THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

In the Matter of the General Investigation to Examine Issues Surrounding Rate Design for Distributed Generation Customers	))))	Docket No. 16-GIME-403-GIE

NOTICE OF FILING OF CURB'S INITIAL COMMENTS

COMES NOW, the Citizens' Utility Ratepayer Board (CURB), and files the *Comments of Cary Catchpole for the Citizens' Utility Ratepayer Board on Distributed Generation Policy Matters* (herein referenced as "Attachment A"), and the *Comments of Brian Kalcic for the Citizens' Utility Ratepayer Board on Distributed Generation Rate Design Alternatives* (herein referenced as "Attachment B"), with supporting affidavits, attached hereto and made a part hereof by reference. Attachment A and Attachment B are the constituent parts that make up CURB's Initial Comments, for the purposes of this proceeding and in accordance with the Order Setting Procedural Schedule, in the above captioned docket.[1]

WHEREFORE, CURB respectfully submits its Initial Comments.

Respectfully submitted,

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[1] *See* Order Setting Procedural Schedule, ¶ 12 (February 16, 2017).

VERIFICATION

STATE OF KANSAS)
) ss:
COUNTY OF SHAWNEE)

I, Thomas J. Connors, of lawful age and being first duly sworn upon my oath, state that I am an attorney for the Citizens' Utility Ratepayer Board; that I have read and am familiar with the above and foregoing document and attest that the statements therein are true and correct to the best of my knowledge, information, and belief.

Thomas J. Connors

SUBSCRIBED AND SWORN to before me this 17th day of March, 2017.

DELLA J. SMITH
Notary Public - State of Kansas
My Appt. Expires Jan. 26, 2021

Notary Public

My Commission expires: 01-26-2021.

ATTACHMENT A

THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

Before Commissioners: Pat Apple, Chair
Shari Feist Albrecht
Jay Scott Emler

In the Matter of a General Investigation to Examine Issues Surrounding Rate Design for Distributed Generation Customers.	)))	KCC Docket No. 16-GIME-403-GIE

COMMENTS OF CARY CATCHPOLE FOR THE CITIZENS' UTILITY RATEPAYER BOARD ON DISTRIBUTED GENERATION POLICY MATTERS

COMES NOW, Cary Catchpole for the Citizens' Utility Ratepayer Board ("CURB"), and respectfully submits the following comments as requested by the Kansas Corporation Commission ("KCC" or "Commission") in its July 12, 2016 Order in the above-captioned docket:

I. Background

1. In the full general rate case application filed in Docket 15-WSEE-115-RTS ("Docket 115"), Westar Energy, Inc. and Kansas Gas and Electric Company (collectively "Westar") sponsored a number of renewable generation proposals that included solar and wind generation programs. Many issues arose in connection with considering these proposals such as revenue shortfalls, program independence, and non-participant cost allocation of solar and wind generation programs.[1] CURB supported a generic proceeding to examine these issues outside the context of Westar's general rate proceeding and prior to approval by the KCC of the wind and solar generation programs proposed by Westar.[2]

[1] Direct Testimony of Andrea C. Crane, KCC No. Docket 15-WSEE-115-RTS, July 9, 2015, p. 78, lines 2-7.
[2] Direct Testimony of Andrea C. Crane, KCC No. Docket 15-WSEE-115-RTS, July 9, 2015, p. 78, lines 14-16.

2. On January 22, 2016, the Commission Staff ("Staff") filed their final Report and Recommendation in Docket 115. The Report and Recommendation requested the KCC to defer the renewable rate issues, authorize a generic investigative docket to evaluate the costs and benefits of Distributed Generation ("DG"), and discuss potential rate design for Kansas distributed generation customers ("DG customers"). Staff envisioned the proceeding would involve thorough research, thoughtful consideration and comprehensive dialogue to help develop policy and rate design alternatives for distributive generation participants in Kansas.

3. The KCC's Order Approving the Stipulation and Agreement in Docket 115 deferred consideration of DG issues to this generic investigative docket.[3] CURB appreciates the opportunity to address these issues in the context of a broader investigation. CURB zealously supports effective programs that provide lower cost clean energy and other real benefits to Kansas customers. Although there are a variety of energy resources and DG applications available today, CURB will center its comments around small capacity distributed generation applications that are powered by renewable solar photovoltaic ("solar PV") and wind resources.

4. Led by technology, the 21st Century energy era is well underway, and all stakeholders (ratepayers, utilities, and public commissions alike) are adjusting to the rapid expanse of change. The proactive nature of the KCC to introduce and launch this investigation is timely and commendable. According to the 50 States of Solar report, regulators or lawmakers in 47 states and the District of Columbia are currently looking at distributive generation value and addressing potential policy changes.[4] Similarly, over 65 million customers nationwide are eligible for

[3] Order Approving Stipulation and Agreement, KCC Docket No. 15-WSEE-115-RTS, Sept. 24, 2015, p. 22, para. 60.

[4] North Carolina Clean Energy Technology Center & Meister Consultants Group, "*The 50 States of Solar: 2016 Policy Review and Q4 Quarterly Report,*" Jan. 2017, p. 11.

distributive generation rates and highly value rate design flexibility, as per the Rocky Mountain Institute.[5]

II. Definition and Historical Perspective

5. Distributed generation is energy generated independently of the centralized electric system commonly referred to as "the grid." DG applications have the additional characteristic of being located close to the site of use, such as solar panels mounted on a customer's house or a small wind turbine placed on the owner's property. This type of energy generation can serve both residential and commercial/industrial needs, and may consist of either single units or links with other applications within a microgrid.[6] Distributed generation is differentiated from the more comprehensive category of Distributed Energy Resources ("DER"), which includes demand response conservation measures, controllable loads, and energy efficiency.[7] As a subset of DER, DG shares many similarities with broader conservation measures, especially when analyzing DG's potential impact on the grid.[8]

6. Deployment of distributive generation is often intertwined with the harnessing of renewable sources. Electricity produced from renewable sources such as the sun and wind is typically referred to as "green" or "clean" energy, as it is environmentally neutral and naturally replenished.[9] The desire to harness natural sources has been appealing to mankind since the

