



Solution Architect for Global  
Bioeconomy & Cleantech Opportunities



Sustainable Bioenergy  
Solutions for Tomorrow

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Researcher

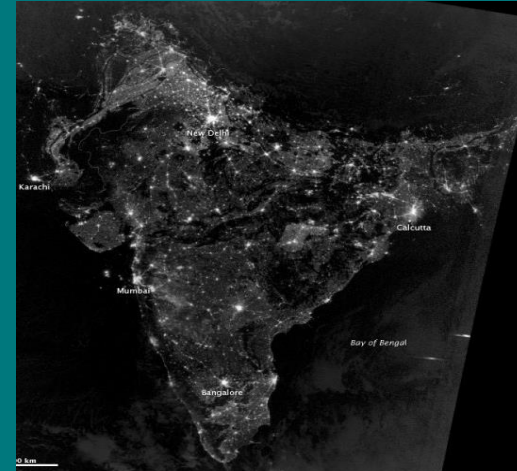
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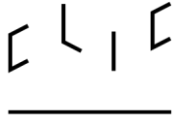
# Business opportunities and challenges in new markets



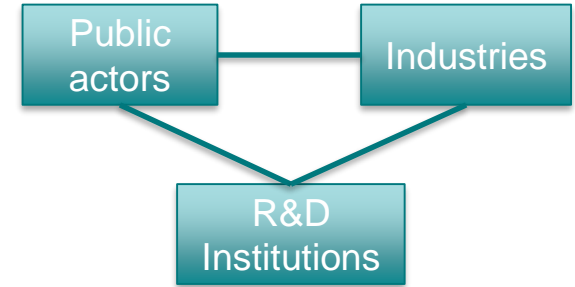
POLAND



India



# A Triple Helix based BEST consortium



Consortium:



Case India (2013-2014):

UEF, TUT, LUKE, Fortum, Valmet, VTT, Arbonaut, TERI, local Govt departments

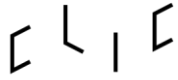


Case Poland (2015-2016):

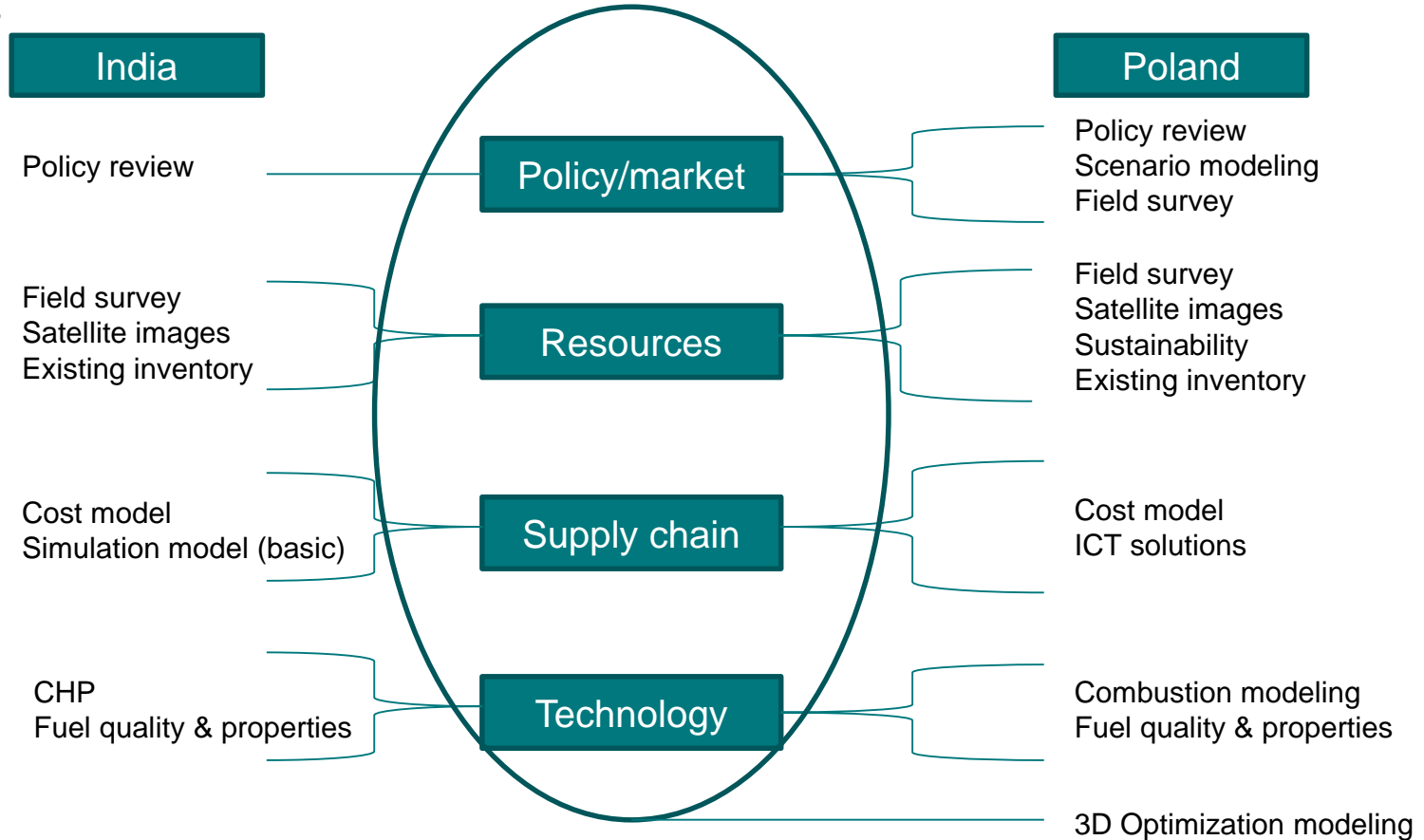
UEF, TUT, UO, LUKE, Fortum, Valmet, VTT, Arbonaut, Nicolaus Copernicus University, University of Lodz, Statistics department, local Marshal offices

