Potential of Biomass Energy As Aid for Baseload Power Source

Kinya Sakanishi

Deputy Director-General,

Fukushima Renewable Energy Institute,

AIST (FREA),

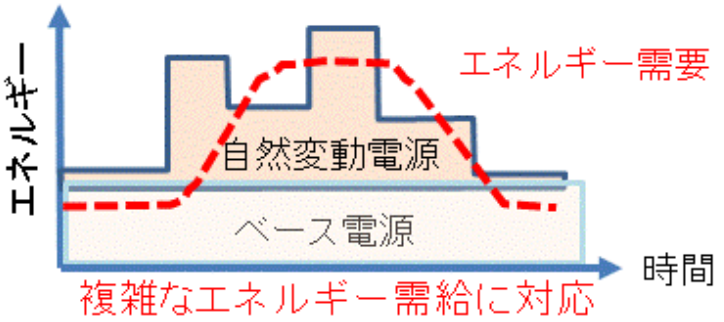
Koriyama, Fukushima 963-0298,

Japan

National Institute of Advanced Industrial Science and Technology
AIST

FREA
FUKUSHIMA RENEWABLE ENERGY INSTITUTE, AIST

スマート再エネコンビナート構想（仮称）



再エネ
変動電源

光

人工
光合成

電力

再エネ
補助電源

光化学
プロセス

電気化学
プロセス

エネ
キャリ

MCH、
NH_3、
ギ酸、etc

再エネ水素

吸熱反応
プロセス

地熱

熱

ベース電源

低炭素社会に向けたバイオマスコンビナートの役割

一次エネルギー	利用技術	アウトカム

化石燃料　高効率利用

天然ガス　石油　石炭

燃焼、電気化学反応
燃料電池

CCS

CO_2の地中・海洋貯留に関する挙動予測・探査・安全影響評価等の技術を開発

