

**BEFORE THE
PUBLIC SERVICE COMMISSION OF WISCONSIN**

Joint Application of Wisconsin Electric Power
Company and Wisconsin Gas LLC, both d/b/a
We Energies, for Authority to Adjust Electric,
Natural Gas, and Steam Rates

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05-UR-107

DIRECT TESTIMONY OF KEVIN L. SHAFER, P.E.

1 **Q. Please state your name, business address, and title.**

2 **A.** My name is Kevin Shafer, and I am the Executive Director of the Milwaukee
3 Metropolitan Sewerage District (“MMSD”). My business address is 260 West Seeboth
4 Street, Milwaukee, Wisconsin 53204.

5 **Q. Please describe your educational and professional experience.**

6 **A.** I received a Bachelor’s of Civil Engineering from the University of Illinois in
7 Champaign-Urbana, Illinois, and a Master’s of Civil Engineering from the University of
8 Texas-Arlington. I became a professional engineer in approximately 1989 and worked for
9 nine years at a private engineering firm, Parsons, Brinckerhoff, Quade, & Douglas, Inc. I
10 currently hold a license in the State of Wisconsin, and I used to be licensed in Texas,
11 Indiana, and Illinois.

12 I began working for MMSD in October 1998, as the Director of Technical
13 Services. My job responsibilities included overseeing planning, design, and construction
14 of the capital program. I oversaw a number of people and department heads, and
15 reported directly to the Executive Director, who later resigned to take a different job. I
16 was promoted to Executive Director in March 2002. As Executive Director, I report to
17 the MMSD Commission and oversee District operations, human resources, budgets, long-

1 term planning, engineering, construction, and contract compliance for the District's
2 private operator.

3 **Q. Have you received any awards or special recognitions in your tenure as Executive**
4 **Director?**

5 **A.** I have been recognized as a leader in wastewater treatment engineering and management,
6 water quality planning, watershed management, and financial management, as evidenced
7 by the following list of leadership positions and awards: 2001 American Society of Civil
8 Engineers, Wisconsin Section, Individual Merit Award Engineer in Government Service;
9 2007 Kodak American Greenways Award; 2012 Lloyd D. Gladfelter Award; 2013
10 Daniel H. Burnham Visionary Award; 2013 UIM's Water Infrastructure Management
11 Award; 2014 Public Policy Forum Norman Gill Award; Past President, National
12 Association of Clean Water Agencies; Vice Chair, Water Environment Research
13 Foundation; Chair, Clean Water American Alliance's Urban Water Sustainability
14 Leadership Council; member, American Society of Civil Engineers.

15 **Q. What is the purpose of your testimony in this proceeding?**

16 **A.** The purpose of my testimony is to describe MMSD's structure and operations, and to
17 explain MMSD's position regarding Wisconsin Electric Power Company's ("WEPCO")
18 proposed customer-owned generation service ("COGS") and standby service ("SS")
19 tariffs. I will first describe the purpose and structure of MMSD, and the long range
20 planning processes that MMSD follows to achieve its statutory mission. I will then
21 explain why MMSD opposes WEPCO's proposed changes to its tariffs—and specifically,
22 the mandate to move MMSD to the Cp-4 tariff with its punitive terms and charges —and
23 describe the projected negative financial and environmental impacts that these tariffs will

1 have on both MMSD and its ratepayers. Finally, I recommend that the Commission (i)
2 reject the changes that WEPCO is proposing; (ii) grandfather MMSD in its existing rate
3 structure for at least the next 20 years; and (iii) order WEPCO to develop a Distribution
4 Wheeling Tariff under which MMSD or others could obtain additional services.

5 **Q. How was MMSD created?**

6 **A.** MMSD's current organizational structure was created in 1982 when the Wisconsin State
7 Assembly passed legislation to merge two of MMSD's predecessors—the Metropolitan
8 Sewerage District of the County of Milwaukee and the City of Milwaukee Sewerage
9 Commission—into a single metropolitan government unit.