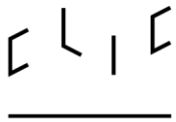


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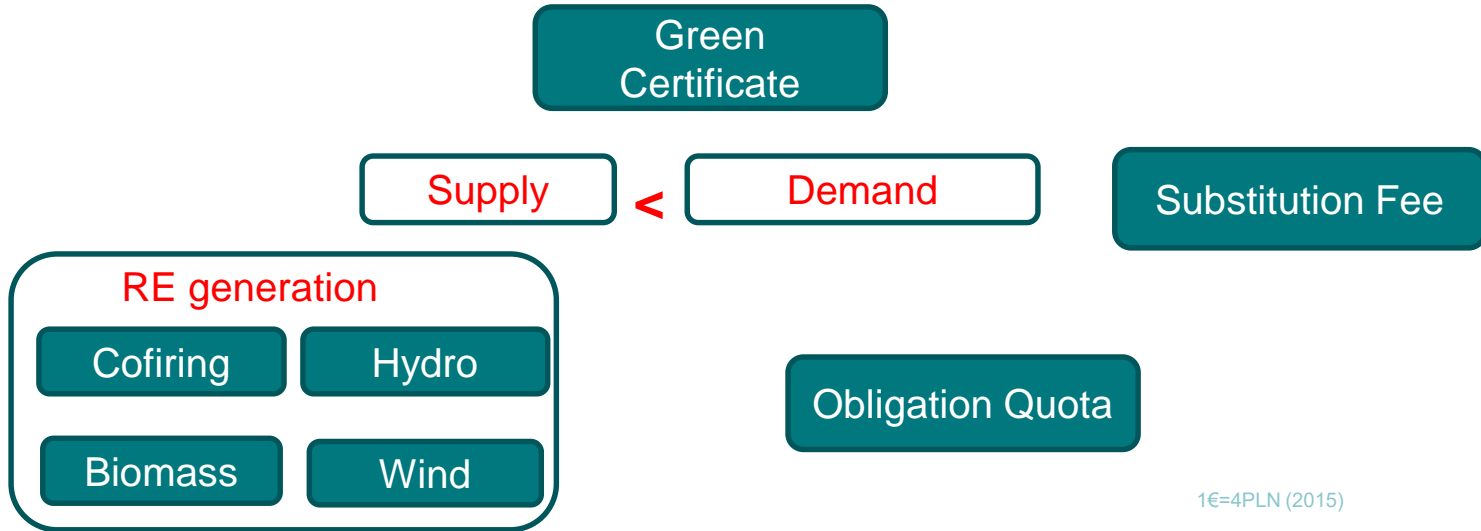
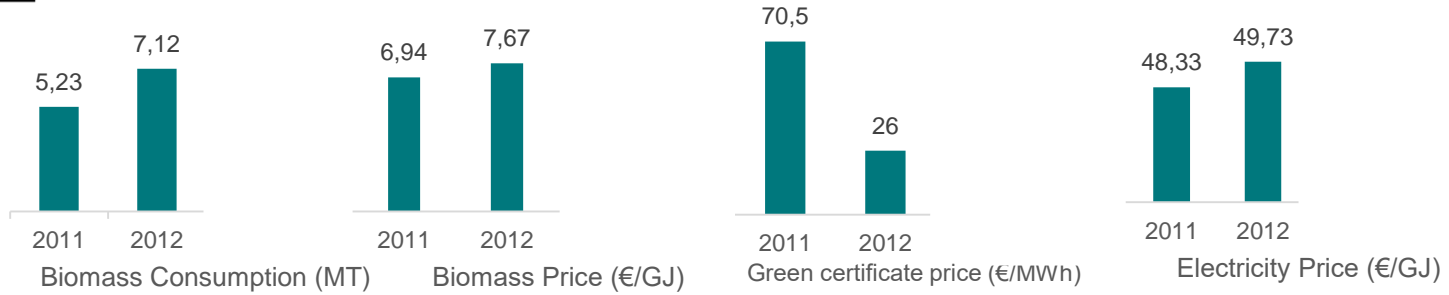
# Research methods applied in India and Poland