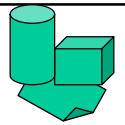
・地球温暖化の回避
・化石エネルギーの高効率利用

バイオマス

バイオマスコンビナート

・バイオマスから化学製品を生産
・分離、精製、変換プロセスの開発と全体設計

・サステナビリティへの貢献
・石油依存度の低下

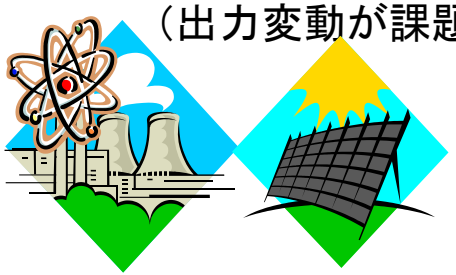


新燃料自動車技術

・新燃料の製造・使用技術開発
・規格化、品質確保を推進・支援
・排気ガス浄化技術の向上

・石油依存度の低下
・良好な大気環境の確保

原子力（負荷変動に弱い）
再生可能エネルギー
（出力変動が課題）



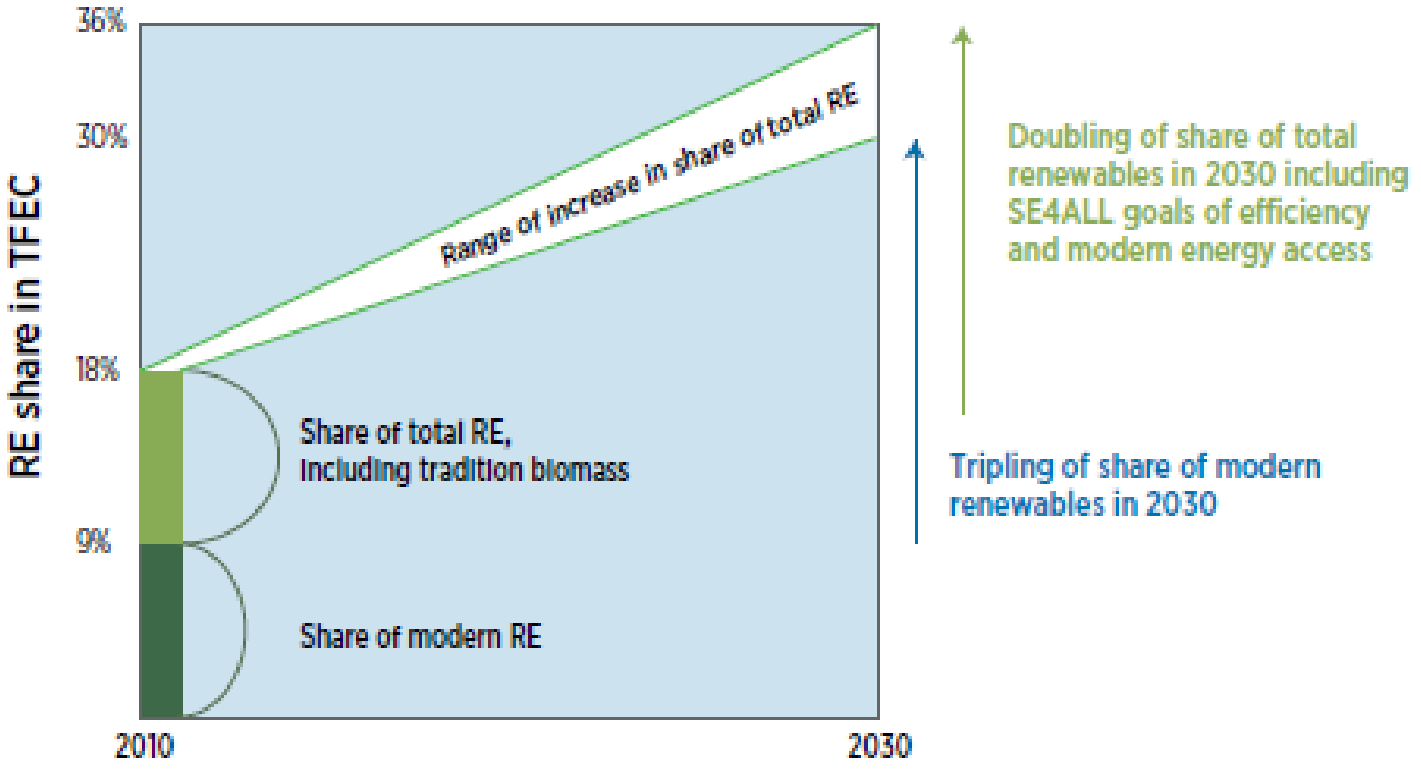
蓄電技術

・二次電池やキャパシタの高性能化
・新規材料の開発、デバイス化
・評価技術

・エネルギーの需要ギャップの調整
・自動車の電化促進
・良好な大気環境の確保

プラグインハイブリッド
電気自動車

Figure 1. Doubling the share of renewables by 2030



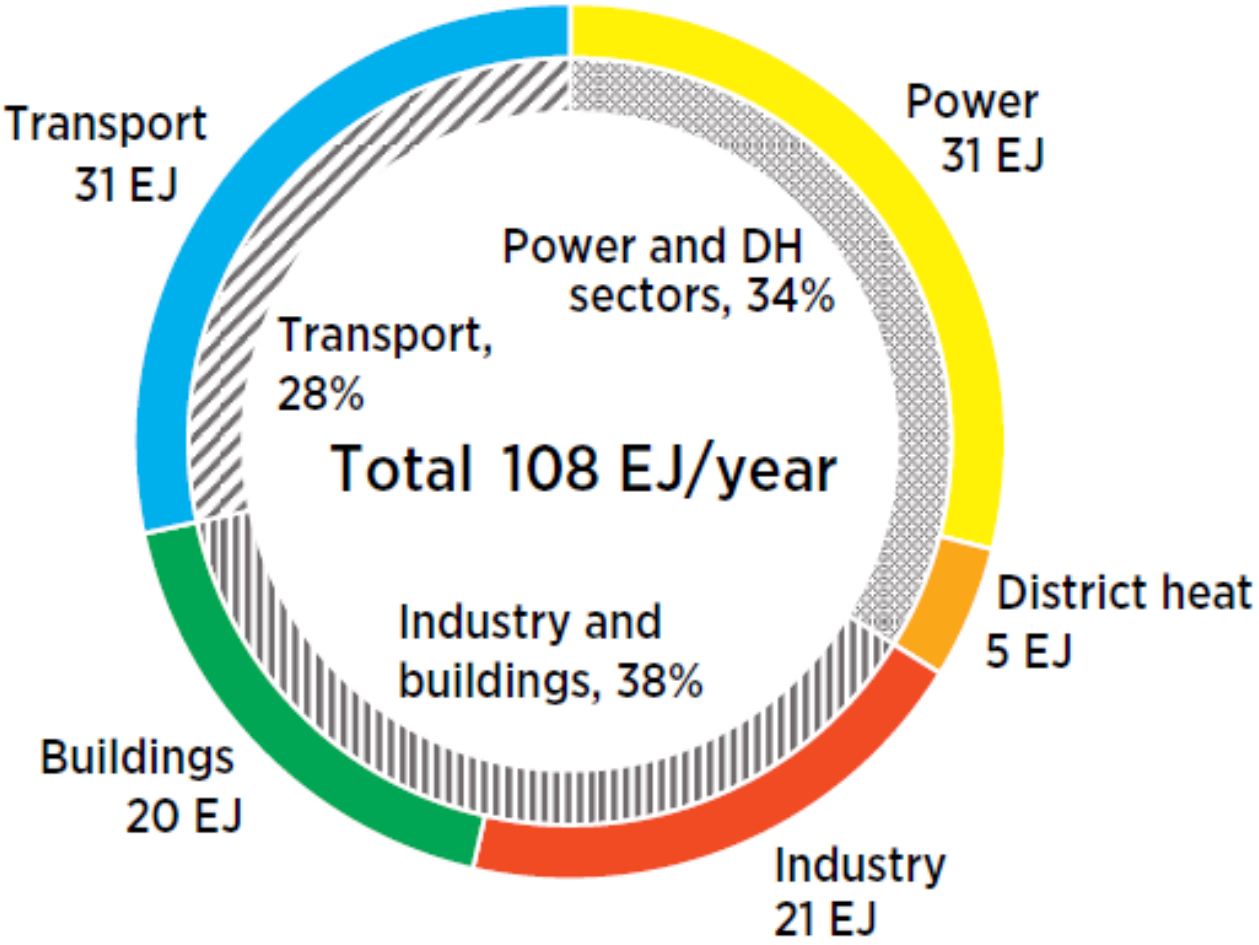
Doubling the share of renewable energy implies a tripling of the share of modern renewables.