[5] "DER valuation, rate design, and the evolving customer role in the electricity system: Webinar." *Rocky Mountain Institute and eLab*, 24 Mar. 2016, www.youtube.com/watch?v=9irikpH_cjs.
[6] United States, Environmental Protection Agency. *Distributed Generation of Electricity and its Environmental Impacts.* 2017 Jan. 24. www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts.
[7] *Distributed Energy Resources Rate Design and Compensation: A Manual Prepared by the NARUC Staff Subcommittee on Rate Design*. National Association of Regulatory Utility Commissioners (NARUC), Nov. 2016, p. 45. pubs.naruc.org/pub/19FDF48B-AA57-5160-DBA1-BE2E9C2F7EA0.
[8] "Distributed Energy Resources in Nevada: Quantifying the Net Benefits of Distributed Energy Resources, Executive Summary, May 2016." *SolarCity and NRDC.* www.solarcity.com/sites/default/files/SolarCity-Distributed_Energy_Resources_in_Nevada.pdf http://solarcity.gom/gridx.
[9] Rogers, S. A. "What is Green Energy?" *Mother Nature Network*, 25 Jul. 2012. www.mnn.com/earth-matters/energy/stories/what-is-green-energy.

dawn of civilization; however, measurable progress in this aged goal can be traced to technology developments in the last few hundred years. The first solar engine was created in the 1860's,[10] wind turbines powering light bulbs were developed in 1887,[11] and in 1953 researchers at Bell Laboratories developed the first silicon solar cell with the ability to generate a measurable current.[12]

7. Solar PV and wind have taken a leading position in today's choice of distributed generation primarily due to reduced costs, technology advancements, best applicability, and purchase incentives. According to Carbon Tracker, a research institute that studies the potential impact of climate change on investment, solar PV-cell prices have fallen 85% in the last seven years alone.[13] A report from Bloomberg New Energy Finance (BNEF") and the Business Council for Sustainable Energy ("BCSE") cites that comparable costs of building large utility-scale solar photovoltaic power plants have fallen by 50% in just 5 years.[14] Although the technology costs are falling, distributive generation remains largely unaffordable for many individuals, particularly residents of low-income communities who struggle to afford food, housing, electricity and transportation. For customers in these communities, direct installation of DG is out of reach and may feel like a "regressive policy that benefits others with race and wealth privilege."[15] Moreover, a customer may not be able to participate in DG because there is

[10] "*The History of Solar.*" United States, Department of Energy, p. 2. www1.eere.energy.gov/solar/pdfs/solar_timeline.pdf.
[11] Bracken Meyers, C. "Wind Turbine History," *Centurion Energy*, Sunday, 17 Nov. 2013, 23:09. www.centurionenergy.net/index.php.
[12] "How long has solar power been around?" *Sciencing*, 2017. www.sciencing.com/long-solar-power-around-5185289.html.
[13] Sussams, L. and Leaton, J. "Expect the Unexpected: The Disruptive Power of Low-Carbon Technology." *Carbon Tracker and Grantham Institute at Imperial College London,* Feb. 2017, p. 13.
[14] 2017 Sustainable Energy in America Factbook: Infrastructure Data Sets. *Bloomberg Finance L.P. and the Business Council for Sustainable Energy,* 2017. www.bcse.org/wp-content/uploads/BCSE_2017_Sustainable_Energy_in_America_Factbook-State_and_Regional-Slides.pdf.
[15] Patterson, J. "Energy Democracy, #BlackLivesMatter, and the NAACP Advocacy Agenda: Remarks given on a

no suitable place for it (i.e. multi-family customers who do not own their own property or inner city dwellers with no land for a wind generator).

8. Many Americans overwhelmingly support clean energy concepts and associated national policy goals regardless of their political views,[16] but are overly optimistic about the amount of renewable energy powering the U.S. According to a survey conducted in 2016 by communications and PR firm Makovsky, the average American believes that 11 percent solar generated power and 9 percent wind generated provide our electricity, when in all actuality the solar contribution is 1 percent and wind is 2 percent.[17] Additionally, popular view holds that in five years solar PV and wind sourced power will increase to 34 percent of the energy mix. United States Energy Information Administration ("EIA") estimates are much more conservative, however, predicting that in five years solar will still be hovering around 1 percent and wind will have grown to 3 percent.[18]

9. Distributed generation prevalence in Kansas is minimal, and the cumulative installed residential solar PV capacity through November 2016 was 3.649 Megawatts.[19] Kansas is not a national major player in solar PV; in 2016, the state was ranked 47th out of 50 by The Solar Foundation on a scale that rates solar jobs per capita, cumulative installed capacity and projected solar job growth.[20] Similarly, Kansas is rated 48th (down 2 points from ratings in 2015) on the

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Webinar on Net Metering for Solar Advocates hosted by the Energy Foundation." *National Association for Advancement of Colored Peoples (NAACP)*, 2015 May 29. naacp.org/latest/energy-democracy-blacklivesmatter-and-the-naacp-advocacy-agenda/.

[16] Pomerantz, D. "Florida's Amendment 1 Defeat Shows Why Solar Won't be Stopped, Trump or No Trump." *Utility Dive,* 2016 Nov. 14. www.utilitydive.com/news/floridas-amendment-1-defeat-shows-why-solar-wont-be-stopped-trump-or-no/430373/.

[17] Roberts, D. "America Isn't Using Nearly as Much Renewable Energy as Americans Think. *Vox,* 2016 Oct 23. www.vox.com/energy-and-environment/2016/10/28/13427822/americans-overestimate-renewable-energy.

[18] Roberts, Ibid.

[19] United States, Energy Information Administration. *Form EIA 826, Monthly Electric Utility Sales and Revenues with State Distributions Report.*" Dec. 2016.

[20] "State Solar Jobs Compendium 2015." *The Solar Foundation*, 2015, pp. 3, 57-58.