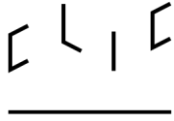
# Status of biomass market in Poland

(Dominating role of Policy actions)



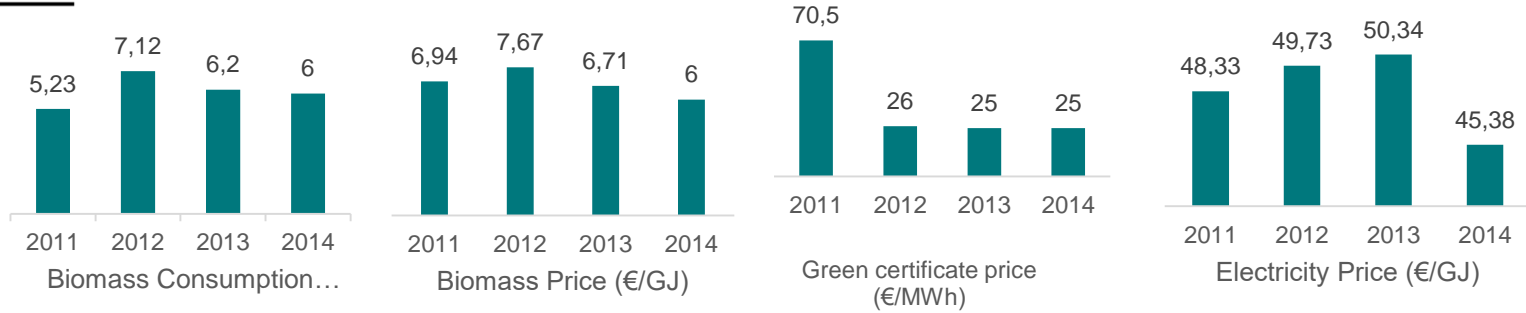
1€=4PLN (2015)





# Status of biomass market in Poland

(Dominating role of Policy actions)



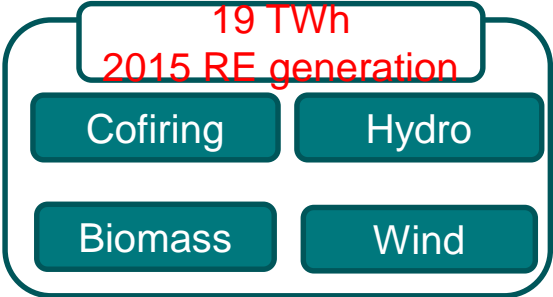
Unsold 15TWh GC since 2012

Supply



Demand

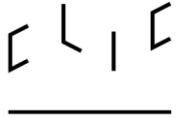
Substitution Fee



17 TWh 2015 redemption

1€=4PLN (2015)



