



Vanuatu
Dipatmen blong Klaemet Jenis



ENEJI SEKTA



Pablikesen mo Print blong Dipatmen blong Klaemet Jenis, Vanuatu

ENEJI SEKTA

Folem IPCC-2006, Eneji Sekta hemi stap long plante samting we i blong explo mo yusum ol praemari sos blong eneji, mekem ol praemari sos blong eneji i kam olsem ol mo yusful fom blong eneji insaed long ol rifaeneri mo ol paoa plant, distribusen mo transmisen blong fuel, mo yus blong fuel difren kaen mashin we umi save muvum mo olgeta we oli stap nomo long wan ples. Ol emisens we oli kamaot long ol aktiviti ia i save kamaot long fasin blong bonem fuel mo olsem ol fugitive emisens (emisens we i kamaot nomo be i no bonem fuel). Ol GHG emisens we i kamaot long Sekta blong Eneji i kavremap olgeta GHG emisens we i kamaot long fasin blong bonem fuel mo ol fugitive emisens long ol kategori ia:

- Ol Aktiviti blong Bonem Fuel long Ol Indastri blong Eneji (Elektrisiti mo Prodaksen blong Hit - Generesen blong Elektrisiti, Kombaen Hit mo Paoa Generesen (CHP), Ol Heat Plant, Rifaeneri blong Petroleum, Prodaksen blong Solid Fuel mo Ol Nara Eneji Indastri).



- Ol Indastri blong Prodaksen mo Konstraksen (Iron mo Stiil, Non-ferrous Metals (ol metal we I nogat iron long hem), Kemikal, Pulp, Peipa mo Print, Proses blong mekem ol kakae, Beverij mo Tobako, Non-metallic Minerals (ol mineral we I nogat metal long hem), Transpot Equipmen, Masinari, olgeta fasin blong karem aut stone mo mineral andanit long graon olsem mining mo quarrying, Ol Wood mo Ol Prodaksen blong Wood, Konstraksen, Textile mo Leather, Ol Indastri we oli no spesifae).



- Transpot (Sevil Aviasen - Intanasonal Aviasen, Domestik Aviasen, Rod Transpot – Ol car, Light-duty Trak, Heavy-duty Trak mo Bas, Motobaik, Evaporativ Emisens long Ol Vehicle, Urea-based katalis, Ol Reilwe, Navigesen long Wota - Intanasonal mo Domestik, Ol narafala Transpot).



- Ol Narafala Sekta (Komesel/Institusene, Residensel, Agrikalja/Forestri/Fising/Fam blong Fis, Ol Stationary, Ol movable vehicle mo masin, mo Fising (mobile combustion)).
- Olgeta we i no Spesifae (Stationary, Mobile - aviasen mo water-borne mo ol narafala).
- Ol Fugitive Emisens long Fuel (Solid Fuel -fasin blong minem ol kol mo how blong usum, Oil mo Najurel Gas, mo Ol Nara Emisens blong Prodaksen blong Eneji).
- Transpot mo Storej blong Kabon Daeoksaed (Transpot blong kabon daeoksaed, Injeksin mo Storej mo Ol narafala).



Be, olgeta kategori, sab-kategori mo ol aktiviti we oli bin listem ia i no aplae long Vanuatu. Long Vanuatu, ol GHG emisens long Sekta Eneji oli kamaot nomo long fasin blong bonem fuel long ol aktiviti blong Eneji Industri (we i mekem Elektrisiti), Ol Industri blong Prodaksen mo Konstraksen, Transpot (Sevil Aviasen, Navigasen long Wota, Rod Transpot), mo Ol Narafala Sekta (Institusenel, Komesel mo Residensel).

Long yia 2007 kasem 2015, blong mekem inventri blong GHG emisens long sekta ia, oli yusum nomo ol aktiviti blong bonem fuel blong estimetem ol emisens ia.

