BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

IN THE MATTER OF THE APPLICATION OF ENBRIDGE GAS UTAH TO INCREASE DISTRIBUTION RATES AND CHARGES AND MAKE TARIFF MODIFICATIONS	)	Docket No. 25-057-06

PHASE II DIRECT TESTIMONY OF LANCE D. KAUFMAN, PH.D.

ON BEHALF OF

NUCOR STEEL-UTAH, A DIVISION OF NUCOR CORPORATION

September 16, 2025

Nucor Exhibit 1.0

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I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Lance D. Kaufman, Ph.D., and my business address is 2623 NW Bluebell Place, Corvallis, Oregon 97330.

Q. PLEASE STATE YOUR OCCUPATION AND ON WHOSE BEHALF YOU ARE TESTIFYING.

A. I am the owner and principal economist of Western Economics, LLC. I provide economic and statistical consulting in utility proceedings and civil litigation. I am appearing in this matter on behalf of Nucor Steel-Utah, a Division of Nucor Corporation ("Nucor"), a transportation service customer of Enbridge Gas Utah ("Enbridge").

Q. PLEASE SUMMARIZE YOUR EDUCATION AND WORK EXPERIENCE.

A. I received a master's and Ph.D. in Economics from the University of Oregon, and BBA in Economics from the University of Alaska Anchorage. I have worked as staff for the Public Utility Commission of Oregon, as a public utility advocate for the Alaska Department of Law, and as an independent utility consultant over the past 13 years. My Curriculum Vitae can be found in **Nucor Exhibit 1.1**.

Q. WHAT IS THE PURPOSE OF YOUR PHASE II DIRECT TESTIMONY?

A. I evaluate the class cost of service model, rate spread, and rate design Enbridge has proposed in the Direct Testimony of Austin C. Summers for Enbridge Gas Utah. I present an alternate class cost of service study attached as **Nucor Exhibit 1.2**. I also discuss and analyze the rate design for the TSL rate class, a summary of which is attached as **Nucor Exhibit 1.4**.

Q. PLEASE SUMMARIZE YOUR PRINCIPAL RECOMMENDATIONS AND CONCLUSIONS.

A. I make three recommendations that move rates towards economically efficient pricing. Specifically, I recommend the Commission:

1) Modify Enbridge's as-filed class cost of service study to use winter throughput, defined as throughput in November, December, January, February, and March, for the 40 percent throughput component of the F230 allocation factor applied to feeder mains, compressor stations, and measuring and regulating stations.

2) Modify the rate design for the Transportation Service Large ("TSL") class as follows:

   (a) Recover costs associated with the use of intermediate high pressure ("IHP") mains through a new Low Pressure Surcharge applicable only to customers taking service from lower pressure mains.

   (b) Modify the TSL volumetric block rate design to be more reflective of actual economies of scale in the distribution of gas by changing the block breakpoints to be for the first 20,000 Dth, next 20,000 Dth, next 40,000 Dth, and all over 80,000 Dth of total monthly use and to introduce a 30 percent discount at each subsequent block relative to the prior block.

II. COST OF SERVICE STUDY

Q. WHAT CHANGES DO YOU RECOMMEND REGARDING THE COST OF SERVICE STUDY?

A. I recommend the Commission make some movement away from the use of annual throughput in the allocation of feeder mains, compressor stations, and measuring and regulating stations. These costs are currently allocated using the F230 allocation factor, which is a blend of 60 percent Design Day Demand and 40 percent Annual Throughput.[1] In this testimony, I show that annual throughput is an unambiguously inefficient allocator that does not contribute to fair allocation of costs. As discussed further herein, Design Day Demand is the metric utilized by Enbridge when designing and building feeder mains and

[1] *See* EGU Exhibit No. 5.14, sheet "COS Detail," cells F1044, F1051, and F1056.

compressor stations. Thus, Design Day Demand is the proper allocator for this plant. However, in recognition of the Commission's historic use of Enbridge's 60% Design Day Demand/40% Annual Throughput allocator, and in the interests of the principle of gradualism, I recommend that the Commission modify the F230 allocation factor by limiting the throughput component to winter throughput, in the months of November, December, January, February, and March.[2]

A. General Cost Allocation Principles

Q. WHAT GENERAL PRINCIPLES DO YOU RECOMMEND THE COMMISSION APPLY WHEN EVALUATING CLASS COST OF SERVICE?

A. The following foundational principles are commonly considered in evaluating class cost of service:

- Assign costs to the customers/classes whose demand and service characteristics drive those costs.
- Recover costs from classes in proportion to the benefits they receive or the capacity they require.
- Similar customers pay similar costs; differences must be cost-justified.
- Use allocators that are measurable with utility data and reproducible.
- Move toward "true" cost responsibility without creating rate shock.
- Price signals should encourage efficient behavior and consumption patterns and reflect marginal usage costs where practicable.

