



Forest and Agricultural biomass potential in Spain

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www.avebiom.org

The Spanish Biomass Association (AVEBIOM) was founded on 2004 with the aim of **promoting the development of the Bioenergy sector in Spain**

The **MAIN OBJECTIVE** of the Association is to increase the sustainable consumption of biomass and developing our companies at the same time



AVEBIOM represents
all the companies of
the **whole supply
chain** of the
bioenergy



 Canal CLIMA para empresas	 Certificación CALIDAD del PELLET	 Organiza FERIA PROFESIONAL DE BIOENERGÍA	 Revista PROFESIONAL
 CLÚSTER de la Bioenergía AEI de AVEBIOM	 Certificación CALIDAD biomasa	 Evento para GRANDES CONSUMIDORES	 Elabora ÍNDICE de PRECIOS de la biomasa
 Proyectos EUROPEOS	 OBSERVATORIO Nacional de CALDERAS de biomasa	 Organiza CONGRESO INTERNACIONAL	www.avebiom.org



CONGRESO BIOENERGÍA



CIMEP
Confederación Internacional
Mercado del Pellet doméstico



aveBiom

16 years promoting quality and sustainability of solid biofuels



Strong International presence

Members and presence in managing positions:



16 years promoting the biomass sector



Spain is the second country in EU with more Forest Surface (27,7 Mha which means the 54,8% of the territory) only behind Sweden.

Bioenergy → opportunity for the “Emptied Spain”

		POTENTIAL (t DM/y)	AVAILABLE (t DM/y)
Forests	Conifers	3.031.382	1.438.717
	Broadleaves	3.601.615	1.594.704
	Mixed forests	893.080	549.137
	Shrubs	2.080.482	937.845
	Wooded pasture	941.701	252.248
	TOTAL FORESTS	10.548.261	4.772.650
Agriculture	Rain-fed crops	16.944.193	5.420.661
	Irrigated crops	4.682.592	3.746.230
	Rice crops	394.983	316.204
	Olive plantations	1.819.981	1.455.168
	Orchard plantations	1.411.563	1.129.094
	Vineyards	843.949	675.000
	Crop mixtures	123.225	99.416
	TOTAL AGRICULTURE	26.220.486	12.841.774

Source: Ciemat (BIORAISE)

Biomassud Plus H2020 Project

Spain has a huge forestry biomass potential (and growing!)

IFN2 1996: 594 mil. m³ wood

IFN3 2009: 921 mil. m³ wood

(+ 64% in 13 years!!)

Annual increase: 46 millones de m³ wood

In Spain, annually, 16 mil. m³ Wood (35%) are used annually

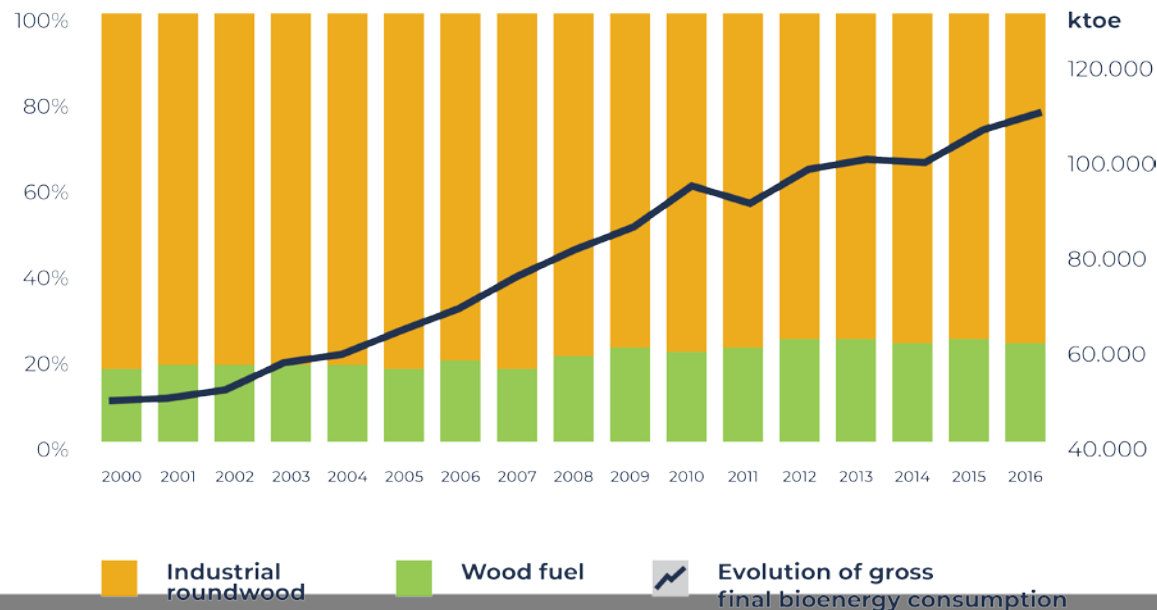
European average 61% (the used of Wood could be increased in about 12 mil. m³ annually in a SUSTAINABLE way)