Sekta blong Eneji hem i stap mekem plante GHG emisens long Vanuatu. Ol emisens ia oli kamaot long fuel (fosil fuel o petroleum), mo long ol aktiviti blong bonem fuel insaed long ol indastri blong Eneji (mekem Elektrisiti), Ol Industri blong Prodaksen mo Konstraksen, Transpot (Rod, Domestik Aviation mo Navigasen long Wota), mo Ol Narafala (Komesel, Institusenel mo Residensel). Ol emisens ia oli kamaot plante taem oli bonem fosil fuel o petroleum.



Olgeta Mein Gas long Sekta blong Eneji

Taep blong Gas	Kemikel Fomula	GWP (ARS)
Miten (Methane)	CH ₄	28
Nitros Oksaed (Nitrous Oxide)	N ₂ O	265
Kabon Daeoksaed (Carbon Dioxide)	CO ₂	1

Ol meja mo daerek GHG gas long Sekta blong Eneji hem i Kabon Daeoksaed (CO₂), mo ol smol non kabon daeksoaed emisens hem i Miten (CH₄) mo Nitros Oksaed, N₂O).

OL SAB-SEKTA WE OLI ESTIMETEM LONG VANUATU

Ol emisens blong ol sab-sekta long sekta blong eneji oli estimetem long ol aktiviti blong bonem fuel (fosil fuel o petroleum) we oli kamaot long Indastri blong Eneji (Mekem Elektrisiti), Ol Indastri blong Prodaksen mo Konstraksen, mo Transpot (Rod, Domestik Aviasen mo Navigasen long Wota). Ol emisens we oli kamaot long Intanasonal Aviasen mo Intanasonal Maritime tu oli estimetem, be oli no inklud long GHG emisens blong Vanuatu. Oli putum ol samting ia insaed long analisis olsem wan memo item (not). Ol narafala emisens oli kamaot long ol Komesel, Institusenel mo Residensel sekta. Plante long ol emisens ia oli kamaot long fasin blong bonem fosil fuel o petroleum.

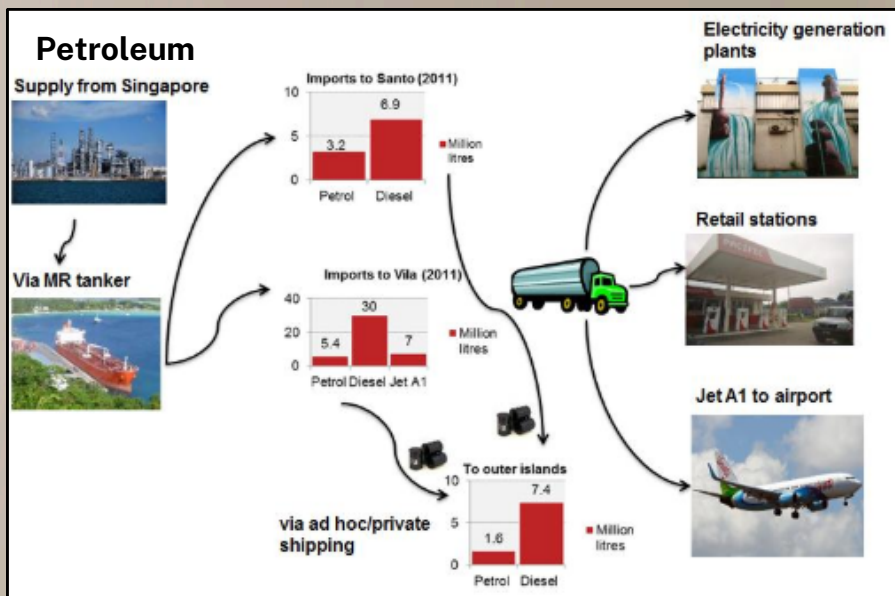
OL MAIN PETROLEUM/FUEL WE OLI YUSUM LONG VANUATU

Aviasen Gasolin (AVG/ AVGas)	Gasolin/Pe trol/Benzin	Gas/Diesel Oil/ Mazut
Jet Kerosin (DPK- Dual Purpose Kerosin- hemi wan spesel fuel we oli usum blong tu difren samting)	Kerosin	Liquefied Petroleum Gas (LPG)- hem i wan fuel we oli mekem long kombinason blong ol hydrocarbon gas olsem propane (C ₃ H ₈) mo butane (C ₄ H ₁₀)