10 **Q. What is MMSD's purpose and primary function?**

11 **A.** As a state-chartered government agency, MMSD's mission is to protect public health,
12 property, and the environment by providing wastewater conveyance, treatment, and flood
13 management services within a certain service territory. This territory includes all of the
14 cities and villages (except South Milwaukee) within Milwaukee County and all or part of
15 nine municipalities in Ozaukee, Washington, and Waukesha Counties, as well as a
16 portion of the Village of Caledonia in Racine County. In total, MMSD serves 28
17 municipalities, about 1.1 million people, and thousands businesses. MMSD is responsible
18 for constructing, operating, and maintaining interceptor sewers and wastewater treatment
19 facilities within its sewer service area and has authority to manage floods and improve
20 watercourses. MMSD has authority to promulgate and enforce rules and regulations to
21 achieve its statutory purposes.

22 **Q. What is MMSD's governance structure?**

23 **A.** MMSD is governed by an eleven member Commission ("the MMSD Commission"). The

1 Mayor of Milwaukee appoints seven members, but those appointments are subject to
2 confirmation by the Common Council of Milwaukee. An Executive Council composed of
3 the chief elected officer in the Cities of Cudahy, Franklin, Glendale, Greenfield, Oak
4 Creek, St. Francis, Wauwatosa and West Allis, and the Villages of Bayside, Brown Deer,
5 Fox Point, Greendale, Hales Corners, River Hills, Shorewood, West Milwaukee and
6 Whitefish Bay appoints the remaining four members. Three of the Milwaukee mayoral
7 appointments and three of the Executive Council appointments must be elected officials.

8 **Q. What facilities does MMSD operate to achieve its statutory purposes?**

9 MMSD operates two major wastewater treatment plants: the Jones Island Water
10 Reclamation Facility and the South Shore Water Reclamation Facility. During dry
11 weather, each facility discharges an average of 60 to 70 million gallons per day of treated
12 water to Lake Michigan. During wet weather events, these discharge flows can increase
13 up to 300 million gallons per day at each plant and, at times, even beyond each plant's
14 rated capacity. It is during these peak flow times that additional electrical power is
15 needed to maintain water treatment capability and avoid the discharge of untreated storm
16 water and sanitary wastewater into surface waterways. The Jones Island and South Shore
17 plants are among the largest dischargers to Lake Michigan and consistently operate in
18 compliance with the terms of its Wisconsin Pollution Discharge Elimination ("WPDES")
19 permit. Patrick Obenauf, MMSD's Contract Compliance Manager, describes the location
20 of each plant in Ex.-MMSD-Obenauf-1.

21 **Q. How does MMSD finance its facilities and operations?**

22 **A.** Like many businesses, MMSD has both capital costs and operating expenses. MMSD
23 finances its capital budget through an ad valorem tax levy on the taxable property within

1 the District's territory. In addition to servicing debt, the tax levy primarily funds
2 acquisition and improvement of land and facilities (*i.e.*, capital assets) that support the
3 water treatment services to the District's users. A detailed description of the procedures
4 for adopting a tax levy is available in the District's annual combined 2014 Operations and
5 Maintenance and Capital Budgets at www.mmsd.com.

6 In contrast to capital investments, operating expenses are recovered from MMSD
7 customers through sewer service charges (also referred to as "user charges"), which are
8 based on the adopted Annual Operations and Maintenance ("O&M") Budget. The annual
9 budget is created through a transparent, public process. Each year, MMSD's Commission
10 adopts an annual combined O&M and capital budget for the following year. After
11 adopting the annual budget and approving the tax levy to fund the capital budget,
12 MMSD's Commission approves the user charge billing rates for the coming year.
13 MMSD strives to minimize increases to the user charge billing rates so that customers
14 may reasonably rely on the rates. The 2014 Annual Budget detailing the O&M Budget
15 and user charges is available at www.mmsd.com/financial/budget.