ACEEE state-by-state scorecard regarding DERs, with the group crediting Kansas for state government initiatives, building energy codes and a smattering of utility and public beneficial programs and policies.[21]

10. The EIA estimates there are a total of 655 DG customers in the state: 595 residential and commercial solar customers, and 60 residential and commercial wind customers.[22] CURB polled our electric utilities, and they reported that as of March 1, 2017 there are 690 solar PV and wind customers. Kansas customer generators participate through interconnection agreements with their utilities and most utilize net metering, which is a billing mechanism that compensates a customer for excess generation from their on-site DG system. Excess energy is considered to be "exported" from "behind-the-meter," and is compensated at rates that vary by state and utility.[23] Net energy metering, or NEM, favors a bi-directional meter that can turn backwards when the customer is exporting energy into the grid. In Kansas, credits for exported energy accumulate either monthly or yearly depending on the contract date with the utility, and apply to the customer generator's usage during times that their on-site system is not generating electricity. By law these credits expire annually in March if not used.[24] NEM is governed by Kansas law statutes K.S.A. 66-1263 through K.S.A. 66-1271, which outline compensation rates, customer system size limits, installation requirements, and billing procedures. Kansas law also provides for an aggregate participation cap of 1% of all state utility peak demand during the previous year. A smaller number of Kansas customer generators

www.thesolarfoundation.org/solar-jobs-census/solar-jobs-compendium/.

[21] State and Local Policy Database (Kansas). *American Council for an Energy-Efficient Economy (ACEEE)*, Sep. 2016. database.aceee.org/state/kansas.

[22] Energy Information Administration, Form EIA 826,.

[23] The 50 States of Solar: 2016 Policy Review and Q4 Quarterly Report, NC Clean Energy Technology Center, p. 14.

[24] K.S.A. 66-1266 (a)(5).

participate via parallel generation laws that were first introduced in 1979, and feature a payment rather than credits.[25] Although our customer generation numbers are low, addressing the issue now is a good idea and urged by many planning advisories.[26] As the technology continues to advance and DG adoptions increase, more sophisticated tariffs and cost allocation methods can be applied once a solid planning foundation is in place and sufficient information is gathered.[27]

III. Distributed Generation Issues

11. Renewable sources are not reliable or able to provide for a customer's complete power needs due to their intermittent and variable nature. Whimsical weather can adversely affect a DG system's ability to provide power; wind can defy predictability and a cloud can cover the sun's rays. There are on average 2,674 sunny hours in Kansas annually[28] with which to harness solar PV generation out of 8,766 hours per year of potential electricity demand. Solar technology is tasked with harvesting a fuel that is available on average 30.5% of the year. For solar to completely fulfill a customer's needs, it must find a way to extend electricity output of this limited sunshine availability (not seasonally reflective); otherwise, the rest of a customer's yearly electricity needs must be supplied by the customer's utility provider, a different DG technology, or energy storage. Called the "new solar," storage systems (batteries) for DG systems are in development. Storage advocates look favorably upon the augmentation of solar-plus-storage as a potentially useful tool in providing backup functions, as well as reducing the

[25] K.S.A. 66-1, 184.
[26] Pyper, J. "As America's Top Utility Regulatory Body Overhauls Rate Design, Solar Players Want More Transparency: A New Manual Will Inform How State Regulators Design Rates and Treat DERs Around the Country." *Greentech Media,* 2016 Sep. 7. www.greentechmedia.com/articles/read/solar-stakeholders-seek-transparency-fair-treatment-in-der-rate-manual/.
[27] Saha, D. and Muro, M. "Rooftop Solar: Net Metering is a Net Benefit." *Brookings,* 2016 May 23. brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/.
[28] United States, National Climatic Data Center, National Oceanic and Atmospheric Administration. *Comparative Climatic Data.* www.ncdc.noaa.gov/cdo-web. Accessed 24 Jan. 2017.

magnitude of power flow from DG.[29] Unfortunately, DG storage is not widely available or affordable at this time for residential and small commercial use.[30] Consequently, the DG customer is typically not fully independent of the grid and requires some amount of power to continue normal everyday activities.

12. Solar PV and wind unpredictability presents very real issues for planning, as the utility company must provide for capacity to cover the DG customer's maximum demand on any given day should their DG system not be able to provide it. Often times the customer producer may not be cognizant of the total energy or capacity they use on an everyday basis, or how much their DG system may be affecting their personal conservation habits. This critical information is important to the utility, however, and probably should be to the customer generator as well in order to plan for the delivery of backup or overage service as required. Equipment failure or maintenance activities at the DG site are also a component of concern for utility sufficiency preparation. Planned or unplanned down time of the DG system is likely to create an immediate request for full magnitude power while the customer generator's system undergoes repair, maintenance or waits for the renewable energy source to resume availability.

13. In addition to these issues, distributed generation is challenging the traditional utility business model because it transforms the residential customer from an energy "taker" to an energy "maker." This transfiguration of passive customer receiver to energy producer creates a dynamic change to both the utility system and the historic relationship between the ratepayer

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[29]Maloney, P. "With Tax Reform on the Table Senators Prepare Second Push for Energy Storage." *Utility Dive.* 2017 Feb. 7. www.utilitydive.com/news/with-tax-reform-on-the-table-senators-prepare-second-push-for-energy-stora/435595/. As per Mr. Maloney, "[e]nergy storage would most likely not reduce emissions or primary energy consumption unless it directly enables intermittent renewable energy."

[30] Maloney, With Tax Reform on the Table Senators Prepare Second Push for Energy Storage.

and the public utility. Sometimes referred to as "disrupters" or "upstarts,"[31] customer generators in this new role are recognizing a sense of independence and a lower energy bill from the utility company. Additionally, distributed generation customers are often more affluent, as DG systems are expensive.[32] Installing solar on your house in the neighborhood is a statement about your values, self-sufficiency, independence and pride.[33] However, the environmental benefits of solar and all of these elements are secondary to the concern of whether solar investments can pay for themselves according to Clean Technica.[34] The potential customer generator will not be interested in investing in solar if they cannot be assured that the system will save them money on their electric bills.

