Status, Challenges and Forecast of the Philippines Wind Industry

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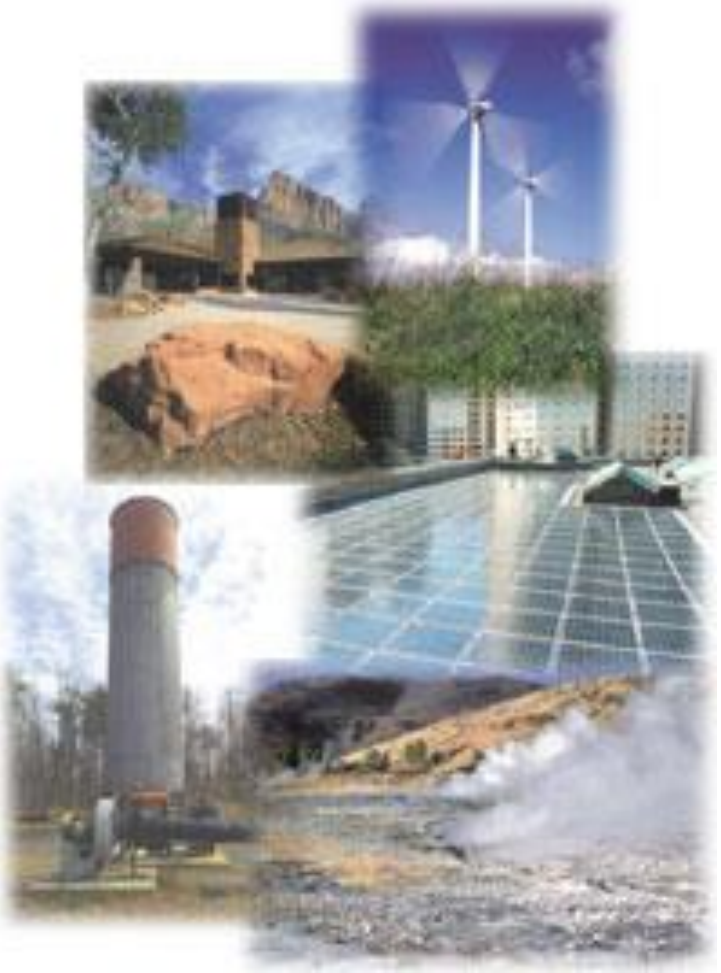
Outline of Presentation

- Brief History of Wind Energy Development in the Philippines
- Challenges and Barriers
- Enactment of Landmark Laws
- Policy Directions and Mechanisms
- Where are we now
- Policies and Development Status
- Wind Energy Resource Assessment
- The Way Forward

Renewable Energy



- **Bi**omas / **Bi**ofuels
- **G**eothermal
- **S**olar Power
- **H**ydropower
- **O**cean
- **W**ind Power

Brief History

- Ocean, Solar, Wind (OSW)
  - Solar PV systems were introduced in the country in rural electrification program in late 1980's
  - Private sector exploration, development, utilization and commercialization for power generation and other uses was initiated under Executive Order No. 462, as amended by Executive Order No. 232 in mid-1990
  - First Wind Farm in Northern Luzon at 33 MW capacity was installed in 2005 (initially at 25 MW)
  - First grid-connected solar PV Farm at 1-MWe capacity was completed in 2008.

33MW Northwind Power Project

(Bangui, Ilocos Norte)

Challenges and Barriers

- High upfront and technology costs
- Non-competitiveness
- Non-viable markets
- Inaccessible Financial Packages
- Social Acceptability

To address these barriers, the Government promulgated landmark Laws to accelerate development of the Country's renewable energy resources.

Enactment of Landmark Laws

Republic Acts Nos.
(RA) 9367 and 9513

R. A. No. 9513: The Renewable Energy Act of 2008

Accelerate the development of the country's renewable energy resources by providing fiscal and non-fiscal incentives to private sector investors and equipment manufacturers / suppliers.

