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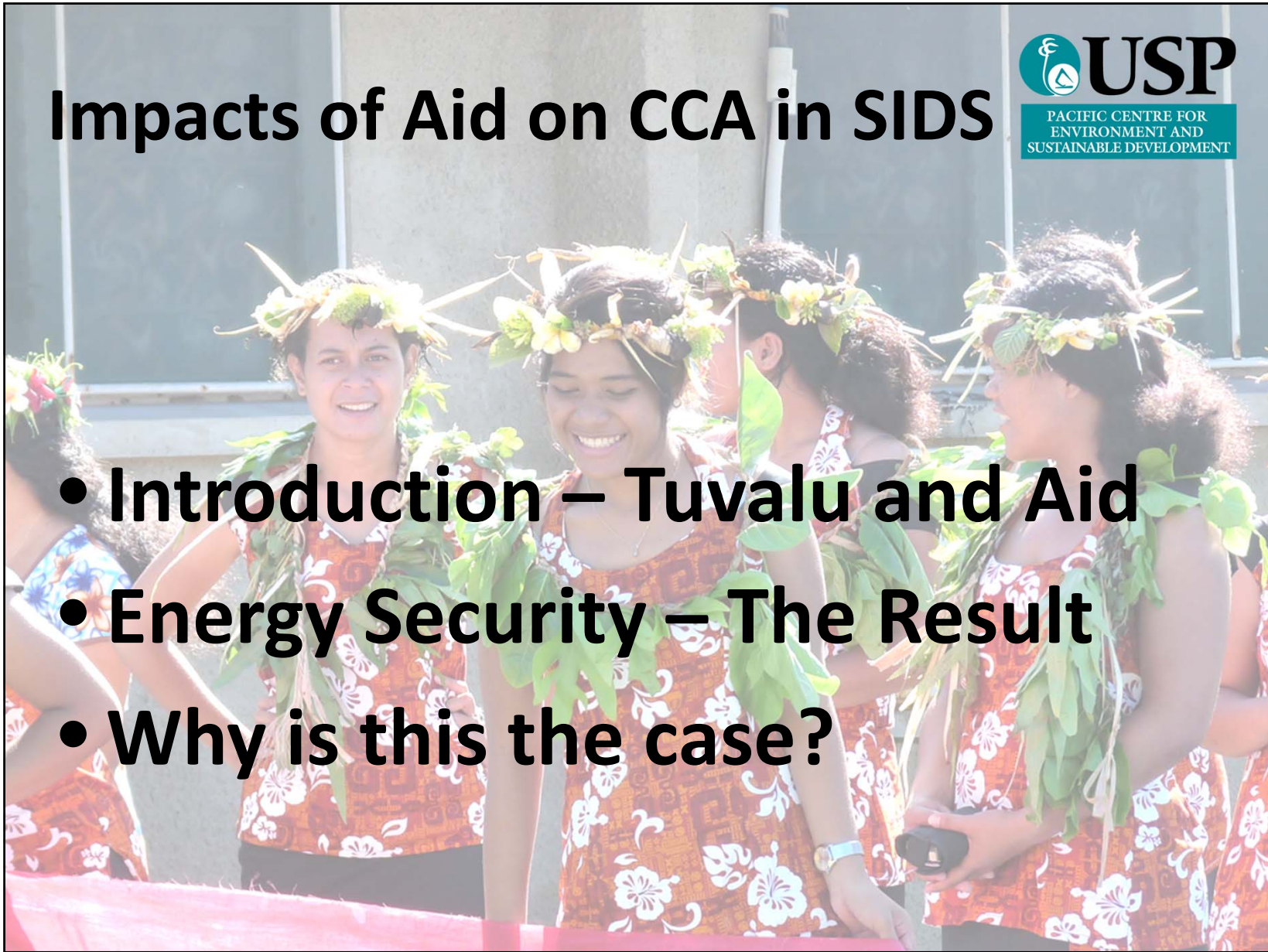
# ***The Impacts of International Aid for Climate Change Adaptation on Small Island Developing States (SIDS) using Tuvalu as a Case Study***

**Sarah L Hemstock**

# Impacts of Aid on CCA in SIDS



- Introduction – Tuvalu and Aid
- Energy Security – The Result
- Why is this the case?

