

Asian Power Market & Renewable Energy Options



Dr. Jules Chuang, Managing Director
Mt.Stonegate Green Asset Management Ltd.
Board Member of International REC Standard

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Outline

1. Asian Power Market Analysis

- Market Structure
- Renewable Energy Target
- Primary Energy Mix & Outlook
- Renewable Energy Latest Trends

2. Available Options

- Suggested Solutions
- Energy Attribute Certificates

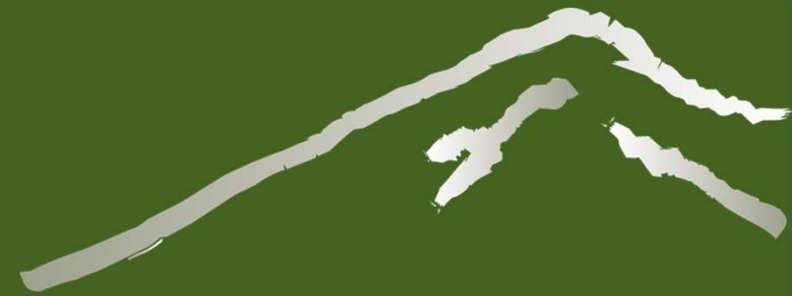
3. International REC Standard

- Introduction to I-REC
- Authorized Countries
- Corporate Users

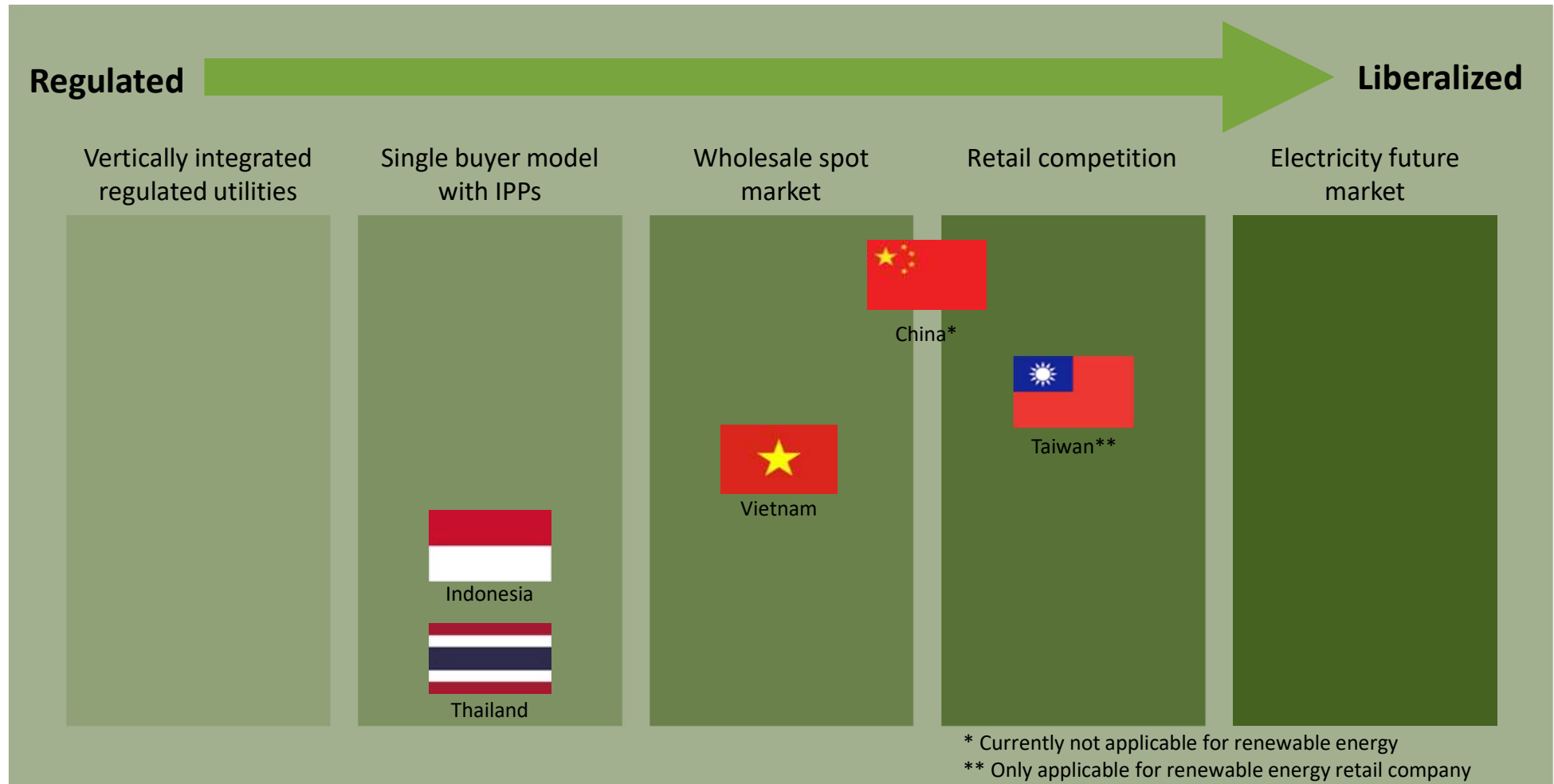
4. Appendix

- About Mt.Stonegate
- Jules' Self Introduction

Renewable Energy Development in Asia

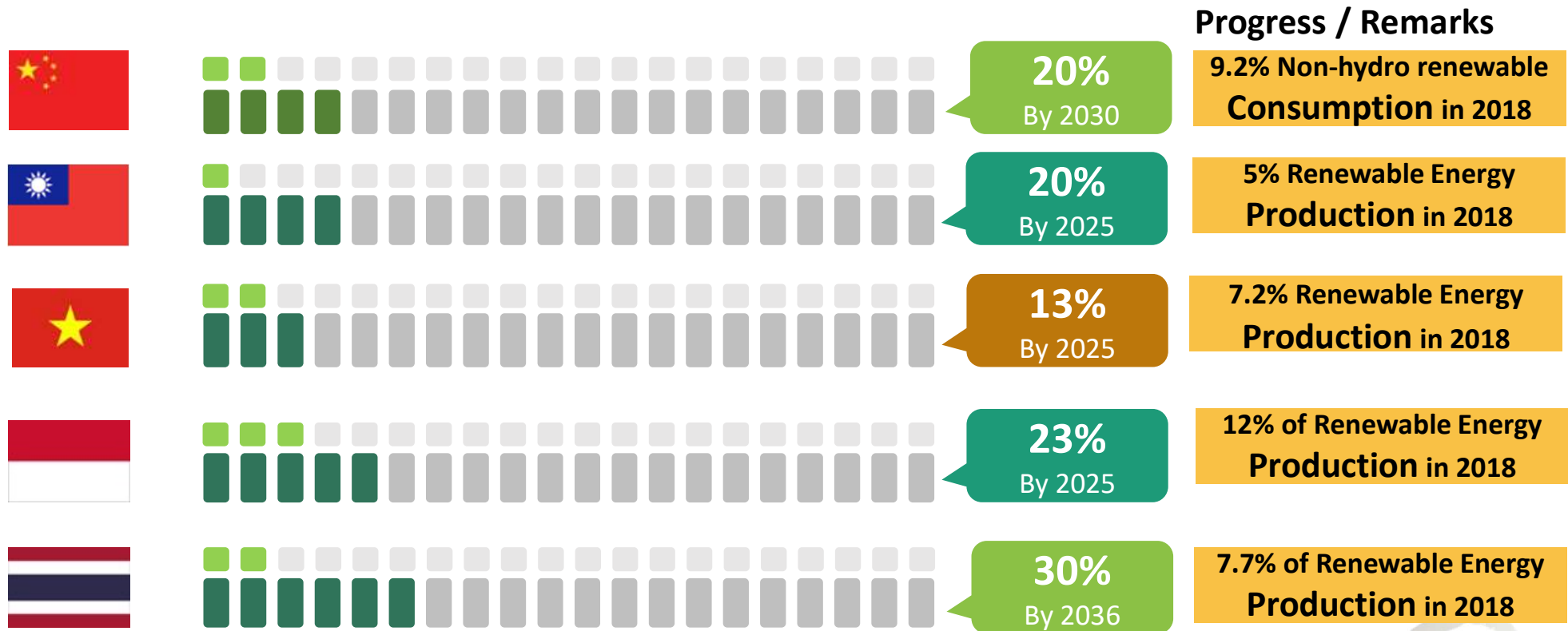


Electricity Market Structure

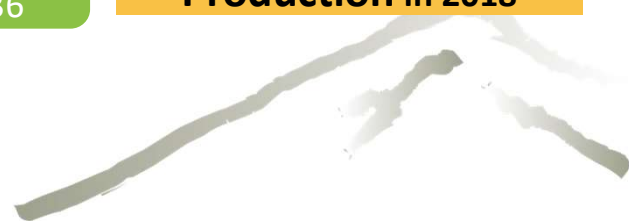


Source: Based on KPMG, 2015

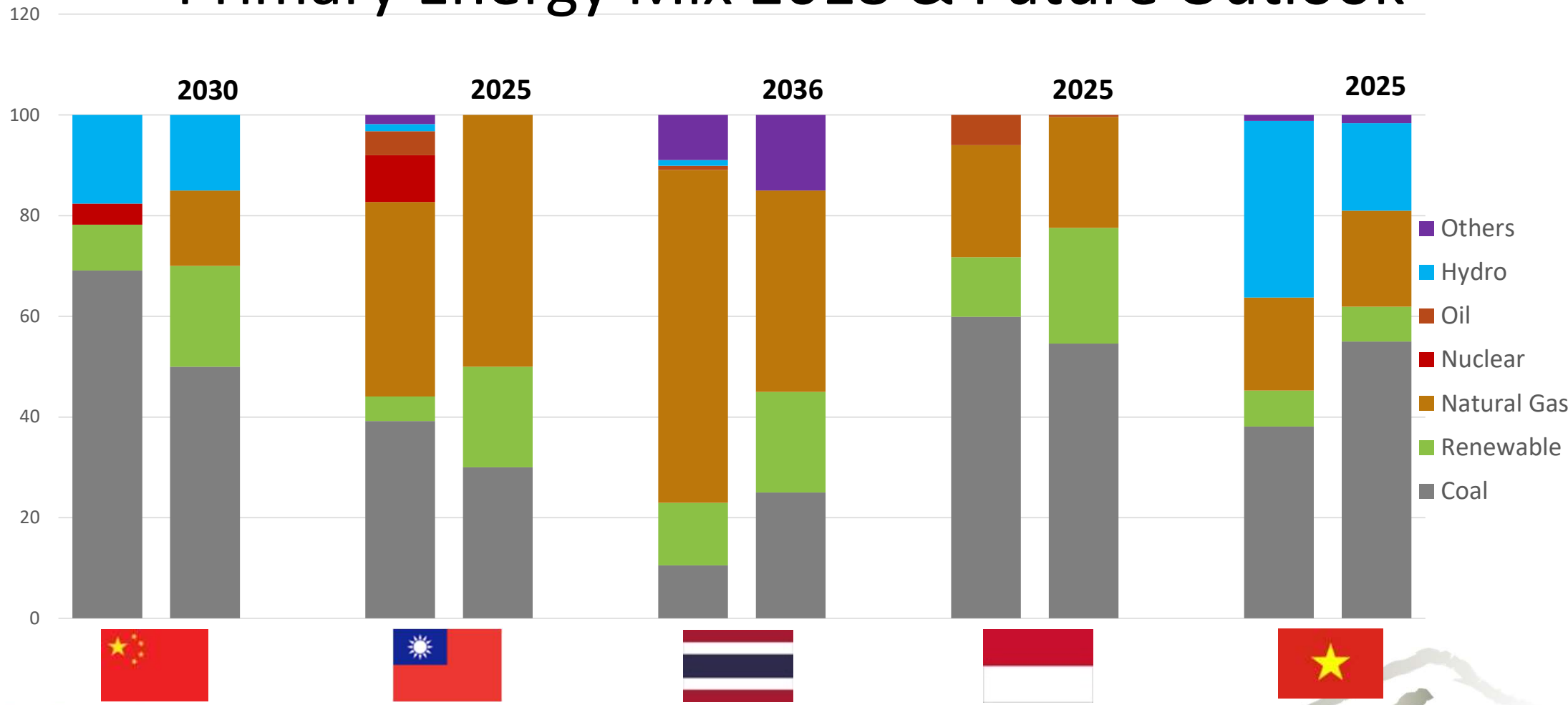
Renewable Energy Target



■ 2018 renewable percentage (%) situation
■ Target year renewable percentage (%)



Primary Energy Mix 2018 & Future Outlook





Taiwan: Amendment to REDA 2019

- Taiwan power market is open to independent renewable power utility/retailer, where they can sign renewable PPA with corporate users.
- Amendments to the “Renewable Energy Development Act” published on May 1st, 2019
 - When power consumption exceeds a certain capacity, the user should install RE generating equipment or energy storage equipment, or purchase renewable energy and RECs (bundled PPA)

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The challenges of China's renewable energy market

1. Curtailment of wind and solar power in the “Three Norths” region of China (northwest, north, and northeast China) is severe
2. Heavy financial burden from Renewable Energy Development Fund:
 - Existing projects: the Renewable Energy Development Fund has seen widening deficits as renewable capacity grew and has delayed the payment of some subsidies;
 - New projects: no more governmental financial incentive for renewable energy installations.