Policy Directions

- Accelerate the exploration and development of renewable energy resources

  - achieve energy self-reliance
    - to reduce the country's dependence on fossil fuels
    - minimize the country's exposure to price fluctuations
  - adoption of clean energy to mitigate climate change
  - promote socio-economic development in rural areas

- Increase the utilization of renewable energy by providing fiscal and non fiscal incentives;

Policy Mechanisms

- Lowering of investment costs
  - Fiscal Incentives
    - Income Tax Holiday and Low Income Tax Rate
    - Reduced Government Share
    - Duty-free Importation of Equipment and VAT-zero Rating
    - Tax Credit on Domestic Capital Equipment
    - Special Realty Tax Rate on Equipment and Machinery
    - Cash Incentive for Missionary Electrification
    - Exemption from Universal Charge
    - Payment of Transmission Charges
    - Tax Exemption on Carbon Credits

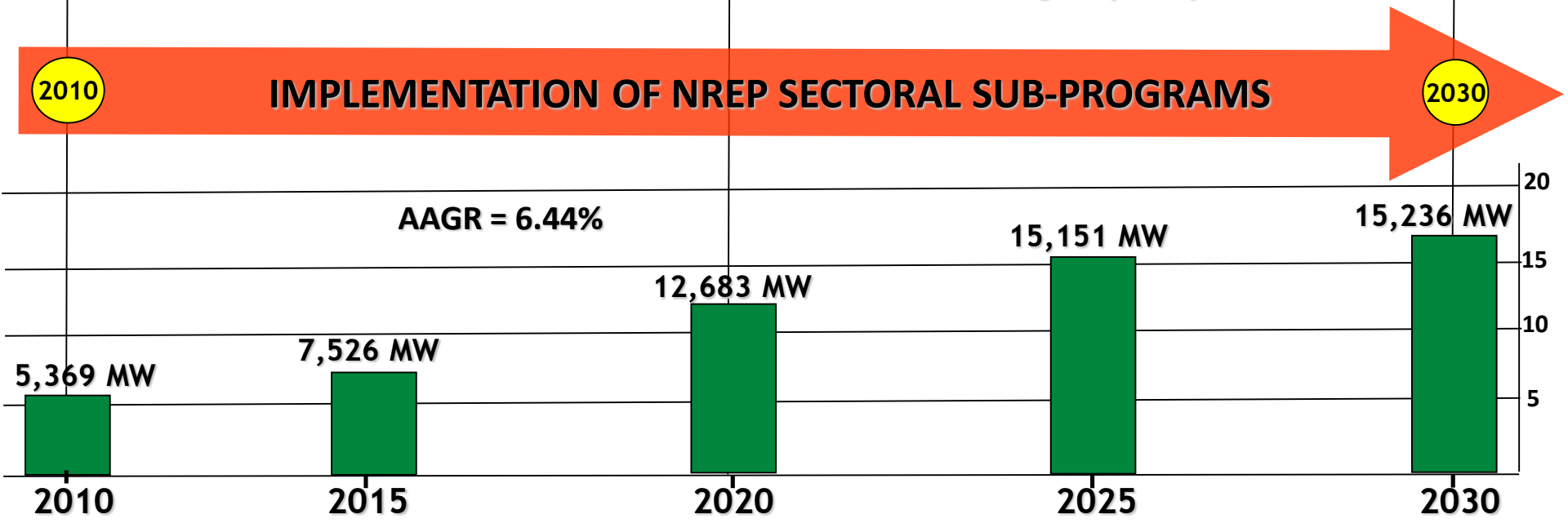
Policy Mechanisms

- Enhanced Competitiveness
  - Mandatory Utilization of RE Resources
    - Biofuels Mandate
    - Renewable Portfolio Standard (RPS)
    - Feed-In Tariff (FIT)
  - Provision of Interconnection / Ancillary Services
  - Other Market Options
    - Net Metering Concept
    - Green Energy Option

NREP ROADMAP (2010-2030)