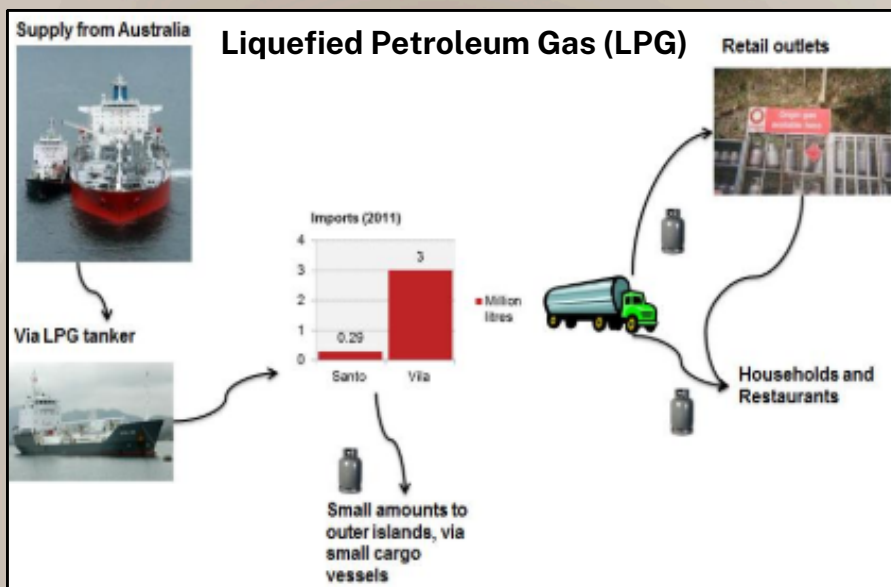
Sos blong Ol Data

Taep blong Fuel	Infomesen/ Sos blong data	Taep blong Data	Saplaea blong Produkt
Aviasen Gasolin (AVG/AvGas), Gasolin, Petrol/Benzene,Gas/Diesel, Oil/Mazut/ Jet Kerosene (DPK-Dual Purpose Kerosene), Kerosene	Pacific Petroleum, Dipatmen blong Kastoms , Utility Regulatory Authority (URA), Dipatmen blong Eneji(DoE)	Impot blong Petroleum folem ol kategori blong fuel long evri inventri yia.	Singapore
Liquefied Petroleum gas (LPG)	Origin Gas, Dipatmen blong Kastoms	Total Impot blong Petroleum folem ol kategori blong fuel long evri inventri yia.	Australia (Brisbane)

PETROLIUM MO LPG SAPLAE JEN



Sos: Dipatmen blong Eneji, Faenol Report: Opsen blong Inkrisim Efisiensi long Oil mo gas saplae jen long Vanuatu. Ripot ia hemi blong World Bank (2013)



Sos: Dipatmen blong Eneji, Faenol Report: Opsen blong Inkrisim Efisiensi long Oil mo gas saplae jen long Vanuatu. Ripot ia hemi blong World Bank (2013)

METODOLOJI WE YUMI YUSUM BLONG ESTIMETEM EMISEN

I gat tri Tiers (1, 2, mo 3) we oli presentem long 2006 IPCC Guidelines blong estimetem emisens long fuel kombasten. Tier 1 metod i fuel-based, taem we ol emisens long olgeta sos blong bonem fuel oli save estimetem folem kwantiti blong fuel we oli bonem (folem ol nasional eneji statistik) mo ol avarej emisens faktor. Tier-1 metod i bin yusum long GHG emisens long Sekta Eneji long Vanuatu.

