



NEDO's Initiatives for Woody Biomass Power Generation

Woody biomass / fast-growing trees / broadleaf trees / chips and pellets

Trends in Biomass Power Generation

■ According to the 7th Strategic Energy Plan, biomass power generation is recognized as **a distributed, locally produced and consumed energy source** with diverse value, such as enhancing resilience during disasters and having significant economic and employment ripple effects through revitalization of local industries.

■ In the 2040 energy supply-demand outlook, renewable energy is expected to account for approximately 40-50% of the power mix, with **biomass accounting for around 5-6%**.

Electricity demand and power generation mix

	FY2013 (Actual)	FY2022 (Actual)	FY2040 (Forecast)
Electricity demand	0.99 trillion kWh	0.90 trillion kWh	Approx. 0.9-1.1 trillion kWh
Industry	0.36 trillion kWh	0.32 trillion kWh	Approx. 0.38-0.41 trillion kWh
Commercial	0.32 trillion kWh	0.31 trillion kWh	Approx. 0.29-0.30 trillion kWh
Residential	0.29 trillion kWh	0.26 trillion kWh	Approx. 0.23-0.26 trillion kWh
Transport	0.02 trillion kWh	0.02 trillion kWh	Approx. 0.04-0.10 trillion kWh
Electricity generated	1.08 trillion kWh	1.00 trillion kWh	Approx. 1.1-1.2 trillion kWh
Renewable energy	10.9%	21.8%	Approx. 40-50%
Solar PV	1.2%	9.2%	Approx. 23-29%
Wind	0.5%	0.9%	Approx. 4-8%
Hydro	7.3%	7.7%	Approx. 8-10%
Geothermal	0.2%	0.3%	Approx. 1-2%
Biomass	1.6%	3.7%	Approx. 5-6%
Nuclear	0.9%	5.6%	Approx. 20%
Thermal	88.3%	72.6%	Approx. 30-40%



Source : Source: Agency for Natural Resources and Energy, "Outlook for Energy Supply and Demand in FY2040 (reference material)"



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Challenges in the Utilization of Woody Biomass (1)

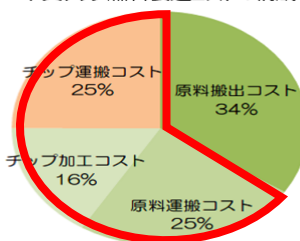
In Japan, wood is mainly used as building material, and **wood for fuel is positioned as a secondary use**, leading to the following challenges

1. **Predicting supply is difficult** because of volatile market trend of building materials
2. **Streamline the production and transportation system**, originally designed for conifer building materials, **to make it more efficient for energy use.**
3. **No standard to evaluate fuel quality with unified measurement**



建材（A材、B材）が主流、燃料用途は二次的取扱。商慣行として、燃料用途のみを目的とした伐採は行われていない（安定供給上の支障）。

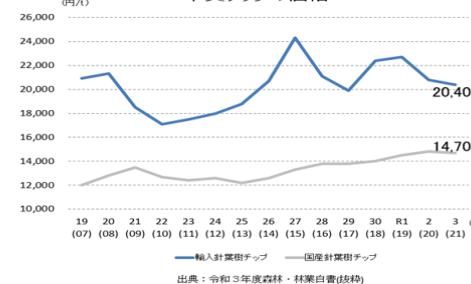
木質チップ燃料製造コストの構成



出典：平成25年度木質バイオマス利用支援体制構築事業 発電・熱供給・熱電併給推進のための調査

木質チップ燃料製造コスト構成のうち、運搬コストと加工コストが全体の約2/3を占める。（製造・輸送システムの効率化が必要）。

木質チップの価格



発電所での需要増により国産チップの利用量・価格は上昇傾向。また、燃料材は、発電所が長期的に一定額で購入する形をとっているため、どんな燃料材が来ても、基本的には決まった購入価格で取引されている状況。（品質規格が存在しない）