- 2012 - Full implementation of RA 9513
- 2015 - Target additional biomass capacity of 277 MW is reached
- 2018 – Commissioning of the 1st OTEC facility
- 2020 – Solar grid parity is attained

- Target additional RE capacities are reached by:
  - 2022 - Wind : 2,345 MW
  - 2023 - Hydro : 5,398 MW
  - 2025 - Ocean : 75 MW
  - 2030 - Solar : 284 MW*
  - Geothermal : 1,495 MW
- 2025 - Wind grid parity is attained



Note: The National Renewable Energy Program (NREP) is currently under review of NREB to reflect developments on RE sector and the DOE's issuances of new Installation targets.

Source: Philippine Department of Energy/NREP

Government Policy

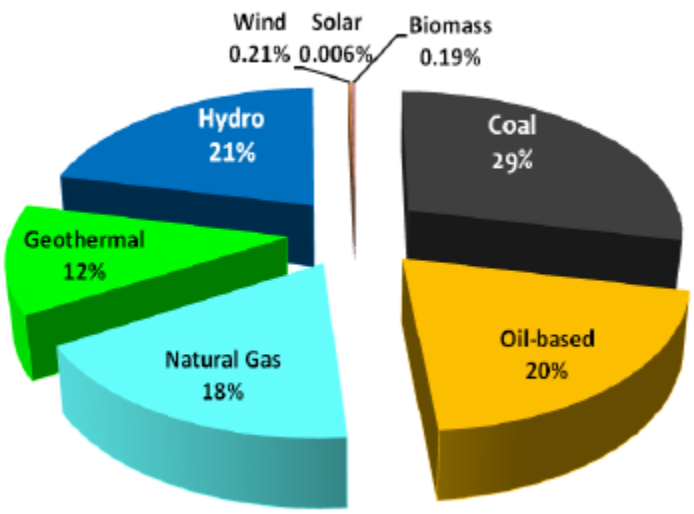
National Renewable Energy Program

- Increase RE-based capacity by 200% within the next 20 years (2011-2030)
- Increase non-power contribution of RE to the energy mix by 10 MMBFOE in the next ten years
- Be the number one geothermal energy producer in the world (additional 1,495 MW)
- Be the number one wind energy producer in Southeast Asia (up to 2,500 MW)
- Double hydro capacity (additional 5,400 MW)
- Expand contribution of;
  - biomass - 265 MW
  - solar - at least 280 MW
  - ocean energy – at least 10 MW

Where are we now?

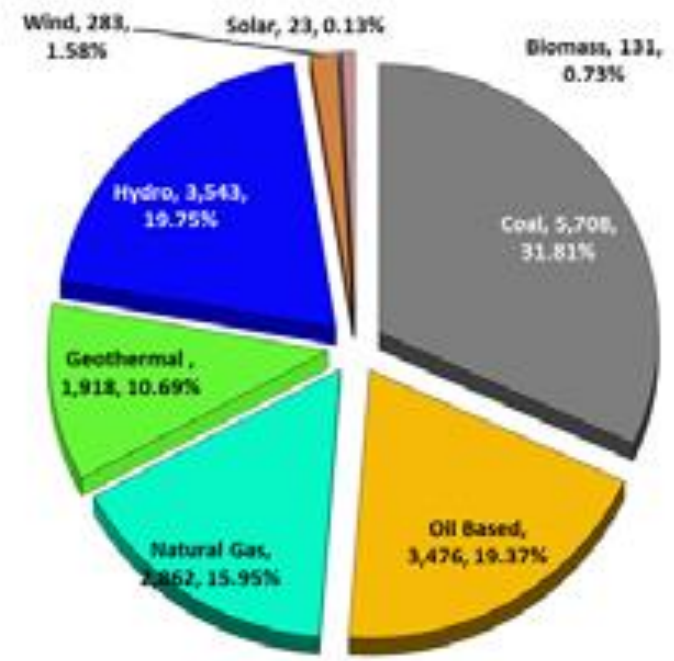
2010 and 2014 Total Installed Capacity Mix (MW)

