

The East and Southeast Asia Renewable Energy Statistics Training Workshop

Renewable Energy in Thailand

Energy Statistics Section
Alternative Energy and Efficiency Information Center

December 12nd, 2016 Bangkok, Thailand

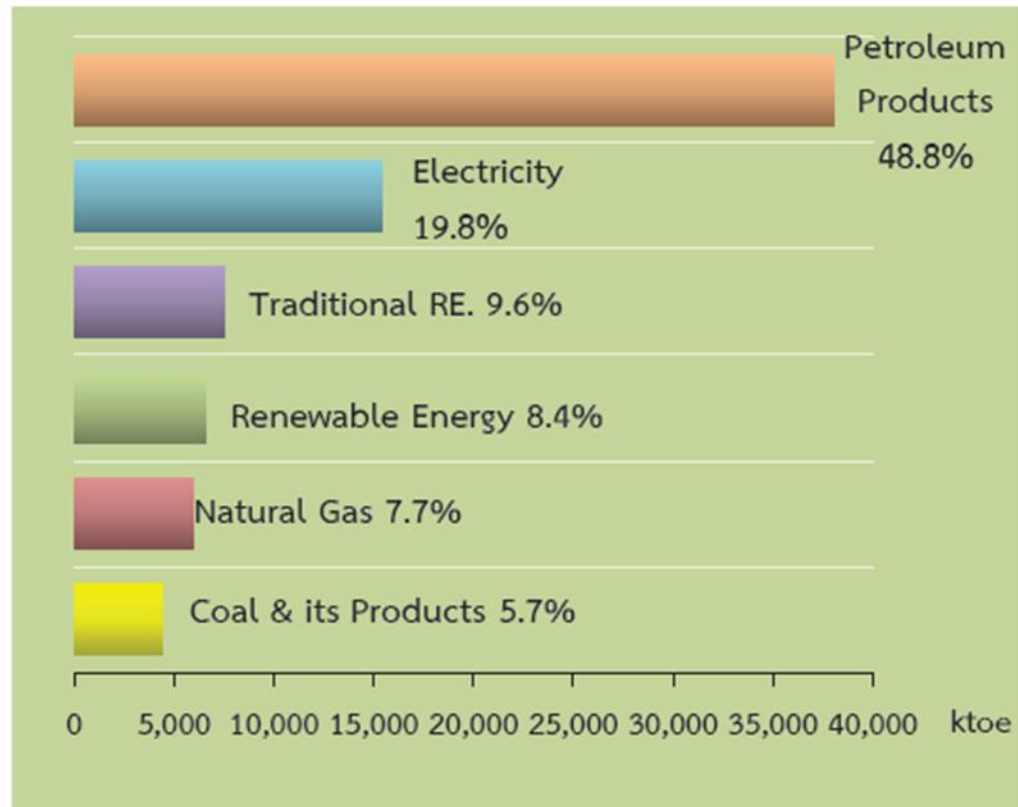


Outlines

- ❖ **Thailand Energy Situation in 2015**
- ❖ **Thailand Energy Balance Table**
- ❖ **Renewable Energy Data Collection**
- ❖ **Alternative Energy Development Plan (AEDP) 2015-2036**
- ❖ **Challenges for Renewable Energy Development in Thailand**

