Why Are We Doing This?
What are Current Limitations?
Where Will it Lead?

John Willis, P.E., BCEE – Brown and Caldwell
What is Happening Now

• Many comparisons
• Inconsistent or “cherry-picked” assumptions
• No context of overall GHG impact of improvements
  – Area of focus may actually be wrong

• Historically, cost has driven sustainable solutions
Don’t do a GHG/Carbon Comparison without a Baseline

• $30-70k for consultant-assisted baseline development for a medium-sized W-WW utility (no evaluations or comparisons)
• Drive strategies for
  – Energy, fuel, and chemical savings
  – Future carbon trading
  – Future efficiency gains
  – Relative impacts of current decisions
The Box is Easy to Draw

- Carbon/GHG Inventories must be Utility-wide; then disaggregate elements
- Review data as far back as electronic data are available to identify your biggest “baseline years”
- Document all assumptions
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<tr>
<th>Context for Future Predictions is provided by today’s GHG Inventory</th>
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<tr>
<td>• Future GHG/Carbon Reductions are from year to reference year</td>
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<td>• Without a baseline, the changes are not measurable by a utility</td>
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<td>• Below the baseline is good (credits to sell)</td>
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<td>• Above is bad (may need to buy offsets)</td>
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<td>• Collecting old data can be tough…</td>
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Certification Protects Client and Assumptions

- Climate Registry: [www.theclimateregistry.org](http://www.theclimateregistry.org)
- Client (and possibly consultant) develop baselines
- Baselines is uploaded into Climate Registry Information System (CRIS) – “registration”
- Baselines are audited by third party
- Audit and Baselines are certified
- Creates uniform assumptions for evaluations
Points of Potential GHG
“Funkiness”
Risks and Vulnerabilities in Utility Inventories

- Methanol and other chemical carbon
- N$_2$O from nitrification-denitrification processes
- Methane (CH$_4$) emissions from sewers
Are Methanol CO$_2$e Biogenic?

- Carbon is un-sequestered to produce methanol from natural gas
- Manufacturing of methanol is rated at 0.67 MT CO$_2$e/MT methanol (energy only)
- Tracking the Carbon results in:
  
  $1 \text{ MT CH}_3\text{OH} \times \frac{(44 \text{ (AWt of CO2)})}{(32 \text{ (AWt of CH}_3\text{OH})} = 1.37 \text{ MT CO}_2\text{e} \text{ MT CH}_3\text{OH}$

- Scope 1 emission for natural gas supplier, methanol manufacturer, or DCWASA/farmer?
Where Does the Methanol Carbon go???

- ~60% direct process emissions from aeration basins
- ~40% to cell mass
  - ~20% to methane from digestion
  - ~15% to biosolids CO2 emissions
  - ~5% to biosolids sequestered carbon
N$_2$O from Nitrification/Denitrification

- Population based equivalent – assumed 0.5% of TN is evolved as N$_2$O
- WERF research has shown extreme variability in N$_2$O evolution
- CO$_2$e could be much larger than current assumption
- Research promises to correlate cause and effects and show mechanisms for reduction
N$_2$O from Incineration/Thermal Processes

- Methodology for measuring N$_2$O is varied
- Random grabs have shown significant mass
- Others say grab sampling does not represent proper test methodology
- Verdict and data are still out…
Conclusions
Recommended Take-Aways

• Water, Wastewater, and Biosolids Industries are a “big player” in GHG

• Knowledge provides
  – Basis for informed decision making
  – Allows nimble response to changing regs/market

• Develop your utility-wide baseline using Climate Registry/LGOP and consider certification
Questions?

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