2010



Total Installed Capacity = 15,881 MW
RE Capacity Share = 5,304.25 MW
% RE Share = 33.4 %

2014

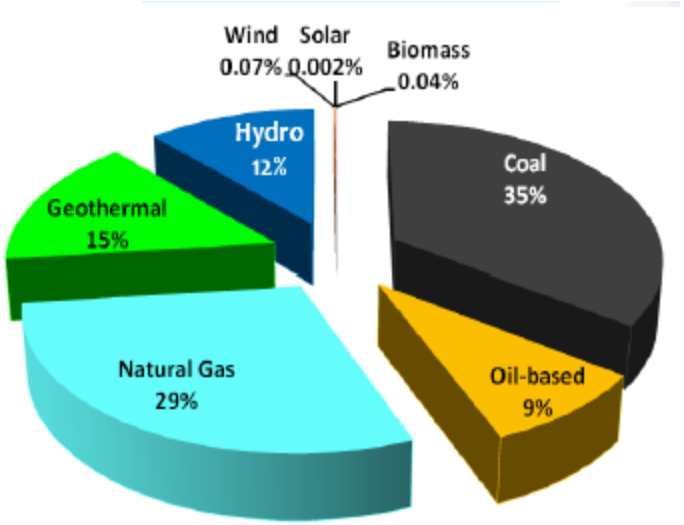


Total Installed Capacity = 17,944 MW
RE Capacity Share = 5,900 MW
% RE Share = 32.88 %

Where are we now?

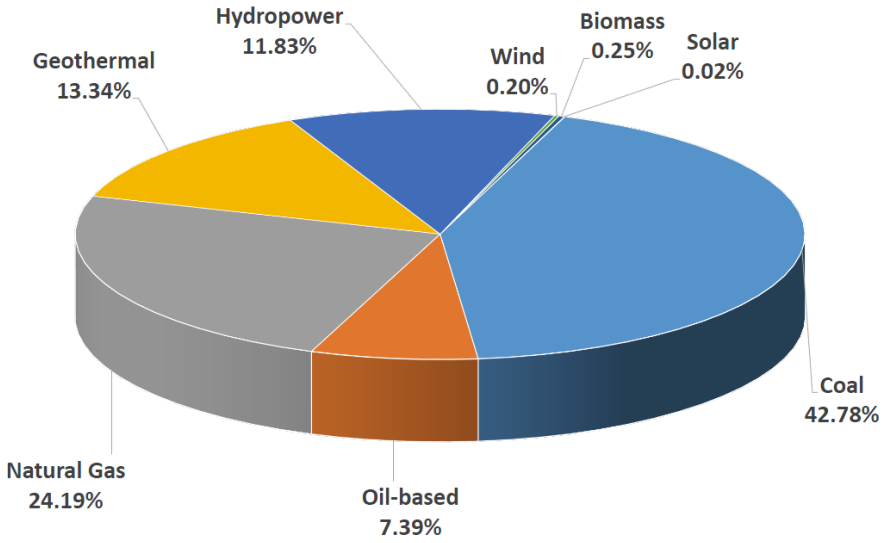
2010 and 2014 Total Generation Mix (GWh)

2010



Total Generation = 65,795 GWh
RE Generation Share = 17,830.4 GWh
% RE Share= 27.1%

2014



Total Generation = 77,261 GWh
RE Generation Share = 19,809.7 GWh
% RE Share= 25.64 %

RE Capacity Addition Historical Development

RESOURCES	2009		2010		2011		2012		2013		2014		2015		Own-Use		Total	
	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW	No. of Projects	Installed Capacity MW
Biomass	2	29.33	1	21.00	3	27.00	1	19.00	1	0.876	1	12.00	5	108.50	15	140.43	29	358.13
Geothermal	-	-	-	-	-	-	-	-	-	-	2	50.00	1	10.00	-	-	3	60.00
Solar	-	-	-	-	-	-	-	-	-	-	1	22.00	6	122.40			7	144.40
Hydro Power	-	-	2	2.00	1	2.10	2	11.80			4	16.65	2	14.82	-	-	11	47.37
Ocean Energy	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-
Wind	-	-	-	-	-	-	-	-	-	-	4	303.90	2	90.00	-	-	6	393.90
TOTAL	**2**	**29.33**	**3**	**23.00**	**4**	**29.10**	**3**	**30.80**	**1**	**0.88**	**12**	**404.55**	**16**	**345.72**	**15**	**140.43**	**56**	**1,003.80**