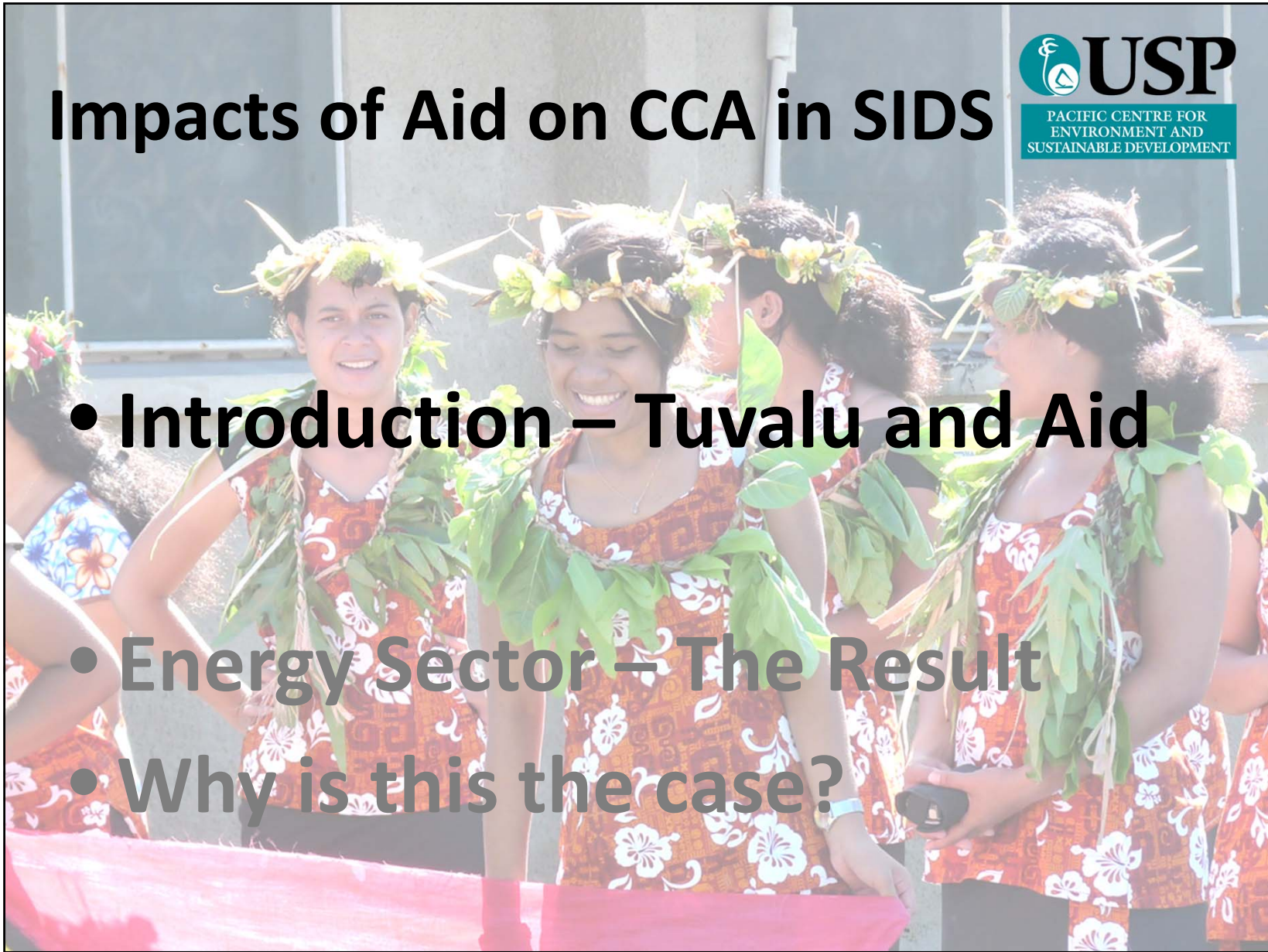




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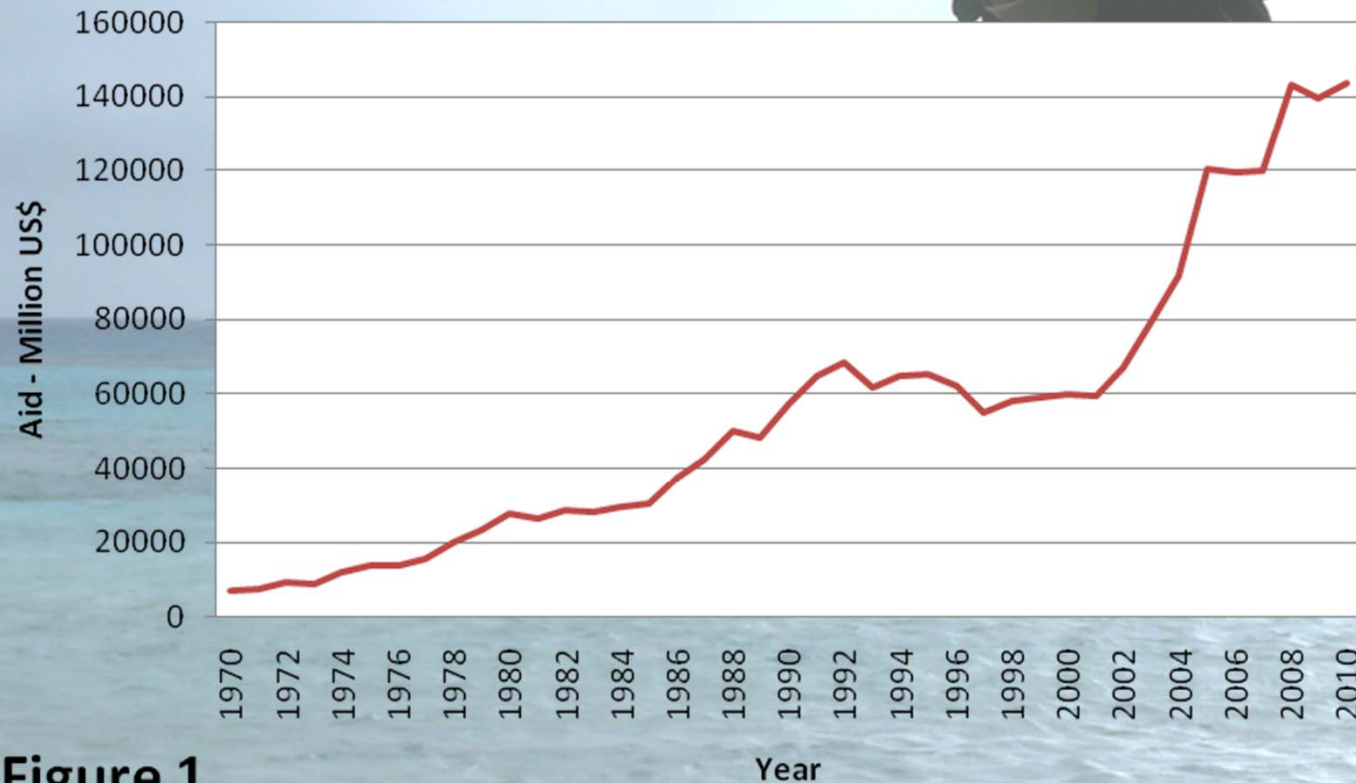
# Preconceptions\*



- **Aid?**
- **Donor/Recipient?**



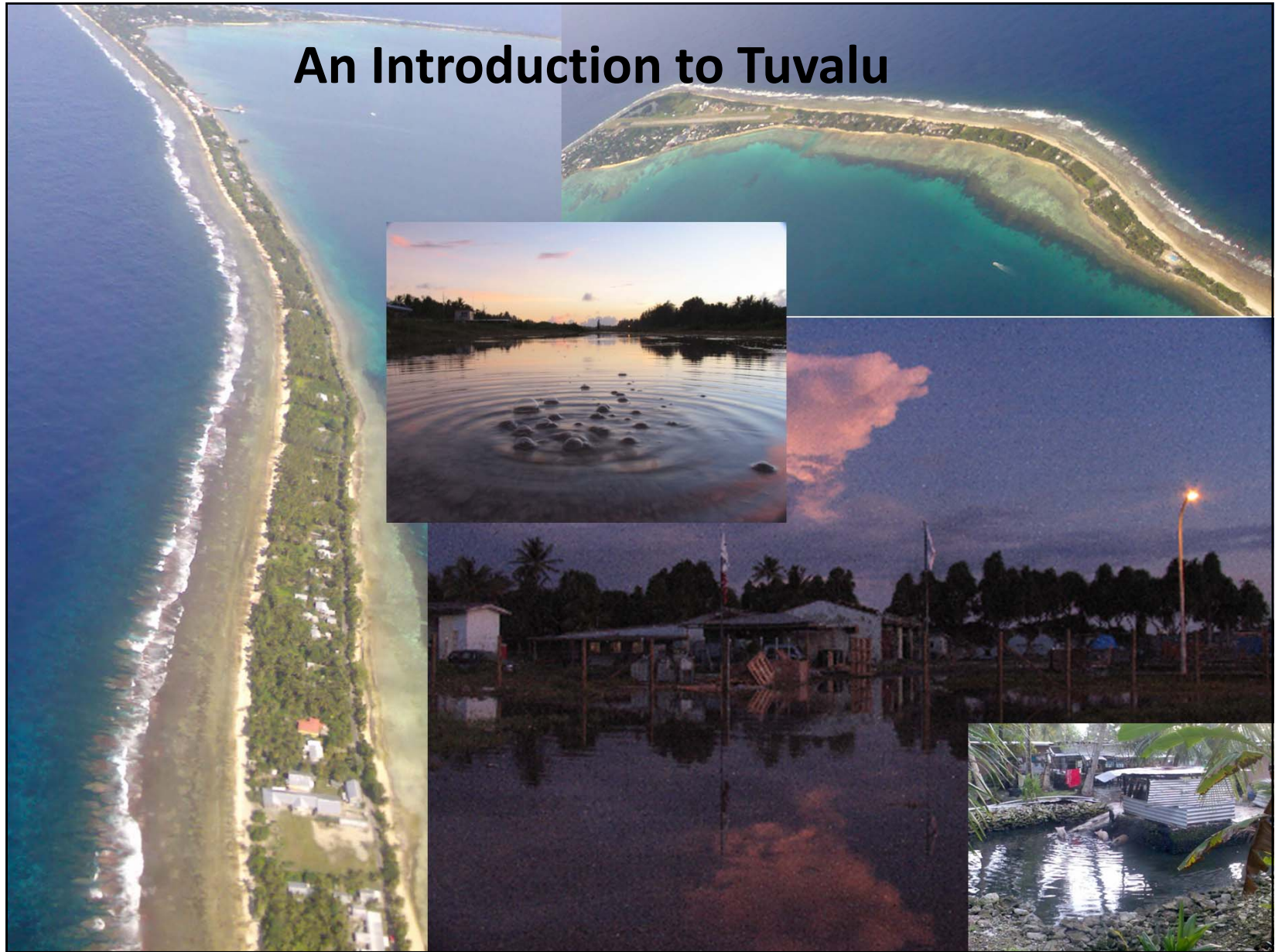
# Development aid dispersed internationally from all donors (total million US\$) from 1970 to 2010



