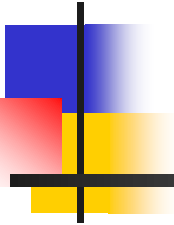


Fiji Economic Update 2009
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**The sustainable development of Fiji's
energy infrastructure: a status report**

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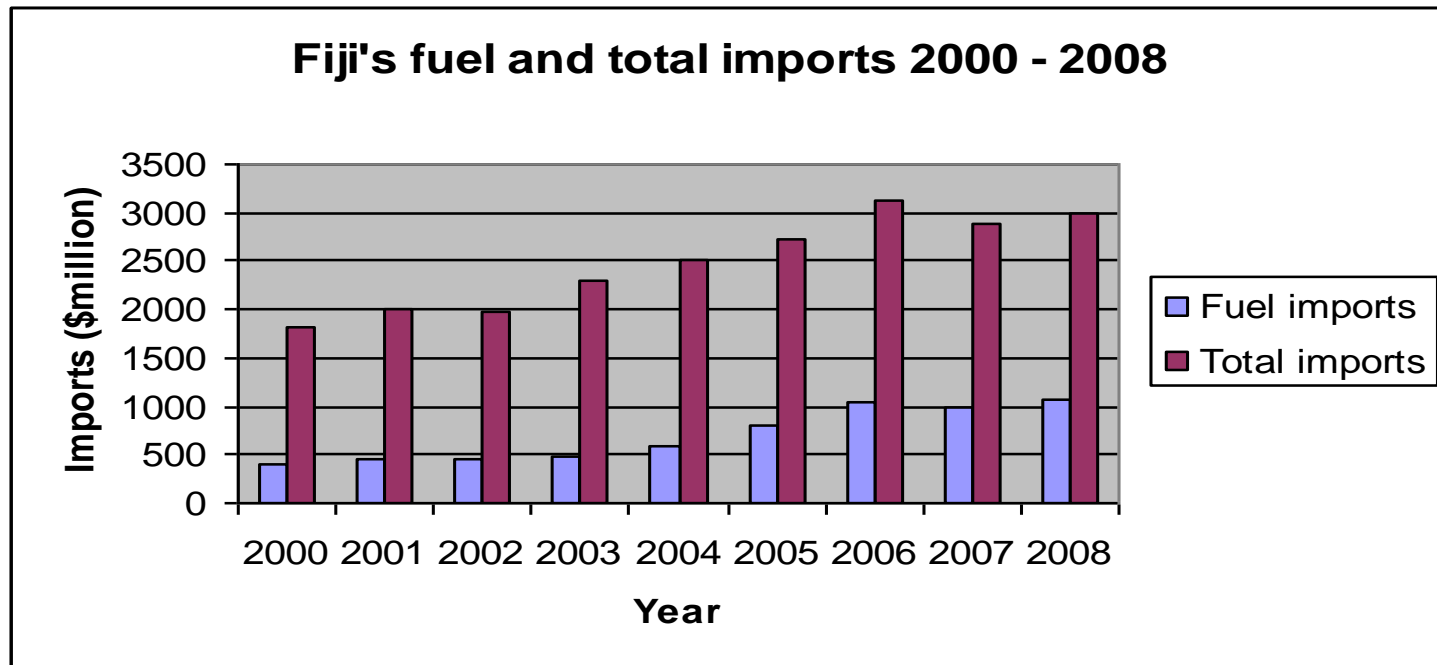


Outline

- The energy supply and demand situation as at the end of 2008
- Fiji's energy challenges: stationary vs transportation needs
- Meeting the challenges –
 - An energy strategy for Fiji
 - FEA's present status and future plans
 - Training and capacity building for the energy sector.
 - The need for an Institute of Energy
- Proposals for the Future

The energy supply and demand situation in Fiji

Fiji's fuel import



Source: Fiji Islands Bureau of Statistics, 2008a, P66



Fuel consumption by type -2007

Table 1: Fossil fuel consumption by type- 2007. Source: Fiji Islands Bureau of Statistics, 2008

Fuel type	Quantity (000 litres)	Percent of total (%)	Value F\$(000)
Motor spirit	78,753	9.55	95,429
Automotive distillate	62,231	7.55	62,208
Aviation turbine fuel	291,327	35.33	321,743
Kerosene	667	0.08	1,062
Industrial distillate	375,656	45.55	416,912
Residual fuel	16,017	1.94	12,950
Total	808,650	100	910,304



Electricity demand

Table 2: Electricity consumption by sector in 2007

Sector	Quantity (kWh)	% of total (%)	Value (\$F)
Industry	195,133,086	25.4	34,144,625
Commerce	332,656,989	43.4	68,477,240
Domestic	239,029,843	31.2	44,229,121
Other	N/A	N/A	867,757
Total	766,819,918	100	147,718,742



Biomass use

- Domestic – firewood is used mostly in rural areas (up to 50% cooking needs)
- Industry uses *bagasse* from sugarcane and *hog fuel* from timber.
- Bagasse used by the Fiji Sugar Corporation (FSC) - electrical power generation and process heat.
- Hog fuel (timber milling residue) - used by the logging industry for process heat - electrical power generation in CHPs.