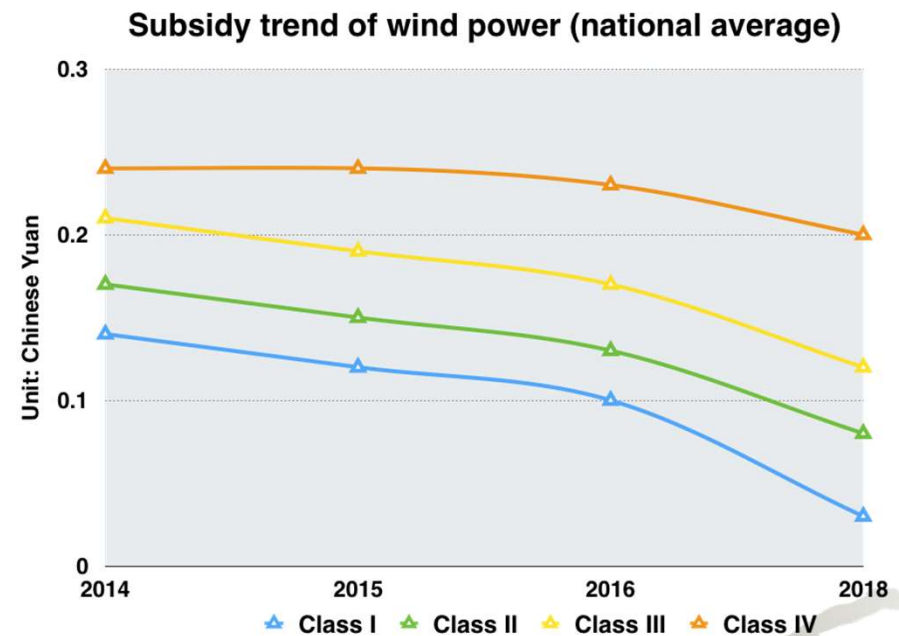
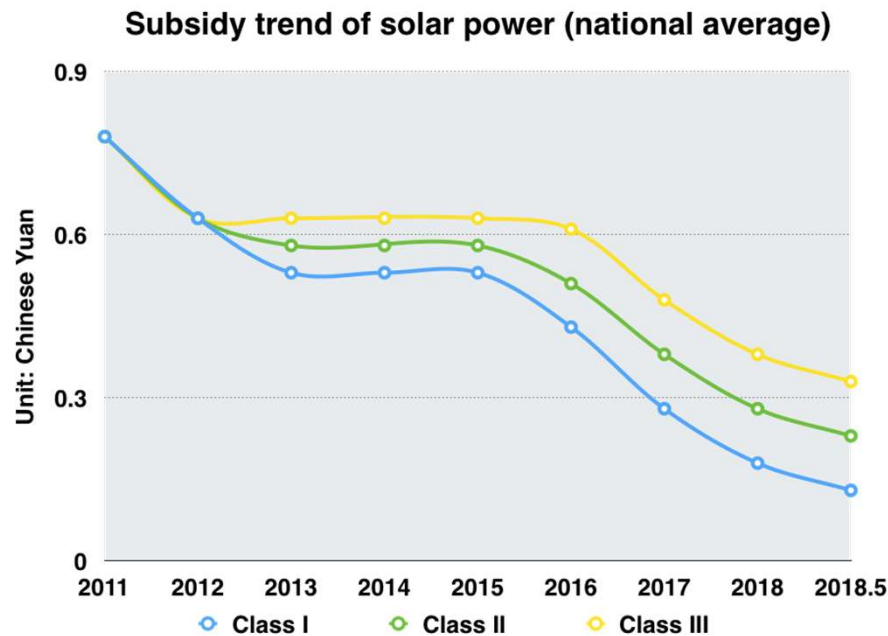
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China: Subsidy trend of solar and wind power

- By the end of 2018, the total financial shortage of renewable energy subsidy has reached 93.7 billion CNY, which is expected to be 300 billion in 2020.



Voluntary Green Energy Certificate

On January 18, 2017, Chinese National Development and Reform Commission (NDRC), Ministry of Finance (MOF) and National Energy Administration (NEA) jointly released The Notice on Trial Implementation of Renewable Energy Green Electricity Certificate Issuing and Voluntary Purchasing Mechanism, which marks the official launch of Green Electricity Certificate mechanism in China.



$$\text{FiT price} / \text{On-grid price} = \text{Benchmark price} + \text{Subsidy}$$



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The Notice of non-subsidized projects



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目录项的基本信息

公开事项名称:	国家发展改革委办公厅 国家能源局综合司关于公布2019年第一批风电、光伏发电平价上网项目的通知 发改办能源〔2019〕594号		
索引号:	000019705/2019-00054	主办单位:	国家发展改革委 国家能源局
制发日期:	2019-05-20		

**国家发展改革委办公厅 国家能源局综合司关于
公布2019年第一批风电、光伏发电
平价上网项目的通知**
发改办能源〔2019〕594号

各省、自治区、直辖市、新疆生产建设兵团发展改革委、能源局，国家能源局各派出监管机构，国家电网有限公司、中国南方电网有限责任公司、内蒙古电力（集团）有限责任公司、电力规划设计总院、水电水利规划设计总院、各有关发电企业：

根据《国家发展改革委 国家能源局关于积极推进风电、光伏发电无补贴平价上网有关工作的通知》（发改能源〔2019〕19号）要求，共有16个省（自治区、直辖市）能源主管部门向国家能源局报送了2019年第一批风电、光伏发电平价上网项目名单，总装机容量2076万千瓦。现予以公布。

请国家电网有限公司、南方电网公司组织所属有关省级电网企业按照平价上网项目有关政策要求，认真落实

- On May 20, 2019, NDRC and NEA released the notice for the first batch of subsidy-free, with a total capacity of 20,760 MW.
- Over 200 wind and solar farms are listed in the Notice, these projects will not receive any subsidy while feeding their generation to the grid.