IV. Costs of Distributed Generation

14. Distributed Generation introduces certain costs to the electric system arising from: 1) the use of the utility system as a backup to DG; and 2) the unpredictability that DG adds to the utility system due to unexpected demand fluctuations and intermittent supply. Both of these issues stem from the fact that the energy produced by renewable sources is irregular and inconsistent. "[S]olar and wind resources may be suited for peaking application but lack durability for continuous output," confirms the Resource Dynamic Corporation in a report prepared for the Maine Public Utilities Corporation.[35] Due to their intermittent nature, distributed generation from solar PV or wind resources introduce an element of unreliability and

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[31] Greenberg, A. "The Great DER Divide." *Energybiz*, Spring 2016, p. 4.
[32] For example, a professionally installed 5 kW solar system can cost up to $40,000, which translates to about 25 cents per kWh. (Thiele, T. "How Much Does Solar Power Cost?" *About Home.com.*)
[33] "Net Metering in Missouri: The Benefits and the Costs." *Missouri Energy Initiative*, Winter 2015, p. 17. www.moenergy.org.
[34] Cooney, S. "Top 10 Target Strategies for Solar Marketing." *CleanTechnica,* 2014 Mar. 2. cleantechnica.com/2014/03/02/top-ten-target-strategies-solar-marketing/.
[35] *Assessment of Distributed Generation Technology Applications:* A Report Prepared for the Maine Public Utilities Commission. *Resource Dynamic Corporation*, Feb. 2001, p. 1.

potential dysfunction to the total electric system. Because distributive generation customers may be constantly plugging into and out of the grid, the utility company may have a difficult task in planning for the overall usage of its system, particularly before and during high demand time periods (system peaks). The assignment and recovery of corresponding system costs is also disrupted, due to the fluctuation and unpredictability of DG customer consumption. As mentioned earlier, planning for demand and anticipating energy needs in this scenario may create distinct challenges for the utility company, which is charged with providing safe and reliable service. These challenges reverberate through the rate making process also as the utility endeavors to assess all ratepayers (including the residential and small commercial classes) their determined portion of the utility's fixed and variable costs for the provision of electric service.

15. According to the distributed energy resources manual released by the National Association of Regulatory Utility Commissioners ("NARUC"), distributed power generation raises additional economic and technical issues.[36] The following issues are outlined in the manual:

i. Utility Revenue Erosion – decreased utility revenues due to a reduction in usage (the customer is using less).

ii. Cost Recovery – the apportionment and recovery of a utility's authorized fixed costs, whether short- or long-term as embedded in the customer bill.

iii. Cost Shifting – the alteration and transferal of costs from one customer to another, and most commonly within the same class of customers.

iv. Technology and Physical Issues - non-economic pressures put on the

[36] NARUC, Distributed Energy Resources Rate Design and Compensation, p. 143

physical grid from various technology or hardware, and compounded by the inability of the utility to know about and control the customer's on-site distributed generation "behind-the-meter."[37]

16. CURB agrees that these issues highlighted by NARUC are problematic, and is particularly concerned with cost recovery questions as well as the potential for a cost shift or "cross-subsidy" between DG customers and other ratepayers. A recent study by the Missouri Energy Initiative ("MEI") indicates the potential for cross-subsidization could be as much as 20% of fixed costs.[38] "Non-participating consumers want tariffs and public policies that protect them from subsidizing those customers who choose to invest in or lease solar PV," says RAP.[39] All ratepayers need assurance to verifiably say that distributive generation customers are paying for their fair share of utility investments and maintenance of the grid, including the DG customers themselves. (emphasis added) Imagine undertaking the expense of investing in and installing a home solar system on your rooftop only to learn that you are accepting a handout from your neighbors to keep you going on cloudy days. This outcome doesn't satisfy either party, nor does it match with the underlying profile of the independent and environmentally conscious DG customer.

V. Benefits of Distributed Generation

17. Be assured distributed generation adds value to the system as well. The potential benefits of DG are numerous when you take a wide multitude of categories into consideration, including societal and environmental benefits. Benefits under the most expansive evaluations

[37] As per the manual DG can put pressure on the physical grid. Many of these problems are different depending on the technology, but they are all often compounded by a utility's lack of control over, and visibility of, DER's effects. (NARUC, Distributed Energy Resources Rate Design and Compensation, p. 68.)
[38] Missouri Energy Initiative, Net Metering in Missouri: The Benefits and the Costs. p. 11.
[39] Linvill, C., Shenot, J. and Lazar, J. "Designing Distributed Generation Tariffs Well: Fair Compensation in a Time of Transition." *RAP*, Nov. 2013, p. 21.

may include:

i. Avoided energy costs and fuel purchases;

ii. Avoided purchases of financially protective fuel hedges;

iii. Avoided utility investment in generation capacity;

iv. Avoided transmission and distribution ("T&D") electrical line losses, which exponentially increase at the residential site;

v. Avoided emissions from the utility plants;

vi. Avoided distribution costs (substations and equipment);

vii. Avoided transmission costs (lines, transformers and poles);

viii. Avoided fixed operation and management costs;

ix. Assorted societal benefits such as DG job creation and avoided health impacts;

x. Associated environmental benefits including reduced water usage in power production and land costs for generation and T&D; and

xi. Grid security advantages due to independent DG systems.

18. Various studies nationwide include DG benefit elements in different combinations, depending on how broad or narrow the study is, or what local policy may be.[40] Correspondingly, the evaluation of net benefit may also be utility specific and dependent upon whether the utility is considered high-cost or low-cost due to embedded low-cost resources, such as those in the Kansas City area.[41] It is important to include the benefits of DG into the

[40] Saha, D. and Muro, M. "Rooftop Solar: Net metering is a net benefit." *Brookings,* 2016 May 23. brookings.edu/research/rooftop-solar-net-metering-is-a-net-benefit/.
[41] Lazar, J. and Vitolo, T. "The Value of Solar: Assessing the Benefits, the Costs, and what it May Mean for Net Energy Metering: Webinar." *RAP*, 2016 Sep. 22. www.raponline.org/event/the-value-of-solar-assessing-the-

calculation of value, however, as the utility is in receipt of a resource with value that needs to be evaluated, and especially in the context of its location.[42] As per Jim Lazar, "Net metering can produce a significant net benefit to the utility. They are getting a resource worth as much as 16 cents at the most expansive evaluation at a cost of lost revenue of 8 cents. This benefits all ratepayers where the [local] residential rate is below 16 cents. Where the rate is higher, the net metering has an adverse effect on the distribution of costs."[43]