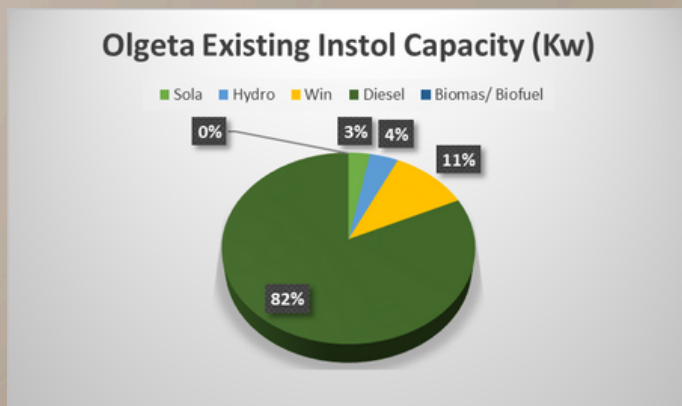
Ol kalkulesen blong GHG emisens long olgeta emisens long sekta ia i no hard blong mekem taem oli save kwantiti blong fosil fuel we oli impotem (aktiviti data). Problem blong Vanuatu hem i long ol sektoral brekdaon blong emisens, folem we oli no gat eneji balance blong kantri, mo sektoral fuel sales we i no kamaot long ol fuel saplaia mo retaila.

Yumi bin traim blong yusum sam data we oli availebal long ol stakeholders mo ol proxy data blong estimetem sektoral emisens. Oli bin entarem ol Sektoral Data I go insaed long IPCC Inventory Software (Version 2.54 – Jun 2017) folem ol rikwaiemens blong standad IPCC sektoral model, mo IPCC tul i bin kastomaisem blong spesifik rikwaiemen blong GHG emisens kalkulesen blong Vanuatu, i.e. yusum ol defolt emisens fakta blong eneji konvesen mo IPCC AR5 GHG emisens fakta. Ol risalt i givim wan sektoral brekdaon blong CO₂ emisens long Sekta Eneji blong Vanuatu long period blong 2007 kasem 2015. IPCC inventory software i kalkuletem daerek CO₂ emisens mo non-carbon dioxide emisens (CH₄ mo N₂O) long sekta ia; mo narafala gas olsem SO_x, NO_x, mo NMVOC oli smol tumas mo oli no insaed long estimated akurasi blong ol men CO₂, CH₄, mo N₂O emisens.

GHG Emita long Eneji Sab-sekta

1. Eneji Indastri: Fasin blong Mekem Elektrisiti

Ol sab-sekta blong generetem elektrisiti i kompos long paoa we i kamaot long Disel mo Biofuel, mo paoa we i kamaot long win, wota mo san. Olsem we i stap long graf andanit, Diesel- Based generesen hem i stap olsem men sos blong elektrisiti, long ol grid-connected eria blong Vanuatu olsem Port Vila, Luganville, Lakatoro mo Lenakel, we tu bigfala kampani we i stap generetem elektrisiti (VUI mo UNELCO). Generesen blong elektrisiti long Vanuatu hemi namba tu lajes end yus blong petroleum prodaks, folem disel we hem i karem lajes volume we oli impotem. Ol grid-connected paoa plan oli estimetem blong yusum 76% blong fuel, mo 24% nomo blong yus blong ol narafala aelan.



Tebol 22: Konsamsen blong Fuel blong Givimaot Elektrisiti long Yia 2007 kasem 2015

	2007		2008	2009	2010	2011	2012	2013	2014	2015
	Lita		Lita	Lita	Lita	Lita	Lita	Lita	Lita	Lita
Gas/ Diese l Oil	10,42 6,177		15,80 8,98 0	14,840,5 00	14,29 5,30 6	14,59 0,90 4	13,48 9,193	11,91 0,108	13,43 8,140	12,10 3,88 0
Gasoline/ Petrol	-		-	-	-	800	400	400	600	800