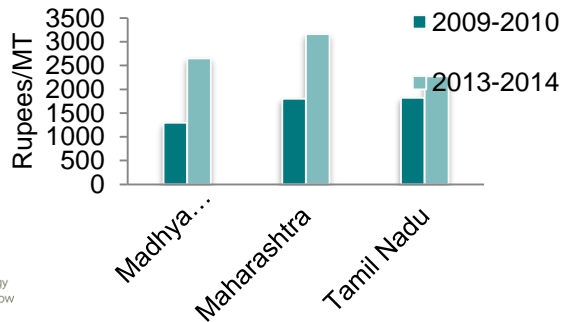


# Challenges facing the biomass industry in India (Diversified India)



Unloading

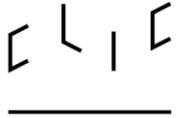
Chipping – Mobile drummer



No	Plant characteristics	Units	Value
1	Installed capacity	MW <sub>e</sub>	10
2	Investment cost (no land price)	Crores (MEuros)	65 (8.1)
3	C.F (fuel-to-power)	%	19
4	Biomass	tons/day	450-500
5	Carbon credits – UNFCCC	Rs/Kwh	1.5 - 3.6
6	Employees – permanent (temporary)	nos	40(60)
7	Emission savings	CO <sub>2</sub> equi/year	46,991



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# Challenges facing the biomass industry in India (Diversified India)



Unloading

Chipping – Mobile drummer



Biomass

Farmer price  
4 €/MWh

Supply chain  
5.8 €/MWh

Biomass @ plant  
9.8 €/MWh

Indian

Cost of Electricity is 85€/MWh

Western

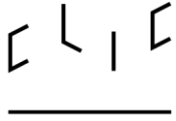
Cost of Electricity is 76€/MWh

Tariff  
60 €/MWh,  
80 €/MWh

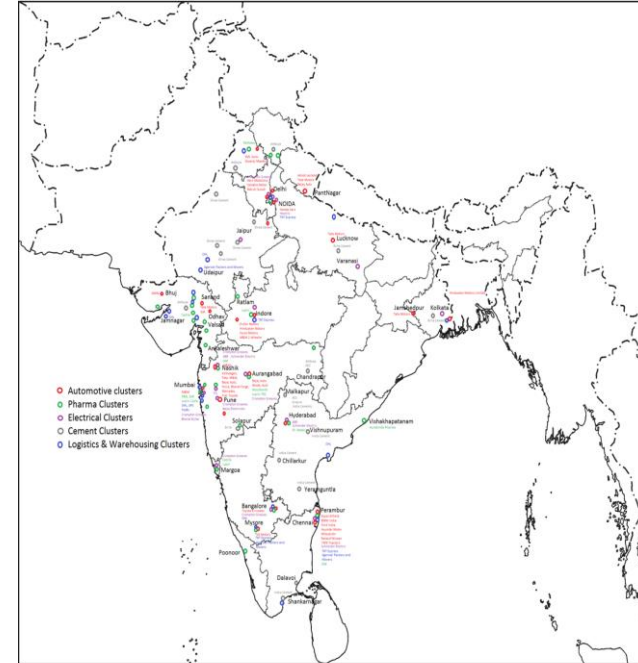
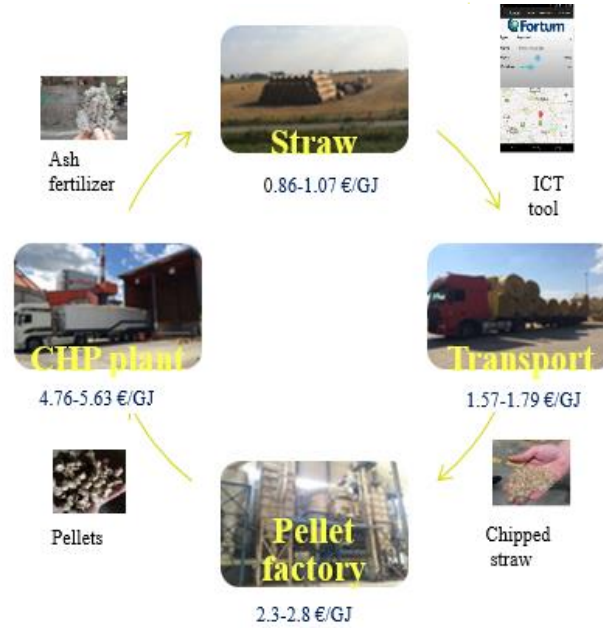
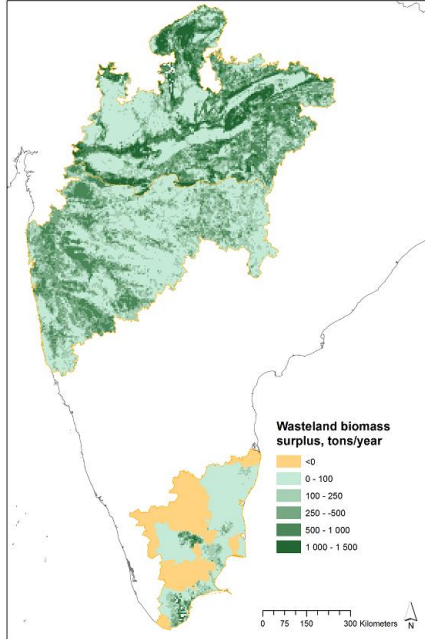
REC incentives  
17.8 €/MWh