16 **Q. Does MMSD follow any long-term planning process to meet its statutory obligations**
17 **to protect public health and welfare?**

18 **A.** Yes. MMSD conducts long-term planning to maintain its facilities and treatment systems,
19 to ensure compliance with environmental laws, to preserve its financial stability, and to
20 keep rates stable for users. MMSD completes a Strategic Plan every three years. This
21 plan is tied to the District 2035 Vision, which was adopted in 2010. The 2035 Vision has
22 two elements: integrated watershed management and climate change adaptation, with an
23 emphasis on energy efficiency. The 2035 Vision contains strategic goals and objectives

1 to be achieved by 2035, and focuses on using green infrastructure, reducing MMSD's
2 carbon footprint by 90 percent from its 2005 baseline, and working with local
3 organizations, nonprofits, and universities to further water industry knowledge and
4 environmental stewardship. The Strategic Plan is presented in the 2014 adopted budget
5 at www.mmsd.com.

6 In addition to the 2035 Vision, every ten years or so, the District reviews its
7 facilities and projects future treatment system needs. In 2008, the MMSD Commission
8 adopted and the Wisconsin Department of Natural Resources ("WDNR") approved the
9 most recent facilities plan, the 2020 Facilities Plan. The plan identifies and recommends
10 projects needed to comply with its statutory duties for the period ending in 2020.

11 MMSD's financial planning process is tied to its Facilities Planning process, but is based
12 on a six year planning cycle. Each year, as part of the annual budget process, MMSD
13 staff prepares a six year financial plan that forecasts the projects to be completed during
14 the period with corresponding financing plans.

15 **Q. What specifically drives MMSD's demand for electricity?**

16 **A.** MMSD is a public agency responsible for cleaning all of the wastewater delivered to its
17 two water reclamation facilities and returning that clean water to Lake Michigan, the
18 source of drinking water for much of southeastern Wisconsin. It is MMSD's job to
19 protect these precious water resources, but it takes an enormous amount of electricity to
20 do so.

21 MMSD's electricity needs are by nature highly variable and dependent on the
22 weather. During wet weather events, the Deep Tunnel system fills with sewage and storm
23 water. When the storm subsides, and treatment plant capacity becomes available, the

1 Deep Tunnel gates must be opened, the stored contaminated storm water must be pumped
2 out, and the flows sent for treatment. These gates and pumps are used intermittently as
3 storm events happen, and require very large amounts of power to operate. MMSD may
4 rely on WEPCO to supply some electricity during these high demand times.

5 Ultimately, MMSD's demand for electricity is driven by the need to maintain
6 public health. Although MMSD consumes a lot of electricity, it is unlike WEPCO's other
7 large commercial or industrial customers. Electricity is not an input to produce profits or
8 commercial benefit, but a necessity for ensuring that Milwaukee County and the
9 surrounding communities have their water adequately treated before discharge to Lake
10 Michigan. MMSD must open and close the gates to the deep tunnels and operate its
11 pumps to store the maximum amount of contaminated stormwater for treatment, and to
12 prevent sewage overflows into area waterways.

13 MMSD is remarkably good at what it does. This year, MMSD has treated 99.22%
14 of the contaminated water delivered to its system—one of the best performances in the
15 United States. MMSD has received numerous awards recognizing its superior
16 performance.

17 **Q. Does MMSD produce any of its own electricity?**

18 **A.** Yes. To meet its high demands and ensure reliability, MMSD has been producing a
19 significant share of its own electric power since the 1970s.

20 Until recently, the Jones Island facility had two natural gas turbines that MMSD
21 operated as co-generators. MMSD used the electricity from these turbines to meet a
22 significant share of Jones Island's annual electricity demand. At the same time, MMSD
23 has used "waste" heat from the turbines to dry biosolids and produce Milorganite®, a

1 natural fertilizer that MMSD sells. The use of the “waste” heat in the biosolids dryers
2 increases the efficiency of these turbines. Moreover, the production of Milorganite® is a
3 beneficial re-use of the solids produced in the water treatment process and eliminates the
4 cost of solids disposal for MMSD.

