

Infrastructure

by Scott Younger



Power and climate change

A FEW WEEKS AGO, ON A FINE AUTUMN DAY, I WAS invited to lunch at a new apartment set right on the seaside at Largs on the west coast of Scotland, in the Clyde estuary, a place of much history over the centuries, witness to many battles of man to man and man with nature.

My host was Professor Alan McGown, mentor to quite a number of Indonesian public works students.

From the balcony, breathing in the clean air with just a touch of the perfume of seaweed, and a gentle zephyr rippling the surface of the sea, I realized that a number of different events or memories were there in front of me.

Walking distance away was an obelisk marking the 1263 Battle of Largs, and the end of Viking incursions on the west coast. Just a mile further on was an apartment belonging to the late Crawford Hogarth, ex-Acting Chief Constable, who spent several years in the 1990s teaching and working with Jakarta traffic police, and was responsible for upgrading some of their safety equipment.

A little further on was the location of the first ever trials, in 1971, of an ICI waste product for use in civil engineering – geotextile – which subsequently led to a worldwide multi-billion dollar industry.

I played a supporting role in these trials to Professor McGown, my then colleague and consultancy partner, who went on to become an industry guru and establish many of the testing standards.

Just beyond that, there is a materials handling plant going out from land to deep water, much as we see in Indonesia for coal mining and, next to that at Hunterston, one of the first nuclear reactors built in the early 1960s and still going strong.

The Magnox reactor has been threatened with decommissioning several times in recent years, since it has more than achieved its 40-year design life, but the demand for energy, coupled with concerns for providing clean energy in the future, have given it a reprieve for a few more years.



Clean energy sources

SCOTLAND HAS MUCH HYDRO POTENTIAL ON TOP OF THE MANY schemes that were built over the decades after World War II.

A recent article in the *Scotsman* newspaper indicated that the government is looking sympathetically at progressing with a number of the 1000 mini to major schemes that have been identified.

The potential of all would be to provide power for over 2 million people, although not all the available power is needed.

Obviously some schemes are better than others in terms of return on investment and environmental impact, and only select

Potential Energy Sources

Fossil Energy	Total Reserve	Proven Reserve	Production	Supply
Crude Oil	56.6 billion bbl	8.4 billion bbl	384 billion bbl	24 years
Gas	334.5 TSCF	165 TSCF	2.79 TSCF	59 years
Coal	90.5	18.7 billion ton	201 million ton	93 years
Coal Bed Methane	453 TSCF	--	--	--

Renewable Energy	Generating Potential	Installed Capacity
Hydro	75,670 MW	4,200 MW
Biomass	49,810 MW	300 MW
Geothermal	27,000 MW	1,052 MW
Wind	9,290 MW	0.5 MW
Mini/Micro Hydro	450 MW	84 MW

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Source: Departemen ESDM (2007)

ones will be built.

In addition, the first full-scale tidal energy scheme has just been installed off Scotland's northwest coast, supplementing a number of wind power turbines that have been installed and are in operation in various locations.

In the United States, as featured on TV, the big energy companies realize that they have to reduce their dependence on fossil-fuel energy.

While nuclear is expected to provide part of the solution, some companies are also working hard on finding economic solutions using renewable sources.

Indonesia is looking at the nuclear energy option for part of its future energy requirements, particularly for Java, but the country remains blessed with strong fossil fuel reserves, as highlighted in above and, now of particular significance, largely untapped renewable options, as also shown.

With 83% of Indonesian industry and 58% of the population based on Java, unquestionably the greatest demand for energy will be located there.

As currently being applied, a policy that leans heavily on the use of coal, albeit with flue gases cleaned up as necessary, and gas, supported by judicious use of geothermal and hydro, makes sense.

Furthermore, as the chart shows, it is essential to move away from the use of oil as quickly as possible: the country is bleeding financially to the tune of billions of dollars of state revenues.

The energy subsidy forecast for 2009 is Rp91 trillion, money which could well be spent on other vital sectors of the economy.

Cost issues

IN THE PAST, THE INCREASED CAPITAL COST IN ESTABLISHING hydro and geothermal schemes has made them uncompetitive compared with using oil, and mitigated against their use.

But times have greatly changed, adding to the impact of

global concerns on fossil fuel emissions and their affect on climate change.

There is serious interest worldwide in pushing forward with solar, wind and tidal sources of energy.

However, while these could be attractive options in the Indonesian energy mix and should be so counted, they will only provide a fraction of the total requirement in the overall scheme of things.

Apart from specific city and town large energy-using communities on Sumatra and centers in Kalimantan and Sulawesi, the rest of Indonesia can well be largely served by use of renewable energy solutions, a mix of geothermal, biomass and hydro, as appropriate.

In most cases the power in outer areas is supplied, often intermittently, through generally under-maintained diesel generators, and it is not surprising that there is a reluctance to use these "money-guzzlers" except at an absolute minimum. Consequently local populations and their supporting industries often have to do without, which is not a recipe for balanced economic growth.

It is therefore pleasing to note that renewables are now fashionable for solutions in these areas. But does PLN have the capacity to cope?

There is huge pressure to deal with the backlog on Java, never mind tackle the problems in the outer islands.

Back to the nuclear option, where Indonesia also has the energy source. It is clear, however, that the country is rich in other energy resources, whether renewable or not.

It has the capacity to push ahead with these in the short term, where the pressure will continue to lie for several years to come, and nuclear can sensibly go into the reserve basket. GA

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