Thailand's Energy Situation in 2015

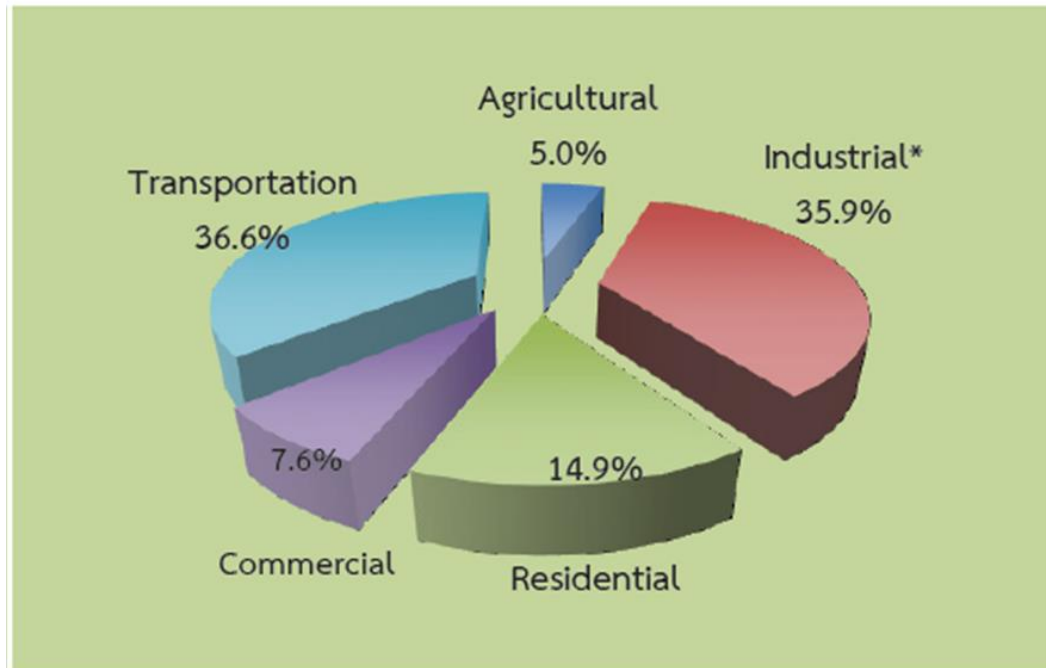
Final Energy Consumption by Fuel Type



- ❖ Thailand's final energy consumption by fuel type in 2015 was 77,881 ktoe, an increasing 2.7% from 2014.
- ❖ Commercial energy consumption including Petroleum products, Electricity, Coal and its product, Natural gas, was shared 82% of the total final energy consumption.
- ❖ While the rest 8.4% and 9.6% were renewable energy and traditional renewable energy in 2015
- ❖ The total value of final energy consumption was 999 Billion Baht.

Thailand's Energy Situation in 2015

Final Energy Consumption by Economics Sector



* Including manufacturing (27,696 ktoe), mining (133 ktoe) and construction (122 ktoe).

p : preliminary data.

- ❖ The final energy consumption by economics sector in 2015 which the greatest shared 36.6% in transportation sector, was 28,501 ktoe, an increasing 6.3% from 2014.
- ❖ The second energy consumed in Industry sector shared 35.9% which are include manufacturing, mining and construction, the final energy consumption was 27,951 ktoe, an decreasing 0.6% from 2014.
- ❖ While the rest of final energy consumption were 14.9% in residential sector, 7.6% in commercial sector and 5.0% in agricultural sector respectively.

Thailand Energy Balance Table

Renewable Energy

- ❖ Renewable Energy are including
 - Solar
 - Wind
 - Hydro
 - Geothermal
 - Biomass (Fuel wood, Paddy Husk, Bagasse, Agricultural waste)
 - Municipal solid waste (MSW)
 - Biogas
- ❖ Traditional Renewable Energy are including
 - Fuel wood
 - Charcoal
 - Paddy Husk
 - Agricultural waste
- ❖ Biofuels are including Ethanol and Biodiesel
- ❖ Others Energy are including Black liquor and Residual gas

พลังงานทดแทน RENEWABLE ENERGY														พลังงานทดแทนดั้งเดิม TRADITIONAL RENEWABLE ENERGY				เชื้อเพลิงชีวภาพ BIOFUELS			พลังงานอื่น ๆ OTHER	รวมทั้งสิ้น GRAND TOTAL	ประเภท TYPE		
ชีวมวล SOLID BIOMASS														รวมชีวมวล TOTAL SOLID BIOMASS				รวมเชื้อเพลิงชีวภาพทั้งหมด TOTAL BIOFUELS			รวมชีวมวลและกากดำน้ำตาลและก๊าซตกค้าง BLACK LIQUOR & RESIDUAL GAS			รวมทั้งสิ้น GRAND TOTAL	
แสงอาทิตย์ (ความร้อน) SOLAR (HEAT)	แสงอาทิตย์ SOLAR	ลม WIND	พลังน้ำขนาดเล็ก SMALL HYDRO POWER	พลังน้ำขนาดใหญ่ LARGE HYDRO POWER	พลังงานความร้อนใต้พิภพ GEOTHERMAL	ฟืน FUEL WOOD	เศษ PADDY HUSK	กากมะพร้าว BAGASSE	กากพืชไร่และพืชสวน AGRICULTURAL WASTE	รวมชีวมวล TOTAL SOLID BIOMASS	ขยะ MSW	ก๊าซชีวภาพ BIOGAS	รวมพลังงานทดแทน TOTAL RENEWABLE ENERGY	ฟืน FUEL WOOD	ถ่าน CHARCOAL	เศษ PADDY HUSK	กากพืชไร่และพืชสวน AGRICULTURAL WASTE	รวมชีวมวล TOTAL SOLID BIOMASS	เอทานอล ETHANOL	ไบโอดีเซล BIO DIESEL	รวม TOTAL BIOFUELS	กากดำน้ำตาลและกากตกค้าง BLACK LIQUOR & RESIDUAL GAS	รวมทั้งสิ้น GRAND TOTAL		
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SUPPLY AND CONSUMPTION