Capacity Addition since the enactment of RE Law = 1,003.80 MW
Installed Capacity under Net-Metering (recorded) = 1.984.41 MWp

TOTAL = 1,005.784 MW

Environmental Impact and Social Responsibility

Year	Capacity Addition (MW)	Emission Reduction (t-CO_2/year)**	Cumulative Emission Reduction (2009-2015)
2008	3.6	11600.45	81203.15
2009	29.33	94511.48	567068.88
2010	23	71876.27	359381.35
2011	29.1	91420.71	365682.84
2012	30.8	86045.66	258136.98
2013	1.476	4085	8169.72
2014	468.65	1,138,632.50	1138632.5
Total	585.956	1,498,171.93	2,778,275.42

2,778,275.42 t- CO_2

Reduction (2009-2015)

Total	Capacity Addition (MW)	Construction Jobs	Full Time O&M Jobs
2008	3.6	90	11
2009	29.33	733	88
2010	23	558	64
2011	29.1	710	82
2012	30.8	672	65
2013	1.476	32	4
2014	468.65	7,251.00	410
2015	342.4	5,332.00	316
Total	928.356	15,378	1040

Source: IRENA Rule of Thumb

16,418 Green Jobs

Generated (2009-2015)

Summary Renewable Energy Projects under RE Law (as of January 2016)

AWARDED PROJECTS UNDER RENEWABLE ENERGY (RE) LAW

RESOURCES	AWARDED PROJECTS		POTENTIAL CAPACITY MW		INSTALLED CAPACITY MW	
	Grid-Use	Own-Use	Grid-Use	Own-Use	Grid-Use	Own-Use
Hydro Power	352	1	7,474.40	1.50	139.49	-
Ocean Energy	7	-	26.00	-	-	-
Geothermal	41	-	610.00	-	1,906.19	-
Wind	54	1	1,168.00	-	426.90	0.006
Solar	133	16	3,956.64	4.286	304.56	3.218
Biomass	40	25	200.08	3.92	253.62	166.18
Sub-Total	**627**	**43**	**13,435.12**	**9.706**	**3,030.76**	**169.40**
TOTAL	**670**		**13,444.83**		**3,200.16**	

Existing and Updates on RE Policy Mechanisms

Feed-in-Tariff (FIT)

- Priority connection to the grid
- Priority purchase and transmission of and payment for by grid system operators
- Fixed tariff for 20 years
- To be applied for generation utilized in compliance with RPS
- DOE issued List of guidelines for the Selection Process of Renewable Energy Projects Under Feed-In Tariff System and the Award of Certificate for Feed-In Tariff Eligibility

Existing and Updates on RE Policy Mechanisms

Feed-in-Tariff (FIT) issued Regulations

- The FIT Rules was promulgated on August 12, 2010.
- The ERC approved the FIT Rates on July 27, 2012.
- ERC issued FIT Allowance (FIT-ALL) Payment and Collection Guidelines
  - Approved FIT-ALL Rates 0.0406 PHP/kWh (2014-2015), Oct. 7, 2014 and effective January 2015
- Amendment of DOE's installation target
  - The DOE issued a Certification to amend installation targets of Solar Energy Generation (50mw to 500mw) on April 30, 2014 and Wind Energy Generation (200mw to 400mw) on April 24, 2015
- ERC issued new FIT Rates for Solar (0.1293$/Kwh, *Resolution No. 6, series of 2015)*) and Wind (0.164$/Kwh, *Resolution No. 14, series of 2015*)