**Figure 1**

Source: Hemstock & Smith, 2012; OECD international development statistical database (<http://stats.oecd.org/qwids>)

# An Introduction to Tuvalu







Housing situation in Tuvalu



# Problems



- **A weak economy**
- ***The weight of imports- Lack of exports***
- **Exports: 109 413aus\$**
- **Imports: 18 000 000 aus\$**
- **Imports are 170 times greater than exports!!!!**
- **This situation is unsustainable and, without aid the economy will collapse in the short term.**
  
- **A difficult agriculture** – poor soil, salt contamination.
- **Waste management problems** - high population density - 420 inhabitants per km<sup>2</sup> (and 1600 in Funafuti);
- **Oil dependent economy – increase in oil price.**
  
- **All these problems degrade the environment.**

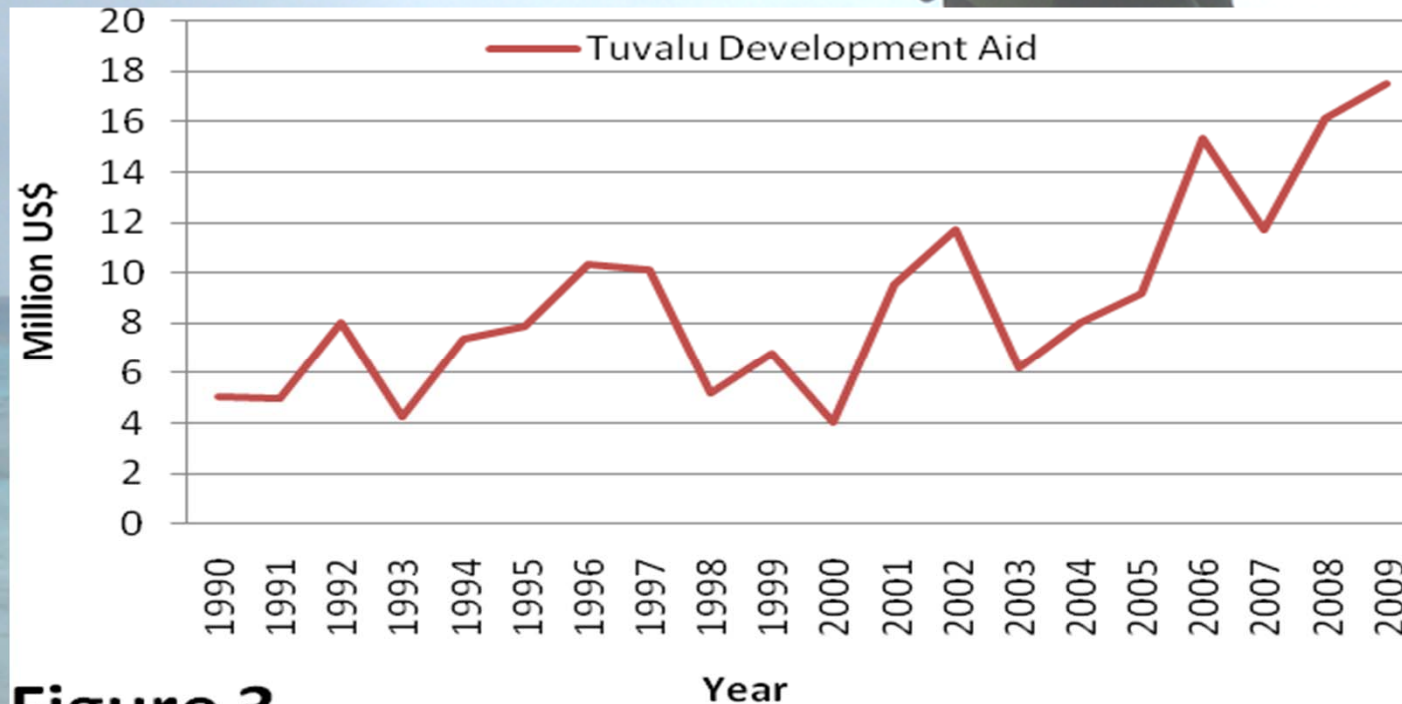


## Economic overview of Tuvalu

<b>Year</b>	<b>2000</b>	<b>2003</b>	<b>2005</b>	<b>2008</b>
<b>GDP: Gross Domestic Product (million current US\$)</b>	<b>12</b>	<b>-</b>	<b>25</b>	<b>32</b>
<b>Development aid contribution to GDP (million US\$)</b>	<b>4</b>	<b>6</b>	<b>9</b>	<b>16</b>
<b>Development aid as a % of GDP</b>	<b>33</b>	<b>-</b>	<b>36</b>	<b>50</b>
<b>GNI: Gross National Income per capita (current US\$)</b>	<b>1204</b>	<b>-</b>	<b>2383</b>	<b>3213</b>
<b>Available average income per capita (US\$)</b>	<b>806</b>	<b>-</b>	<b>1525</b>	<b>1607</b>
<b>Exports (million US\$)</b>	<b>-</b>	<b>0.15</b>	<b>0.1</b>	<b>0.1</b>
<b>Imports (million US\$)</b>	<b>-</b>	<b>24</b>	<b>18.5</b>	<b>26</b>