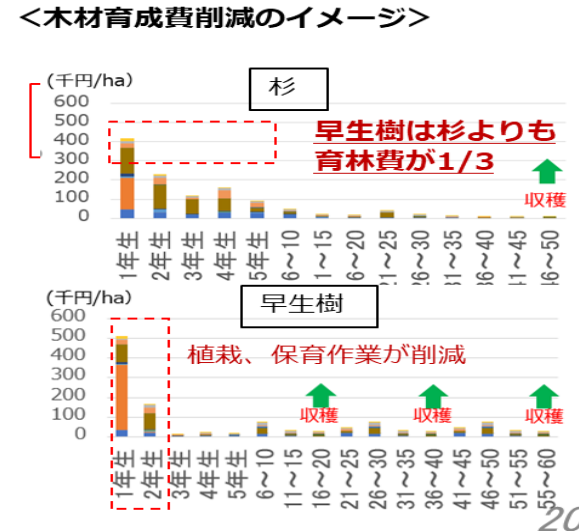
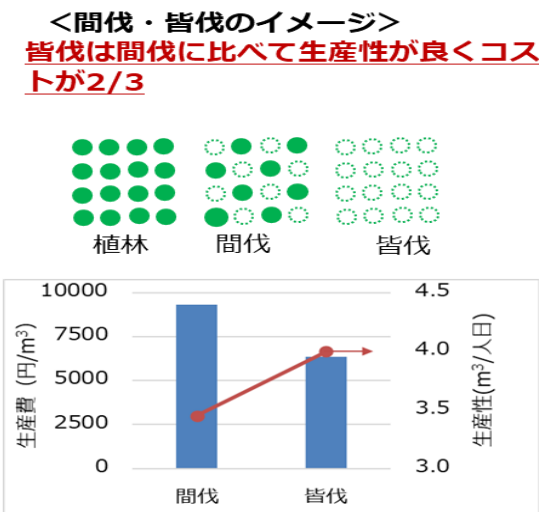
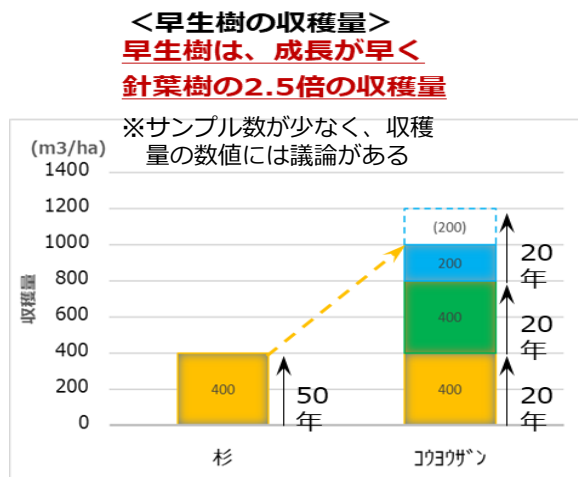


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Challenges in the Utilization of Woody Biomass (2)

1. Fast-growing trees, etc., are expected to reduce reforestation and afforestation work due to their rapid growth and sprouting characteristics, **but utilization methods have not yet been established.**
2. Although broadleaf trees are abundant in resources, their curved growth makes extraction difficult, and **utilization has not progressed.**