Note: The world currently gets 18% of its energy from renewables, but only 9% is modern renewables, and the other 9% is traditional biomass, of which only part is sustainable. On the path towards a doubling of sustainable renewable energy, modern renewables therefore need to replace traditional biomass almost entirely. As a result, the share of modern renewables more than triples from 9% in 2010, to 30% or more by 2030.

RE = renewable energy; TFEC = total final energy consumption

Remap 2030の世界的なバイオマス需要は発電、輸送、熱と多岐にわたる！

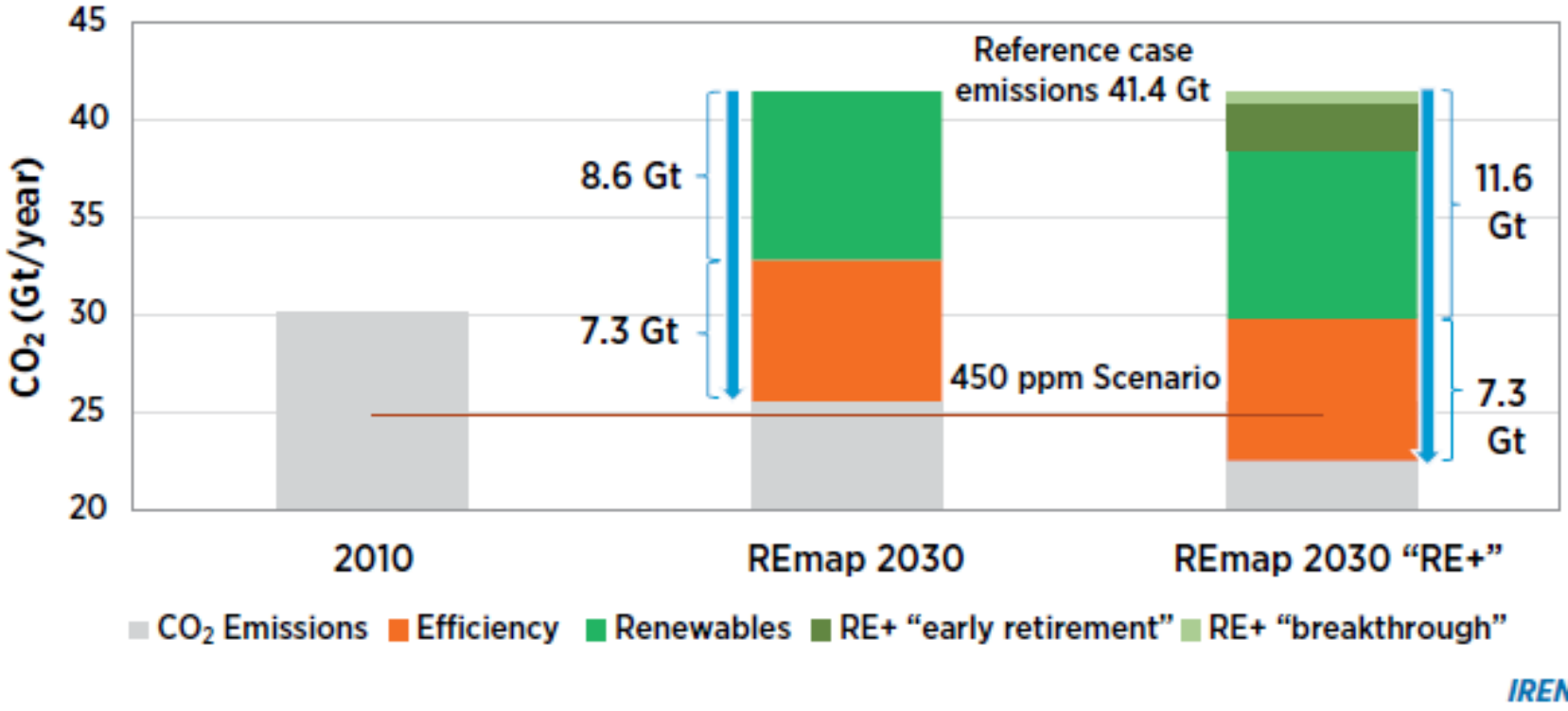
Figure 14. Global biomass demand by sector in REmap 2030 (in primary energy terms)