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Mt. Stonegate Green Asset Management Source: http://zfxgk.nea.gov.cn/auto87/201905/t20190522_3664.htm

China Subsidy Free Renewables

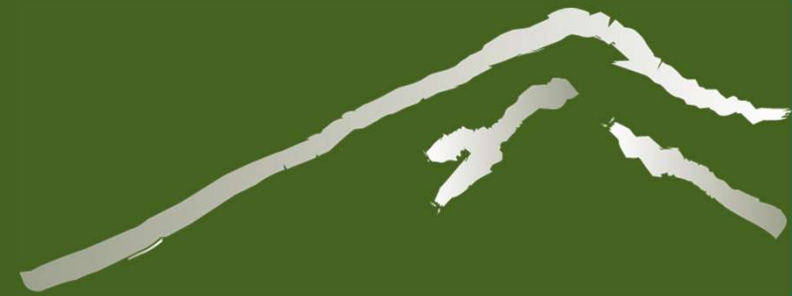
Grid Priority	Instead of giving subsidy, government ensure wind or PV generator priority dispatch and full purchase with a long-term contract
Market-based	Promote the non-subsidized development of wind and PV power generation through market-based trading
C-GEC	Promote C-GEC trading, which is currently high issuance amount, but low trading amount

Southeast Asia: Emerging RE Projects

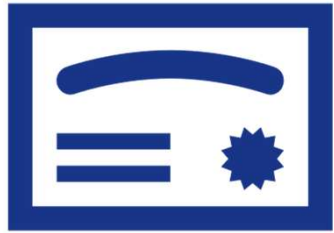
- Fast becoming the "hot spot" for renewable energy development, as the demand for energy is increasing rapidly.
- Similar conditions shared by Vietnam, Thailand, and Indonesia (monopolized market)
- Open market for investor to invest on renewable energy projects