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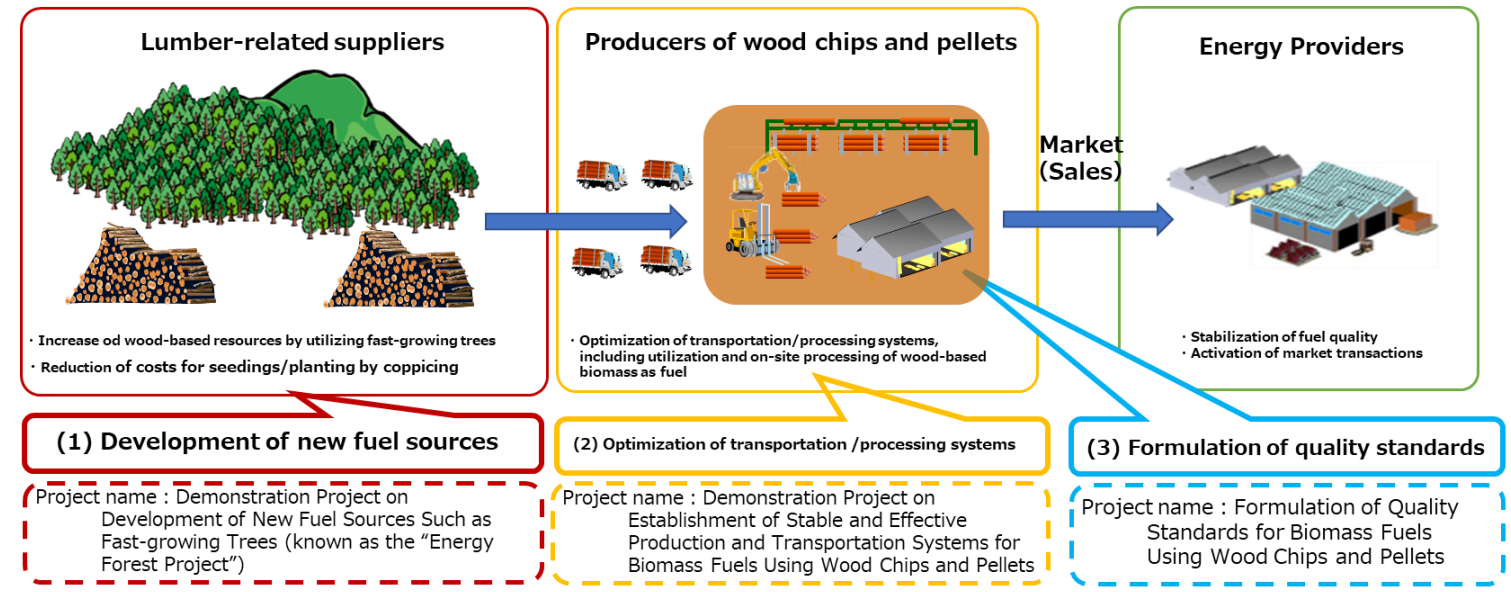
Woody biomass / fast-growing trees / broadleaf trees / chips and pellets

NEDO's Initiatives

NEDO is implementing the **“Support Project for Creating Stable and Effective Supply Systems of Woody Biomass Fuels”** to solve challenges in the utilization of woody biomass.

In this project, aiming for the post-FIT period, we are working on:

1. Developing and promoting the use of new fuel potential by utilizing fast-growing trees and unused broadleaf trees.
2. Building stable and efficient manufacturing and transportation systems for wood chips and pellets.
3. Establishing quality standards to vitalize market transactions and improve power generation efficiency.





NEDO's Initiatives for Woody Biomass Power Generation

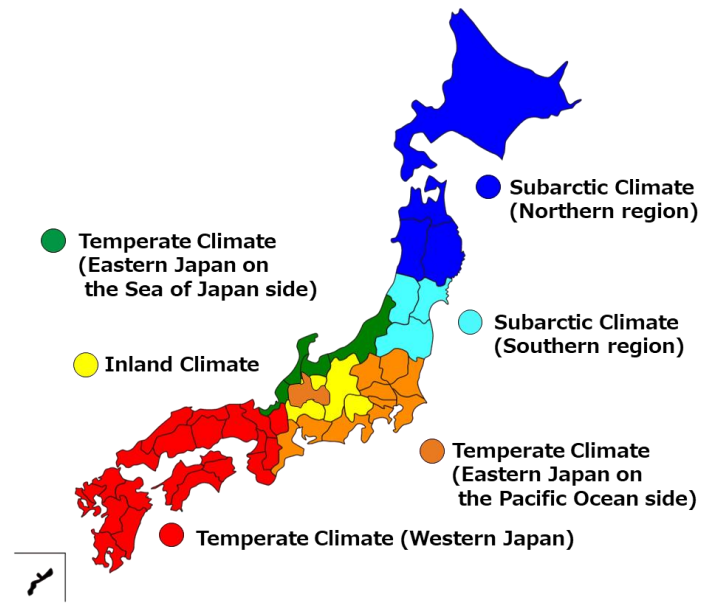
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NEDO's Initiatives

Development of Fuel Potential
In Japan's six climate zones, multiple tree species are being planted and cultivated.