Biofuel - coconut oil (CNO)

Coconut oil is a potential fuel for diesel engines. But the coconut industry has been on the decline.

Year	1977	1980	1985	1990	1995
Quantity of copra (tonnes)	30,877	22802	21,112	19,005	8761
Year	2000	2002	2004	2006	2007
Quantity (tonnes)	13,422	14,340	14,805	11,148	10,079

The challenges – an overview



- Heavy dependence on imported fossil fuel for both transportation and stationary power needs
- No indigenous fossil fuel sources
- Lack of human capacity and institutional mechanisms to develop its renewable energy resources
- Little (and scattered) data on its Renewable Energy (RE) resources



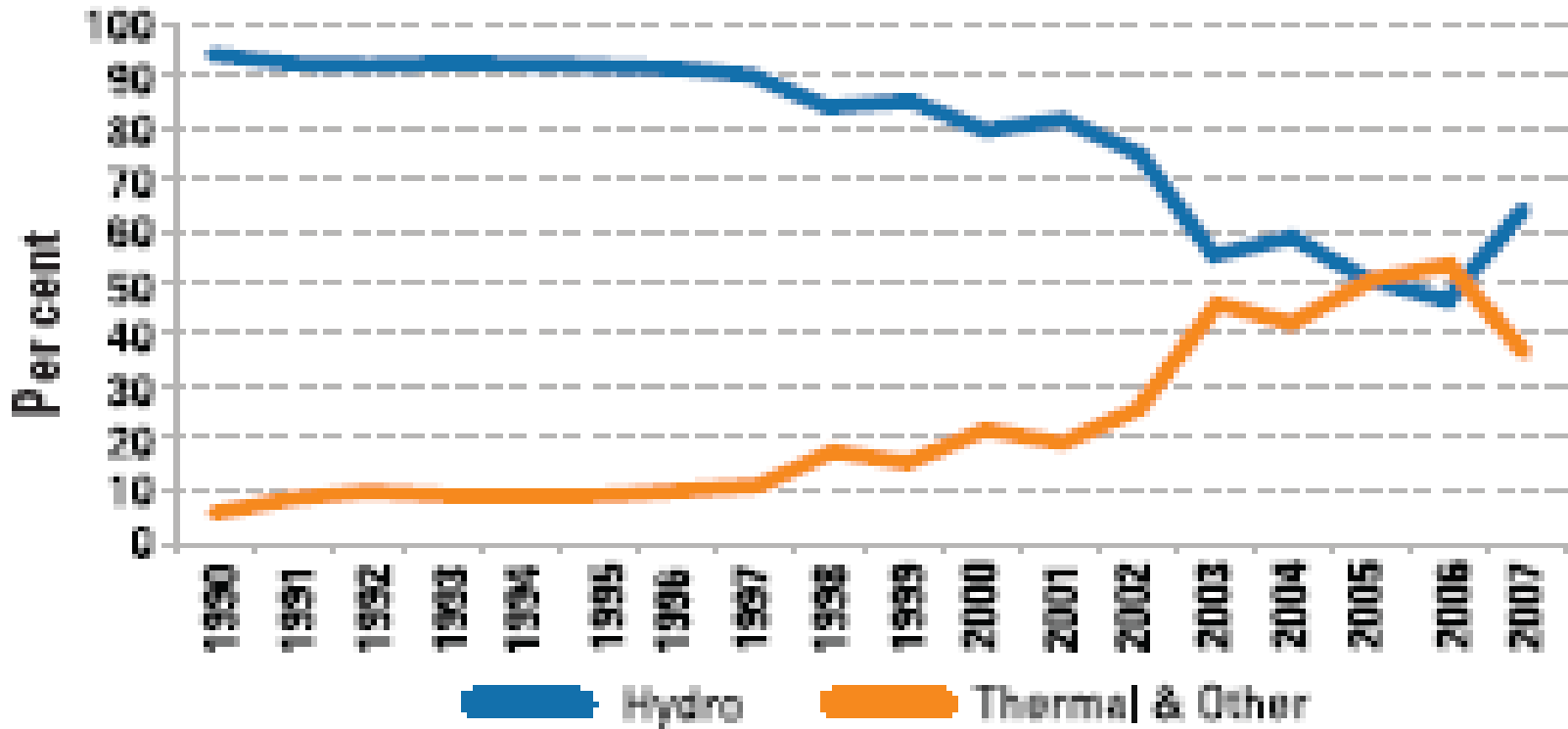
Going renewable – the only viable option

Fiji's only viable option to its energy supply problem is to go renewable.