5 MMSD recently replaced the natural gas turbines at Jones Island with three new
6 landfill gas (“LFG”) turbines, as discussed further in the testimony of Mr. Krill. MMSD
7 is currently producing as much as 75 percent of its electricity needs at Jones Island with
8 these new turbines; an older GE turbine produces a smaller portion, primarily during wet
9 weather. Between 2009 and 2012, MMSD generated between 40 percent and 73 percent
10 of its Jones Island electricity needs on an annual average basis.

11 At the South Shore facility, MMSD has, since the 1970s, burned digester gas that
12 is produced in the solids digestion process to make power. The direct testimony of
13 MMSD witness Patrick Obenauf provides more details regarding MMSD’s historical and
14 current generation capacity.

15 **Q. Has MMSD done anything to improve energy efficiency at its facilities?**

16 **A.** Absolutely. During my tenure as Executive Director, MMSD has undertaken significant
17 efforts to increase the efficiency of its electric self-generation facilities and to reduce
18 utility costs by increasing the use of biofuels in its operations. I have also initiated a
19 number of programs to improve overall water treatment efficiency, including some that
20 rely on natural processes generally referred to as green infrastructure, and all of which
21 reduce the likelihood of sewer overflows from the MMSD treatment system.

22 **Q. Why is MMSD concerned with WEPCO’s proposed tariff changes?**

23 **A.** MMSD is opposed to WEPCO’s proposed tariff changes for two main reasons. First, the

1 proposed tariffs will impose an unreasonable increase in electricity rates for MMSD, with
2 resulting increases user charges for customers. Second, MMSD has made significant
3 recent capital projects investments based in large part on reasonably projected electric
4 cost savings, as described in Mr. Krill's testimony. The proposed tariffs threaten to
5 severely reduce or even eliminate these costs savings, thus undermining the economics of
6 these projects and stranding the public investment.

7 **Q. How would WEPCO's proposed tariffs affect MMSD's overall electricity bill?**

8 **A.** The way WEPCO has drafted the eligibility criteria for its proposed tariffs, it appears that
9 MMSD's Jones Island and South Shore facilities would be required to take service under
10 the proposed Cp-4 Standby Service tariff. Despite the fact that MMSD is expected to
11 purchase less power from WEPCO and to require smaller total amounts of such power on
12 a less frequent basis, the proposed tariffs will result in a significantly higher monthly
13 electric bill! We project an approximate 20% increase in our total electric billings from
14 WEPCO under the proposed Cp-4 tariff, which will amount to estimated increases on an
15 annual basis of between \$1 million in a year with few storms and no major generation
16 interruptions, to more than \$1.5 million in a wet year.

17 These additional charges will reduce our expected savings from taxpayer-funded
18 investments that had been projected at \$2.5 million or more annually. In their direct
19 testimony, MMSD witnesses Mickie Pearsall and William Krill discuss in greater detail
20 the past, current, and proposed charges for electric service and the financial impacts on
21 MMSD.

22 **Q. How would WEPCO's proposed tariffs affect MMSD's users?**

23 MMSD does not have the option of simply absorbing costs or passing them onto

1 shareholders. Rather, the cost of electricity is charged to users via the sewer service (or
2 user) charges. Accordingly, the rate increase that WEPCO is proposing will be passed
3 onto MMSD's users.

4 To understand the impact of WEPCO's proposed tariff on MMSD's users, it is
5 important to understand how MMSD allocates electricity costs among those users.
6 MMSD bills a sewer service charge to each municipality within MMSD's service area.
7 This charge is based on waste strength (biochemical oxygen demand, or "BOD", and
8 total suspended solids, or "TSS"), flow volume, and the number of connections. Each
9 municipality then bills its users for their share of the charges using billing parameters
10 applied to each of four customer classes: residential, industrial, commercial and non-
11 certified. The U. S. Environmental Protection Agency and the WDNR have approved
12 MMSD's user charge system.