[2] Under Enbridge's tariff, winter season is from November 1 to March 31. Enbridge Gas Utah, Utah Natural Gas Tariff Page 11-10.

More generally, these principles are intended to allocate costs in an economically efficient and fair manner. Assigning costs to classes that drive costs is both fair and efficient and is generally referred to as the principle of cost causation. The principle is fair because it treats classes according to the burden they place on the system, and efficient because it moves classes towards marginal cost. Consumers make efficient consumption decisions when they face the marginal cost of their actions.

Under the principle of cost causation, it is the consumer that causes a cost to exist that pays for the costs. Often, system resources are shared by multiple consumers or customer classes, and identifying cost causers requires some method of allocating shared costs. For instance, Enbridge's study assumes that the cost of feeder mains is caused by consumers in proportion to a metric calculated as 60% Design Day Demand and 40% Annual Throughput. This sort of approach, however, is not an accurate measure of costs because, as discussed more herein, throughput is not a criteria considered by Enbridge when designing and building feeder mains.

Q. WHAT IS ECONOMIC EFFICIENCY?

A. Economic efficiency is the fundamental basis for price regulation of utilities. In economics, efficiency means maximizing the social surplus associated with economic activity, where social surplus is the difference between the benefit of goods and the cost to produce goods. When the marginal benefit of a good (i.e. the value to consumer of consuming one incremental unit) exceeds the marginal cost of a good (i.e. the cost to the producer of producing one incremental unit), there is a net benefit from additional consumption and production.[3] Similarly, in the reverse situation, when cost exceeds benefit, the marginal unit lowers social surplus and there is a social benefit from reducing consumption.

In competitive markets, social surplus is achieved naturally through market mechanisms. In the case of natural gas distribution, where there is monopolistic supply, markets are not efficient because the monopolist can set prices above marginal cost. This creates opportunities for improved societal outcomes by introducing a price regulator, such as the Utah Public Service Commission. Thus, one of the primary roles of the Commission is to set prices in a manner that maximizes social surplus or introduces economic efficiency.

Q. WHAT IS THE ROLE OF COST ALLOCATION IN A COST OF SERVICE STUDY?

A. The goal of cost allocation in a cost of service study is to achieve economic efficiency and fairness. Economic efficiency is not subjective; it is well defined and measurable. There can certainly be judgment involved in evaluating what models will best lead to economic efficiency, but it is often possible to identify flawed allocators in an objective and non-judgmental manner. The use of throughput in allocating feeder mains can be established as economically inefficient without relying on subjectivity. In this section, I will expand on why this is the case.

[3] In the presence of external costs and benefits, replace "consumer" and "producer" with "society."

B. Feeder Mains

Q. WHAT IS YOUR VIEW ON THE ALLOCATOR FOR FEEDER MAINS THAT ENCOURAGES ECONOMIC EFFICIENCY?

A. In my view, as stated above, Design Day Demand is the most accurate and direct driver of cost for Enbridge. When asked in discovery if Enbridge has ever designed a feeder based on factors other than peak demand, Enbridge provided the following response:

> Sizing for all feeder lines and large diameter lines is performed by taking into account current peak demand, future master-planned peak demand using population growth projections, and contracted firm demand. Interruptible loads are not considered in design calculations. The only exception is when customers request and pay for service lines that directly serve only that customer. In such cases, the size of that service line is calculated using the customer loads[4]

This response confirms that Enbridge does not consider throughput when designing feeder mains, and therefore throughput does not cause costs associated with feeder mains. Suppose, for simplicity, that Enbridge had two customer classes, of equal demand on a design day, but one class only uses gas on the coldest days of the year, for example as emergency back-up for electric heat-pumps, while the other class uses the same amount of gas every day of the year. With respect to cost causation, these two customers cause Enbridge to incur identical feeder main costs. Because Enbridge designs and plans for a theoretical peak day use, both customers are identical in the eyes of Enbridge's design team for purposes of feeder mains. However, these two customer types have markedly different use throughout the year.