19. CURB recognizes that a number of the benefits highlighted under the widest studies cannot be quantified, and may be considered speculative and/or outside the realm of utility revenue requirements. CURB would recommend inclusion of only those benefits within the standard utility model that are direct, measurable, and cost-based. Choosing values that represent cost-based principles avoid the hazards of creating either too much investment in DG through a subsidized tariff design or barriers to its adoption.[44] Thus, DG benefits to be included when evaluating distributed generation value are as follows: 1) avoided fuel purchases, 2) avoided T&D electrical line losses, 3) avoided utility investment in generation capacity, and 4) avoided transmission and distribution costs. Adhering to measurable, cost-based values when evaluating DG applications will avoid the potential problems of abuse to the electrical system, creation of an economically unsustainable ratepayer class due to subsidy-based investments, and ultimate utility and customer disservice in realizing planning and conservation goals. We all know that "somewhere over the rainbow skies are blue,"[45] and CURB would suggest that

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benefits-the-costs-and-what-it-may-mean-for-net-energy-metering/.

[42] Brookings, Roof-top Solar.

[43] Lazar, J. and Vitolo, T., The Value of Solar Webinar.

[44] "Contractual and Regulatory Issues related to Customer-sited Renewable Generation," Professor Lecture Presentation, New Mexico State University.

[45] Arlen, H. and Harburg, E. Y. "Over the Rainbow." Metro-Goldwyn-Mayer Studios Inc., 1938.

utilizing cost-based principles when evaluating DG applications will provide Kansas with the solid foundation needed to address DG issues.

VI. Analysis Techniques and Methodologies to Value DG

20. CURB surmises that the balance between the costs which the DG source may impose on all customers and the benefits which the DG source may offer the total electric system is the primary matter at hand. Conducting a benefit-to-cost comparison, or "cost benefit analysis" as it is commonly referred to, gives the analyst a way to evaluate and arrive at a conclusive net value. Cost benefit analysis is accomplished by listing appropriate benefits as compared to identified costs to produce a calculated value. The following table illustrates a cost benefit analysis process as applied to DG:[46]

Description of Cost Benefit Analysis Scope

Net Benefit or Cost = Total Benefits to All Utility Customers - Total Costs to All Utility Customers	
Total Benefits	The benefits that accrue to all utility customers due to DG deployment.
Total Costs	The costs that all utility customers incur as a result of DG deplyoyment.
Net Benefits or Costs	The value to DG and non-DG ratepayers of continued deployment of DG, defined as the benefits less the costs.

This straight-forward analysis can help stakeholders determine the greatest net benefit or cost for their systems. Of itself, however, this analysis may not be adequate to determine an appropriate level of rates for DG customers. A finer tuned analysis would include deployment of relevant stakeholder perspective tests advanced in the California Standard Practice Manual in 2001

[46] SolarCity, Distributed Energy Resources in Nevada, adapted from page 5.

("CPUC 2001"), and which currently provide a general standard of cost-effectiveness analysis in the United States.[47]

21. The Ratepayer Impact Measure Test ("RIM"), which was originally known as the Non-Participant or "no losers test,"[48] conducts a benefit/cost analysis from a total utility customer viewpoint, and takes into account distributional impacts. In DG applications, the RIM's purpose is to give non-DG participants utility rate decrease information.[49] If a RIM test scores below 1.0, meaning there are fewer benefits than costs, DG applications will increase costs and rates. Conversely, if a RIM test scores above 1.0, DG applications will decrease overall utility costs and rates. This test is highly valued by CURB due to its potential to shield residential and small commercial ratepayers from inappropriate rate increases. CURB would also advocate utilizing the Total Resource Cost Test ("TRC") to evaluate DG. The TRC test provides a benefit/cost result for the entire utility service territory excluding non-energy benefits, such as public health benefits, environmental benefits, and economic development benefits. Also known as the All-Ratepayer Test,[50] the TRC test as it applies to DG will give a clear picture of an increase or decrease in the sum of the utility net benefit or net cost and the DG customer net benefit or net cost. Essentially, a TRC score of less than 1.0 indicates that DG is adding more costs than benefits to the system, and a score of 1.0 or greater reveals benefits added. Interestingly, both tests can also be represented as a net benefit value rather than a benefit/cost ratio. Applying the RIM and TRC tests is consistent with Kansas energy efficiency (DER)

[47] Daykin, E., Aiona, J. and Hedman, B. "Whose Perspective? The Impact of the Utility Cost Test." *The Cadmus Group*. n.d., p. 1. www.cadmusgroup.com/wp-content/uploads/2012/11/TRC_UCT-Paper_12DEC11.pdf
[48] Dayken, E., Aiona, J. and Hedman, B., Whose Perspective, p. 1
[49] Linvill, C., Shenot, J. and Lazar, J., Designing Distributed Generation Tariffs Well, p. 24.
[50] Dayken, E., Aiona, J. and Hedman, B., Whose Perspective, p. 1.

policies,[51] and CURB would suggest application of the TRC and RIM is equally applicable to DG evaluation. Although there are other stakeholder tests within the portfolio of CPUC 2001 ratios, the TRC and RIM tests represent benefit/cost ratios that capture the impact of DG on overall electricity rates through cost based evaluation techniques that exclude non-energy benefits that are unquantifiable.

VII. Other Consumer Advocate Positions

22. Other consumer advocacy offices across the nation are weighing in on distributed energy generation issues, and the impact of DG on the consumer's energy future. Proposed legislation to cancel or end net metering in a number of states has drawn opposition from some consumer advocates responding to cases in Indiana, Missouri and Nevada. Heralding climate and social health values, the NAACP has gone on record to promote net metering as a starting point for improving air quality conditions for low-income citizens and communities of color, although stating implementation of DG is reserved for wealthier, privileged households.[52] *The Utility Reform Network* ("TURN"), California's prominent ratepayer advocate, continues their mission of "Lower bills. Livable Planet" by recently challenging proposed distribution investments by utility companies for DG grid readiness. TURN is imploring the California Public Utilities Commission to be certain the pricey investments will be worth the increases in customer's bills.[53]