13 Electricity is one of the largest expenses allocated to users via the user charge,
14 and most electricity expenses are allocated to users on the basis of flow volume. This
15 means that increases in user charges based on additional electricity costs will have the
16 greatest impact on residential users, as well as commercial and industrial users with high
17 wastewater discharges.

18 **Q. How will WEPCO's proposed tariff changes affect the costs associated with**
19 **MMSD's recent capital investments?**

20 **A.** As described in Mr. Krill's testimony, MMSD has reasonably relied on the existing rate
21 structure to plan and construct large capital improvements. MMSD's decision to invest in
22 various capital projects has been based in part on projected cost savings resulting from
23 lower energy bills under the existing Cp-1 tariff. As discussed in the testimony of Mr.

1 Krill, WEPCO's proposed Cp-4 tariff would reduce or eliminate these savings.

2 **Q. What specific capital investments will be affected by WEPCO's proposed tariff**
3 **changes?**

4 **A.** Broadly speaking, the rate increase from WEPCO's proposed tariff will negatively affect
5 MMSD's current budget and facilities plan. When MMSD conducted its most recent
6 budget and six-year planning process, it did not account for the rate increase that
7 WEPCO is currently. As for specific projects, MMSD did not account for these rate
8 increases when it decided to invest in two biofuel use projects at the Jones Island and
9 South Shore facilities. Mr. Krill's direct testimony contains more details regarding the
10 cost-benefit analysis done for these two projects during MMSD's last round of facilities
11 planning.

12 **Q. Can you provide more details regarding the Jones Island biofuel use project in**
13 **which MMSD recently invested?**

14 **A.** Yes. In 2007, MMSD recognized that the two existing 16 MW GE electric generating
15 turbines at the Jones Island facility were 40 years-old, nearing the end of their useful
16 lives, and would likely need replacement. At that time, the idea was presented to MMSD
17 that landfill gas could be transported to Jones Island to fuel a new set landfill gas
18 ("LFG") turbines. MMSD evaluated this idea and began discussing it with the owner of
19 the Emerald Park Landfill in Muskego, Wisconsin. The parties reached an agreement
20 under which the landfill would supply MMSD with LFG at a lower cost than natural gas.
21 MMSD conducted a search for turbines that would be capable of burning LFG without
22 significant air emission impacts. It also conducted a cost-benefit analysis of the LFG
23 Utilization Project, which included the purchase and use of an existing stainless steel

1 pipeline on Jones Island.

2 The MMSD Commission authorized the project and the WDNR issued MMSD an
3 air permit to construct the project. MMSD then built a 19-mile pipeline from the Emerald
4 Park Landfill in to the Jones Island facility to transport the landfill gas. This project
5 included acquiring the existing stainless steel pipeline and lining it to comply with
6 corrosion requirements. Prior to piping the LFG to Jones Island, all of the landfill gas
7 had been wasted (i.e., flared) at the Emerald Park Landfill. MMSD also installed three
8 4.6 MW turbines capable of burning the LFG, and has long term plans are to install two
9 more turbines as more LFG become available. The total cost of the Landfill Gas
10 Utilization Project was estimated during the facilities planning process (during the 2008
11 to 2010 timeframe) to be approximately \$80 million, that is, \$60 million for the new LFG
12 turbines and \$20 million for the pipeline.

13 The new LFG turbines have been in operation since 2013, operate at high
14 efficiencies, produce low emissions, and have been using the LFG supplied by the
15 landfill to produce electricity at Jones Island. These three new LFG turbines replaced
16 one of the 40 year old GE natural gas turbine generators which had been providing power
17 at JI WRF.