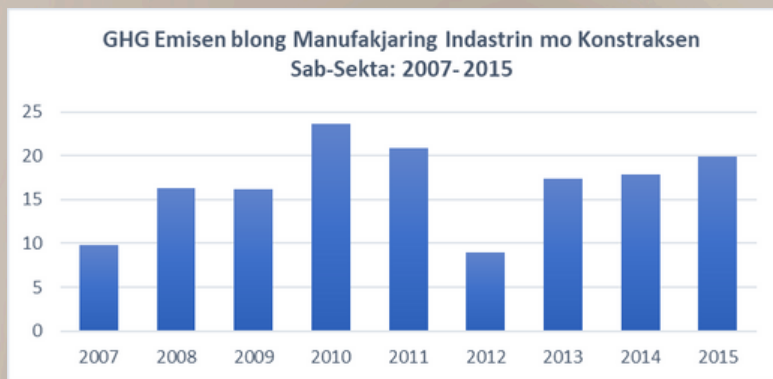
Tebol ia oli karemaot ol Vanuatu TNC Report

Konsamsen blong Disel long ol Inventri yia (2007 – 2015) i gro sloslo; i drop smol long ol yia folem we oli bin ademap sam moa narafala riniuabol eneji long mix blong givim aot elektrisiti. Be, yumi stap expectem blong i go antap long fuja, folem ol niufala kapasiti we oli ademap mo ol inkris long ol taget blong NERM.

2. Ol Indastri blong Prodaksen mo Konstraksen

Sab-sekta ia hemi namba tri lajes sab-sekta we l yusum mo givimaot fuel long Vanuatu. Ol fuel taep we oli yusum long sab-sekta ia hemi Disel, Petrol, Kerosin, AVG, DPK mo LPG. Ol men GHG gas long sekta ia hemi CO₂, mo l soem se emissen hemi bin go antap mo go daon ova long time olsem we l stap long tebol antap. Ol sektas ia l inkludum ol indastri blong prodaksen, konstraksen, kwari, holssel mo retail. Ol men indastri blong prodaksen long Vanuatu i inkludum ol Agrikalsa indastri, Laefstok indastri, Forestri indastri mo Fisheries indastri.

Figa 20: GHG Emisen blong Manufakjaring Indastri mo Konstruksen Sab-sekta: 2007-2015



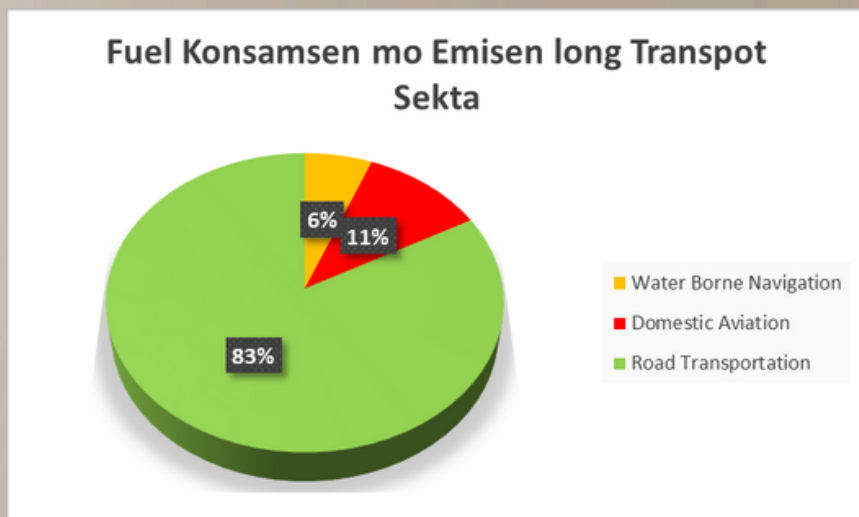
Graph ia oli karemaot ol Vanuatu TNC Report