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Publications

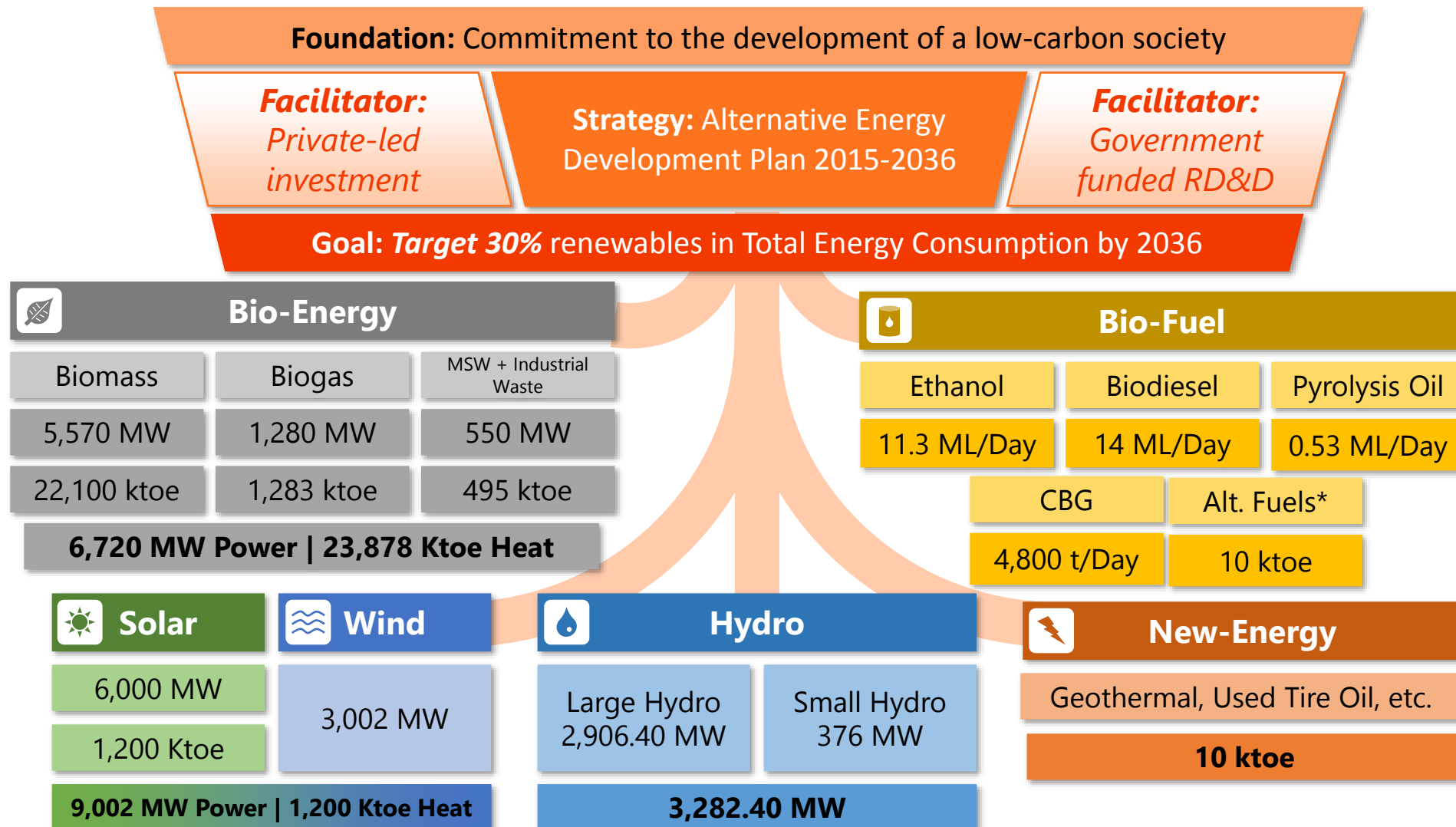
- **Energy Balance of Thailand**
- **Thailand Alternative Energy Situation**
- **Thailand Energy Efficiency Situation**