12 millones de m³ mean:

- 12.000 jobs
- 25 mil. of oil barrels (1.500 M€)
- 9 mil. Tons of CO₂ not emitted

SHARE OF EU-28 WOOD REMOVALS ACCORDING TO END USE - IN COMPARISON WITH THE FINAL ENERGY CONSUMPTION OF BIOENERGY

(%, KTOE) SOURCE: FAOSTAT, EUROSTAT, BIOENERGY EUROPE'S CALCULATIONS



More use of biomass for Bioenergy purposes doesn't mean necessarily more pressure on the forests

Producción de Pellets de madera

(toneladas/año)

Año	Número de plantas de producción operativas	Capacidad máxima teórica de producción	PRODUCCIÓN REAL
2010	29	900.000	150.000
2011	32	950.000	225.000
2012	40	950.000	250.000
2013	42	975.000	350.000
2014	45	1.125.000	410.000
2015	79	1.250.000	475.000
2016	82	1.600.000	490.000
2017	78	1.747.000	529.000
2018	79	1.760.000	593.000
2019	82	1.878.400	714.000
2020*	84	2.000.000	650.000
2022*	88	2.200.000	900.000

*Estimaciones

La **Capacidad Máxima Teórica** se calcula a partir de la producción máxima que pueden alcanzar las fábricas de pellets en función de sus granuladoras o secaderos, trabajando 8000 horas al año.

Production increased almost 5 times from 2010 to 2019

Consumo de Pellets de madera

(toneladas/año)