23. When it comes to progressive ratemaking strategies to help address cost and usage

[51] Order, Docket No. 12-GIMX-337-GIV, Mar. 6, 2016, p. 5-7.
[52] Patterson, J. "Just Energy Policies and Practices Compendium: A State by State Guide to Energy Efficiency and Renewable Energy Policies." *National Association for Advancement of Colored Peoples (NAACP)*. December 2013, p. 4. Environmental and Climate Justice Program. naacp.3cdn.net/5502c09b47ddedffb9_wrim6j5v0.pdf.
[53] Trabish, H. "How Southern California Edison's New Rate Case Would Transform the Grid." *Utility Dive,* 2016 Sep. 2. www.utilitydive.com/news/how-southern-california-edisons-new-rate-case-would-transform-the-grid/426493/.

concerns, a recent survey of consumer advocates in September 2016 identified areas of agreement and disagreement, tracing overall skepticism for advanced rate structure to a lack of experience that the residential class has with demand rates. "Our survey of consumer advocates identified perspectives that ranged from direct opposition to guarded support," said Ryan Hledik who, along with Ahmad Faruqui administered the survey.[54] "Emerging concerns about equity and fairness in rate design, particularly as it relates to effects of growing adoption of distributed generation [indicate that] rate designs must continue to evolve," states Hledik and Faruqui.[55] CURB suggests that whatever DG rate policy the Commission chooses to adopt, the ensuing DG rate design should be introduced gradually. Bill impacts should be quantified, particularly for low and moderate income customers, and the development of a customer education plan is highly recommended. Additionally, many low-income advocates, consumer advocates, and environmental advocates favor balancing the special needs low-income families encounter under new rate designs with specific anticipatory approaches or direct financial assistance. "Regulators and consumer advocates should consider providing some form of public information or outreach programs to clearly explain to all ratepayers these potential effects, immediately and before the time any rate design change is implemented," encourages NARUC.[56] At the very least, an active and dynamic program of consumer education is warranted and timely.

24. Urging the consumer to make ethically informed consumption choices has been in vogue since 1989 when the UK Magazine "Ethical Consumers" first penned the movement. This concept springs from ethical consumerism or "green consumerism," and empowers

[54] Hledik, R. and Faruqui, A. "Competing Perspectives on Demand Charges." *Public Utilities Fortnightly,* Sep. 2016, p. 24. Brattle Group. brattle.com/system/publications/pdfs/000/005/357/original/Competing_Perspectives_on_Demand_Charges.pdf?1473348105.

[55] Hledik, Competing Perspectives on Demand Charges, p. 25.

[56] NARUC, Distributed Energy Resources Rate Design and Compensation, p. 92.

consumers to seek out and make socially and ethically motivated decisions.[57] Consumers have responded to this movement, and are continuing to require more information to help in their decision-making. As a result, ethical and environmental ratings of companies have become commonplace both as a signal to consumers and other firms of corporate social responsibility and sustainability. CURB believes this movement has some parallel elements to the facilitation and increasing prevalence of DG. Of particular concern is both rate change and contractual information consumers should receive prior to participation in DG. "[C]ustomers may lack sufficient education about the difference between a "rate" and a long-term contract," further explains the NARUC Committee.[58] "Regulators and other consumer protection advocates may want to monitor marketing materials from DER providers to ensure that customers are being adequately and correctly informed of their options and the potential results of their actions."[59] This is a worthy notion, especially as it may pertain to initial customer investment in DG, or new rates and tariff designs adopted by the KCC.

VIII. Conclusions and Recommendations

25. In conclusion, we can summarize that we know a small number of DG customers exist in Kansas. As indicated by interconnect agreement information provided by utility partners, there are 690 distributed generation customers in Kansas, which is equivalent to 0.02 percent of the total Kansas population. DG is popular with consumers for a number of reasons, not the least of which is the fact that humankind has been trying to harness free natural resources since the dawn of our human experience. Renewable energy sources are "green," freely

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[57] Giesler, M.; Veresiu, E. "Creating the Responsible Consumer: Moralistic Governance Regimes and Consumer Subjectivity." *Journal of Consumer Research.* 41 (3): 840–867, 30 July 2014. doi:10.1086/677842.
[58] NARUC, Distributed Energy Resources Rate Design and Compensation, p. 92, (Footnote 121).
[59] NARUC, Distributed Energy Resources Rate Design and Compensation, p. 93.

replenished, and leave no lasting negative environmental effects such as pollution, smoke or harmful residual. Becoming a consumer generator gives us a sense of energy independence, and technology advances coupled with incentives have allowed DG installed costs to fall in recent years. All of these items combined with the political movement of "Ethical Consumerism" continue to make DG a popular and much talked about energy movement among consumers.

26. Unfortunately, distributed generation presents issues to the existing electrical system through the intermittent and unreliable nature of the renewable sources powering it. These issues challenge the standard utility model in place that has been used for nearly one hundred years, and prevailing rate design may not be allowing DG customers to contribute adequately to maintenance costs of the grid. DG's ability to provide system benefits that contribute to lower grid outlays, while simultaneously imposing system-wide costs, necessitates that stakeholders undertake detailed analyses to determine overall (or net) DG value. CURB's recommendations emphasize assessment approaches that utilize standard energy utility value tools that are cost based, and would include employing both a benefit-costs analysis methodology as well as RIM and TRC stakeholder tests initiated by the California CPUC. In addition, consumer education plays a key role in the process of DG evaluation and rate setting. Both necessary and timely, programmatic outreach can help with capacity planning, avoidance of rate shock, and consumer protection. We would advocate that it is better to set rates from a cost basis originally in order to avoid a potential rate shock when adjusting later, and transparency and communication to the consumer will help in facilitating the process.

VERIFICATION

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) ss:
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I, Cary Catchpole, of lawful age and being first duly sworn upon my oath, state that I am a regulatory analyst for the Citizens' Utility Ratepayer Board; that I have read and am familiar with the above and foregoing document and attest that the statements therein are true and correct to the best of my knowledge, information, and belief.

Cary Catchpole

SUBSCRIBED AND SWORN to before me this 14th day of March, 2017.

DELLA J. SMITH
Notary Public - State of Kansas
My Appt. Expires Jan. 26, 2021

Notary Public

My Commission expires: 01-26-2021.

