Foreword

Flying into the Wind!

We're lined up, facing into a good head wind.

"I'm ready." "- Roger". " . . . Departure!"

The tow wire tugs at my glider, which suddenly accelerates. When I pull the control-stick back, my glider floats up into the air as if it were weightless. A winch winds up the wire at full power to match my increasing speed, and my glider climbs at steep angle, making a roaring sound as it does. The altimeter turns steadily. After a few minutes, my rate of climb decreases. When I sense that I'm being pulled down, I level off the glider and release the tow wire. As soon as the wire is gone, a silent world surrounds me. There is no wind noise whatsoever. At an altitude of about 300 m, I am enveloped in a sense of peacefulness. My glider is flying by changing potential energy into motion energy. I should try to eliminate all unnecessary movement so as to minimize the air resistance. I am concentrating on catching and controlling the wind. I am united and at one with the wind! This feeling of unity is magnificent.

The above description is of a glider flying without an engine for power. In the same way as with the glider, efficient energy consumption demands that we use the energy stored in fuel both gradually and effectively, starting from a high position. To what degree, however, can we use energy efficiently?

As a first stage, for example, a high-temperature type fuel cell could be employed to generate electricity from fuel, and a gas turbine that is driven by the exhaust gas of the fuel cell could be used to generate electricity. Then, in the final stage, hot and/or cold water is generated from the exhaust gas. We could develop a new hybrid system in which high-efficiency generating systems are combined to enable co-generation or tri-generation systems, or even cascade systems.

We hope that this special issue will give you a glimpse of the possibilities.