Design of an Energy Performance Contract: City of Jackson Case Study

Qingbin Cui
Dena Morgan

Aging Infrastructure in U.S.

WATER & ENVIRONMENT		TRANSPORTATION	
Dams	D	Aviation	D
Drinking Water	D	Bridges	C+
Hazardous Waste	D	Inland Waterways	D-
Levees	D-	Ports	C
Solid Waste	B-	Rail	C+
Wastewater	D	Roads	D
		Transit	D

$45 billion funded, $105 unfunded

Financing Innovation

- **Water infrastructure and Funding Innovation Act**
- **Community Based Public Private Partnership**
- **Utility Energy Service Contract (UESC/EPC)**

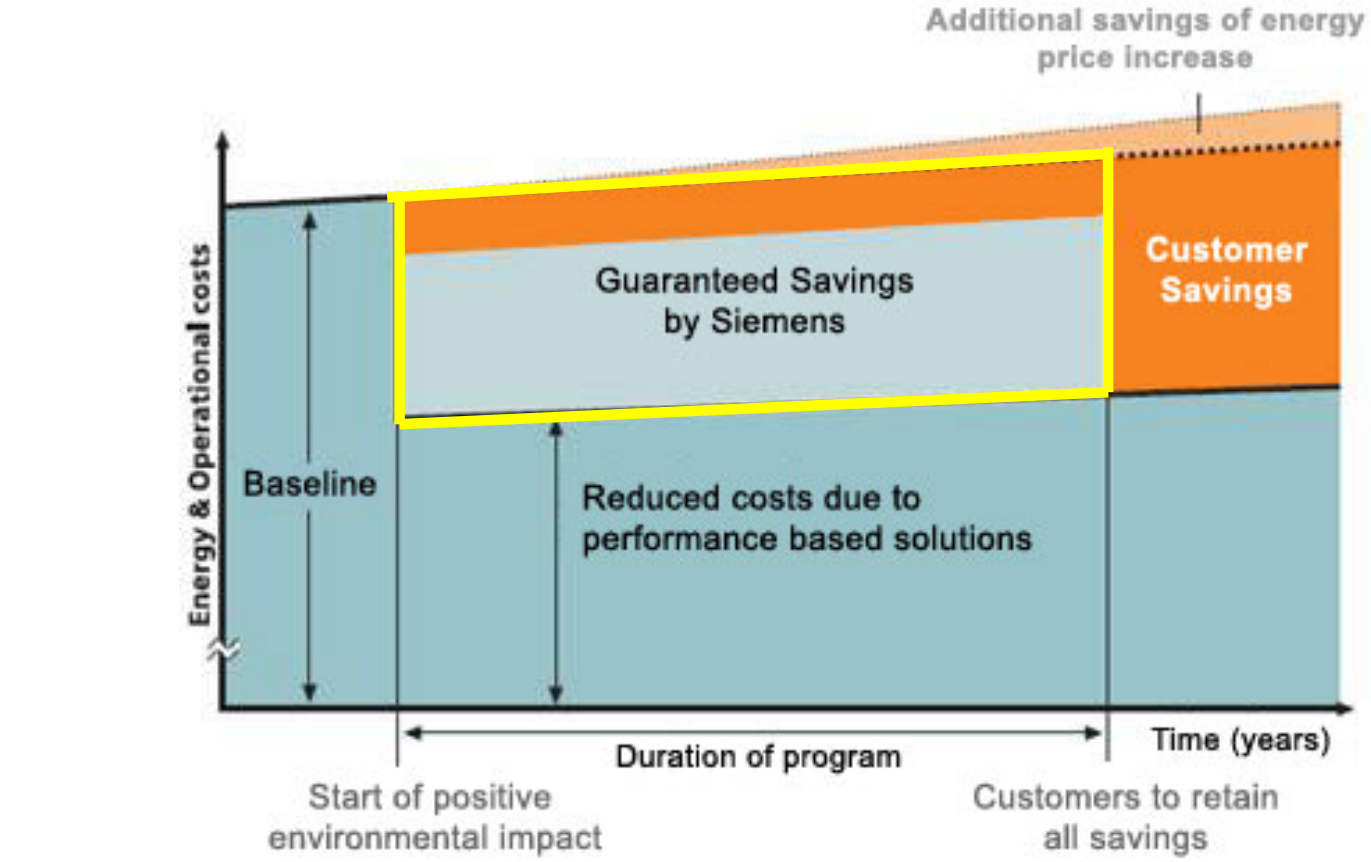
COJ Background

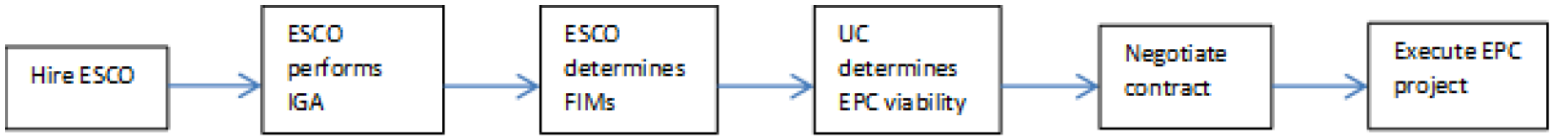
- **Jan 2010:** Jackson City DPW suffered over 150 water main breaks
- **2010 – 2012: Jackson DPW cited for several violations of Clean Water Act due to bypass issues at 2 water treatment plants**
- **Aug 2011: Jackson water and sewer securities downgraded by Moody's Investor Service due to high debt ratio**
- **May 2012: Jackson City contracts with Siemens to perform utility audit**
- **January 2013: Jackson City contracts with Siemens for 24 month construction to:**
  - Replace 65,000 water meters
  - Upgrade 2 WTPs
  - Repair aging sewer lines

Background (Con't)

- **Fall 2014:** Siemens invoiced 80% of contract
  - 70% of WTP sewer upgrades complete
  - 40% of meters installed
- **February 2015:** Jackson City DPW Director stopped all work when installation of several of the wrong type meters were discovered
- **2015-2016:** Legal action