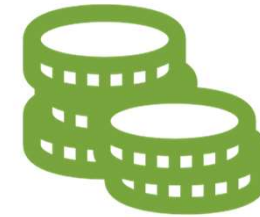
Available Options



Available Options



Energy Attribute Certificates



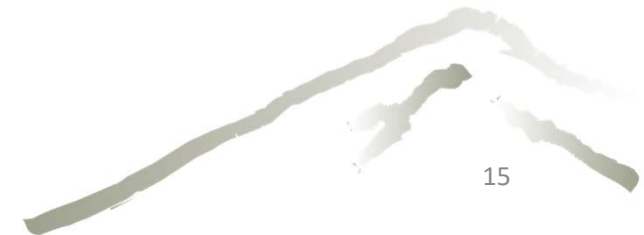
Green Electricity Tariff



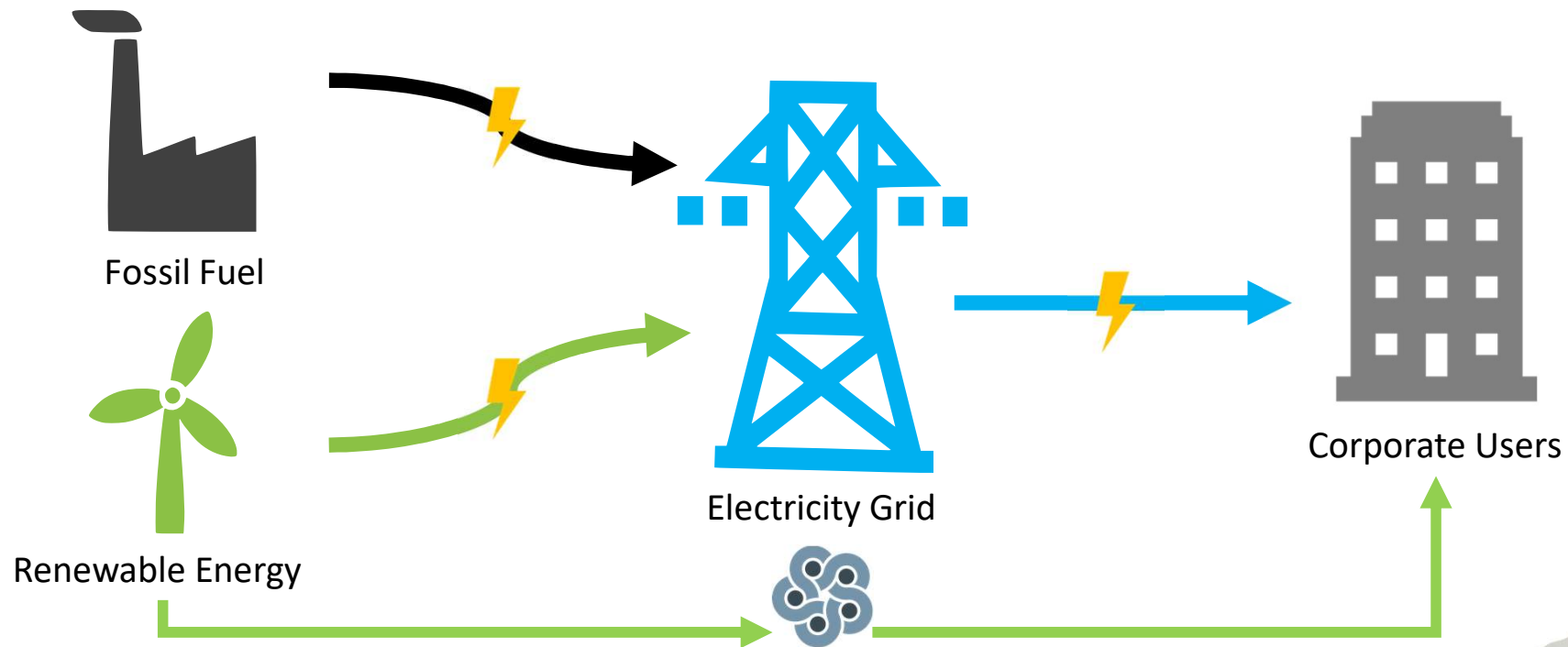
Power Purchase Agreement

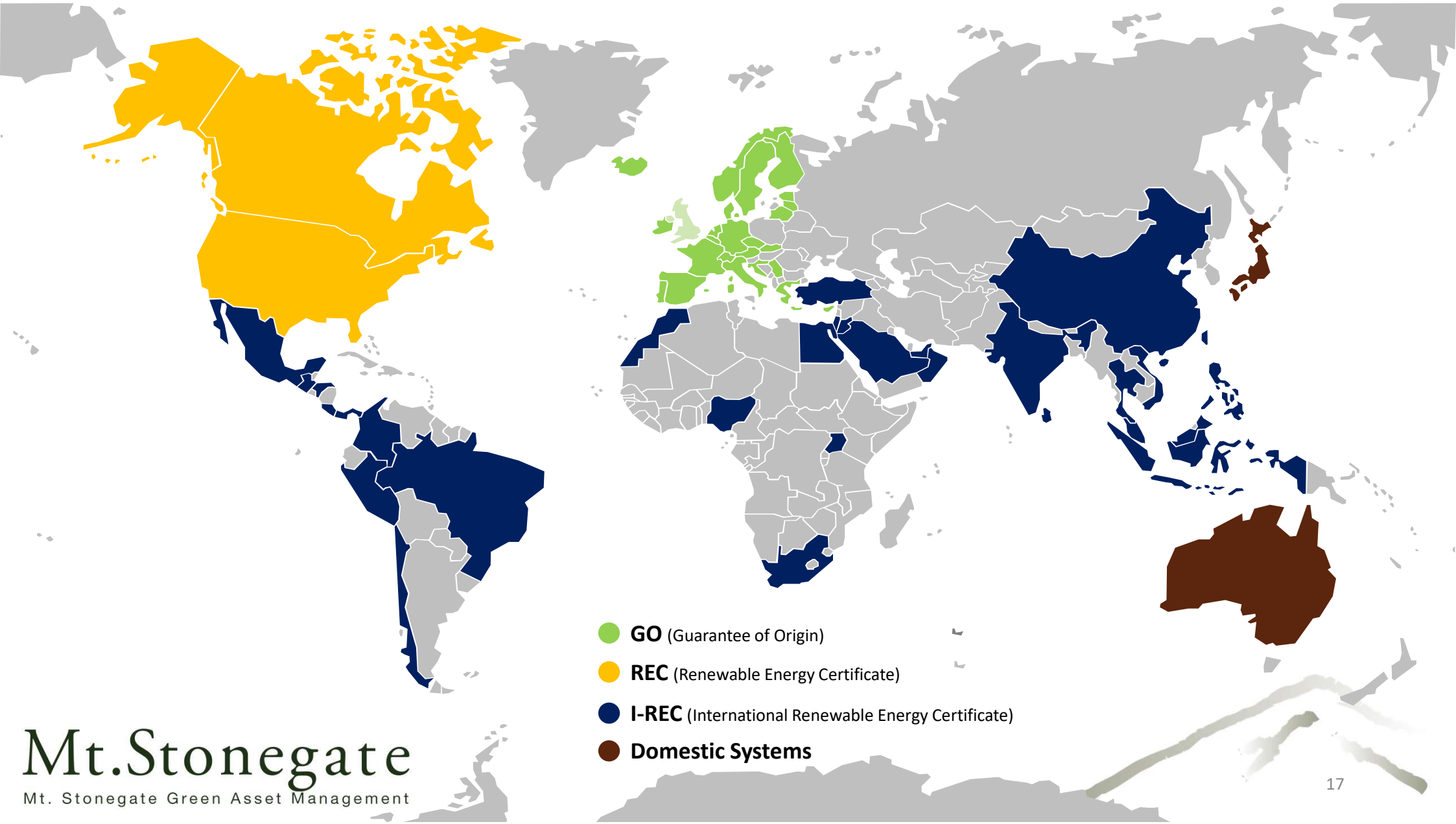


On-site Generation



How renewable energy certificates (REC) works

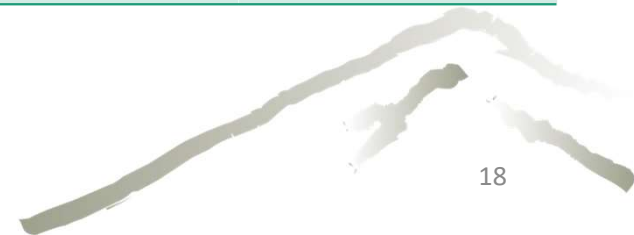




- **GO** (Guarantee of Origin)
- **REC** (Renewable Energy Certificate)
- **I-REC** (International Renewable Energy Certificate)
- **Domestic Systems**

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		China	Taiwan	Vietnam	Indonesia	Thailand
Renewable Energy Target		20% RE Consumption in 2025	20% RE Generation in 2025	13% RE Generation in 2025	23% RE Generation in 2025	30% RE Consumption in 2036
Energy Attribute Certificates		1. I-REC 2. C-GEC	1. I-REC 2. T-REC	1. I-REC	1. I-REC	1. I-REC
Renewable Power Purchase Agreement		X	✓	X	X	X
Self Generation	Small Scale (<1MW)	✓	✓	✓	✓	✓
	Large Scale (ex. Investment in power plant)	✓	✓	X	X	X



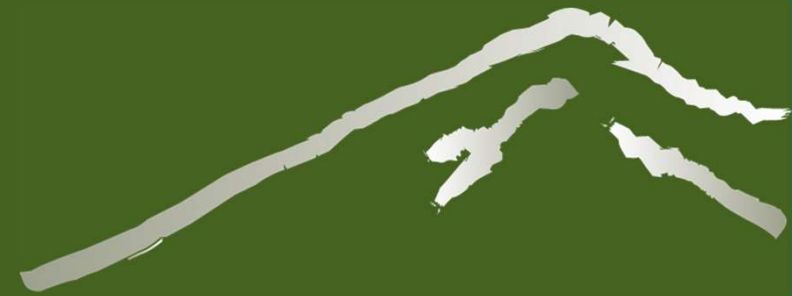
	I-REC	C-GEC	T-REC
Established	2015	2018	2017
Regulator	I-REC Standard	China National Energy Administration	Bureau of Standards, Metrology & Inspection, Ministry of Economic Affairs
Scope	International	P.R. China	Taiwan
Purchaser	Corporate User	Corporate/Personal User	Corporate User
Market	Voluntary	Voluntary	Voluntary
Energy Source	Wind, Hydro, Solar, Biomass	Onshore Wind, Solar	Wind, Hydro, Solar, Biomass, Geothermal
Price	Market Price	JP¥ 2,787 - 10,490/MWh	JP¥ 5,155 – 10,704/MWh
Generation*	18,706,000 MWh	26,918,591 MWh	59,973 MWh
Traded Amount*	11,214,000 MWh	34,691MWh	2,757 MWh
Recognized by CDP	Yes	No	Yes
Recognized as Tool for Scope 2 Market-Based	Yes	No	Yes