[4] *See* Nucor Exhibit 1.5, Enbridge Response to Nucor Steel-Utah Data Request No. 2.02.

Q. WHY ARE YOU CONTRASTING USE ON THE DESIGN DAY WITH ANNUAL USE?

A. Allocation Factor 230, Enbridge's allocator for feeder mains, is weighted based on these two considerations, with 60 percent weight on peak, or Design Day Demand, and 40 percent weight on Annual Throughput.

Q. UNDER ALLOCATION FACTOR 230, WOULD THE TWO CUSTOMER CLASSES DISCUSSED EARLIER FACE EQUAL COSTS?

A. No, under the Enbridge proposal the customer class with flat use would be allocated approximately 70 percent of costs while the customer class only peak use would be allocated 30 percent of costs, even though both classes cause an equal amount of costs for feeder mains.

Q. IS THIS APPROACH FAIR?

A. No, this approach isn't fair because it violates the cost causer principle, the benefit principle, and the efficient pricing principle. This becomes clear when the problem is simplified to a level that could allow direct assignment of costs. Continuing the prior example of two customer classes of equal size, one with only peak use and one with a flat load. Suppose further that these two customer classes are located in separate regions, such that a single feeder pipe serves the peak use class, and an identically sized pipe serves the flat load class. In such a situation, it is clearly possible to directly assign the cost of each pipe to each customer class, in which case the costs would be split 50/50.

The fair treatment, when costs can clearly be directly assigned, is to directly assign costs. However, a Design Day Demand allocator, in this example, would also allocate costs with a 50/50 split, achieving the direct assignment outcome without the need for a clear delineation of directly assignable pipe. Under direct assignment, it would be unreasonable to ask the customer class with flat load to pay for a portion of the peak class's pipe because the flat load customer clearly receives no benefit from, nor causes any costs for, the peak load class's pipe.

Q. IS ENBRIDGE'S F230 ALLOCATION FACTOR APPROACH ECONOMICALLY EFFICIENT?

A. No, this approach is not economically efficient because the customer allocated only 30 percent of costs is being subsidized by the customer class allocated 70 percent of costs. This will push costs away from marginal cost, and cause inefficient consumption decisions, with the subsidized customer consuming more gas than economically efficient and the subsidizing customer consuming less gas than is economically efficient.

Q. DOES A DESIGN DAY DEMAND ALLOCATOR ADDRESS THE REQUIREMENT TO MOVE GAS TO ALL CUSTOMERS 365 DAYS PER YEAR?

A. Yes, a Design Day Demand allocator does address the need to move gas to all customers 365 days per year. Let's return to the prior example. The gas system is designed to meet the design day needs of both customer groups. This means that each customer is capable of receiving equal amounts of gas every day of the year. If the "back up heating" customer class chooses to use gas in the summer or another non-peak day, Enbridge is obligated to provide service to that customer; regardless, this capacity has been secured for the customer and is available 365 days of the year.

Q. WHAT IS THE ROLE OF INTERRUPTIBLE CUSTOMER LOAD IN DESIGN DAY DEMAND?

A. Interruptible customer load is excluded from a 100% Design Day Demand allocator. This is appropriate because the system is not designed to serve interruptible customers during a peak event. This means that the interruptible customer imposes no costs to the system and therefore is not a cost causer with respect to feeder mains. Technically, because there are no feeder-related costs associated with serving an interruptible customer, an allocation of zero main costs to these customers accurately reflects the cost of moving gas to the customer every day of the year, both on peak days when the customer is interrupted and on off-peak days where no interruption occurs. Moreover, the company is not obligated to provide gas service to an interruptible customer on any specific day of the year.[5] However the perception of free riding is illusory, and this illusion can lead to erroneous assignment of costs based on off-peak use.

Q. WHY IS FREE RIDERSHIP OF INTERRUPTIBLE CUSTOMERS ILLUSORY?

A. Free ridership is a term of art in economics that refers to specific circumstances leading to inefficient and less than optimal outcomes for society. More specifically, "[f]ree riders are people or firms that consume a public good without paying for it."[6] In traditional use of this term, free-riders do not contribute because it is not possible to exclude them from use of the public good. Free riding has a negative economic connotation because it leads to inefficient economic outcomes. Under the free rider problem, an inefficiently low provision of public goods occurs due to lack of cost contribution by free riders. This is not the case with gas distribution, because, as acknowledged by Enbridge, interruptible customers do not cause marginal feeder main costs. Accordingly, from a marginal cost perspective, an allocation of zero feeder main costs to interruptible customers is economically efficient and thus does not constitute a free rider problem. Assigning zero feeder main costs to Interruptible customers is not free riding because these customers are excludable (i.e.