18 **Q. Please describe the South Shore biofuel use project in which MMSD recently**
19 **invested.**

20 **A.** MMSD's South Shore facility is located south of Jones Island in Oak Creek and treats
21 flow mostly from the southern and western portions of MMSD's service area. South
22 Shore uses an anaerobic digestion process to treat wastewater. The digestion process
23 destroys up to 30 percent of the solids and generates methane gas, which is then

1 combusted to produce electrical power.

2 As discussed above, MMSD has been generating power at South Shore in this
3 manner since the 1970's, but recently determined that it could improve the efficiency of
4 this process. Beginning in 2008, MMSD has spent \$25.8 million to upgrade South
5 Shore's engine generators so that they could more efficiently burn digester gas. In 2013,
6 MMSD initiated a \$10.7 million project to improve mixing in the digesters. We are doing
7 the project in two phases. We have completed phase I, involving two digesters at a cost
8 of \$3,753,737. Phase 2 of the project would possibly convert 2-4 more digesters. The
9 exact scope of Phase 2 is still being worked on, so final cost and number of impacted
10 digesters may yet change. The project could increase digestion capacity by 20 to 40
11 percent, which would result in increased gas production. The purpose of the digester gas
12 utilization projects is to move the South Shore facility closer to the goal of energy
13 independence by utilizing the digester gas (a biofuel) that is a by-product of the water
14 treatment process.

15 **Q. When MMSD planned and invested in these projects, did it make any assumptions**
16 **regarding the cost of purchasing electricity from WEPCO?**

17 **A.** Yes. MMSD reasonably relied on WEPCO's existing tariffs when it decided to upgrade
18 its older generation capacity, to increase efficiency, and to build more capacity to
19 generate electricity from biofuels. MMSD projected that investing in the biofuels projects
20 would reduce its day-to-day reliance on electricity from WEPCO and would therefore to
21 result in significant savings. However, that projection assumed that WEPCO's current
22 rate structure would remain in place.

1 **Q. How does WEPCO’s proposed Cp-4 tariff affect the economics of MMSD’s decision**
2 **to invest in the biofuels projectS?**

3 **A.** As noted above, MMSD projected that the costs of the biofuels projects—which total
4 approximately \$116 million—would be offset in part by the savings resulting from
5 reduced future billings from WEPCO. WEPCO’s proposed tariffs will significantly
6 reduce or eliminate these savings. It seems fundamentally unfair for WEPCO to impose
7 tariffs seeking to guarantee its own revenue requirement and return on its shareholder
8 investments at the expense of MMSD achieving the reasonably anticipated ratepayer
9 savings on these taxpayer investments.

10 For the approximately 40-year period during which MMSD has self-generated
11 power, it has paid WEPCO demand charges under existing tariffs. Despite improved
12 reliability from new turbines, MMSD charges from WEPCO under the proposed rates
13 will be significantly higher even though its actual usage will be significantly lower.

14 In other words, when evaluating the cost effectiveness of the recent biofuels
15 projects, MMSD could not have known about—and therefore could not have accounted
16 for—the very high reserve and stand-by power tariff charges that WEPCO is proposing to
17 impose on MMSD. MMSD should not be penalized for improving efficiency and
18 upgrading the facilities it has used for years to generate its own power. Our direct
19 testimony demonstrates that the Company’s proposed changes are unreasonable as
20 applied to a long time self-generator of power like MMSD, which requires power to meet
21 its statutory obligations to protect the public health and welfare, and which has paid
22 substantial demand charges for decades.

1 **Q. Should the Commission accept WEPCO's proposed changes to the COGS and SS**
2 **tariffs?**

3 **A.** No. The Commission should reject the changes that WEPCO is proposing, grandfather
4 MMSD for its existing rate structure for at least 20 years, and order WEPCO to develop a
5 Distribution Wheeling Tariff.

6 **Q. Does that conclude your direct testimony?**

7 **A.** Yes, it does. However I note that MMSD has pending discovery requests to WEPCO and
8 it is possible that receipt of answers could impact the above analysis.