

Wastewater Treatment Systems

Global abatement potential in 2020 and 2030 is 122 and 191 MtCO_{2e}, respectively. Nearly 60% of the abatement potential is concentrated in the top 5 emitting countries that include United States, Indonesia, Mexico, Nigeria, and China. The results of the MAC analysis are presented in Table 1 and Figure 1 below by major country and regional grouping at select break-even prices in 2030. In addition, Figures 2 and 3 present the United States and Global MAC curves in 2010, 2020 and 2030.

The analysis assesses the technical feasibility of four abatement measures on three major demographic populations. The abatement measures include: shifting from septic and latrine wastewater systems to individual (or centralized) aerobic wastewater treatment plants (WWTPs); shifting from open sewer systems to closed collection systems with aerobic WWTP; and the add-on installation of an anaerobic sludge digester for electricity generation. These abatement measures were assessed across rural, urban high income, and urban low income populations, where the distribution of existing wastewater treatment systems (i.e. septic tank, latrine, open sewer, or WWTP) varies by income and population density. Reduction efficiency and technical applicability factors are assumed to improve over time. Technical effectiveness of each abatement measure grows from 15% to 35% between 2010 and 2030.

The MAC analysis results show that only 3.3 MtCO_{2e}, less than 1% of global baseline CH₄ emissions associated with wastewater treatment, can be cost-effectively abated. This is largely due to the significant costs of constructing public wastewater collection systems to bring wastewater to centralized treatment facilities. The breakeven prices for abatement measures in the wastewater sector are high when only considering the environmental costs of CH₄ emissions. The breakeven prices would fall considerably if benefits of improved public health were factored into the economic analysis.

Table 1: Abatement Potential by Region at Selected Break-Even Prices (\$/tCO_{2e}) in 2030

Country/Region	Break-Even Price										
	-10	-5	0	5	10	15	20	30	50	100	100+
Top 5 Emitting Countries											
China						2.9	2.9	11.1	11.1	13.0	49.7
Indonesia						0.8	0.9	0.9	2.7	2.7	10.3
Mexico									2.5	2.6	13.6
Nigeria		1.4	1.4	1.4	5.2	5.2	5.2	5.2	5.2	8.0	21.9
United States											14.5
Rest of Region											
Africa	0.2	0.5	0.7	0.9	0.9	1.1	1.6	1.7	2.0	2.5	8.8
Central & South America		0.7	0.8	0.9	1.1	1.2	2.0	2.6	3.7	5.1	17.1
Middle East			0.0	0.0	0.0	0.0	0.0	0.2	0.7	0.9	5.4
Europe						0.1	0.1	0.3	1.2	1.6	11.8
Eurasia									0.0	5.6	11.2
Asia		0.0	0.5	0.8	1.2	1.5	2.9	3.7	5.2	11.2	26.7
North America											0.1
Total	0.2	2.6	3.3	4.0	8.4	12.8	15.6	25.8	34.1	53.1	191.2