Sources: Hemstock & Smith 2012; <http://data.un.org/CountryProfile.aspx?cname=Tuvalu> (World Statistics Pocket Book, 2009); (UNCCA, 2005); (Chung, 2006); OECD international development statistical database (<http://stats.oecd.org/qwids>); (GoT, 2008)

## Development aid dispersed to Tuvalu from all donors (total million US\$) from 1990 to 2009



**Figure 3**

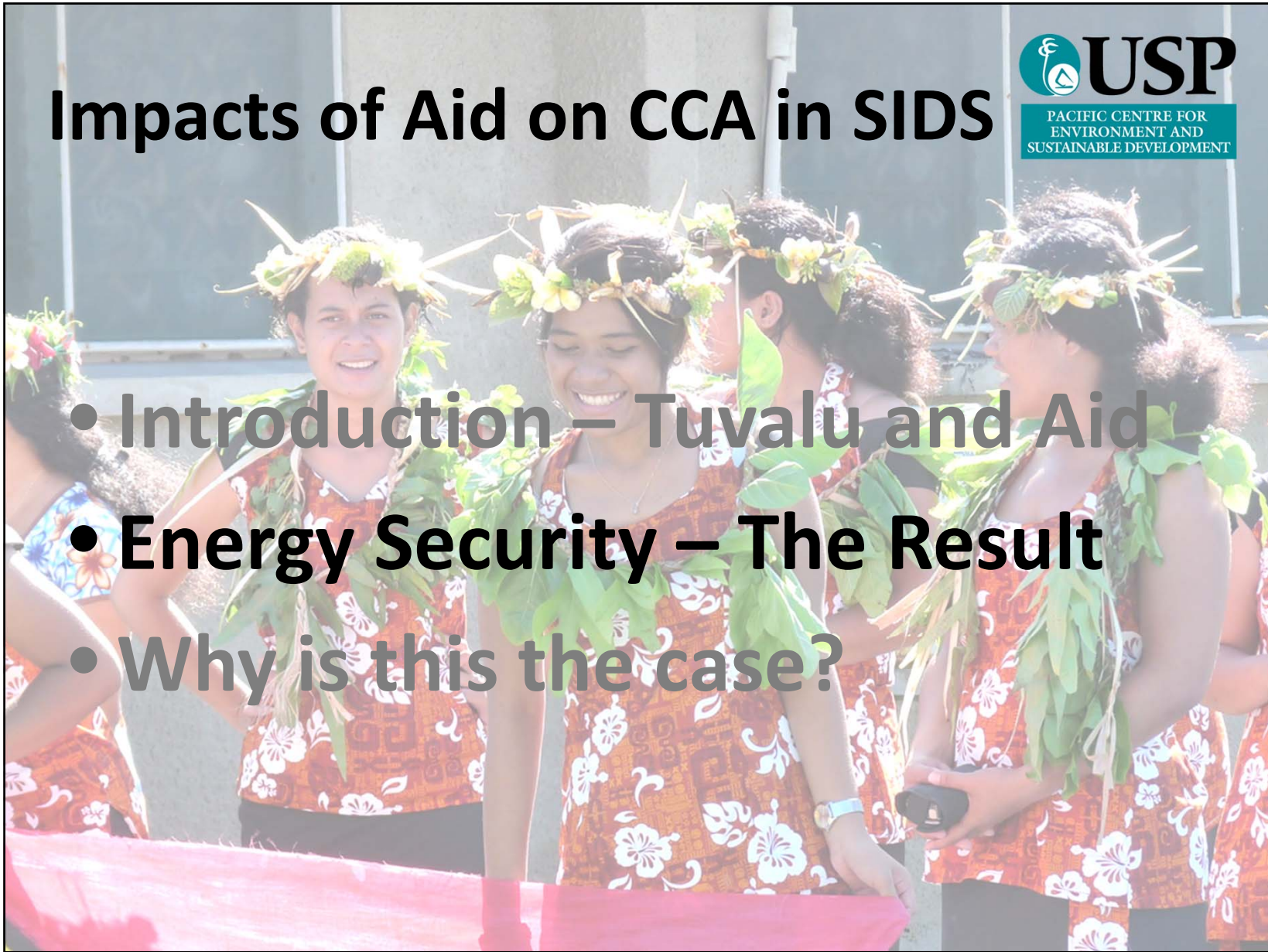
Source: Hemstock & Smith, 2012; OECD international development statistical database (<http://stats.oecd.org/qwids>)



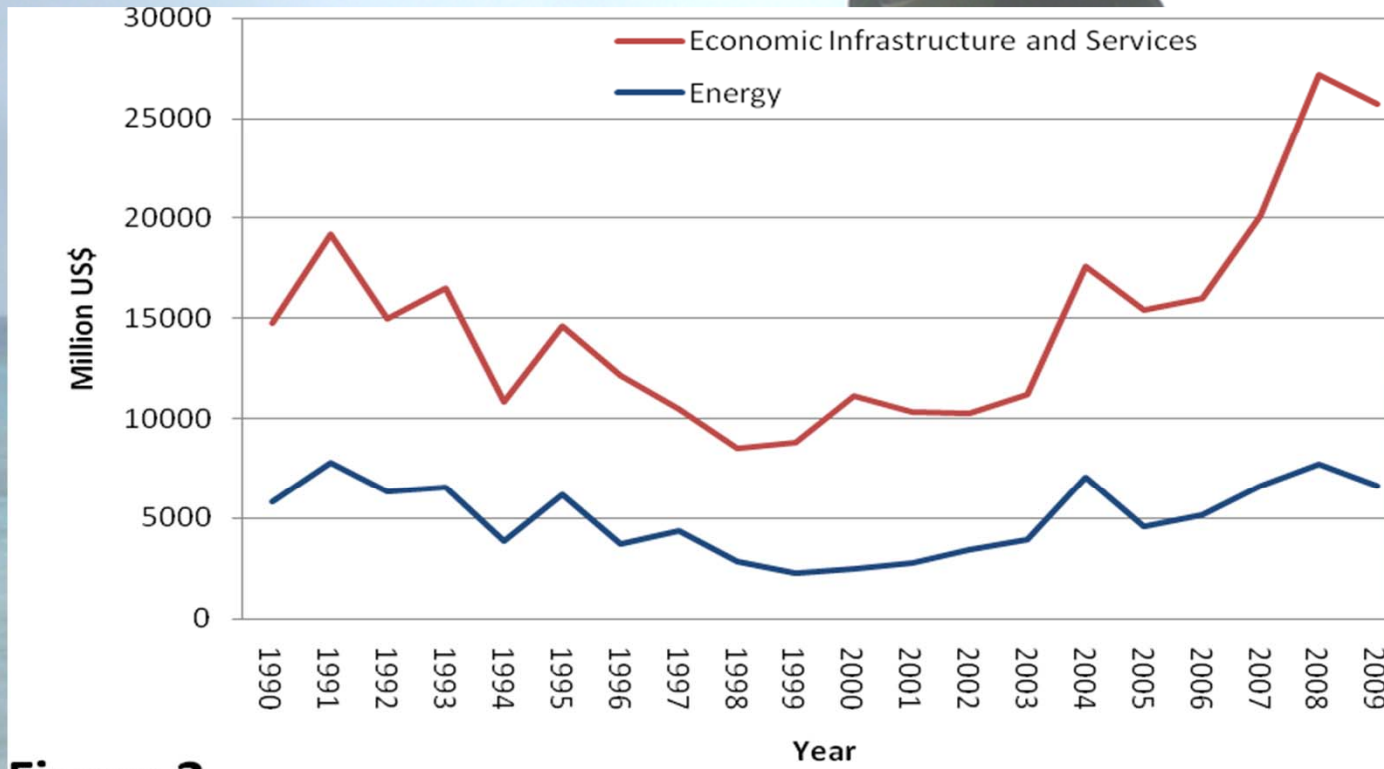
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# Development aid committed for economic infrastructure and services