* As of Nov 2019

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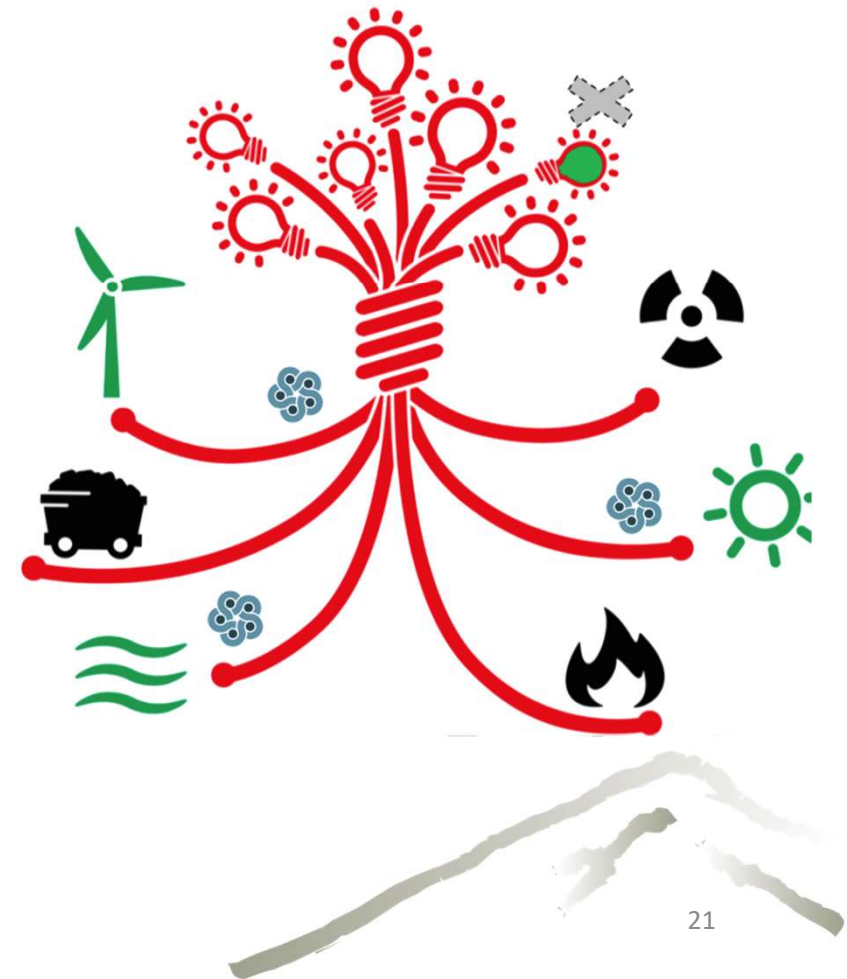
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Introduction to I-REC Standard

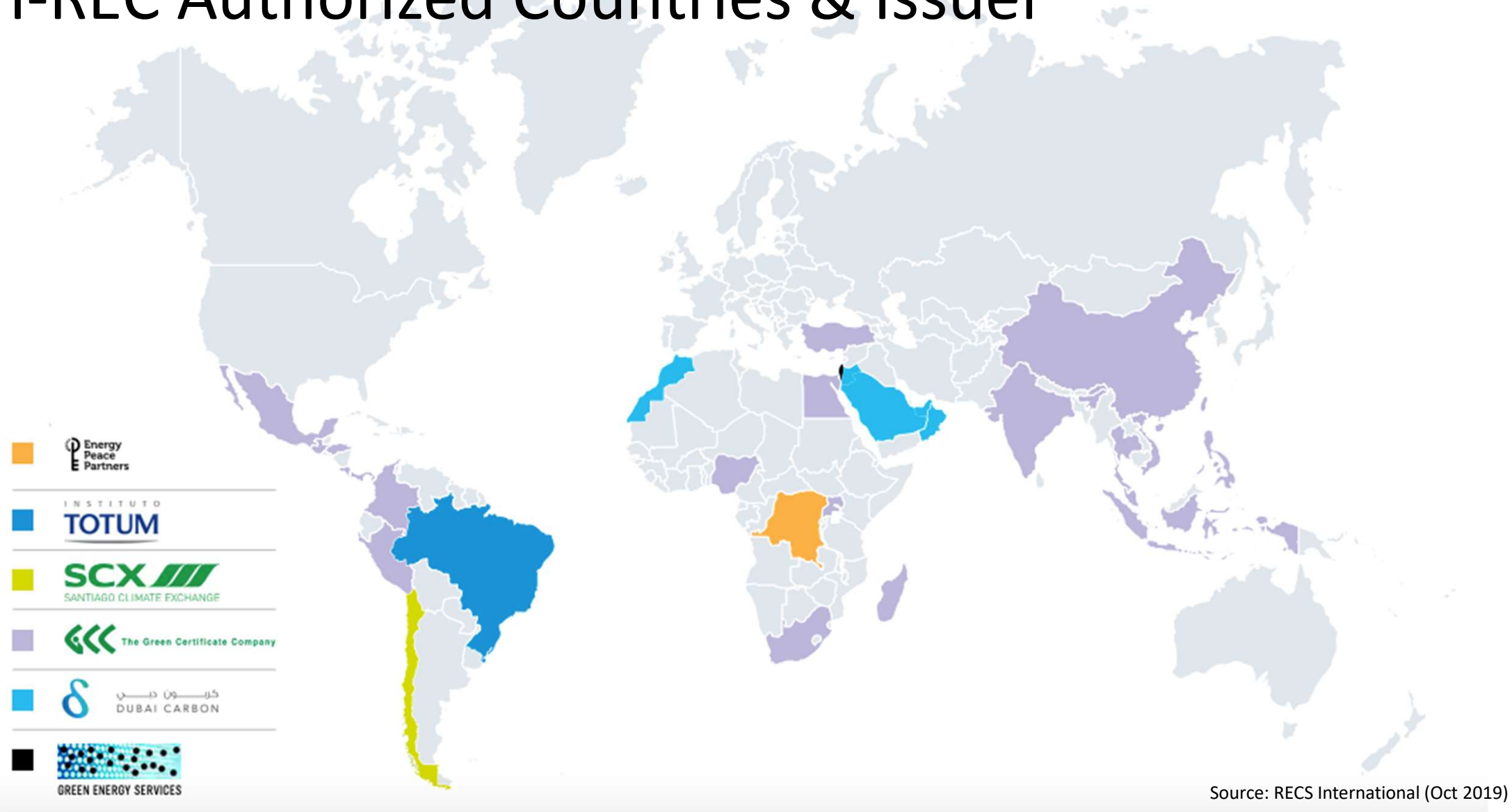


International REC Standard (I-REC) THE INTERNATIONAL REC STANDARD

- An international tracking system
- Each I-REC is unique to a specified 1 MWh of production and exclusive having one owner at any time.
- 1 I-REC = 1 MWh = 1,000 kWh
- Each I-REC must be redeemed as proof of its use
- Recognized by international initiatives, such as RE100, CDP, WRI (GHG Protocol Scope 2 Guidance)