ATTACHMENT B

THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS

Before Commissioners: Pat Apple, Chair
Shari Feist Albrecht
Jay Scott Emler

In the Matter of a General Investigation to Examine Issues Surrounding Rate Design for Distributed Generation Customers.	)))	KCC Docket No. 16-GIME-403-GIE

COMMENTS OF BRIAN KALCIC FOR THE CITIZENS' UTILITY RATEPAYER BOARD ON DISTRIBUTED GENERATION RATE DESIGN ALTERNATIVES

COMES NOW, the Citizens' Utility Ratepayer Board ("CURB"), and respectfully submits the following comments as requested by the Kansas Corporation Commission ("KCC" or "Commission") in its July 12, 2016 Order in the above-captioned docket:

I. Background

1. The Commission opened this general investigation to examine issues related to the development of an appropriate rate structure for Distributed Generation ("DG") customers. In its Opening Order dated July 12, 2016, the Commission stated that an appropriate DG rate structure must be just and reasonable and, as such, should reflect the quantifiable costs and quantifiable benefits of DG. Therefore, this investigation is intended, in part, to provide parties an opportunity to explain how the costs and benefits of DG can be quantified. CURB is providing comments regarding the potential cost and benefits of DG in separate comments sponsored by regulatory analyst Cary P. Catchpole.

2. The Commission also seeks comments regarding an appropriate rate structure(s) for DG customers. Fundamentally, the term "rate structure" refers to the types of charges (or billing components) that are included in a utility rate schedule applicable to a given class of

customers. Utility rate structures normally vary across customer classes. The simplest electric rate structures, which typically apply to residential customers, consist solely of customer and energy charges. More sophisticated electric rate structures, applicable to larger user classes, may include a combination of customer, demand and energy charges, with or without time-of-use ("TOU") rate periods. In the comments that follow, CURB discusses various types of rate structures and rate design alternatives for DG customers.

II. Principles of Utility Rate Design

3. The utility ratemaking process typically involves three distinct phases: 1) the determination of the utility's overall (allowed) revenue requirement; 2) the allocation of that revenue requirement to the utility's individual rate classes; and 3) the implementation of that class revenue allocation, *i.e.*, designing a set of rates that recover assigned class revenues. As such, rate design is the final step in the ratemaking process.

4. Perhaps the most widely cited principles of utility rate design are attributable to James C. Bonbright.[1] Professor Bonbright's principles suggest that utility rates should:

a. be effective in yielding total revenue requirements under the fair-return standard;

b. provide revenue stability from year to year;

c. exhibit stability themselves, with minimal unexpected changes that are seriously adverse to existing customers;

d. reflect fairness in the allocation of total cost of service across customers;

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[1] James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, "Principles of Public Utility Rates, 2nd Edition" *Public Utilities Reports, Inc.* (March 1,1988).

e. avoid undue discrimination;

f. exhibit the attributes of simplicity, understandability, public acceptability, and feasibility of application and interpretation; and

g. provide for economic efficiency (e.g., discourage wasteful use of electricity, and reflect all present and future private and social costs associated with the provision of electricity).

5. For purposes of evaluating DG rate design alternatives, Professor Bonbright's principles may be distilled into five core principles of rate design: 1) revenue adequacy and stability; 2) customer bill stability; 3) equity; 4) customer satisfaction; and 5) economic efficiency.[2] As discussed below, certain conflicts may arise in the simultaneous pursuit of the above outcomes.

III. DG Rate Design Alternatives

6. In the absence of a separate DG rate schedule, residential DG customers will be billed, by default, under the utility's standard residential rate structure. The typical residential rate schedule consists of a two-part rate, *i.e.*, (i) a fixed monthly customer charge and (ii) an energy (kWh) charge.[3] These two charges are set at the combined levels necessary to recover the residential class's assigned share of the utility's total allowed revenue requirement. More specifically, the residential two-part rate structure is designed to recover the class's assigned share of generation-, transmission- and distribution-related costs, including customer service costs related to metering and billing. Many of such costs are fixed in nature in the short run, *i.e.*, do not

[2] *Primer on Rate Design for Residential Distributed Generation*. Edison Electric Institute, Feb. 2016, p. 5.
[3] Residential energy charges may consist of a (i) flat rate charge over all hours, (ii) a seasonally-differentiated flat rate, or (iii) a multi-step inclining or declining block rate.

vary with the amount of electricity consumed.

7. Using a kWh-based charge to recover utility fixed costs may be viewed as particularly problematic in the case of a residential DG customer, who uses fewer kWh per month than the average residential customer.[4] Under such circumstances, the DG customer is seen as using generation, transmission and distribution resources and services, without adequately compensating the utility. This outcome, in turn, is seen to lead to revenue erosion (the opposite of revenue adequacy and stability) for the utility, and subsequent intra- and interclass cost shifting among utility customers. The first step in addressing these concerns is to implement a separate rate schedule for DG customers.

8. Various rate design approaches are available to reduce the reliance on energy charges to recover the cost of serving DG customers, including:[5]

a. Demand Charges;

b. Fixed Charges and Minimum Bills; and

c. Standby and Backup Charges.

9. Unlike energy (kWh) charges, demand charges apply to a customer's maximum *rate of use* of energy in a given time period, measured in kilowatts (or kW). Historically, demand charges have been used to recover generation-, transmission- or distribution-related capacity costs from larger commercial and industrial ("C&I") customers.[6] Since demand charges apply to kW, demand charges send a different price signal to customers than energy charges. Assuming a customer has a complete understanding of, and the ability to react (*i.e.*,

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[4] See *Primer on Rate Design for Residential Distributed Generation*, Edison Electric Institute, Feb. 2016, pp. 1-3.
[5] See *Distributed Energy Resources Rate Design and Compensation*, A Manual Prepared by the NARUC Staff Subcommittee on Rate Design, Nov. 2016, pp. 98-123.
[6] Utilities employ more sophisticated (interval) meters when serving larger C&I customers, which enables utilities to measure (and bill for) demand.