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[5] Enbridge Gas Utah, Utah Natural Gas Tariff Page 3-1. ("Interruptible service is subject to interruption at any time.").

[6] Rittenberg, L., & Tregarthen, T. (2012). In *Principles of microeconomics.* Accessed on September 12, 2025 from https://resources.saylor.org/wwwresources/archived/site/wp-content/uploads/2012/06/ECON101-3.2.pdf.

interruptible) and assigning zero costs increases, rather than decreases, economic efficiency.

Q. IS ALLOCATING FEEDER MAIN COSTS BASED ON THROUGHPUT ECONOMICALLY EFFICIENT?

A. No. The inefficiency of throughput to allocate plant such as feeder mains, compressor stations, and measuring and regulating stations becomes exceedingly clear when evaluating interruptible customers in non-peak months. Recall that economic efficiency requires that the marginal cost of consumption equals the marginal cost of production. In this context, we are examining the consumption and production of gas delivery. Enbridge's gas delivery system is designed to deliver 1,583,348 Dth of gas per day.[7] If this amount of gas were delivered every day, monthly deliveries would be 48 million Dth, and annual deliveries would be 578 million Dth. The table below summarizes Enbridge's filed forecast for 2026:

Table 1
Monthly Throughput by Rate Schedule[8]

Sch.	FS	FT1	FT1C	GS	IS	MT	NGV	TSL	TSM	TSS	Total
January	249,682	804,329	4,483,894	21,267,214	32,734	8,769	14,998	2,550,719	1,623,411	1,241,112	**32,276,862**
February	221,977	732,505	4,068,671	17,374,562	29,634	6,953	12,295	2,196,771	1,487,650	1,106,385	**27,237,403**
March	203,586	746,393	3,843,295	13,834,282	28,577	5,792	10,748	2,230,049	1,506,028	1,045,441	**23,454,191**
April	177,326	665,297	2,967,197	9,531,772	20,662	3,324	11,906	2,240,824	1,271,625	716,209	**17,606,142**
May	164,871	718,181	3,574,691	5,474,098	14,873	1,916	11,756	2,281,927	1,135,325	483,308	**13,860,946**
June	141,570	1,925,405	3,723,257	3,013,097	10,104	1,194	10,389	2,303,339	1,063,906	343,731	**12,535,992**
July	139,418	2,156,629	4,153,120	2,763,562	7,789	1,115	12,129	2,434,691	1,169,036	298,819	**13,136,308**
August	131,084	2,199,062	4,321,657	2,514,371	8,138	1,275	13,968	2,288,960	1,199,248	299,876	**12,977,639**
September	150,860	2,065,929	3,823,681	2,768,711	9,973	1,441	12,182	2,137,117	1,135,891	321,900	**12,427,685**
October	209,973	2,204,773	3,084,746	6,042,450	12,718	2,210	11,487	2,243,906	1,301,428	540,483	**15,654,174**
November	210,373	2,074,420	3,198,979	12,980,877	20,143	6,288	11,907	2,270,309	1,521,458	933,672	**23,228,426**
December	237,044	2,129,979	4,324,084	20,141,912	24,365	7,297	12,053	2,500,102	1,537,351	1,116,089	**32,030,276**
Total	2,237,764	18,422,902	45,567,272	117,706,908	219,710	47,574	145,818	27,678,714	15,952,357	8,447,025	**236,426,044**

From the table above, it can be seen that monthly deliveries fall far short of designed capacity. In the coldest months, deliveries are typically only two-thirds of design capacity.

[7] EGU Exhibit 5.0 at 8:205-206.

[8] Nucor Exhibit 1.2.

In the summer months deliveries are less than one third of design capacity. This means that a long-term, sustained increase in summer deliveries would not cause **any** need for new or larger feeder mains (i.e. the marginal cost of delivering gas in the summer, or at least the marginal cost of feeder mains, is zero). Any incremental delivery of gas in the summer, assuming it has even a modicum of benefit, will increase the economic surplus for society because, at least with respect to mains, it is costless. However, allocating costs based on summer use will cause summer gas users to reduce gas consumption, moving in the **opposite direction** of economic efficiency.

