The case for optimism about a renewable energy future

Massachusetts Institute of Technology
Professor Eric Martinot, the senior research director with the Institute for Sustainable Energy Policies in Tokyo, told students and faculty at a seminar on April 18 that renewables have become “mainstream” and are “a major part of our energy system.”

Martinot just completed a two-year project entitled the *Renewables Global Futures Report* — a compilation of 170 face-to-face interviews conducted with industry executives, CEOs of renewable energy companies, utility leaders, government officials and researchers.

“We’re still thinking about the future of renewable energy like it’s 1990 or like it’s the year 2000,” Martinot said. “Our thinking is just behind the reality of where renewables are today and where they are going based on existing market technology, cost and finance trends.”

Martinot gave an overview of various projections and scenarios from the oil industry, the International Energy Agency (IEA) and environmental groups. The data shows that investment in renewables is a key example of the current growth and expected trajectory. Renewable energy investment is predicted to double if not by 2020, then by 2040.

“For the last three years, since 2010, global investment in renewable energy has exceeded investment in fossil fuels and nuclear power generation capacity. That’s very surprising to most people,” he said.

Despite this growth, Martinot said, “existing sources of finance are not going to enable us to reach high levels of renewables. Bank lending and utility balance sheet finance are the two major current finance mechanisms and they are going to run out.” In the future we should expect to see new sources of investment — including pension funds, oil companies and community funds.

Renewables currently supply about 20 percent of global electricity — with hydropower making up about 15 percent of that and all other renewables (wind, solar, geothermal and biomass) making up five percent. Martinot sees potential in expanding renewables to heating and cooling in the near future.

“We have all of the technologies we need right now, we don’t need to wait for technology for high shares of heating and cooling from renewables, but this is going to involve huge changes in building construction, architectural practices, building materials, the whole construction industry,” he explained. “It can take decades for all of that to change. But we can do it.”

Integration of renewables into the grid, buildings, homes and vehicles is where he sees the greatest opportunities for investment, infrastructure and research.

“Power grids have been operated and designed for the last 100 years on the basis of two things: number one, energy storage is impossible and number two, that supply has to meet demand,” he said. Because of the variability of renewables, integration and management of both storage and demand are necessary.

Martinot believes we are on the path toward combating these challenges. “We’re seeing both of those turned on their head because energy storage has become practical and is being done on a commercial basis on a number of projects. We’re also seeing the so-called ‘demand response’ where you can actually adjust demand to meet supply, rather than the other way around.”

Utilities in Denmark and Germany, for example, are using new tools to manage the variability of wind and solar and are able to switch to natural gas and heat when needed.

The building sector is another opportunity to integrate current renewable energy sources with the demands of the typical family home. Martinot described homes of the future that utilize solar power for heating and hot water, electric vehicles with batteries used by the home for power and energy storage, passive heat storage in building construction, and geothermal heat pumps to power homes.

“If you were able to standardize this type of construction in architectural practices around the world this could lower the cost and make if more common in peoples’ homes,” he said.

Martinot admitted he’s bullish about renewables and has high hopes that we can reduce carbon emissions and provide affordable energy.

His research shows that we can be optimistic about the future of renewables as governments, utilities and energy companies are expanding investment, research and development in renewable power across a variety of sectors.