**Figure 2**

Source: Hemstock & Smith, 2012; OECD international development statistical database (<http://stats.oecd.org/qwids>)



# Aid for EIS

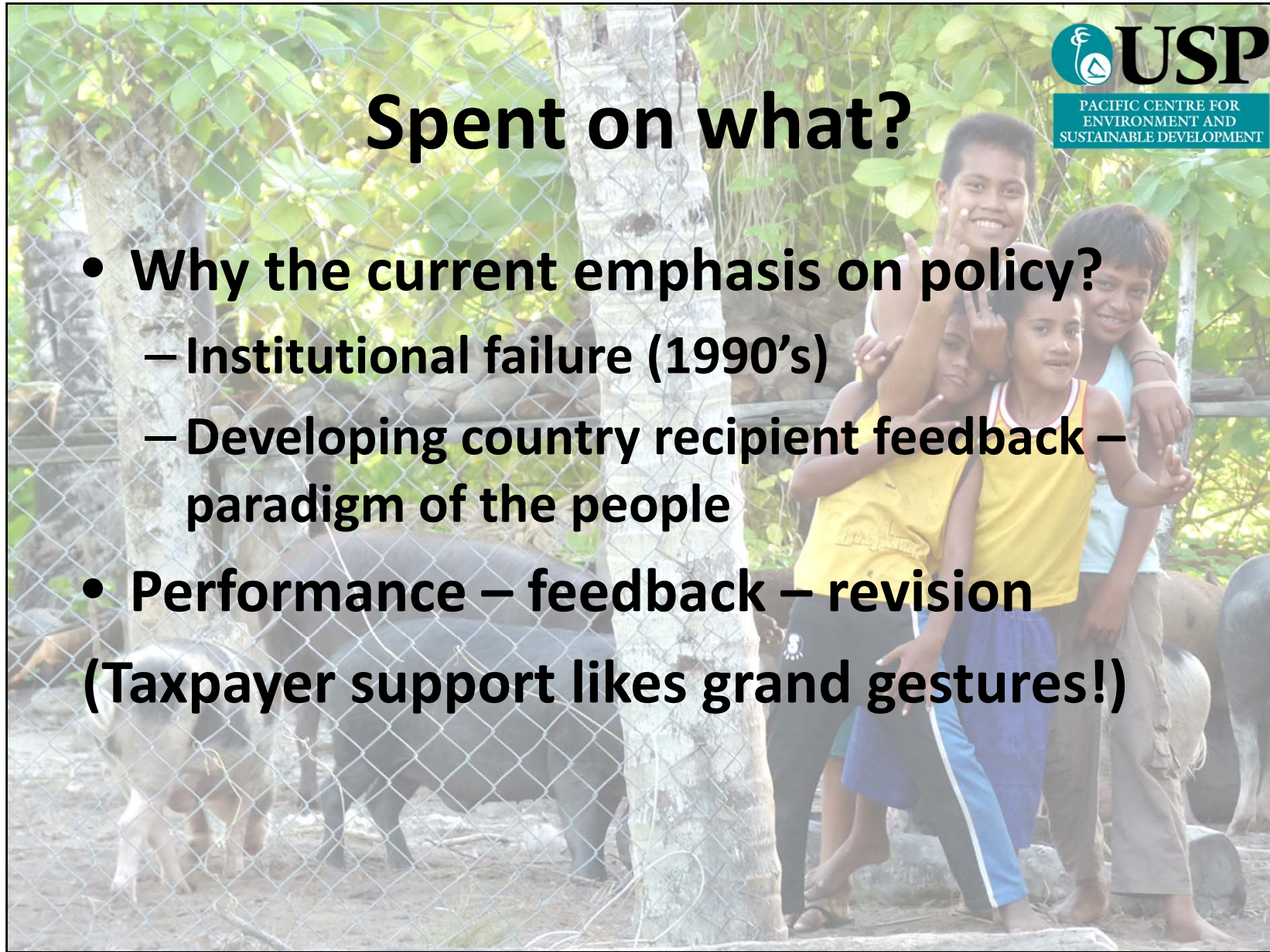


- **The OECD “Economic Infrastructure and Services”** (economic infrastructure, transport and storage, communications, energy, banking and finance, business and other services).
- **1990 to 2009, aid committed accounted 29% (in 1991) and 12% (in 2005) of total international aid.**
- **1990-2009, aid for “Energy” has accounted for between 11% (in 1991) and 4% (in 2005) of total international aid.**



# Spent on what?

- **Why the current emphasis on policy?**
  - Institutional failure (1990's)
  - Developing country recipient feedback – paradigm of the people
- **Performance – feedback – revision**  
**(Taxpayer support likes grand gestures!)**