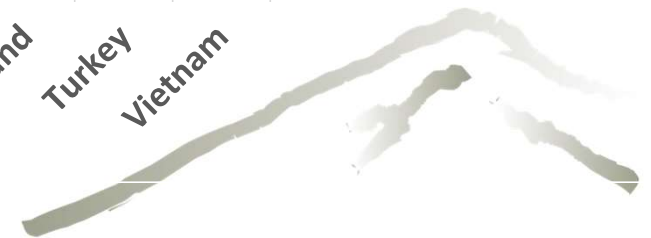
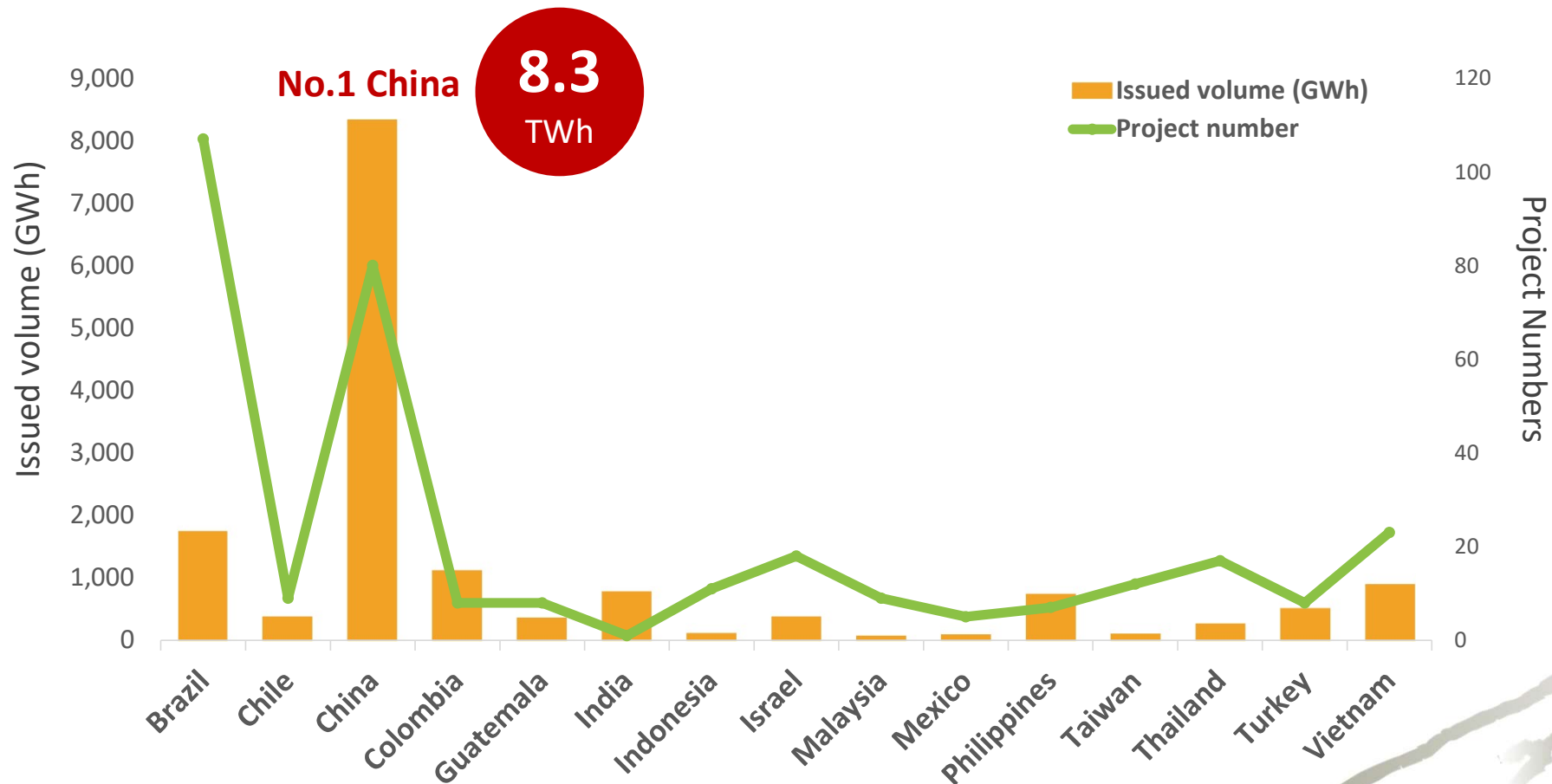
I-REC Authorized Countries & Issuer







Top 15 I-REC Issuance area








I-REC statistics period from September 2018 to August 2019.



I-REC Corporate User (1/2)

Buyer					
Sector	IT	Apparel Retail	Personal Products	Professional Services	Software
Region	BR, TW and TR	CN, TW, MY, TH	TW, TH, VN, and MY	CN, TW, TH, TR, etc.	CN, TW, PH, VN, etc.
CDP Score 2018	A	A-	A	B	A
Ref	CDP Report	CSR Report	CDP Report	Official Website	CDP Report

I-REC Corporate User (2/2)

Buyer	 KONICA MINOLTA				
Sector	Camera equipment	Imaging and electronics	Technology Hardware & Equipment	Luxury goods	Food Packaging and Processing
Region	CN	CN, TH	CN	CN (incl. HK and MO)	CN, TH, South Africa
CDP Score 2018	A-	A-	B	A	Not Available
Ref	Official Website	Official website	Sustainability Report	CSR Report	Sustainability Report

Thank You!