- Subarctic (Northern region)
- Subarctic (Southern region)
- Temperate Climate (Eastern Japan on the Pacific Ocean side)
- Temperate Climate (Eastern Japan on the Sea of Japan side)
- Temperate Climate (Western Japan)
- Inland Climate

By selecting tree species suitable for afforestation, and choosing region-appropriate methods for planting, cultivation, harvesting, and extraction, we aim to establish technologies that can be widely adopted throughout Japan.



気候区分	事業者／実証地	樹種
亜寒帯気候 (北部)	JFEエンジニアリング(株)／北海道夕張郡由仁町	グリーンラーチ、ヤナギ
	(株)柴田産業／岩手県盛岡市、二戸郡一戸町	ヤナギ、ホブラ、ホオノキ、ユリノキ、ハンノキ、キリ、ナラ
亜寒帯気候 (南部)	JCOAL・遠野興産(株)・古河林業(株)／福島県いわき市	コウヨウザン、ユリノキ、チャンチンモドキ
温帯気候 (東日本 太平洋)	(株)エコグリーンホールディングス／千葉県富里市、山武市、夷隅郡大多喜町等	ユーカリ、コウヨウザン、ユリノキ、センダン
	(株)環境公害分析センター／栃木県芳賀郡等	早生キリ
	(株)グリーンアース※／千葉県夷隅郡大多喜町	ヤナギ
	バイオマスパワーテクノロジー(株)※／三重県松坂市、多気郡多気町、大台町等	センダン、ナラ類、カン類
温帯気候 (東日本 日本海)	自然応用科学(株)※／岐阜県山県市、本巣市等	ユーカリ、キリ
温帯気候 (東日本 日本海)	坂井森林組合／福井県あわら市	コウヨウザン
温帯気候 (西日本)	バイオマスパワーテクノロジー(株)※／奈良県五條市、高市郡明日香村、和歌山県田辺市龍神村	センダン、ナラ類、カン類、ヤナギ
	(一社)徳島地域エネルギー／兵庫県宝塚市	広葉樹萌芽更新
	(株)ジャパンインベストメントアドバイザー／兵庫県佐用町、愛媛県久万高原町、長崎県五島市	ユーカリ
内陸性気候	(株)グリーンアース※／宮崎県児湯郡都農町	ヤナギ
	北アルプス森林組合／長野県大町市 自然応用科学(株)※／岐阜県高山市	広葉樹萌芽更新、コナラ、クリ、ホオノキ ユーカリ、キリ

※(株)グリーンアース、バイオマスパワーテクノロジー(株)、自然応用科学(株)は2つの気候区分で実証事業を実施

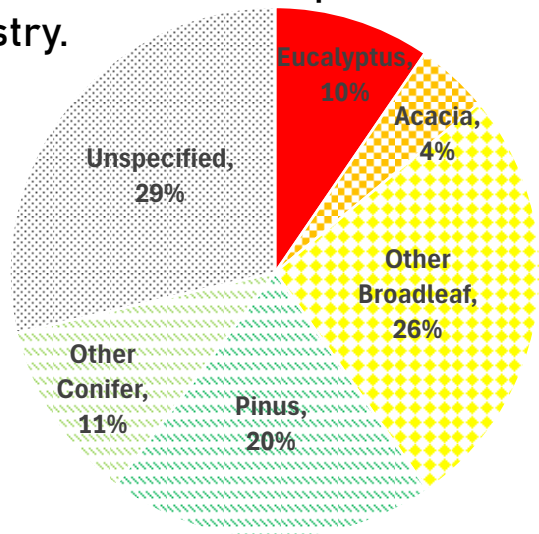


Eucalyptus: A Fast-Growing, Globally Popular Tree

Woody biomass/Fast-growing tree/Eucalyptus

A Globally Popular Tree Species

Eucalyptus is a popular plantation tree with more than 500 species used for forestry.