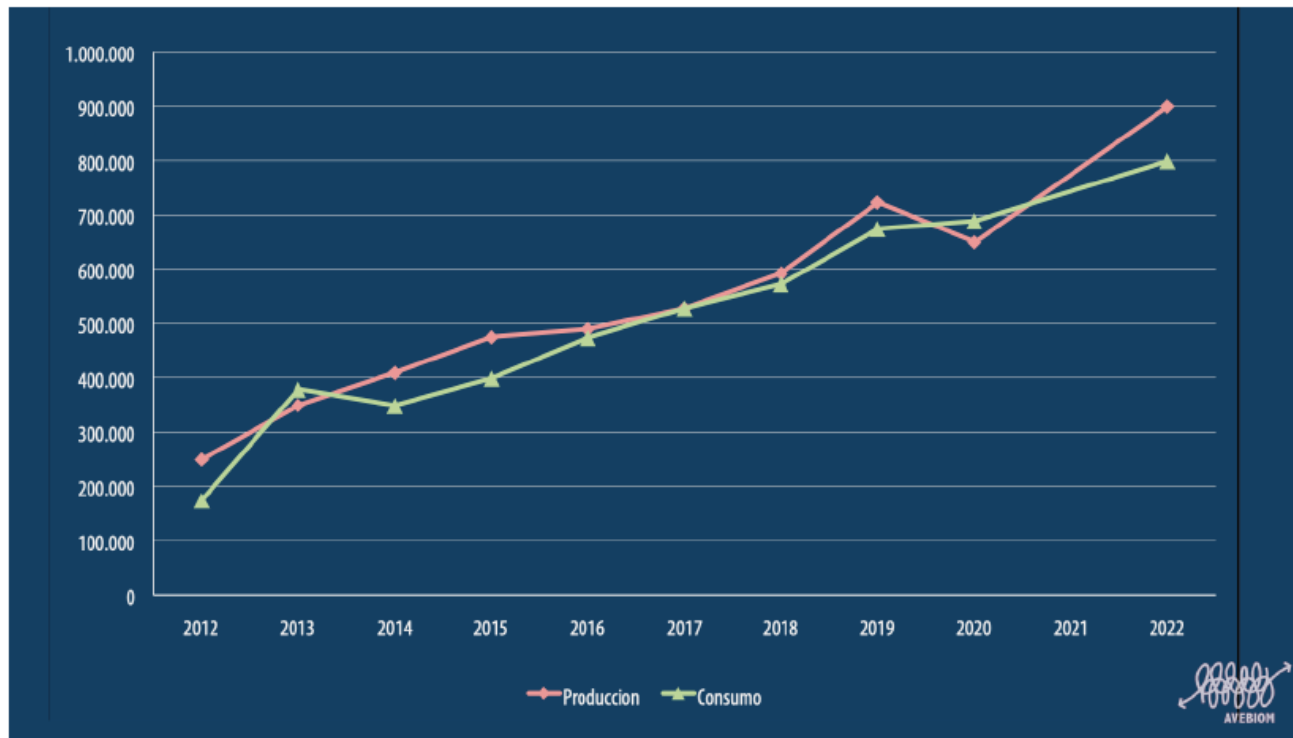
Año	Calefacción residencial <50 kW	Calefacción comercial >50 kW	Plantas de cogeneración	Plantas eléctricas	CONSUMO TOTAL
2010	10.000	0		0	10.000
2011	120.000	0	0	0	
2012	125.000	50.000	0	0	175.000
2013	235.000	145.000	0	0	380.000
2014	205.000	145.000	0	0	350.000
2015	240.000	160.000	0	0	400.000
2016	285.000	190.000	0	0	475.000
2017	326.000	203.000	0	0	529.000
2018	355.000	218.000	0	0	573.000
2019	420.000	255.000	0	0	675.000
2020*	430.000	260.000	0	0	690.000
2022*	505.000	295.000	0	0	800.000

*Estimaciones

Producción y consumo de Pellets de madera

(toneladas/año)

t/año





Website:

<http://www.agrobioheat.eu>

Agrobiomass facility
operator (FR)

⇒ Providing support to
develop the use of
agrobiomass heating in
Europe

Technical partners (GR, ES, AT)



European association (BE)



s (RO, UA, FR, ES, GR, HR)



Straw & network
expertise (DK)



Social sciences
expertise (BE)



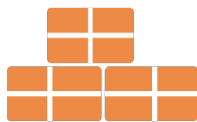
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Why agrobiomass (Spain) ?

- Local and endogenous fuel, renewable, available in large quantities and in some cases underused.
 - Avoid uncontrolled emissions from burning agricultural residues (stubble)
 - Rural development “España Vacía” (“Emptied Spain”)
- Modern technologies with low emissions and high efficiency



straw



prunings



miscanthus



Short Rotation Coppice



nut shells



olive stones

	CEREALS				INDUSTRIAL CROPS			WOODY CROPS		
	Surface	Grain	Straw			Surface		Surface	Productio n	Renewal s
Surface	[ha]	[t]	[t]		Crop	[ha]	Crop	[ha]	[t]	[ha]
Wheat	2.061.508	7.985.725	4.401.035		Cotton	65.121	Vineyards	941.515	6.983.256	15.598
Barley	2.569.462	9.129.535	4.953.509		Sunflower	691.276	Olive trees	2.579.001	9.819.569	21.129
Rye	136.251	388.467	204.190		Safflower	12.254	Citrics	297.615	7.528.310	10.565
Oats	556.500	1.486.948	807.051		Soy	1.481	Sweet fruits	269.012	4.044.415	14.197
Other Winter cereals	262.171	803.667	422.303		Rape	78.401				
Corn	322.373	3.842.519	345.527		Tobacco	8.509	Dry fruits	748.345	555.284	6.110
Rice	105.012	808.167	16.722		Others	65.716				
Other spring cereals	10.233	36.547	11.792							
TOTALS	6.023.510	24.481.575	11.162.129		TOTAL	922.758		4.835.488	28.930.834	67.599

Spain is a very rich country in
Agro-biomass:
1st world producer of olive oil,
3rd world wine producer,
more than 6 Mill ha with cereal,
leader in citrus, nuts, etc.

