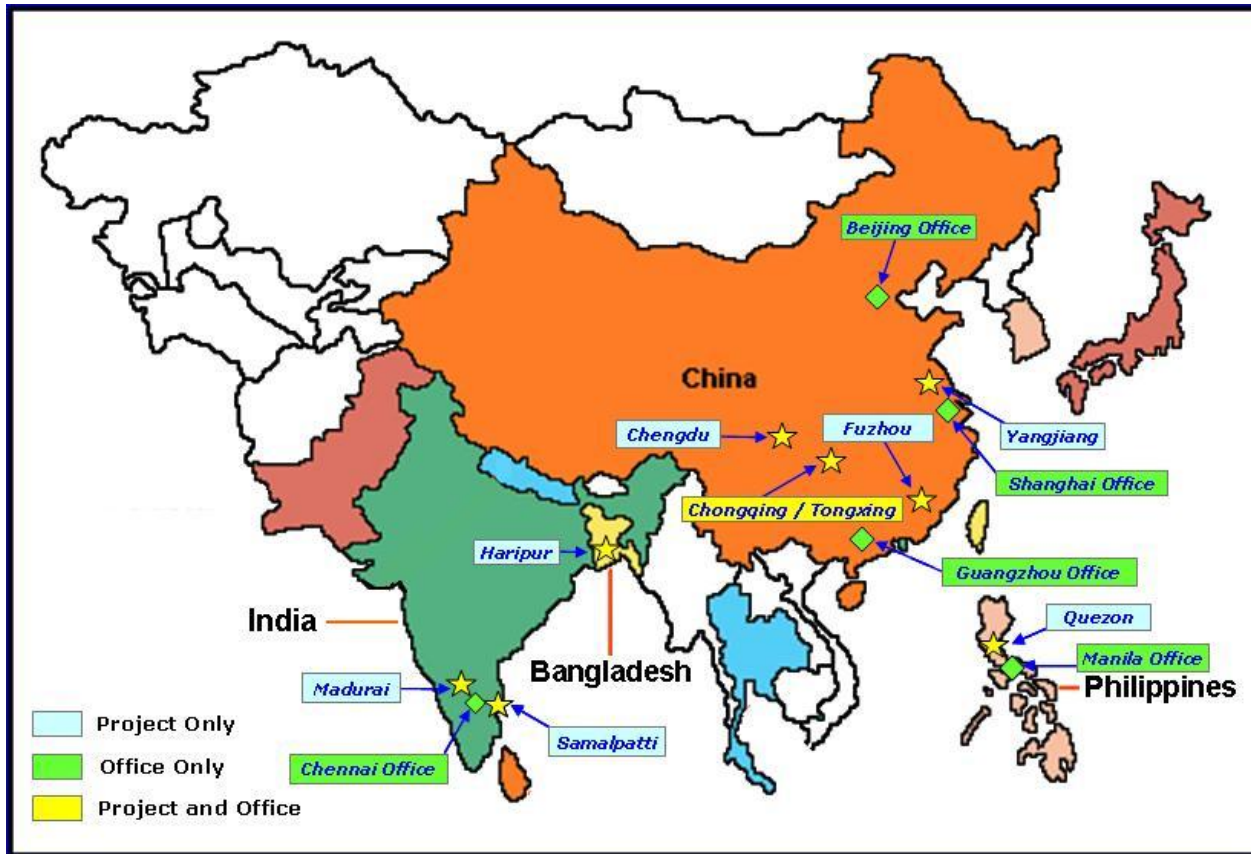




Paul Gilman, Chief Sustainability Officer



Covanta Energy Asia Pacific



EfW - Helping Communities Achieve Sustainability – Solid Waste Management

U.S. EPA

Solid Waste Management Hierarchy



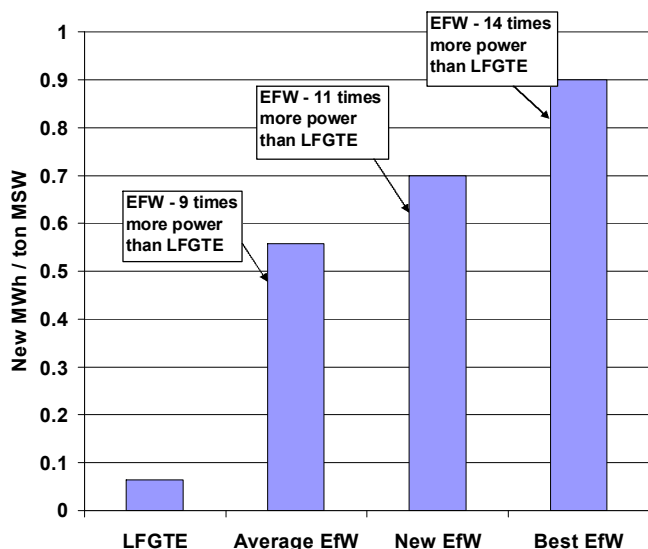
This, and the similar EU hierarchy, promotes sustainable waste management by maximizing energy efficiency and green house gas (GHG) mitigation through an integrated waste management system.