Ol distribusen blong fuel konsamsen long ol yia folem sekta blong prodaksen i no semak oltaem, hemia i folem neja blong ol indastri mo plante intanasonal mo domestik problem. Sabsekta ia i depend bigwan long ol intanasonall eksport mo maket praes, mo we tufala samting ia save jenis enitaem i save afectem ol pefomans blong sabsekta. Sekta blong konstruksen i no bin gro gud long ol inventri yia. Olgeta praevet sekta ritel, residensel mo olgeta gavman konstruksen project we ol dona oli fandem now oli stap draevem ol aktiviti blong konstruksen long raon long Efate mo menly long Port Vila. Wetem olgeta jalenjes we ol sabsekta oli bin fesem, blong kasem wan konsisten inkris long emisen long fuja, I mas gat gavman sapot wetem ol polisi we oli fevorabol, mo help we I kam long ol domestik mo intanasonal oganaesesen.

3. Sekta blong Transpot

Sekta blong Transpot hemi wan long ol bigfala GHG emita mo konsuma blong Fossil long Sekta blong Eneji long Vanuatu. Sekta ia i inkludum rod transpot, domestik aviasen, mo domestik wota-bon navigesen; be, intanasonal aviasen mo intanasonal wota-bon navigesen oli stap olsem memo item mo oli no pat blong GHG inventri ia. Transpot i yusum ova 50% blong ol petroleum prodak we oli impotem. Ol menn petroleum prodak we oli yusum long transpott sekta long yia 2007–2015, folem ol sab-kategori, hemi go olsem, Domestik Aviasen (Aviasen Gasoline (AVG) mo Jet Kerosene (DPK)), Rod Transpotesen (Diesel, Petrol, mo Kerosene), Domestik Wota-Bon Navigesenn (Diesel, Petrol, Kerosene, mo DPK).

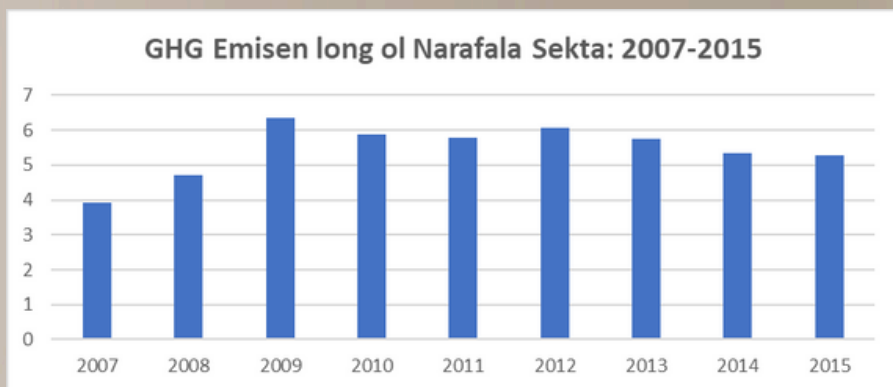
Rod transpotesen i yusum 83% blong fuel long transpot sab-sekta mo i gat hae GHG emisens pitim olgeta emisens blong domestik aviasen mo wota-bon navigesen olsem we data long inventori yia 2007–2015 i soem long graf andanit. Hemia hemi folem hae namba blong trak we oli bin rejista be I nogat wan spesifik regulesen blong fuel efisiensi long transpot sekta (Standed blong ol Trak). Ol praes blong transpot olsem bas, taxi, plen, mo siping oli no gat regulesen, o oli gat smol pat blong regulesen. Long Vanuatu, ol praevet mini-bas now ol mekem up public transpot sistem mo oli ron long long rod we oli no specsifik raon long Port Vila mo Luganville. Long fiuja, yumi ekspektem blong gat wan inkris long konsamsen blong transpot fuel (petrol mo diesel) folem ol data blong ol pas yia we yumi luk se I bin gat inkris long transpot fuel konsamsen. Kerosin (blong yus blong aviasen) bae i dipen long hao ol airline i save wok gud blong sevem fuel mo yumi no ekspektem wan bigfala increase long yus, nating se namba blong ol turist i go antap.