- To develop its RE resources, Fiji needs a national energy plan, data on its energy resources, and human and institutional capacity
- What is Fiji doing to achieve these aims?

Electricity supply challenge

- Fig 2 FEA power generation: ratio of hydro to diesel (1990 – 2007) (*Source: FEA Annual report 2007*)





Electricity challenge (cont)

- FEA's challenge – making the whole country self-sufficient in power
- What is FEA doing to reduce its fossil fuel dependency?



Rural energy needs

- Large rural areas remain without grid electricity
- Fiji Department of Energy (FDoE) estimates that 40,000 rural households in need of electrification
- What is the FDoE doing to meet this goal?



Transportation needs

- Bio-diesel and blended coconut oil (CNO) alternatives for diesel engines
- Ethanol-petrol blends for spark-ignition (petrol) engines
- What is Fiji doing to develop these biofuel alternatives to fossil fuel?



Meeting the challenges – Fiji's National Energy Policy (NEP)

- The NEP – approved 21 Nov 2006
- a common framework for the development of energy by both the public and private sector
- Four strategic areas:
 - National energy planning
 - energy security
 - power sector
 - renewable energy



Electricity generation and distribution

FEA's generation capacity on Viti Levu at the end of 2008 consisted of

- older diesel power stations and
- Monasavu hydro scheme, (80 MW);
Wainikasau hydro-station (3.0 MW); New
caterpillar generators at Kinoya (7.45 MW);
Nadago hydro scheme (2.8 MW) and Butoni
wind farm, consisting of $37 \times 0.275 \text{ MW} = 10$
MW Vergnet wind turbines

Butoni wind farm



Butoni wind farm (cont.)





FEA's plans for the future

- The 40 MW Nadarivatu hydropower scheme initiated in March 2009
- A 3.0MW Biomass plant Deuba and a 2.8 MW biomass plant planned for Savusavu are on hold



Rural energy needs – (FDoE)

- **Sustainable Energy Financing Project (SEFP)**
- An FDoE/ANZ/World Bank project launched 18 Dec 08
- to finance solar PV, pico-hydro, biofuels (coconut oil) for individual households, micro-small businesses, and energy sector suppliers

Eg of pico-hydro – Savu village, Naitasiri



Pico-hydro: the turbine-generator system



Pico-hydro: showing Pelton Wheel turbine and jet



Pico-hydro: storage batteries





Prospects for a biofuel industry in Fiji

- Coconut oil and bio-diesel blends from copra (no clear picture – the only thing clear is that the copra industry is declining!)
- Ethanol from sugar – FSC's joint venture with Sojitz corporation of Japan (no recent word)
- Ethanol from cassava – the Chinese initiative
 - Vanua Levu (on hold)



The Future

We need to translate the National Energy Policy into an

Action Plan that

- ***evolves with time***
- ***contains real measurables/deliverables***
- ***anticipates changes in demand***
- ***assesses threats to supply etc.***



NEP (cont)

That is

*we need to develop the concept of **an Energy Systems Life Cycle**, for the development and maintenance of our energy infra-structure.*



Training, capacity and research

- Need to
 - a) train human resources
 - b) build a knowledge base and create new knowledge through active research
- a) Need to train persons for various levels including
 - technical/operator level staff
 - designers/engineers
 - Managers
 - FIT now has a *Diploma in Renewable Energy Technologies*, but it only caters for first category



Training and capacity (cont2)

A full program for managers/designers should include training in

- **Situational Analysis**
- **Energy Demand and RE Resource Assessment**
- **Systems Design**
- **Construction and Implementation**
- **Testing and Review**
- **Social and Environmental Impacts**
- **Project Management**



Training and capacity (cont3)

*We need a complete **Bachelor of Renewable Energy and Environment** to provide relevant training to renewable energy scientists, consultants and managers.*



RE research and database

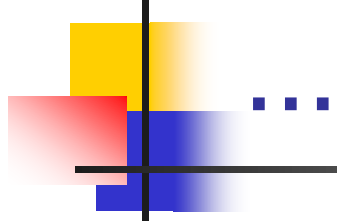
b) We need

- A central venue that will collect, analyse and disseminate data on energy for informing decision-making
- And also create new data through active research



Research needs (cont)

*We need an **Institute of Energy** to guide and inform decision-making on all energy issues*



*Thank you
For your attention!*