Figure 1: Marginal Abatement Cost Curve for Top 5 Emitters in 2030

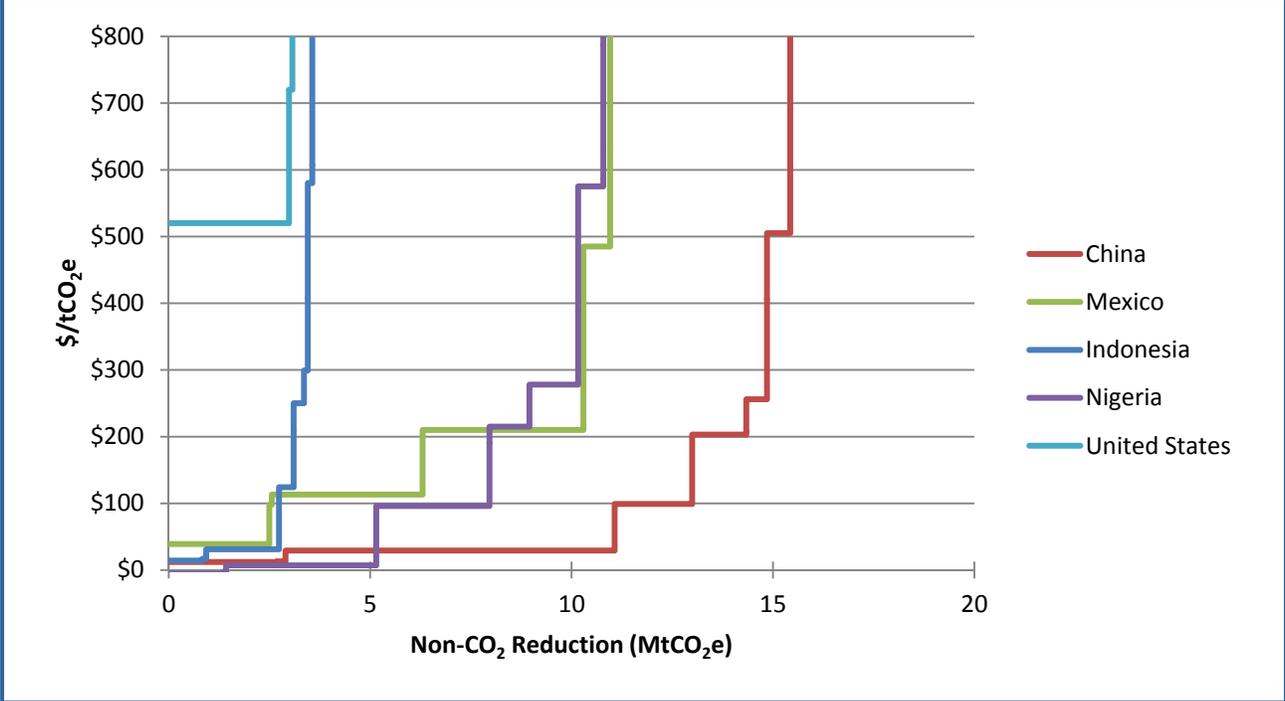


Figure 2: United States Marginal Abatement Cost Curve in 2010, 2020, and 2030

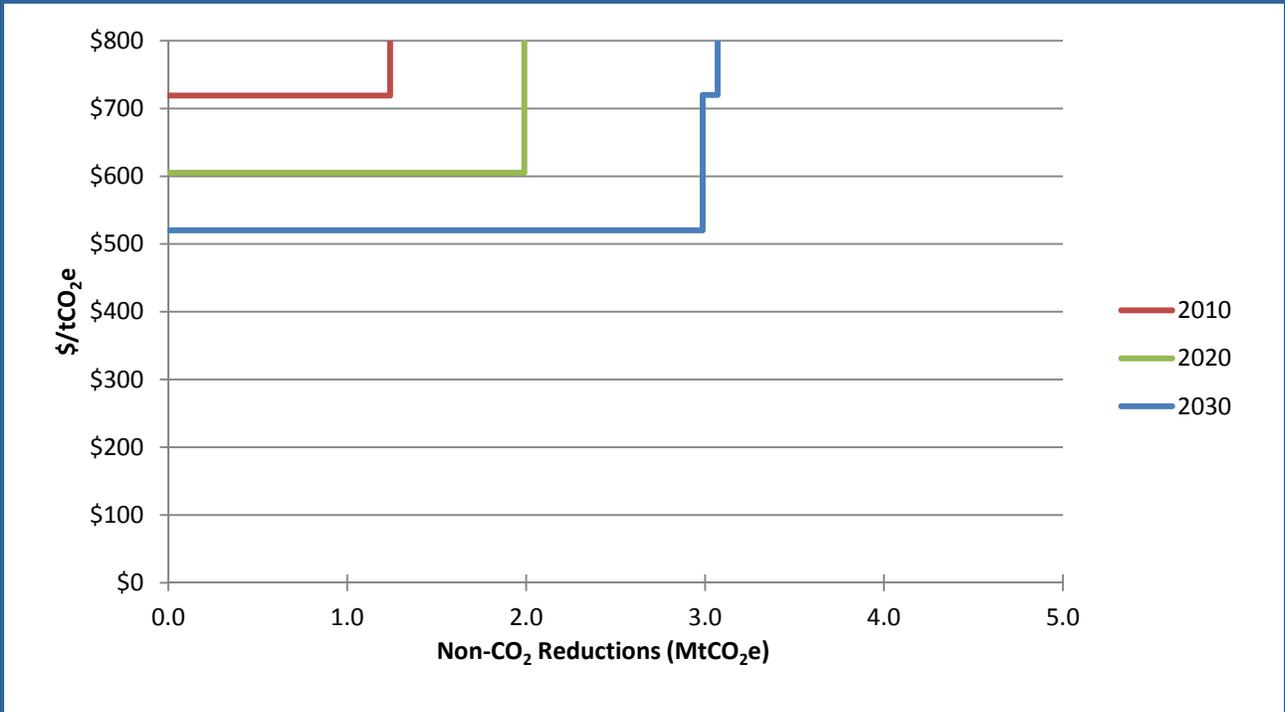


Figure 3: Global Marginal Abatement Cost Curve in 2010, 2020 and 2030