Existing and Updates on RE Policy Mechanisms

Feed-in-Tariff (FIT) Rates

RE Technology	Approved Rates (PHP/kWh)	Installation Target (MW)
Run-of-River Hydro	5.90	250
Biomass	6.63	250
Wind	8.53*	(with initial target of 200) 400**
Solar	8.69 *	(with initial target of 50) 500**

** Feed in Tariff (FIT) rates for solar was revised in April 2015 (resolution no. 6, series of 2015) from Php 9.68 to 8.69/kWh covering additional target of 450 MW and the second FIT rate for wind energy was issued by the ERC at Php 7.40/kWh covering additional target of 200MW under ERC Resolution No. 14, series of 2015.*

*** Amended targets for wind energy and solar power up to March 15, 2016.*

Feed-In Tariff Monitoring Board (as of March 2016)

RESOURCE	FOR NOMINATION / CONVERSION		WITH CERTIFICATE OF CONFIRMATION OF COMMERCIALITY		WITH CERTIFICATE OF ENDORSEMENT TO ERC	
	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)	NO. OF PROJECTS	CAPACITY (MW)
HYDRO		-	66	610.93	4	26.60
WIND	7	1,023.55	5	431.00	6	393.90
SOLAR	18	681.30	25	732.37	11	292.07
BIOMASS			4	24.37	11	94.25
TOTAL	**25**	**1,704.85**	**100**	**1,798.67**	**32**	**806.82**

Existing and Updates on RE Policy Mechanisms

Net-Metering Rules and Interconnection Standards

- Connection / sale of customers' RE generation to the grid
  - The ERC approved the Net Metering Rules last May 27, 2013
  - Monitored capacity addition were 1.984.41 MWp

Renewable Portfolio Standards (RPS) for On-grid and Off-Grid Areas

- Mandated minimum percentage of RE generation
  - For Department of Energy's finalization

Green Energy Option Program

- End-users' option to purchase electricity from RE facilities (open access)
  - For Department of Energy's finalization

Renewable Energy Potential Identification

RE Resource Assessment

- Detailed Wind Resource Assessment Project started in 2013
- ADB-DOE Quantum Leap on Wind (QLW) Project

Renewable Energy Targets, 2011-2030

Sector	Short Term	Medium Term	Long Term	Total
	2011-2015	**2016-2020**	**2021-2030**	
Geothermal	220 MW	1,100 MW	175 MW	1,495 MW
Hydropower	341.3 MW	3,161 MW	1,891.8 MW	5,394.1 MW
Biomass	276.7 MW	0	0	276.7 MW
Biofuels	•DC on E10 in 2011 •Mandatory E10 to all Gasoline by 2012 •PNS for B5 by 2014 •DC on B5 by 2015 •Mandatory B5 to all Diesel by 2015	•PNS for B20 & E85 by 2020 •DC on B10 and E20 by 2020	•DC on B20 and E85 by 2025	
Wind	200 MW	700 MW	1,445 MW	2,345 MW
Solar	50 MW	100 MW	200 MW	350 MW
Ocean Power	0	35.5	35	70.5
Total	**1,088 MW**	**5,096.5 MW**	**3,746.80 MW**	**9,931.3 MW**

Note: RE Targets under review of NREB to reflect developments on RE sector and the DOE's issuances of new Installation targets

Challenges

- Awareness and social acceptance
- Streamlining of Administrative Process
- Full implementation of Policy Mechanisms under the RE Law

The Way Forward

- **Full implementation of the Renewable Energy Act**
  - *Finalization / Approval of Guidelines on other RE Policy Mechanisms (Renewable Portfolio Standard (RPS), Green Energy Option, etc.)*
  - *Establish Energy Investment Coordinating Center and Linkages with other Government Regulatory Agencies*
  - *Resource Inventory and Establishment of RE Database*
  - *Capacity Building / Information, Education and Communication Campaigns*

MABUHAY

THANK YOU ! ! !