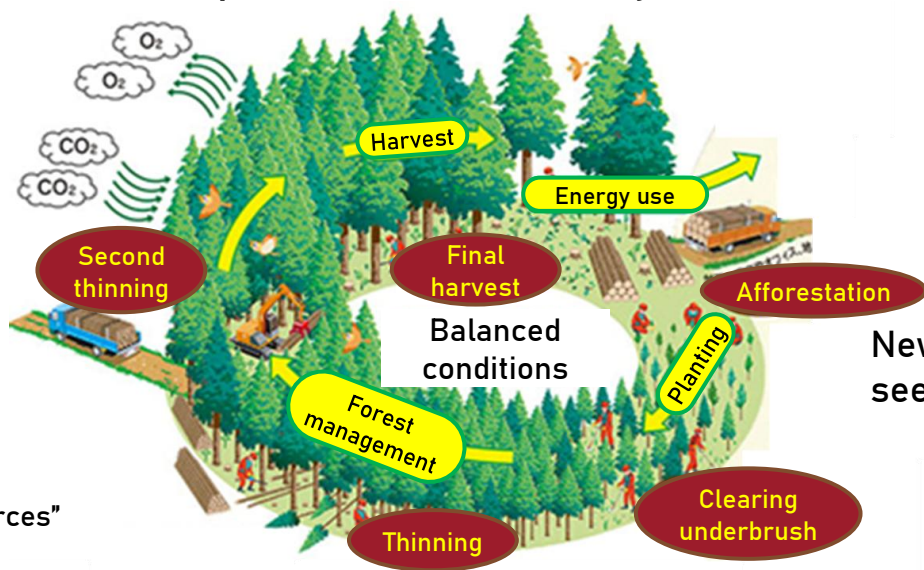


Global plantation area share by tree species

Source: FAO.2001. "Global data on forest plantations resources"
<https://www.fao.org/4/Y2316E/y2316e0b.htm>

What Are "Fast-Growing Trees?"

Fast-growing tree species are those that can be harvested in short rotation periods. Eucalyptus is one such species with a rotation period of less than 10 years.

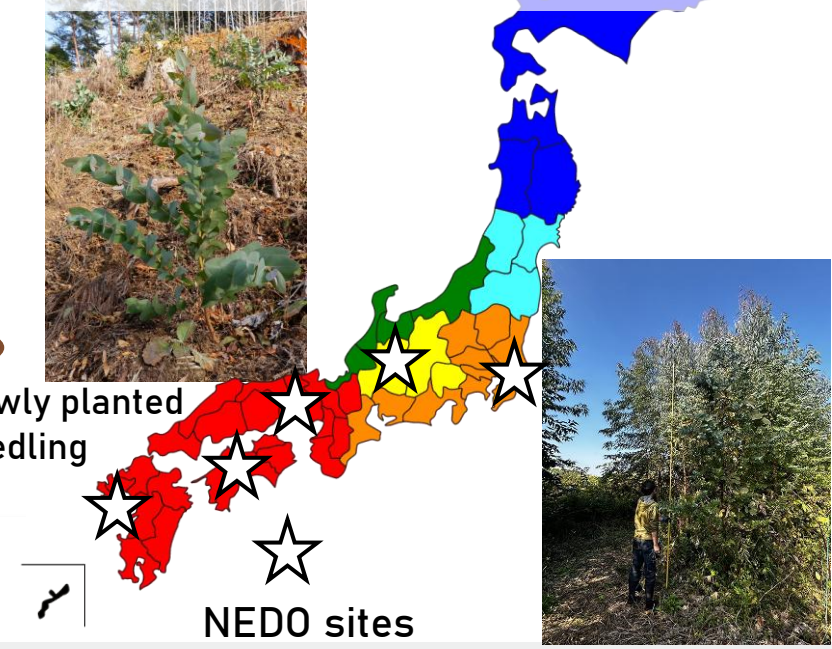


NEDO Experimental Sites

We study tree species and cultivation methods suited to different environmental conditions, such as climate and soil.



Newly planted seedling



NEDO sites

