



Sweden's energy situation from a European perspective

- 1.** The global economy has during the last 150 years been highly dependent on fossil fuels. To reduce climate and environmental risks as well as meeting concerns caused by the depletion of the fossil energy, the world has embarked on a rapid transition towards an economy based on non-fossil energy. How this can be achieved in a feasible way is a fundamental scientific and technical challenge where independent science academies have an important role to play. The required transition to non-fossil energy sources must be analyzed with regard to technical, economical and environmental aspects. In view of the many vested interests in the energy sector, a close cooperation between science and policy is essential to optimize the changes towards a sustainable energy system.
- 2.** Through its Energy Committee, the Royal Swedish Academy of Sciences (RSAS) is involved in studies of Swedish as well as international energy issues. As a member of the European Academies Science Advisory Council (EASAC) the RSAS provides energy policy advice to the EU Commission and the EU Parliament.
- 3.** The EU goals/directives must be well founded and take into account the assets and possibilities of the different EU member countries. Unfortunately the percentage goals/directives 20/20/20(10) by 2020 on CO₂ reduction, energy saving and new renewables (including motor fuels) were overly ambitious and mutually inconsistent. The EU Commission has invited different stakeholders for a consultation on "GREEN PAPER - A 2030 framework for climate and energy policies" with the objective of formulating a more realistic policy (Deadline 2 July 2013).
- 4.** The RSAS Energy Committee assumes in its scenarios of future supply and consumption of energy that the use of fossil fuels, except for a minor fraction of the current level, is unsustainable, because of potentially unacceptable environment and climate effects. In particular, because of the many diverse opinions in the public debate such as for climate change, any decision must be based on robust scientific evidence.
- 5.** Renewable energy and nuclear energy are fossil-free alternatives prioritized by the Energy Committee in its 2050 scenarios. Sweden already supplies and consumes a comparatively low fraction of fossil energy that helps Swedish industry to make products with small carbon footprints, products, which for this reason should become competitive both within as well as outside Sweden.
- 6.** A large part of Swedish CO₂ emissions emanates from the transport sector. Accordingly, Swedish energy policy should give priority to replacement of fossil fuels with domestic bio-fuels and fossil-free electricity, in order to fulfil EU's overarching goals, security of supply and reduction of CO₂ emissions. In addition, energy saving will be achieved, since electricity is the most efficient of all energy carriers and therefore, almost completely, can be transformed into mechanical work.

7. Globally, the share of electricity in the energy supply is expected to grow rapidly. The Swedish energy mix already includes a large portion of electricity, which is fossil-free because of indigenous hydropower, bio-energy and nuclear energy.

8. In the EU, fossil fuels account for 53 % of the electricity production. A growing share of weather-dependent electrical energy from sun and wind will require expansion of power grids and increased power regulation capacity and storage, implying considerable expenses. Furthermore, the replacement of German nuclear reactors by new fossil-based electricity production will affect the energy system on a broader European scale. As a consequence, the currently stable and fossil-free Swedish electricity consumption is expected to be negatively influenced. Associated increased electricity prices may hit the Swedish national economy unless a well thought-out strategy is prepared for negotiations within the EU.

9. The Swedish electricity price has increased after the re-regulation of the trade of electricity in 1996 and the establishment of a Nordic electricity market. This has had consequences for the Swedish energy-intensive industry. Despite the reregulation, the consumer price of electricity in Sweden is mainly under state control through taxes and subsidies, the state-owned Svenska Kraftnät (Swedish Transmission System Operator) and the state-owned Vattenfall, a dominant energy company on the Nordic electricity market. In what way the Swedish trade and industry, subject to international competition, will be affected by price changes caused by integration and conversion of the European electricity system is very unclear. To sort out this problem area will be a political challenge in coming negotiations.

10. There is no authority in Sweden with an overarching responsibility for the energy sector. The present Energy Agency (Energimyndigheten) is instructed by the Government to develop renewable energy especially wind power, in the energy supply. It is desirable that the agency's field of responsibility can be enlarged to fully include all Swedish supply of primary energy.

On behalf of the Energy Committee
Sven Kullander
Chairman