Now consider that these costs that are allocated to summer gas users are allocated away from other customer classes, namely customers with little to no gas use in the summer. These are the customers that **do** cause costs with respect to gas feeder mains. This results in a subsidy of the most costly per therm customers, causing these customers to consume even more costly gas during the most expensive periods to deliver in.

This analysis, which focuses on summer throughput, is just as applicable for winter throughput. As with summer gas use, in the winter, an interruptible customer still causes no marginal costs for gas mains because Enbridge maintains the ability to interrupt the customer's usage on peak days such that Enbridge does not exceed its design day demand. Thus, increased gas use, during non-interruption days, is costless with respect to feeder mains, and any off-peak winter time use creates a net social benefit. This means that efficient pricing for the use of feeder mains should be zero, or as close to zero as possible, for interruptible customers.

Now let's consider economic efficiency for non-interruptible customers. Here, there is a minor correlation between throughput and design demand, as throughput tends to increase with demand. However, given that design demand is known and measurable, and the correlation between throughput and demand is weak at best (i.e., some customers are higher load factor than others), throughput continues to be economically inefficient. Returning to Table 1 above, TSL customers have a similar level of throughput in each month, while GS customers consume seven to ten times more gas in winter months than summer months. Allocating costs using a 40 percent weight on throughput shifts costs away from the costliest and least efficient customers. More importantly, the cost to serve these customers, as reflected by Design Day, is substantially higher than costs allocated using throughput.

C. Compressor Stations

Q. HOW ARE COMPRESSOR STATIONS ALLOCATED IN ENBRIDGE'S PROPOSED COST OF SERVICE STUDY?

A. The F230 allocation factor, 60 percent Design Day Demand and 40 percent Throughput, is applied to compressor and regulating stations in addition to feeder mains.

Q. DO THE SAME ALLOCATION PRINCIPLES FOR FEEDER MAINS APPLY TO COMPRESSOR STATIONS?

A. Yes, these other assets are sized and built to meet peak demand and follow a similar cost and efficiency analysis as feeder mains. However, compressor stations specifically have an additional consideration.

Q. HOW ARE COMPRESSOR STATIONS DIFFERENT?

A. Enbridge's compressor station is only used in emergency events where gas supply is insufficient.[9] As stated by Enbridge in response to discovery: "There is one compressor on the Company system at the Company's Central gate station. The station is in place for

[9] Nucor Exhibit 1.5, Enbridge Response to Nucor Steel-Utah Data Request No. 2.18.

emergency/redundancy situations when the flow from Kern River does not supply enough gas to the central region." This means that, on a fundamental level, Enbridge's sole compressor station is not designed to meet gas use 365 days a year. It is a peaking asset. Thus, the same Design Day Demand cost allocation principles for feeder mains remain true for compressor stations.

D. <u>Recommended F230 Allocation Factor in this Proceeding</u>

Q. HOW DID THE COMMISSION ADDRESS THE ALLOCATION FACTOR 230 ISSUE IN THE PRIOR GENERAL RATE CASE?

A. In the prior general rate case, Docket No. 22-057-03, the Commission supported the status quo, Enbridge's 60 percent Design Day Demand and 40 percent Annual Throughput allocator, due to lack of consensus:

> Based on the lack of consensus among the parties, we find the 60%/40% weighting is consistent with the weightings in prior DEU general rate case applications, and addresses the need for facilities subject to the F230 factor to fulfill two functions including, (1) meeting design day requirements, and (2) moving gas to all customers 365 days per year. We find this ratio also recognizes the diversity of use of the system by all customer groups. Recognizing the inherently subjective nature of this factor, we find it reasonable to continue the use of the 60%/40% ratio that we have approved in previous rate cases.[10]

Q. WHY ARE YOU RAISING THIS ISSUE AGAIN WHEN IT HAS RECENTLY BEEN ADDRESSED BY THE COMMISSION?

A. Given the much stronger economic and rate making principles in support of 100 percent Design Day Demand for this allocator, and the potential for achieving consensus through ongoing discussions, it is reasonable to revisit this allocator in this case.

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[10] Docket No. 22-057-03 Order Page 40.