STATUS ON THE USE OF AGROBIOMASS IN SPAIN

Agrobiomass	Status
Agro-industrial by-products <i>Olive stones, olive cake, dry fruits shells (almonds y pine nuts) etc.</i>	• Markets quite well developed and established • “Easy” logistic • “Tradition” (biofuels being used since years ago) • There is a distribution network relatively well developed and adapted equipment • BUT not always used with the best practices or conditions (obsolete/basic technology, biofuels not valorized (wet olive stones...))
Agricultural residues (leftovers!!) (primary agrobiomasa) <i>Cereal straw, corn cane, prunings, renewals of vineyards/olive/fruit trees), etc.</i>	• There are some examples that we could consider “Heroic” • Not established markets (small size $1 < \text{MW}$) • Multiple barriers: logistic, not easy combustion, not adapted equipment...).
Energy Crops	• Small surface..abt for heating purposes. Small surfaces for demonstration purposes • Possible small cases not visible



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Seleccione datos para visualización

Categorías

Seleccionar/De-seleccionar todo

- ☒ Ejemplos de Agrobiomasa para usos térmicos
- ☒ Ejemplos de utilización de Agrobiomasa
- ☒ Fabricación de sistemas para usos térmicos con Agrobiomasa
- ☒ Empresa de Servicios Energéticos e Instaladores
- ☒ Suministradores de Biocombustibles de Agrobiomasa
- ☒ Iniciativas propuestas

Países

Seleccionar/De-seleccionar todo

- ☐ Alemania
- ☐ Austria
- ☐ Belgium
- ☐ Bulgaria
- ☐ Croacia
- ☐ Cyprus
- ☐ Dinamarca
- ☒ España
- ☐ Estonia
- ☐ Finland
- ☐ Francia
- ☐ Grecia