## Targeted Aid



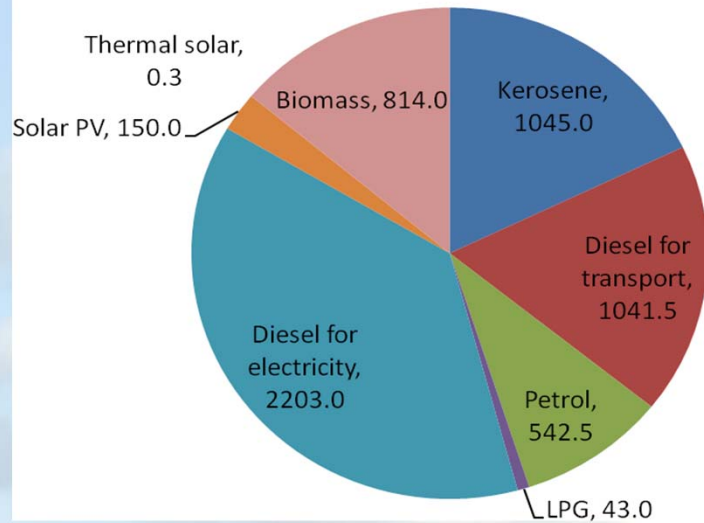
- In recent years, aid for “energy services” has been for policy development. (PIESD; PIEPP; PIPEPSAP – US\$1.8M) Implications?\*
- Yu and Taplin have argued that energy security issues have not been prioritised with a resulting negative impact on ‘social and economic development and environmental protection’ (Yu and Taplin, 1997)



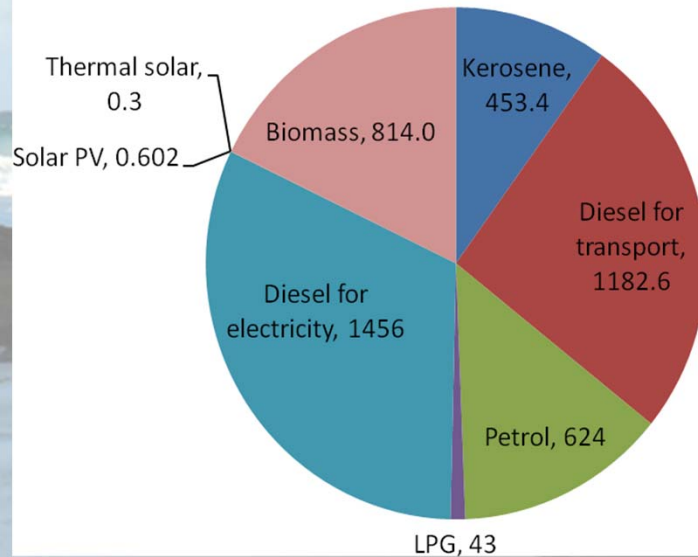
# Implications of targeted aid for the energy sector.....



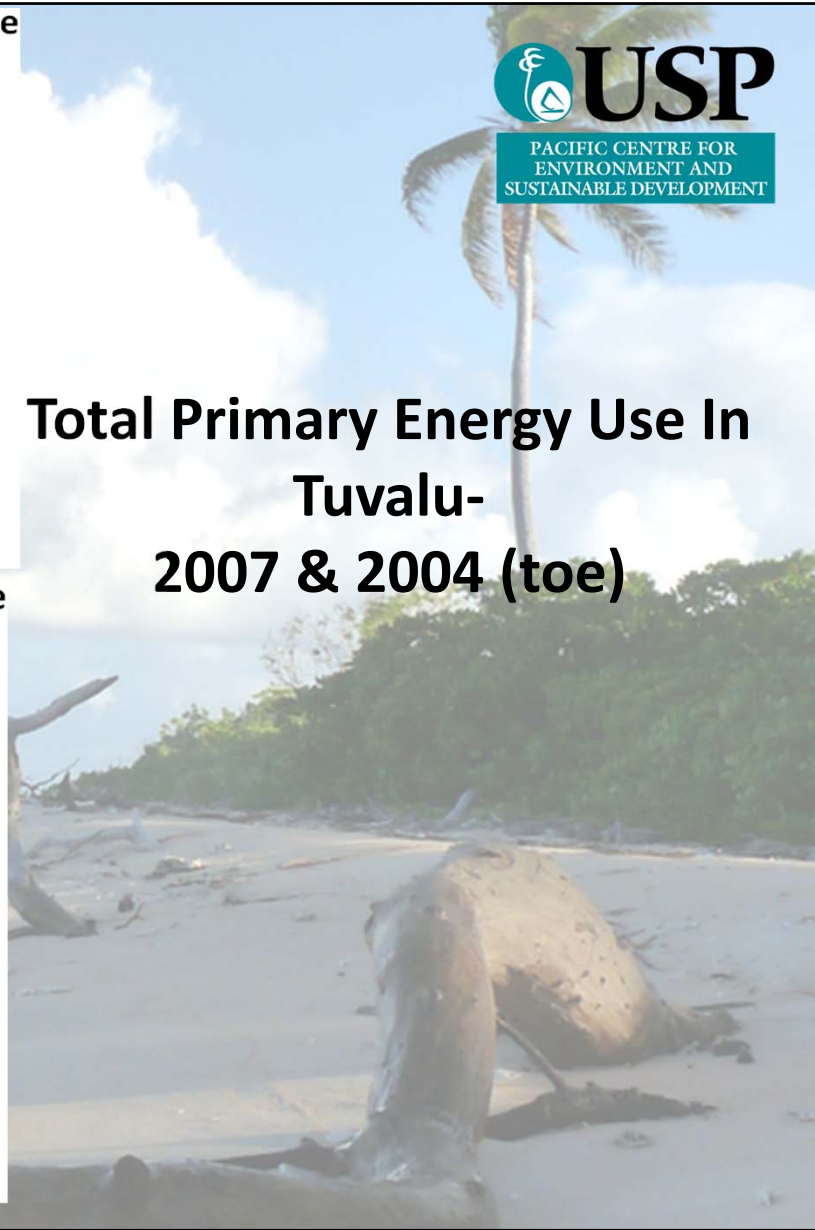
**Primary energy consumption 2007 in toe**



**Primary energy consumption 2004 in toe**



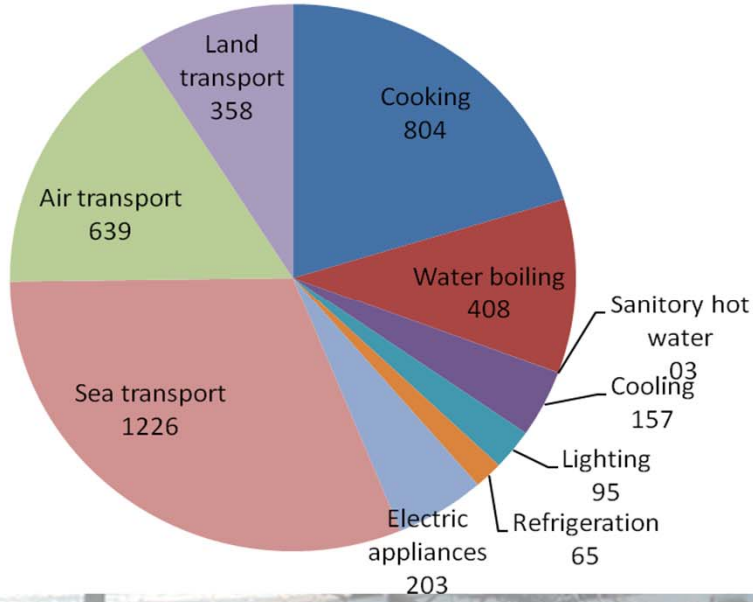
## Total Primary Energy Use In Tuvalu- 2007 & 2004 (toe)