shift load in response) to demand charges, such charges incent a customer to use energy more evenly throughout a billing period (*i.e.*, at a higher load factor), rather than as an incentive to use fewer kWh in a billing period. Stated differently, customers will not see any reduction in their assessed demand (kW), or total billed demand charges, simply from using fewer kWh in a given month. Instead, customers must reduce their peak demands (kW) in order to realize demand charge savings. By their nature, therefore, demand charges may be expected to provide greater revenue stability to the utility than energy charges. However, it is unclear how residential and small commercial DG customers (with little or no previous demand charge exposure) would react to demand charges, particularly in the area of customer acceptance and satisfaction. Opponents of demand charges argue that demand rates do not have an "actionable" price signal, and are confusing and poorly understood by customers as compared to volumetric rates. The NARUC Staff subcommittee on rate design suggests "regulators should be cautious if implementing demand charges to protect a utility's revenue recovery for the distribution grid is the goal, especially if the DER benefits to the grid are not accounted for in any way." [7]

10. Fixed charges may take the form of a customer charge, facilities charge or, in the case of a DG customer, a grid access charge. In all cases, the charge is considered "fixed" since it does not vary with any standard measure of use (*i.e.*, kWh or kW) of the utility system. Higher fixed charges (coupled with lower energy charges) help achieve the goal of revenue stability on the part of the utility. However, a lower energy charge changes the underlying price signal that is conveyed to the customer, and could result in an inefficient increase in consumption. In the case of distributed generation, the lower the usage charge, the lower the incentive to invest in DG

[7] See *Distributed Energy Resources Rate Design and Compensation,* A Manual Prepared by the NARUC Staff Subcommittee on Rate Design, Nov. 2016, pp. 98-108.

facilities (all else equal). Thus, a major challenge in designing a DG tariff is attaining a reasonable level of revenue stability while maintaining economic efficient price signals with respect to both the consumption of electricity and the level of investment in DG. In lieu of an additional fixed charge component, a DG tariff may include a minimum bill provision, which is intended to alleviate concerns that DG customers may avoid all charges on their electric bill in a given month (depending on the net energy metering provisions in a given jurisdiction). Here again, however, it may be difficult to achieve both revenue stability and economic efficiency since minimum bill provisions encourage additional consumption to the level equivalent to the minimum bill amount.[8]

11. Standby service is generally available to utility customers that provide their own generation to protect the customer from loss of service in the event of an *unanticipated* outage of the customer's self-generation equipment. Backup service is similar except that it is intended to apply to a *planned* outage of the customer's generation equipment and, therefore, may not be available on an instantaneous basis. Historically, utilities have made standby service available only to large non-utility generators (*e.g.*, to combined heat and power, or CHP customers), and have recovered the cost of standby service via demand charges. In the absence of sufficient storage, DG systems that employ solar or wind resources may be deemed to require a form of standby service from the electric utility. Therefore, standby fees in the form of demand and/or energy charges could be levied on DG customers for the purpose of recovering energy and capacity costs when the DG customer uses the grid. However, since residential DG systems are small and operate independently, the utility may not incur any incremental DG-related capacity costs until such time as some critically large number of DG systems is installed. CURB suggests

[8] *Ibid*, pp. 117-119.

that the KCC require any utility seeking to implement a standby charge on DG customers to submit a cost analysis in support of a standby fee.[9]

IV. Other Considerations

12. It is not possible to proceed to develop an appropriate DG rate design without first determining a revenue requirement target for the new DG class. As discussed in CURB's separate comments, such a determination requires a detailed, analytical assessment of the utility's net cost of supplying DG customers with generation-, transmission- and distribution-related services. In order to make the approved DG rate design as transparent as possible, the KCC may wish to consider a requirement that utilities employ an *unbundled* DG rate structure. An unbundled rate design includes separate charges for generation-, transmission- and distribution-related services. In this case, the total rate paid by the DG customer would be the sum of the unbundled rate components. However, to the extent that the KCC determines that the net cost of serving a DG customer is lower than a non-DG customer due to, say, generation-related savings, such cost savings would be reflected in the generation portion, as opposed to transmission or distribution portions, of the DG rate.

13. One may expect that any DG rate design that is adopted by the Commission will be markedly different from the default rate schedules currently used to bill DG customers. As such, any attempt to migrate existing DG customers to a new DG rate schedule may not only cause severe bill impacts, it may also reverse the underlying economics used in the customer's decision to invest in DG. Therefore, CURB recommends that all existing DG customers continue to receive service (*i.e.*, be grandfathered) on their existing rate schedules.

[9] *Ibid*, pp. 120-123.

V. Conclusions and Recommendations

14. In response to the growing interest in DG, regulators are evaluating a number of DG rate design alternatives that are intended to address potential problems that may arise under existing (default) DG rate designs, include revenue instability and class cross-subsidization. Various remedies exist to address revenue instability concerns. However, the pursuit of revenue stability may conflict with other rate design goals such as economic efficiency or customer satisfaction.

15. In order to implement an appropriate DG rate design, regulators must first determine an appropriate revenue requirement target for the DG class. It is not reasonable to posit that the appropriate target is simply the level of revenues that would otherwise be contributed by DG customers, if billed for an assumed class-average level of consumption on their default rate schedules. To do so would presume that the total net benefits of DG are zero. Instead, CURB recommends that the KCC set the DG class revenue requirement at the net cost of providing generation-, transmission- and distribution-related services to DG customers. Determining the net cost of serving DG customers will require extensive analyses. Moreover, since the net cost of serving DG customers is likely to vary across electric utilities, it would be reasonable for the KCC to require individual electric utilities to undertake such analyses as a condition for requesting approval of a DG rate.

VERIFICATION

STATE OF MISSOURI)
) ss:
COUNTY OF ST. LOUIS)

I, Brian Kalcic, of lawful age and being first duly sworn upon my oath, state that I am a consultant for the Citizens' Utility Ratepayer Board; that I have read and am familiar with the above and foregoing document and attest that the statements therein are true and correct to the best of my knowledge, information, and belief.

Brian Kalcic

SUBSCRIBED AND SWORN to before me this 15th day of March, 2017.

Notary Public

My Commission expires:
08/29/2020

ANDRIA HUTCHISON
Notary Public - Notary Seal
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Commission # 16813307

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16-GIME-403-GIE

I, the undersigned, hereby certify that a true and correct copy of the above and foregoing document was served by electronic service on this 17th day of March, 2017, to the following parties:

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