Biomass is versatile and can be used to provide power, transport and heat.

REmap 2030
A Renewable Energy Roadmap

Figure 10. Carbon dioxide emissions under REmap 2030



Renewable energy can provide half of the CO_2 emission reductions needed in 2030 from the energy sector.

Note: Only emissions resulting from fossil fuel combustion are shown. CO_2 emission savings from energy efficiency are based on its share in total emissions in the IEA's World Energy Outlook (WEO) 2012 (IEA, 2012b). IRENA applies this share to the total Reference Case emissions of 41.4 Gt of CO_2 to estimate approximately 7.3 Gt of CO_2 emission savings related to energy efficiency in REmap 2030.

Foresight of ASEAN Agricultural Residues in 2030

(Converted into Ethanol x1000 kL)

Type of Agriculture	Sugar cane	Cassava	Corn	Rice	Palm oil	Coconut	Total
Utilized part	Bagasse Filter cake	Lees Stems Leaves	Stems Leaves Cores Husks Fibers	Straw Husks	Shell Tuft	Shell Fiber	
Thailand	4,441	1,123	2,038	13,702	1,128	186	22,618
Malaysia	108	20	42	873	15,024	115	16,182
Indonesia	8,606	2,349	14,499	19,334	24,684	2,584	72,056
Philippines	2,555	187	5,572	6,265	32	5,186	19,797
Vietnam	1,319	388	3,906	12,696	0	137	18,446
Myanmar	1,392	20	1,421	7,161	0	132	10,126
Cambodia	16	40	400	2,436	0	16	2,908
Laos	72	12	327	1,511	0	0	1,922
Total	18,509	4,139	28,205	63,978	40,868	8,356	164,055

* The figures in yellow background are the promising quantities for producing ethanol

Source : NEDO Research Report in 2007

IRENA
International Renewable Energy Agency

Biofuel Potential in Southeast Asia:

Raising food yields, reducing food waste and utilising residues

Effective Utilization of Biomass with Asian Partners

Technology Transfer
Investment

CDM
JCM

CO_2 Reduction

Credit

Solid&Liquid Fuels

Bulk Chemicals

Local Energy Supply
Forest Restoration

Scheme of Sustainable Asian Biomass Strategy

=> ASEAN+6 and Asia-Pacific Collaborations

Best Practice Scenario and System for Sustainable Biomass Utilization Models in East Asian Countries

Win-Win relationship

Total Promotion of Biomass Asia Strategy
Extensive Win-Win Collaboration in Asia
International R&D Joint Projects on Biomass,
Especially agriculture and engineering fields

Technology, IP, Human resources

Resources, Economical development, Technology transfer

Energy, Materials, CO_2 reduction:
CDM&JCM⇒Sustainable Development