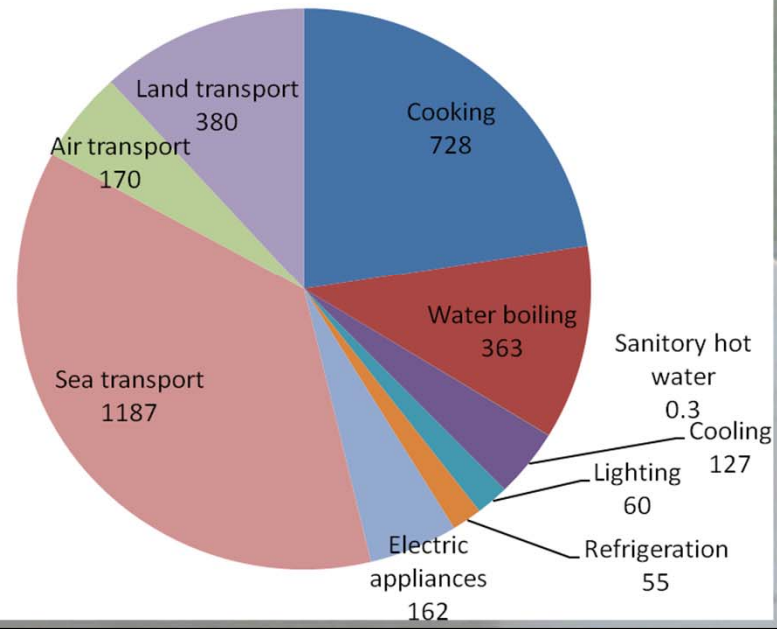
# Total Primary Energy End Use In Tuvalu 2007 & 2004 (toe)



Final energy consumption 2007 by end-use in toe

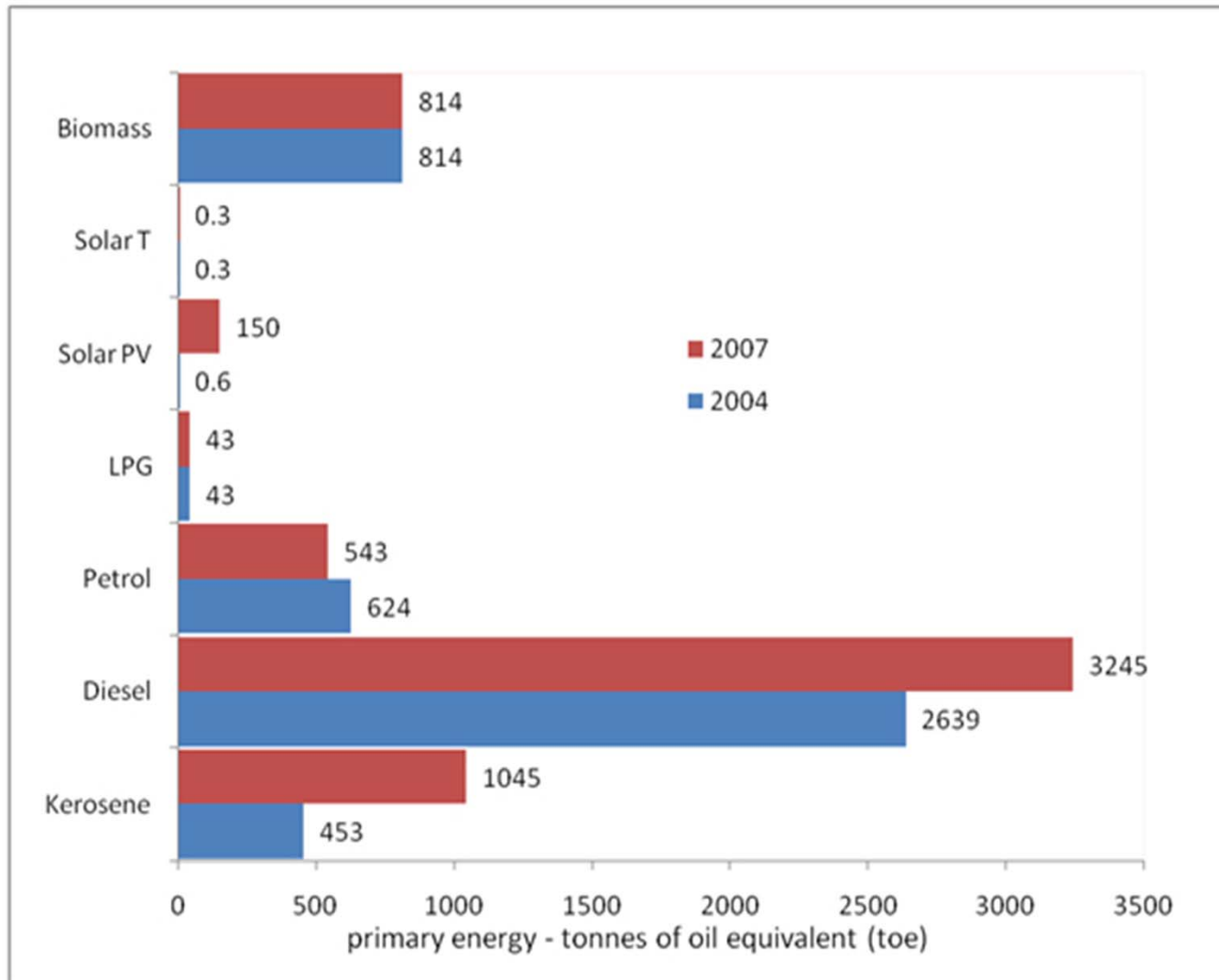


Final energy consumption 2004 by end-use in toe





**Figure 4: A comparison of primary energy supply in Tuvalu for 2004 and 2007**



## Energy use in Tuvalu – increasing demands



- Despite NGO efforts and the efforts of regional programmes, fossil fuel use in Tuvalu has increased dramatically from 2004 to 2007!!!
- An increase in fossil fuel use of 21%

Primary Energy Consumption	2004 (ktoe )	2007 (ktoe )
Oil	3.8	4.8
Biomass	0.8	0.8
Solar	0.0	0.1
Total	4.6	5.8
Total per capita	0.4	0.5



## Energy use in Tuvalu – increasing demands



- **Currently indigenous sources provide 17% of primary energy consumption (biomass 14%; solar pv 3%). Wind potential is being assessed.**
- **Fossil fuels provide 83% of primary energy consumption, so Tuvalu is close to being a totally oil dependent economy.**
- **However, biomass still provides the majority of domestic energy in Tuvalu (64%) – with some households being up to 90% biomass energy dependent!! Energy poverty?**

## Why isn't renewable energy provision keeping pace with energy demand?



- Tuvalu's energy sector is aid dependent – subsidies are in place which encourage fossil fuel use.
- Regional efforts to encourage renewables place more emphasis on policy and market development rather than practical help and installations.
- SIDS do not follow the same “market” rules as larger nations – there is no economy of scale!



