

Executive summary

This study is part of the International Energy Agency's (IEA) ongoing analysis of global renewable energy markets and policies, building on the key principles for effective policy design identified in *Deploying Renewables: Principles for Effective Policies* (IEA, 2008).

The IEA chose to do an in-depth investigation in Southeast Asia because of its rapid economic growth, increasing energy demand, rising fossil fuel imports, growing environmental pressures, low rural electrification levels, and heavy reliance on fossil fuels and traditional biomass. Resource endowments vary greatly from country to country, but it is clear that the region offers large potentials for renewable energy sources, most still untapped.

This paper examines the situation in six of the ten countries that comprise the Association of Southeast Asian Nations (ASEAN): Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam (collectively identified as ASEAN-6).¹ In 2007, ASEAN-6 represented more than 95% of energy demand in Southeast Asia. Given their large populations and robust projected economic growth, these six economies are projected to account for more than 80% of energy demand growth in the medium term to 2030 (IEA, 2009).²

A main focus of the report investigates the potentials and barriers for scaling up market penetration of renewable energy technologies (RETs) in the electricity, heating and transport sectors in the ASEAN-6 countries. In addition to analysing the implications of effective policies on renewable energy market growth, it examines how to overcome economic and non-economic barriers that slow investment in renewable energy, and offers policy recommendations to encourage effective and efficient exploitation of renewable energy in Southeast Asia. As production is growing rapidly in the region, biofuels and their sustainability implications warrant special attention.

Energy sector trends in the ASEAN-6

The energy sectors of Southeast Asian countries have developed significantly over the past two decades. Energy demand more than doubled between 1990 and 2007, while power generation increased nearly fourfold over the same period.

In 2007, energy supply in the ASEAN-6 region derived from the following sources: fossil fuels (74%); combustible biomass and waste (22%), mostly traditional, inefficient and environmentally unsustainable; geothermal (3%) and hydro (1%). Renewables (mostly hydro and some geothermal) accounted for 15% of electricity generation in ASEAN-6.

The warm climate in ASEAN-6 countries means there is little demand for space heating. Heat is required, at varying levels, for a number of industrial and domestic processes. This offers opportunities for expanding the use of renewable heat. All ASEAN-6 countries have some experience with modern biomass in combined heat and power plants. Demand for space

¹ The paper does not cover the other four ASEAN countries, which include Brunei Darussalam, Cambodia, Laos and Myanmar. The paper reflects data available, sometimes referring to ASEAN-6, sometimes to ASEAN and sometimes to Southeast Asia.

² In some other ASEAN countries, problems with collection of energy data represent a substantial challenge to assessing the prospects for renewable energy.

cooling is growing in the region as disposable incomes rise and average temperatures increase as a result of climate change. Renewable energy technologies can contribute to satisfying this demand.

All ASEAN-6 countries except Vietnam produce first-generation ethanol and biodiesel. Production is highest in Thailand, followed by the Philippines and Indonesia. Favourable conditions for biomass cultivation, coupled with related economic and social factors, are expected to boost biofuel production in all these countries. Global innovations in technology and growing awareness among biofuel stakeholders of the need for sustainability criteria have prompted some countries to start research on second-generation biofuels.

Policy frameworks for renewable energy

In recent years, decision makers in most Southeast Asian countries have, through policy implementation, fostered deployment of renewable energy technologies in a more concerted manner. Chief among the driving forces are rising dependency on fossil fuel imports and the environmental impacts of fossil fuel use, including the potential effects of climate change.

Countries in the region have put considerable effort into setting renewable energy targets and are introducing supportive policy frameworks to attract private sector investment. Nearly all ASEAN-6 countries have adopted medium- and long-term targets for renewable energy. Indonesia, Singapore and Thailand also recently announced carbon dioxide (CO₂) emissions reduction targets in support of the Copenhagen Accord (UNFCCC Summit, December 2009). Interest in renewables varies considerably among the ASEAN-6 countries. Renewable energy targets for the medium and long term are much more ambitious in some countries than in others, with Thailand at the forefront (Table ES.1). Targets are important indications of a country's willingness and determination to tap its renewable energy potential.

An effective system of financial and non-financial incentives must also be in place to ensure appropriate conditions to exploit renewables potential. Several ASEAN countries have recently introduced price support systems for renewable energy or are about to do so. Thailand introduced renewable electricity feed-in tariffs (FITs) in 2007. As of early 2010, Indonesia was introducing a FIT for geothermal electricity, and Malaysia and the Philippines had just started drafting guidelines for the introduction of FITs. Other financial incentives for renewable energy in the ASEAN-6 countries include tax exemptions for certain renewable energy technologies in Malaysia, the Philippines and Indonesia, capital costs grants in Thailand and R&D incentives in Singapore.

Malaysia, Indonesia and Thailand have also introduced non-financial support mechanisms, including standard power purchase agreements (PPAs), preferential arrangements for small generators and information support. These initiatives help independent power producers enter the market more easily and reduce barriers specific to non-liberalised energy markets.