Renewable Energy Data Collection

- ❖ **Thailand Energy balance** is a tool for analyzing the country's energy situation in each year and also presenting the energy structure of Thailand which are including energy production, energy import, energy export, energy transformation and final energy consumption by economics sector in term of physical unit and energy unit.
- ❖ We are collecting energy data to make the national energy balance table under the IEA's concept. The energy statistics information is a secondary data that we have received from the various sources such as government agencies, private energy companies and other related agencies with a excellent cooperation by monthly or annually.
- ❖ In case of renewable energy data collection we have collected them from the various sources also. However, the entering data in national energy balance is very complicated because we have some unavailable data as well as we will receive information from the study research and analysis based on statistical methodology because there are no regulations for reporting about renewable energy consumption.

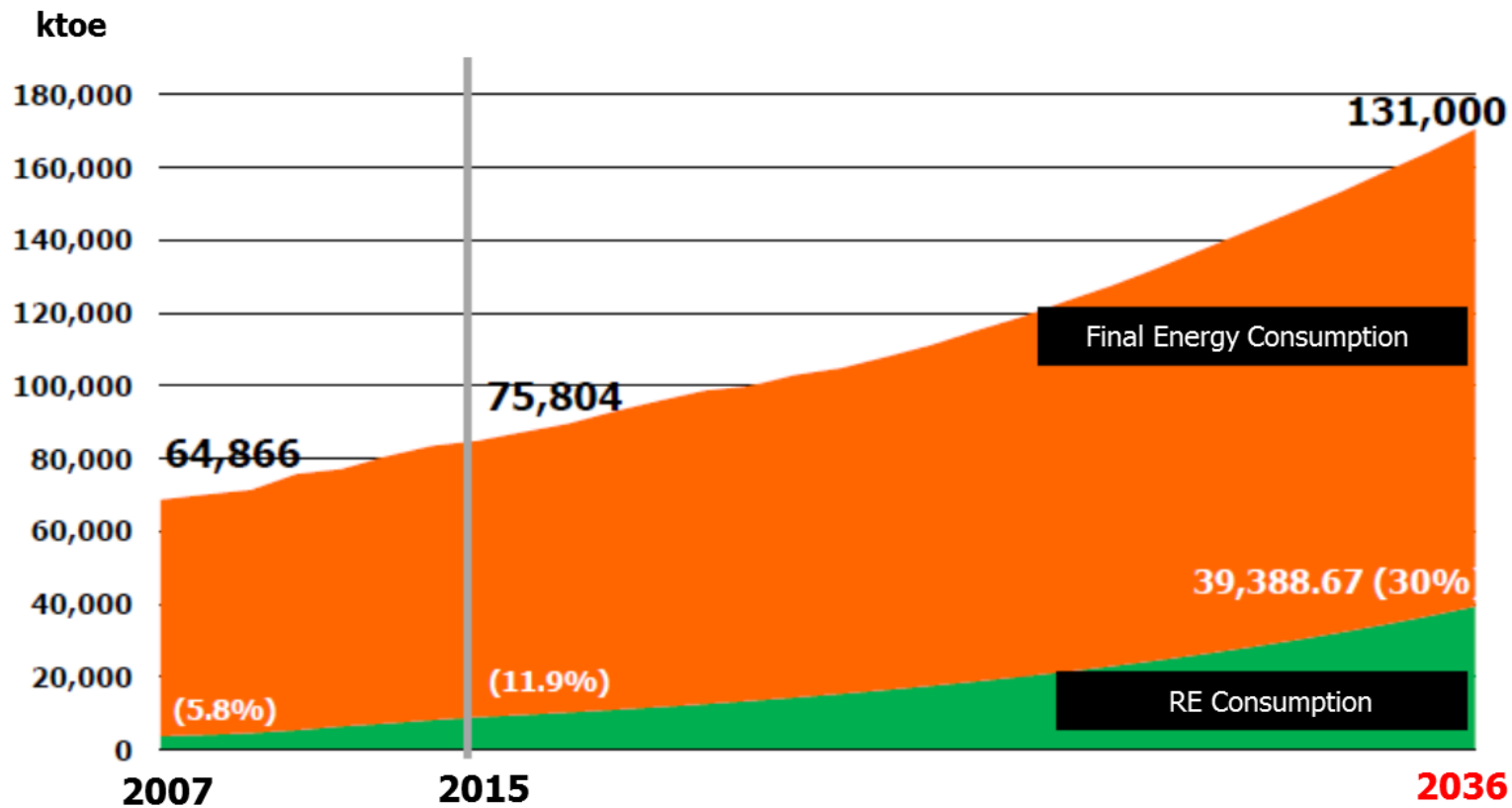
Alternative Energy Development Plan (AEDP) 2015-2036