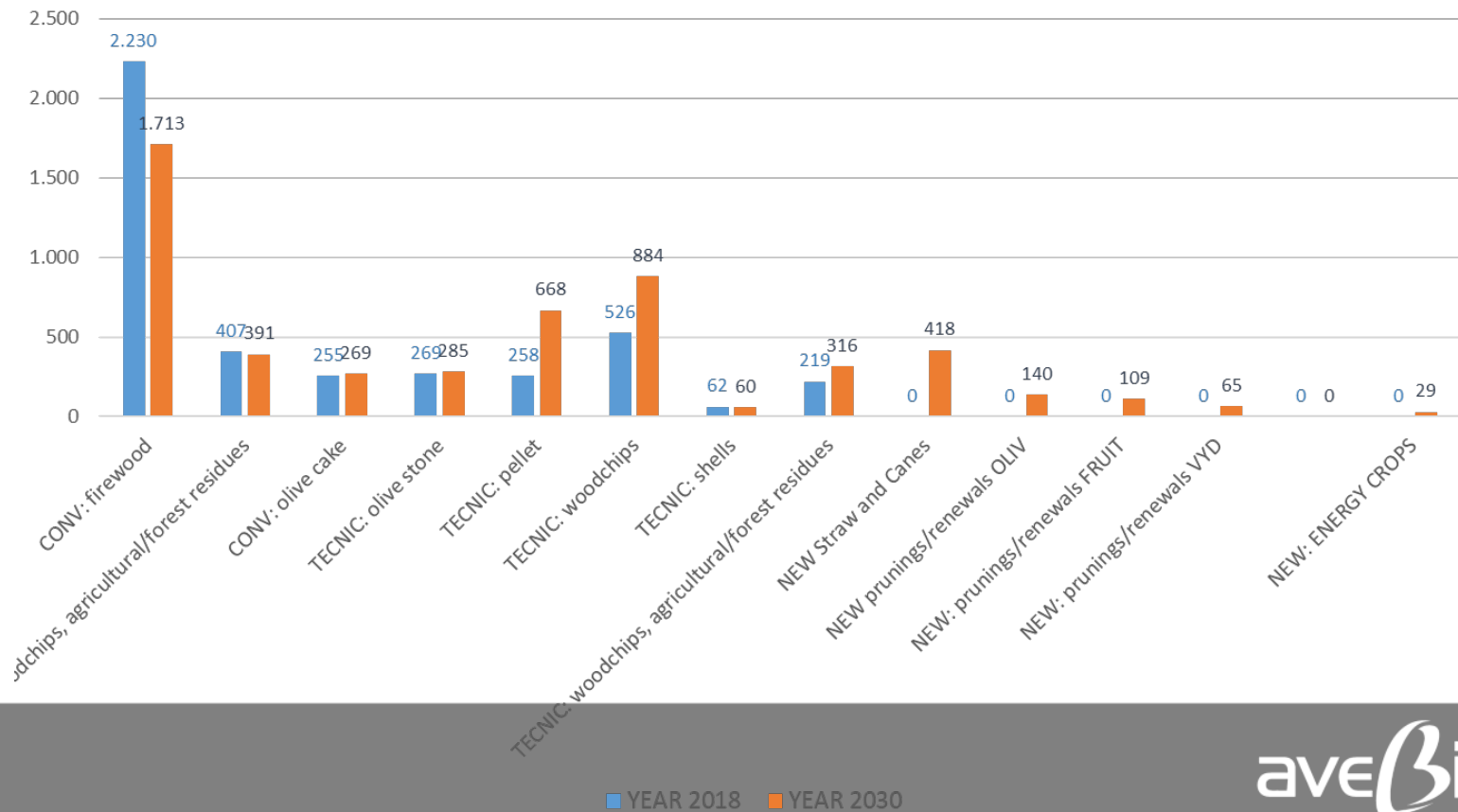


<https://www.agrobiomass-observatory.eu/>

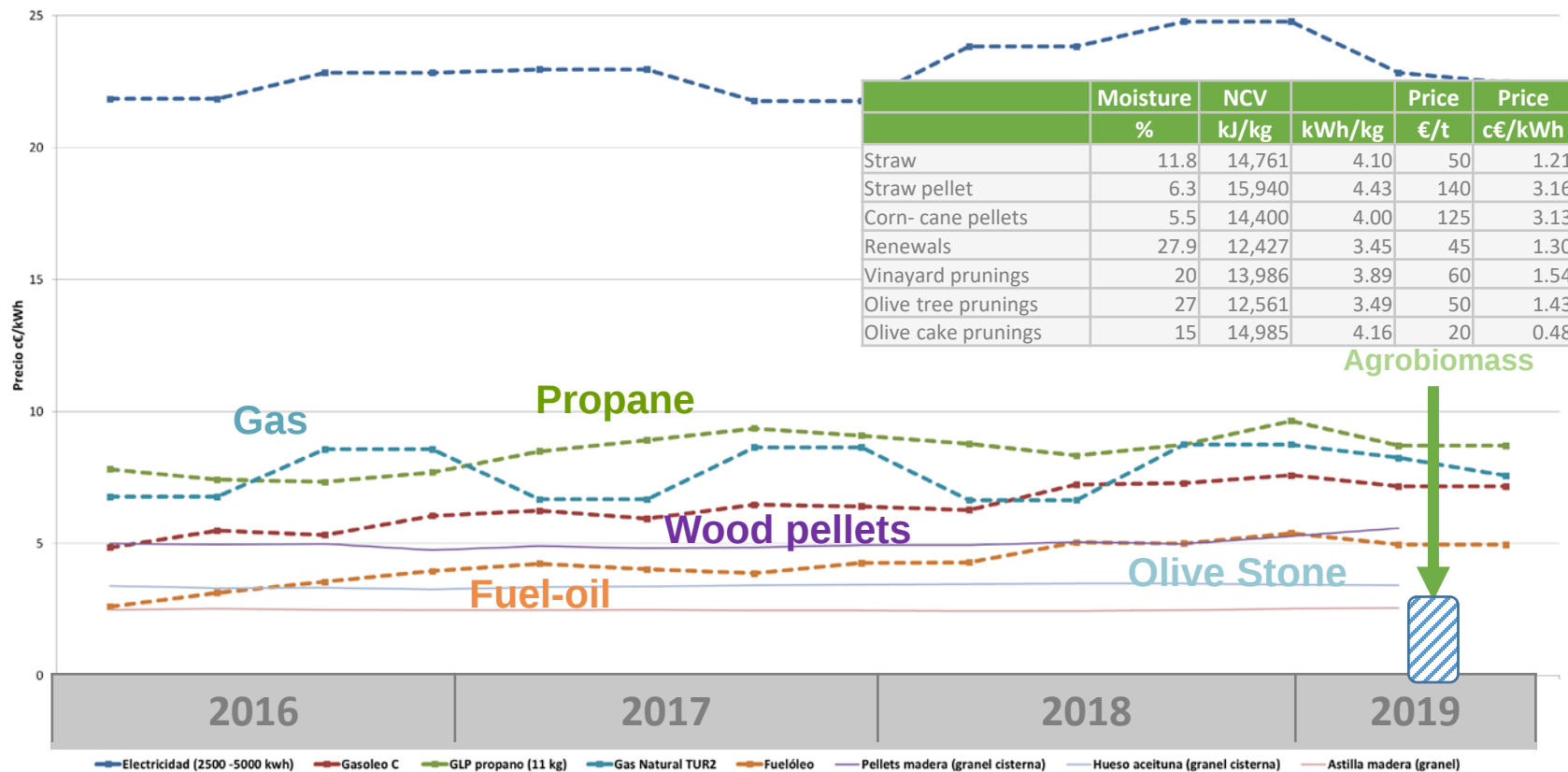
SOLID BIOFUELS PRODUCED

Biofuel	Domestic Quality (t dm/y*)	Industrial Quality (t dm/y*)	Total (t dm/y*)
Firewood	1,500,000		1,500,000
Woodchips	240,000	3,000,000	3,240,000
Other Woodchips (prunings and renewals)	323,021	1,000,000	1,323,021
Wood briquettes	50,000		50,000
Wood pellets	500,205	54,000	554,205
Vineryard pruning pellets		4,673	4,673
Olive Stones	130,000	300,000	430,000
Olive Cake		800,000	800,000
Dry Fruit Shells			
Almond Shells	10,000	140,000	150,000
Chopped pinecones		38,250	38,250
Pine nut shells		6,588	6,588
TOTAL	2,753,226	5,343,511	8,096,737
[*] t dm:/y: dry matter tons / year			

ktep: market in 2018 and projections 2030 in Spain



Comparativa precios combustibles Marzo-2019



PRICE ESTIMATION FOR SOME AGROBIOMASS

- Straw 50 €/t NCV: 3523 Kcal/kg (11,8%) → 1,22 c€/kwh
- Straw pellet: 140 €/t NCV: 3807 Kcal/kg (6,3%) → 2,94 c€/kwh
- Corn cane pellet: 125 €/t NCV: 3807 Kcal/kg (5,5%) → 2,60 c€/kwh
- Fruit tree renewals (Wood chips): 45-70 €/t NCV: 3.439 Kcal/Kg (27,9%) → 1,13–1,75 c€/kwh
- Olive tree prunings (firewood): 45-70 €/t NCV: 3005 Kcal /kg (27%) → 1,29–2 c€/kwh
- Vineyard prunings: 50–70 €/t NCV: 3346 Kcal (20%) → 1,29 – 1,8 c€/kwh
- Olive Cake: 20 €/t; NCV: 3585 Kcal/kg. (15%) → 0,48 c€/kwh

Gracias!

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