollila.

During this year Tanner Lecture we will discuss energy and well-being. Energy is a becoming increasingly important for the future development of the society. According to all predictions the production and consumption of the energy will increase. Word Energy is on the lips of many people, but very often we do not exactly know what energy is and how large the world energy resources are. To help us we have invited prof. Risto Orava from CERN and University of Helsinki to tell us in simple words what energy really is.

Energy consumption will increase because the population is increasing. Some estimates predict that in 2050 there will be 2 billion more people, who will consume more energy. In addition developing countries will consume significantly more energy because their economies are developing and their living standards are rising. Currently more than 80% of the energy used comes from fossil sources and if it continues in a similar manner environmental consequences maybe very serious. To avoid global raise of the temperature by 2 degrees greenhouse gas emissions should be reduced to half.

To meet these challenges we would need a very serious change in the development of energy technologies and also significant investment to the respective research and development. Many experts think that our investments and efforts in this are still very modest and the area of energy technology is in many ways still old-fashioned.

As I mentioned serious new openings are needed and the questions arises what are the key technology areas for the future success? In my opinion these are:

1. New materials
2. Nanotechnology
3. Biotechnology
4. Information technology

New materials have very significant potential. As an example are new superconducting materials that could transfer energy over long distances with its

minimal loss at ambient temperatures. Imagine transferring energy from equatorial solar energy production plants to the Nordic countries!
Good examples of the technology development are also novel solar batteries that mimic some principles of photosynthesising plants, developed by professor Michael Grätzel at the Swiss Federal Institute of Technology in Lausanne. Notably, Dr. Grätzel received Millennium Technology Prize of 2010.

Bioscience and biotechnology are clearly key players also in the future energy technology developments. Development of more efficient devices that work on the principle of photosynthesising green leaves or green-blue algae and efficiently converting solar energy is one very potential way to the future energy technology development . Using phosytosynthesising algae that are more efficient than higher plants have especially great promise. They can very efficiently convert solar energy into the energy of the chemical bond that is easily useable by the man. I personally think that plant genetic engineering has here also a great opportunity. We have invited prof. Eva-Mari Aro from the University of Turku, a great expert in photosynthesis and bioenergetics, to discuss these issues today.

Although biotech, new materials and nanotech will have their impact it is believed that in 2050 still a significant part of energy is coming from gas and oil, and the role of natural gas will increase. It seems also very clear that the role and impact of nuclear energy is increasing and it will have very significant share in 2050. Fusion energy as the great promise and certainly warrants further studies. We have invited prof. Rainer Salomaa from the Aalto University, to discuss the present and future of the nuclear energy and analyse the possibilities fusion energy.

It is important how we produce energy, but almost equally important is how we consume energy. There are many ways how we can save energy and every one of us can contribute to this important task. Most of these measures are very cheap. Energy has also very important political and economic dimensions both globally and also locally. To discuss the economic and environmental aspects of energy we have invited prof. Jukka Pekkarinen from the Ministry of Finance.

To solve the problems of energy production and consumption we need local, regional and also more global attempts, and we also need wider collaboration and networking. One good example of that is the European collaboration we have invited director Pirjo-Liisa Koskimäki from EU Commission to discuss problems of the energy efficiency in Europe.

Ladies and Gentlemen!

I have now the special privilege to introduce to you our today's Tanner lecturer Chairman Dr. Jorma Ollila.

Dr Ollila is currently the Chairman of the Board of Directors of Nokia Corporation. Especially relevant to today's topic is the fact that he is also Chairman of the Board of Directors of Royal Dutch Shell Plc.
He is Master of Political Science from the University of Helsinki, Master of Science in economics from the London School of Economic and Master of Science in engineering from Helsinki University of Technology.

It is probably interesting for this audience that among many important duties Jorma Ollila is the Vice Chairman of the Board of Directors of Otava Ltd and member of the Board of Directors of the University of Helsinki.
He is also *doctor honoris causa* of the Helsinki University of Technology and University of Helsinki.

I would like to invite you, Dr. Jorma Ollila, to give the Tanner Lecture!

Helsinki, February 17, 2011