What is UESC/EPC

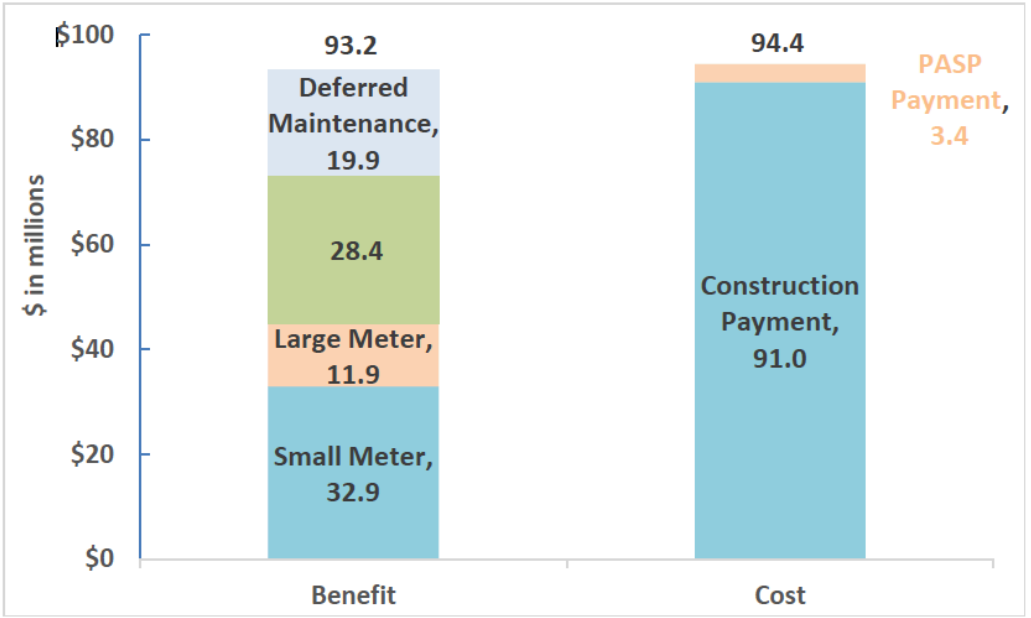




Siemens' EPC Tasks and Contracted Costs

Siemens Contract Cost

TASK	COST
Project Development/ PMO/Mobilization	$ 12,959,355
Billing Software	$ 11,320,444
Water Meters (both large and small)	$ 39,889,440
Water Treatment Plant Upgrades (2 plants)	$ 10,969,673
Sewer Line Infrastructure Upgrades	$ 15,844,194
TOTAL COST	$ 90,983,106



Siemens' Guaranteed Savings

Guaranteed Savings by Siemens to City of Jackson					
PERFORMANCE PERIOD	SMALL METER BILLABLE USAGE INCREASES	LARGE METER BILLABLE USAGE INCREASES	OPERATIONAL	DEFERRED MAINTENANCE	TOTAL
Construction	$ 484,347	$ 501,802	$ 503,750	$ -	$ 1,489,899
Post-Construction					
Year 1	$ 2,421,737	$ 1,003,604	$ 2,015,200	$ 1,750,000	$ 7,190,541
Year 2	$ 2,555,055	$ 1,003,604	$ 2,075,656	$ 1,750,000	$ 7,384,315
Year 3	$ 2,688,373	$ 1,003,604	$ 2,137,926	$ 1,750,000	$ 7,579,903
Year 4	$ 2,821,691	$ 1,003,604	$ 2,202,063	$ 1,750,000	$ 7,777,358
Year 5	$ 2,955,010	$ 1,003,604	$ 2,268,125	$ 1,750,000	$ 7,976,739
Year 6	$ 2,955,010	$ 1,003,604	$ 2,336,169	$ 1,750,000	$ 8,044,783
Year 7	$ 2,955,010	$ 1,003,604	$ 2,406,254	$ 1,750,000	$ 8,114,868
Year 8	$ 2,955,010	$ 1,003,604	$ 2,478,442	$ 1,750,000	$ 8,187,056
Year 9	$ 2,955,010	$ 1,003,604	$ 2,552,795	$ 1,750,000	$ 8,261,409
Year 10	$ 2,955,010	$ 1,003,604	$ 2,629,379	$ 1,750,000	$ 8,337,993
Year 11	$ 2,955,010	$ 1,003,604	$ 2,708,260	$ 1,750,000	$ 8,416,874
Year 12	$ 2,955,010	$ 1,003,604	$ 2,789,508	$ 1,750,000	$ 8,498,122
Year 13	$ 2,955,010	$ 1,003,604	$ 2,873,193	$ 1,750,000	$ 8,581,807
Year 14	$ 2,955,010	$ 1,003,604	$ 2,959,389	$ 1,750,000	$ 8,668,003
Year 15	$ 2,955,010	$ 1,003,604	$ 3,048,171	$ 1,750,000	$ 8,756,785
TOTALS	**$ 43,476,313**	**$ 15,555,862**	**$ 37,984,280**	**$ 26,250,000**	**$ 123,266,455**

What Went Wrong

Contractual Issues

- Non-traditional EPC – upfront payments made to Siemens
- Only the installation of small water meters was included in the M&V system
  - Measured accuracy only of sample set
  - No installation monitoring – wrong meters
- Savings guarantee included stipulated (non-verified) items - shortfall risk for large meters
  - Large meters assumed more accurate – increasing revenue
  - No installation monitoring
  - No accuracy testing
  - No verification that actual savings is equal to or greater than stipulated
- Savings guarantee included operational items – shortfall risk
  - Fewer new employee requests
  - Vehicles
  - Re-reads and locates

Findings (Con't)

Personnel Issues

- Jackson contract reviewers were not skilled in EPCs
- Not enough skilled Jackson personnel to manage the budget and schedule
- Not enough Jackson personnel to manage the installation and M&V processes to ensure savings were realized

Conclusions

- Risk associated innovation
- Capacity Building at Public Agency
- Measurement and Verification Process