EfW - Helping Communities Achieve Sustainability - Renewable Energy

- The World Economic Forum at their recent meeting in Davos, Switzerland, identified EfW as one of eight renewable technologies likely to make a meaningful contribution to a future low-carbon energy system.

(Green Investing: Towards a Clean Energy Infrastructure. January 2009)



- EfW recovers 9 to 14 times more energy from waste than is recovered from landfill gas to energy.

EfW - Helping Communities Achieve Sustainability – Clean Energy

Emission Factors When Generating a Megawatt-hour of Electrical Energy

Reference		EfW	Landfill			Fossil Fuel		
Pollutant	Units	Average	Vent	Flare	ICE	Coal	Gas	Oil
SO2	g/MWh	175	530	600	880	6900	3400	6100
NOx	g/MWh	1500	1000	1300	2300	3700	1500	1400
PM	g/MWh	30	NA	NA	NA	1300	14	120
CO	g/MWh	200 (a)	NA	NA	NA	220	800	340

(a) Emission factor adjusted to represent average emissions.

Comparison of GHG Emissions from Different Sources of Electrical Power

(lbs. Carbon Dioxide Equivalent per megawatt-hour – lbs / MWh)

Fuel Type	Direct CO ₂	Lifecycle CO ₂ ^a
Coal	2138	2196
Oil	1496	1501
Natural Gas	1176	1276
MSW & EfW ^b	1294	- 3636

a. Life Cycle CO₂E for fossil fuels limited to indirect methane emissions using EPA GHG inventory and EIA power generation data. Life Cycle value would be larger if indirect CO₂ was included.

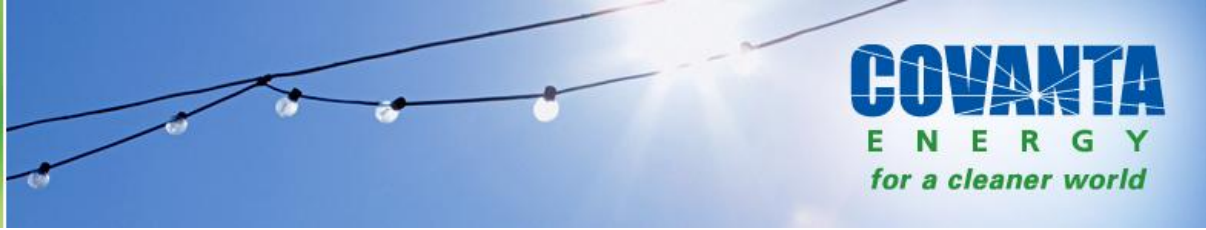


EfW - Helping Communities Achieve Sustainability – Green House Gas Mitigation

- EfW is an internationally recognized source of greenhouse gas mitigation, avoiding approximately one ton of greenhouse gas emissions for every ton of municipal solid waste processed.
- The European Union and many emerging countries are using EfW as a means to reduce GHG emissions.

30% recycle
70% EfW

“The most attractive strategy from a GHG perspective is Scenario 8. The negative offset is due to energy conservation, increased metals recovery, and absence of landfilling any biodegradable waste (only residual being landfilled is combustion ash).”
(Thornloe et al. Waste Management, Volume 27, 2007)



EfW - Helping Communities Achieve Sustainability – Green Jobs

Economic benefits from a single 1,500 ton/day facility

- During construction
 - 2, 475 jobs during construction (3 years)
 - \$1 billion in economic activity from construction
- During Operation
 - 110 jobs (direct and indirect)
 - \$34 million/year in economic impact



EfW -

- Where to implement?
 - Wherever local decision makers and financial institutions understand the multiple benefits of an integrated waste management system.
- Waste character and energy price conditions for success?
 - **It doesn't matter.** Where governments and lenders want to work with industries providing these services, it can be done.
- The World Bank and other international development institutions are the key...