## Renewables will become a bigger player when...



- **Aid and subsidies are more fairly targeted.**
- **Emphasis moves away from “market development” and towards practical solutions which give autonomy to SIDS to repair and maintain installations.**
- **Aid from multi-lateral and bi-lateral donors is actually in-line with newly developed regional energy and environmental policies.**

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# International partnership – a relationship of equals?



- No legal or contractual obligations – donors may make public commitments
- Who is determining strategic priorities?
- Aid agenda : project cycle disparities....
- Effects of targeted funding streams? (e.g.UNDP small grants)
- NGO's – size matters!
- Community participation – “tick in the box” and shift the responsibility
- Ultimate access – who writes the applications?

## Example – Tuvalu donor – recipient relationships



- Donor priorities – target focused... easy projects... (ADB, EU, UNDP/GEF - waste)... NAPA & EU Water Project
- “Technical assistance”... EU 127054...
- Novelty & community participation



## More Technical Assistance



- Up to 35% of “AID” goes back as “Technical Assistance”
- “This report is a working technical document and does not constitute a commitment on the part of any of the partners involved in the development of the initiative” [UNDP, 2006a]



# Small – scale solutions to food and energy security



## Tuvalu's Solutions – from analysis of problems



**The majority of Tuvalu's imports are food & oil so we should look at food production in Tuvalu & reduction of oil imports.**

### **How?**

**By using Tuvalu's natural resources.**

**Solar (PV & solar thermal), Wind, & Biomass (coconuts, charcoal, and organic waste).**

**Turn waste to energy & compost (biogas digestion and gassification).**

**Use compost to grow food (family garden programme).**

**Also: REDUCE NEED: Energy efficiency, recycling packaging & reducing plastic packaging.**

## From 2005: Small is Beautiful in Tuvalu



2005/2006 : first step: Tuvalu national energy study - recommendations were presented to cabinet in 2006 and discussed in Parliament – all project activities were identified and requested by Tuvaluan communities

### 2006-7 : Tuvalu national RET Training Centre at TMTI

This Renewable Energy Technology Training Centre was the main recommendation of the 2005 Energy Survey since training was the activity the most requested by communities. And this centre would form a base – with experience engineers and workshop facilities, so that any wider implemented renewable technology would have tech-support in Tuvalu, rather than relying on outside help... Focusing first on Biomass, it began activities with Biogas in 2006.



## Objectives of the Tuvalu National Renewable Energy Demonstration and Training Centre



The **overall objective in Amatuku** is to provide an ongoing demonstration and training facility where:-

- All Tuvaluans may come to learn and get hands-on experience to make sure future projects are sustainable.
- People trained at Amatuku will become instructors & promoters in their own communities to pass on their knowledge.
- Community members are trained as technicians for basic systems maintenance and repair.
- A valuable training resource for Tuvalu Maritime Training Institute students
- Practical maintenance Hub for Tuvalu



# Resource Availability



## Biomass Energy Identification:









# Resource Availability



## Biomass Energy Identification:





## Why Focus first on Biomass ?

**ALOFA TUVALU**  
small is beautiful

- Using a combination of RET is a prerequisite to become fossil fuel free.
- solar and wind can't answer all needs – they are intermittent
- 50% of fuel import are for Boats – can use biodiesel...
- 80% of waste is organic and has a value as an energy source
- Biomass is simple and kills several birds with one stone :
  - improve energy security and balance of trade
  - Job creation and income generation
  - reduce organic waste
  - provide an educational resource
  - improve health
  - increase food production – family gardens

## Biomass offers a variety of environment solutions

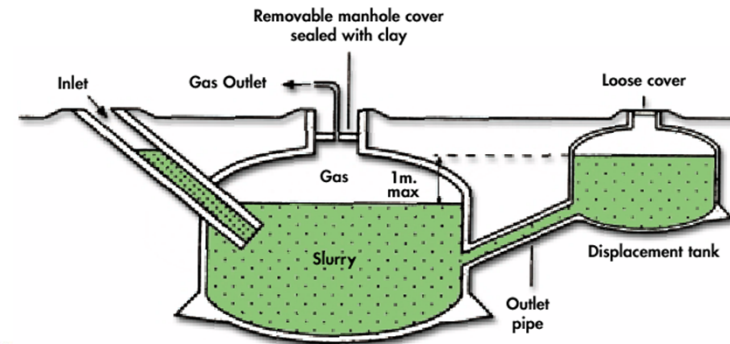


- Biogas produces energy & compost, it also reduces lagoon and soil pollution
- Gasification Turns organic waste into energy and reduces landfill
- Biodiesel from coconut oil can reduce dependency on imported oil for transportation. It can be produced in each island, creating jobs, & supply boats or generator for electricity



## 2006/2007: BIOG piggery and digester

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8 weeks of construction, 4 people  
fully trained,  
4 onsite workshops,  
198 participants,

... Along with awareness raising campaigns about energy efficiency, renewable energy, climate change, composting, organic seeds and waste..., through meetings & daily radio programs...

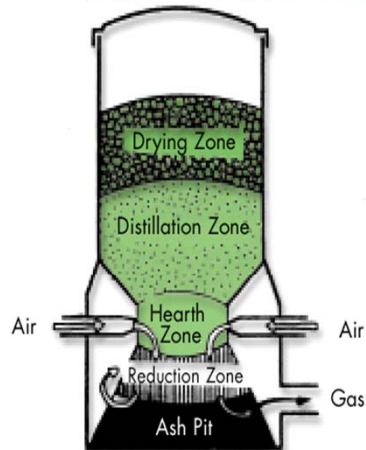




## 2008:introduction to biodiesel, ethanol, gasification



- Public demonstrations of
- -copra biodiesel production
- - Todi ethanol production



- Gasification workshop
- with a unit built by the TMTI engineers with material available on site





2008 - 2009



**Biomass Use... For Energy:**

2008 – bench top demonstration



2009 – Fuel pod installed at TMTI





## 2009 Biodiesel & Gasification implementation



- 3 weeks of Training
- 2 public workshops

- study on viability of ethanol production and coconut replanting needs for biodiesel began



Plus solar ovens and electric motorbike for demonstration



# 2010 – first community biogas plants (Nanumea)

Digesters designed by Sikeli







# Tofa

Vinaka and fokafeti lasi