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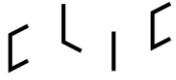
# Business opportunities in revamping the biomass industry in India



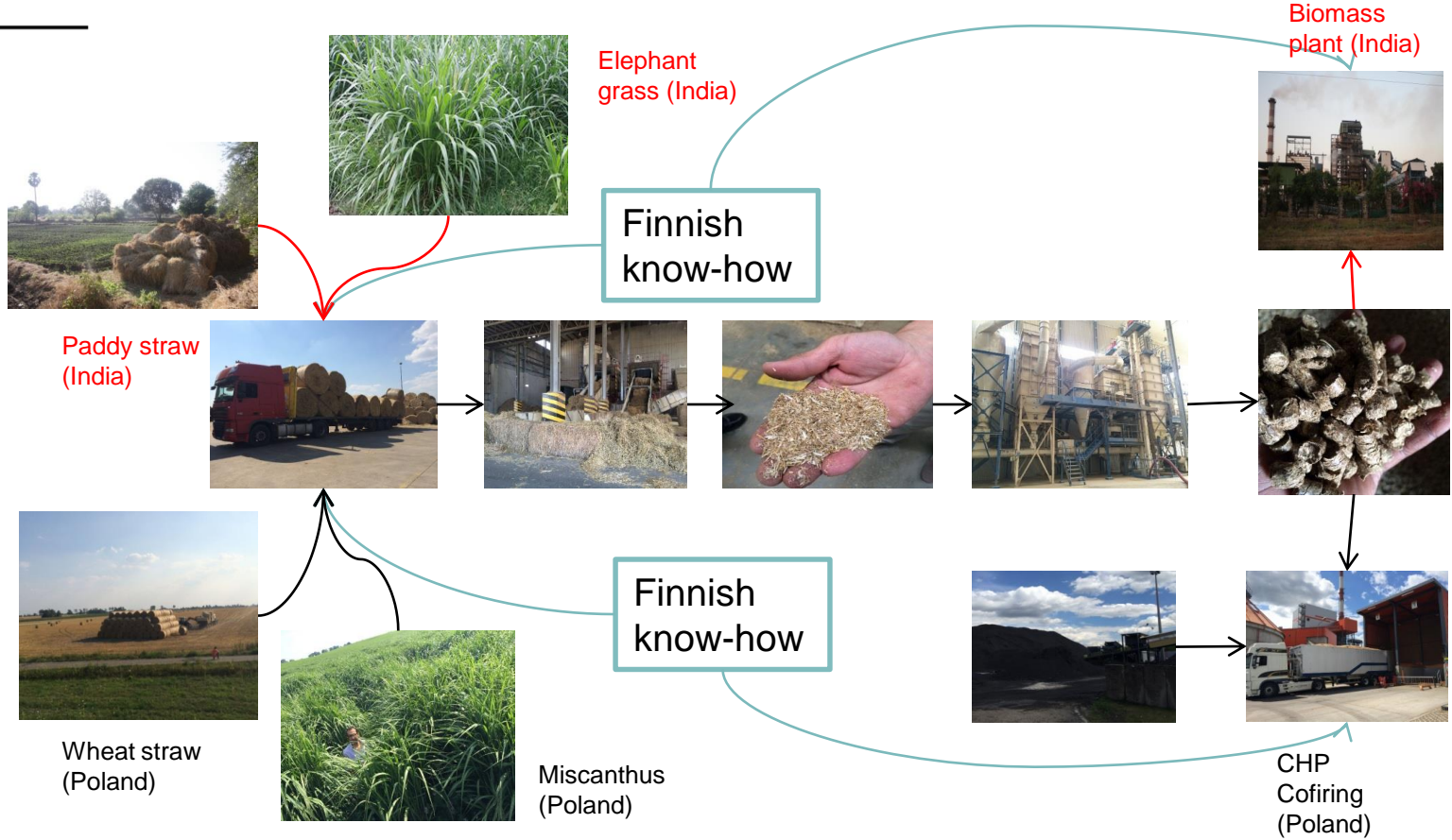
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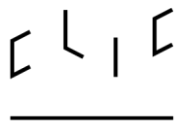
Pic, Valmet  
Power, VTT