* Alternative fuels = Bio-oil, Hydrogen

Alternative Energy Development Plan (AEDP) 2015-2036

Goal Target 30% Renewables in Total Final Energy Consumption by 2036



Target	ktoe
RE Consumption (ktoe)	39,388.67
Final Energy Consumption (ktoe)	131,000
RE share (%)	30%

Performance on Alternative Energy Policy in 2015

Alternative Energy	Unit	Performance				Target 2036
		2012	2013	2014	2015	
Electricity	MW	2,786.27	3,788.46	4,494.03	7,962.79	19,684.40
	ktoe	1,138.00	1,341.00	1,467.00	1,556.00	5,588.00
1. Solar Energy	MW	376.72	823.46	1,298.51	1,419.58	6,000.00
2. Wind Energy	MW	111.73	22.71	224.47	233.90	3,002.00
3. Small Hydro Power	MW	101.75	108.80	142.01	172.12	376.00
4. Biomass	MW	1,959.95	2,320.78	2,451.82	2,726.60	5,570.00
5. Biogas	MW	193.40	265.23	311.50	372.51	1,280.00
6. Municipal Solid Waste	MW	42.72	47.48	65.72	131.68	550.00
7. Large Hydro Power	MW	-	-	-	2,906.40	2,906.40
Heat	ktoe	4,886.00	5,279.00	5,775.00	6,579.00	25,088.00
1. Solar Energy	ktoe	3.50	4.54	5.13	5.72	1,200.00
4. Biomass	ktoe	4,346.00	4,694.00	5,144.00	5,990.00	22,100.00
5. Biogas	ktoe	458.00	495.00	528.00	495.00	1,283.00
6. Municipal Solid Waste	ktoe	78.00	85.00	98.00	88.00	495.00
5. Alternative Heat Energy	ktoe	-	-	-	-	10.00
Biofuels	ktoe	1,270.00	1,612.00	1,783.00	1,942.00	8,712.00
1. Ethanol	million litre/day	1.40	2.60	3.21	3.51	11.30
2. Biodiesel	million litre/day	2.80	2.90	2.89	3.37	14.00
3. Pyrolysis Oil	million litre/day	-	-	-	-	0.53
4. Compressed Bio-methane Gas	ton/day	-	-	-	-	4,800.00
5. Alternative Fuels	ktoe/day	-	-	-	-	10.00
Alternative Energy Consumption (ktoe)		7,294.00	8,232.00	9,025.00	10,077.00	39,389.00
Final Energy Consumption (ktoe)		73,316.00	75,214.00	75,804.00	77,881.00	131,000.00
Percentage of Alternative Energy Consumption (%)		9.95	10.94	11.91	12.94	30.00

Main activities to support RE development

Electricity



Area-based RE power generation target must be related to RE potential (RE Grid Capacity)

Develop and support for power generation from unutilized fuel (e.g. agricultural waste, industrial waste, fast growing crop)

Support competitive bidding for power purchasing system

Heat



Promote and support RDF transformation for municipal waste management

Promote and support biomass-derived fuel (e.g. biomass pellet, bio-coal)

Support biogas generation from waste water or solid waste

Promote heat utilization in building by building code establishing

Biofuel



Promote utilization of B10, B20 in both transportation and industrial sector

Promote gasohol utilization

Promote CBG utilization for vehicle and industry

Promote biofuel production efficiency improvement

Challenges for RE development in Thailand

- ❖ Uncertainty of RE supply and feedstock price, especially for biomass
- ❖ The high potential RE supply resources are located away from the high energy demand area
- ❖ High investment cost of RE as compared to conventional fuel
- ❖ Rules and regulation related to RE development, including the long approval processing time for power purchase agreement
- ❖ Limited Grid capacity to serve RE power generation

Key success factors

Waste To Energy



- Effective waste management/waste sorting system
- Effective collaboration among relevant waste to energy responsible parties

Biomass



- Successful improvement of biomass supply chain system
- Successful improvement of biomass logistic/collection system
- Successful development of community-scale biomass energy technology

Energy Crop



Successful development of energy crop pilot project that can be used as business model

Solar PV



Advancement of solar PV technology development to the stage in which its the levelised cost of electricity (LCOE) cost can be competitive with fossil fuel cost

Wind



Successful development of wind turbine technology that is suitable for low wind speed potential in Thailand



Thank you for your attention.

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