Appendix



About Mt.Stonegate

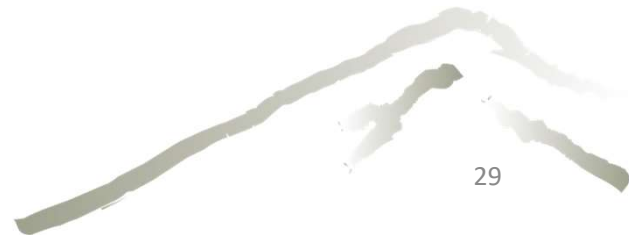




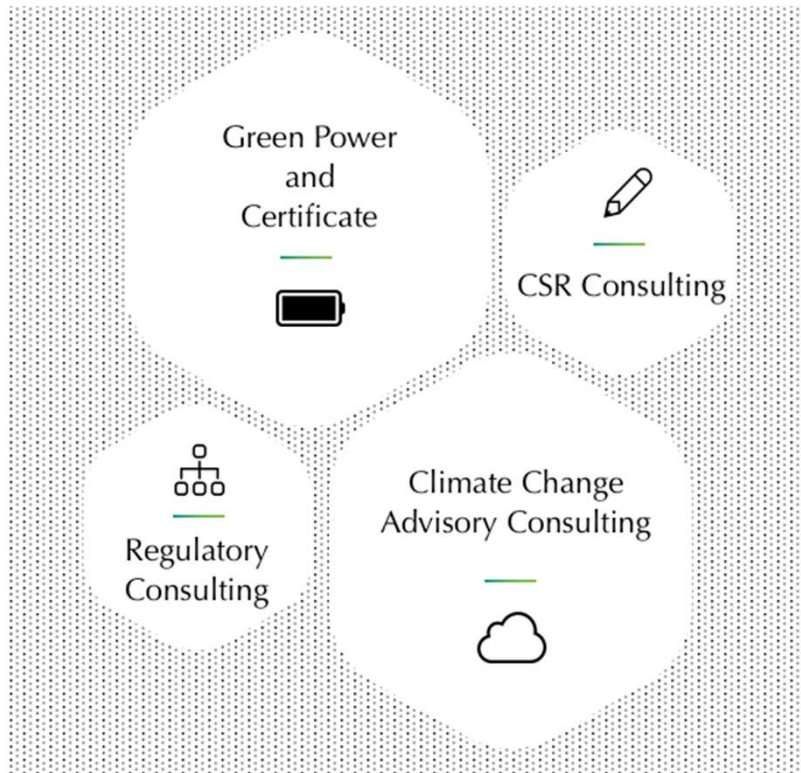
About Mt.Stonegate

Mt.Stonegate is established in 2013, we hit the ground running with our direct approach to bring change in the society and environment.

Consulting operations, innovative project management, advising leading market players in the conventional and renewable energy sectors for their green asset and investment across east Asia are among many of the service that we offer to our thriving corporate and business customers.



Our Services



Mt.Stonegate is committed to providing institutional and corporate clients worldwide with superior carbon asset advice and solutions while generating attractive and sustainable green effects for clients.

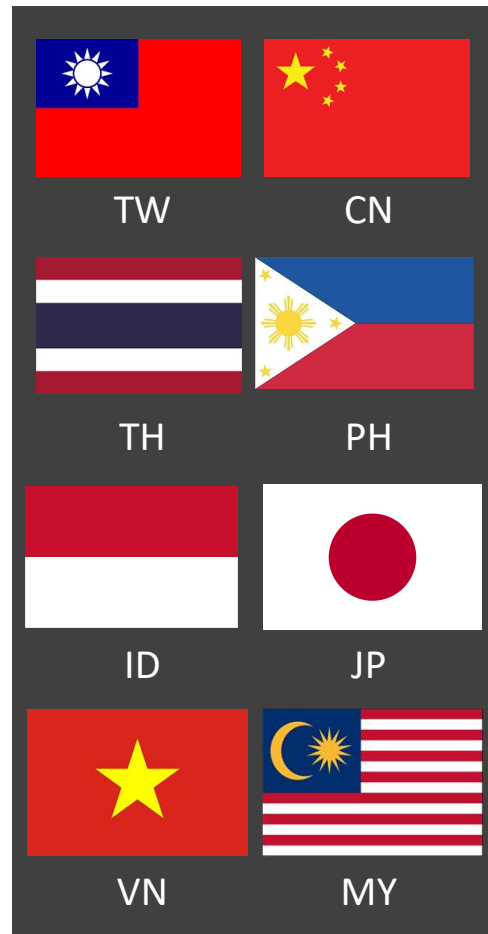
- Environment Attribute Certificate (EACs) management and sales
- Energy Report
- Training Workshop
- Renewable Power Purchase Agreement (PPA)

Our Projects & Achievements

First I-REC Trader based in Asia

Has contributed over **2.500.000 MWh** of electricity to corporate buyers

Projects scatter through major countries in Asia



Contact



Taichung Office

3F-1, No.309, Xinfu Rd.,
Nantun District, Taichung
40880, Taiwan

Tel: +886 4 2380 7548



Shanghai Office

Room 638, 6th Floor, No. 35
Lou Shan Guan Rd.,
Changning District, Shanghai
200336, P.R. China

Tel: +86 21 6259 8238



Tokyo Office

4/F East Tower, Otemachi First
Square, 1-5-1, Otemachi,
Chiyoda-ku, Chiyoda, Tokyo
100-0004, Japan

Tel: +81 3 5777 6730



France Office

100 Avenue Albert 1er, 92500
Rueil Malmaison, Paris, France

Tel: +33 (0)1 73 29 76 24

Dr. Jules Chuang



Employment and Professional Experience

- 2019-ongoing Arbon Capital, Taiwan, Managing Director
- 2019-ongoing Mt.Stonegate Japan, Managing Director
- 2014-ongoing Mt.Stonegate Green Asset Management Ltd, Taiwan, Managing Director
- 2014-ongoing International REC Standard, Co-Founder and Member of the Board
- 2007-ongoing Nanjitan Asset Management Ltd, Principle
- 2007-2011 South Pole Carbon Asset Management, East Asia, Principal

Education

- 2018 PhD. in Environmental Science and Engineering, Tunghai University, Taichung, Taiwan
- 1996-1997 Master of Science in Systems Engineering, University of Pennsylvania, Philadelphia, USA SEP
- 1993-1994 MSc and "Diplôme d'Ingenieur" in Energy Management & Policy, Ecole Nationale Supérieure du Pétrole et des Moteurs, Paris, France SEP