# Opportunities for reciprocal knowledge and technology transfer between Finland, Poland and India.

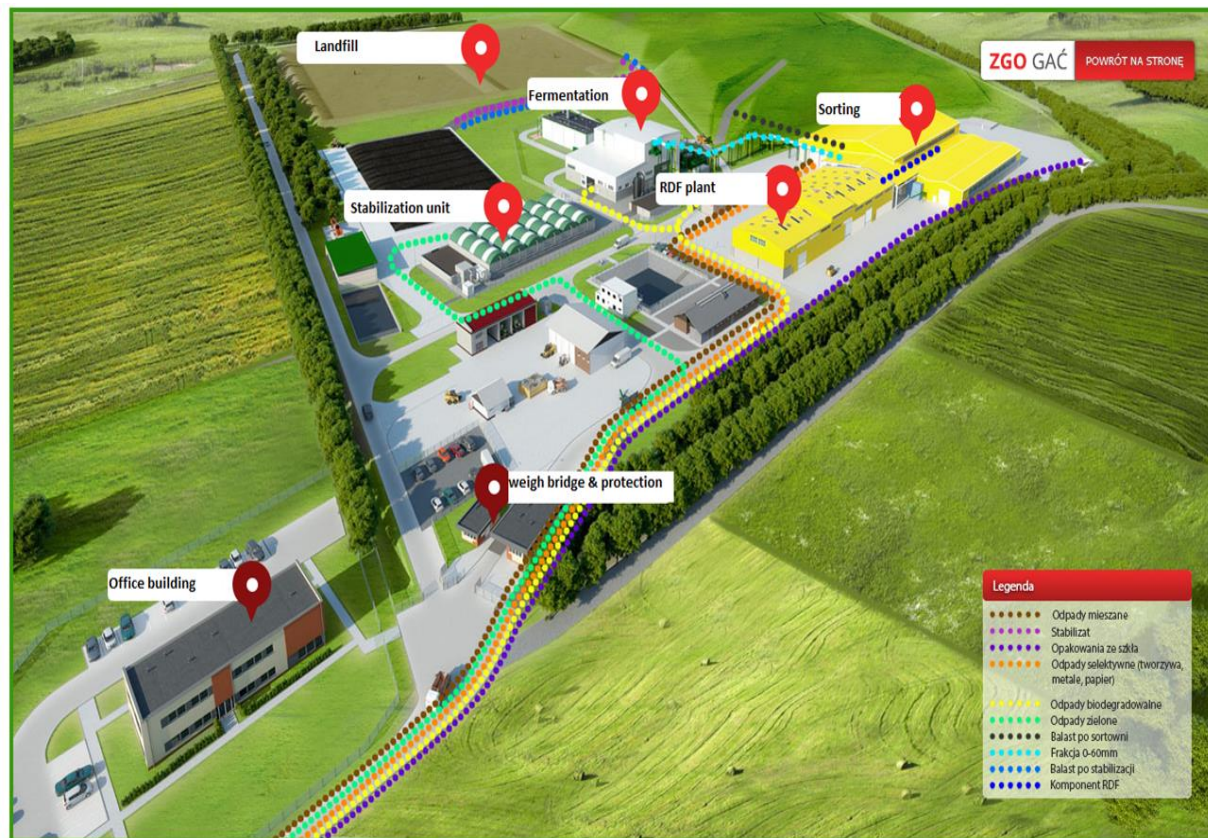




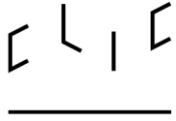
# New circular economy solutions for an Indian energy market

(Great opportunities of technology and knowledge transfer)

ZGO GAĆ



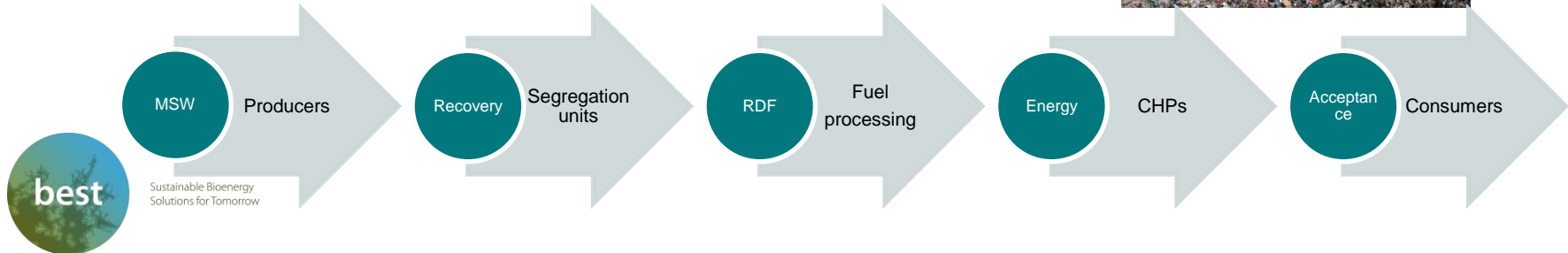
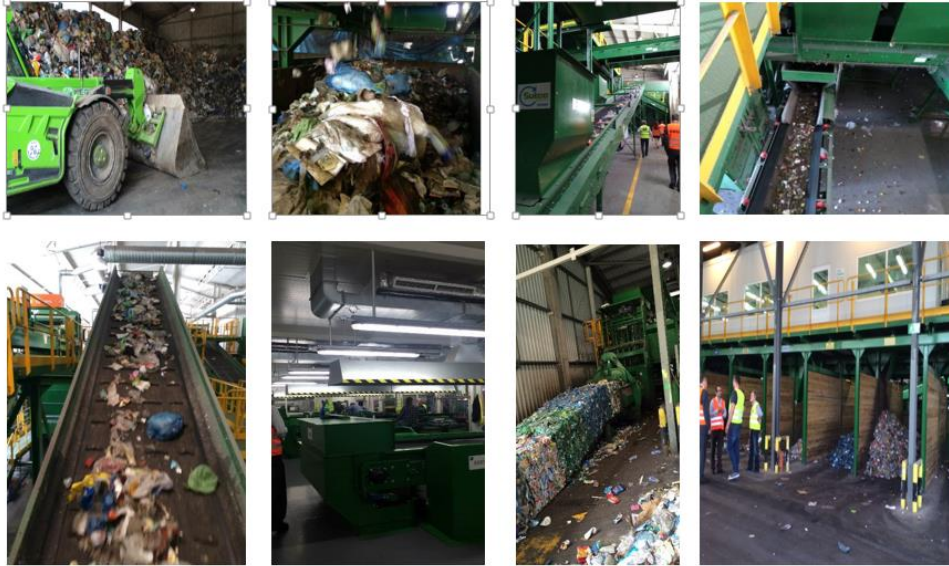
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# New circular economy solutions for an Indian energy market

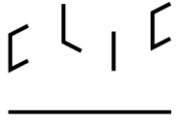
(Great opportunities of technology and knowledge transfer)

RDF Production



best

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**Thank you!**



Source: google



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