Graph ia oli karemaot ol Vanuatu TNC Report

4. Ol Narafala Sekta – Komesel, Institusonal mo Residensel

Sab-sekta ia i inkludum daerek konsamsen blong fuel long ol komesel, institusonal, residensel mo eni narafala sekta we i no kategori mo i no oganaes, o i yusum long narafala risen. Hemia i inkludum ol hotel, turisim bungalow, gest haos, restoran, retail, mo shopping kompleks. Ol fuel taep we oli yusum long ol kategori ia hem Diesel, Petrol, Kerosin, mo LPG. Sub-sekta blong Residensel mo Komesel i stap olsem ol main konsyumer blong LPG blong yus long kuk. I isi blong kasem LPG long tu bigfala senta blong Vanuatu (Port Vila mo Luganville), mo hemia i mekem se ol man i save kasem kwiktaem, defren long ol narafala ples we i gat limit akses mo praes i hae. Long ol ples ia, plante man i stap yusum biomass from hem i isi mo i no kostem tumas. Long fiuja, sefti mo expandem grid blong elektrisiti bae i mekem fuel konsomsen i go daon long sekta ia; be konsomsen blong LPG i ekspekted blong smol bit i go antap from aweanes, praes i daon mo isi akses blong moden kuing fuel long ol residensel sekta.



Graph ia oli karemaot ol Vanuatu TNC Report

Ol GHG emisen olsem we graf antap i soem, i talem se olgeta fuel we oli yusum long ol sab-sekta ia i moa long yus blong mekem elektrisiti mo laet (Diesel mo Petrol jeneresen set), from se grid i no konek long ol aelan we oli stap long aotsaed, mo i gat sam problem wetem sefti blong grid insaed long ol area we i konek finis. Gavman blong Vanuatu i gat wan bigfala plan blong expandem koneksen blong grid mo blong promotem ol off-grid riniuabol elektrisiti jeneresen olsem solar PV mo narafala rinuabol sos. From hemia, konsamsen blong daerek fuel blong laet mo mekem elektrisiti i ekspekted blong i go daon long taem we i kam.

GHG EMISEN LONG SEKTA BLONG ENEJI 2007 – 2015

Yia Blong Inventori: 2007-2015	Net CO2 Emisen (CO2 Ikwivalen Gg)								
Ol Kategori	2007	2008	2009	2010	2011	2012	2013	2014	2015
1 - Eneji	60.419	92.313	95.096	119.662	127.532	114.874	121.536	128.551	129.550
1.A - Ol Fiu we oli bonem	60.419	92.313	95.096	119.662	127.532	114.874	121.536	128.551	129.550
1.A.1 - Ol Enaji Industri	27.730	42.047	39.471	38.021	38.809	35.878	31.678	35.743	32.194
1.A.2 - Ol Manufakja Industri mo Konstruksen	9.847	16.263	16.209	23.671	20.908	8.962	17.9356	17.921	19.943
1.A.3 - Transpot	18.925	29.283	33.078	52.089	62.041	63.951	66.721	69.555	72.135
1.A.4 - Narafala Sekta	3.915	4.720	6.338	5.882	5.773	6.083	5.742	5.332	5.277
1.B - Ol Emisen we oli kamaot nomo long fuel	NO (I no kamaot)								
1.C - Transpot mo Storej blong Kabon Daeoksaed	NO (I no kamaot)								
Total GHG Emisen, ekskludum ol rimuvol	517.412	556.059	435.648	566.818	587.786	581.133	545.299	604.257	610.204
% Shea blong Sektor blong Enaji long Total GHG Emisen	12%	17%	22%	21%	22%	20%	22%	21%	21%

Tebol ia oli karemaot ol Vanuatu TNC Report

Total GHG emisen blong Vanuatu hemi 5004.616 Gg CO₂e; be folem analisis blong GHG inventri long yia 2007 – 2015, sekta blong eneji i mekemap 19.2% blong total GHG emisen long inventri yia ia, wetem total GHG emisen blong 989.533 Gg CO₂e.



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