Q. YOUR TESTIMONY APPEARS TO FAVOR A 100 PERCENT DESIGN DAY DEMAND ALLOCATION FOR THE F230 ALLOCATION FACTOR, YET THIS IS NOT YOUR RECOMMENDED ALLOCATOR. CAN YOU PROVIDE YOUR RECOMMENDATION AGAIN AND EXPLAIN WHY YOU MAKE IT?

A. My recommendation is to maintain the 60/40 weighting on demand and throughput, but to change the throughput measure from annual throughput to winter month throughput. This recommendation is in recognition of the commission's preference for the status quo, and in the interests of gradualism. Throughput in December and January is nearly three times summer month throughput, and in November, February, and March nearly two times summer month throughput. These months also coincide with the Enbridge tariff definition of the Winter season.[11] These months also capture the months of greatest usage by interruptible customers, mitigating the perception of free riding, even though this perception is misplaced, as discussed further above. More importantly, winter throughput avoids much of the heavy cross subsidization that occurs when summer throughput is considered.[12] My recommended cost allocation is reflected in **Nucor Exhibit 1.2**.

Q. WHY ARE YOU NOT PROPOSING DESIGN DAY DEMAND IN THIS PROCEEDING?

A. As discussed above, in the interest of gradualism, it would be reasonable to continue moving towards a Design Day Demand only allocation in future rate cases.

[11] Enbridge Gas Utah Natural Gas Tariff Page 11-10.

[12] As discussed in Section II. b. above, the F230 allocator is used to allocate the cost of assets that are designed to meet a planned theoretical peak day, which occurs during the winter due to heating load. The inclusion of summer terms in the throughput component of F230 shifts costs away from marginal costs, sending an inefficient price signal and causes efficient flat load customers to subsidize peak use customers.

Q. IN THE EVENT OF LACK OF CONSENSUS AMONG PARTIES, SHOULD THE COMMISSION MAINTAIN THE STATUS QUO WITH RESPECT TO ANNUAL THROUGHPUT IN THE F230 ALLOCATOR?

A. No. My testimony is intended to show that this is not simply a subjective issue of how to share common costs, but rather an objective issue of how to achieve economic efficiency. The Commission should reject Enbridge's proposed cost allocation method and adopt an allocator that will cause more efficient consumer decisions regarding use of the gas delivery system.

Q. WHAT IS THE IMPACT OF YOUR RECOMMENDATION?

A. The impact of my recommendation is provided in **Nucor Exhibit 1.2** and is summarized in Table 2 below.

Table 2
Class Cost of Service Study Total Revenue Allocation and Class Share of Revenue Under Nucor's Proposed Winter Throughput Model

	Revenue Requirement Allocated to Each Customer Class								
	GS	**FS**	**IS**	**TSS**	**TSM**	**TSL**	**TBF**	**NGV**	**Total**
Enbridge Proposed	566,512,816	4,299,448	327,076	18,853,431	23,410,352	27,876,422	13,762,948	1,602,464	656,644,957
Nucor Proposed	577,334,395	4,019,577	325,329	18,953,978	21,109,586	22,369,315	10,949,431	1,583,345	656,644,957
Change	10,821,579	(279,871)	(1,747)	100,547	(2,300,766)	(5,507,107)	(2,813,516)	(19,118)	0

	Class Share of Revenue Requirement Allocation								
	GS	**FS**	**IS**	**TSS**	**TSM**	**TSL**	**TBF**	**NGV**	**Total**
Enbridge Proposed	86.3%	0.7%	0.05%	2.9%	3.6%	4.2%	2.1%	0.2%	100.0%
Nucor Proposed	87.9%	0.6%	0.05%	2.9%	3.2%	3.4%	1.7%	0.2%	100.0%
Change	1.6%	0.0%	0.00%	0.0%	-0.4%	-0.8%	-0.4%	0.0%	0.0%

III. TRANSPORTATION SERVICE LARGE RATE DESIGN

Q. HOW DO YOU RECOMMEND THE COMMISSION ADDRESS TRANSPORTATION SERVICE LARGE ("TSL") RATE DESIGN?

A. I make two recommendations regarding transportation rate design. First, I recommend that an additional "Low Pressure Surcharge" charge be assigned to TSL customers that receive service through an IHP distribution main, sufficient to recover the cost allocations associated with IHP use, or approximately $888,850. There appear to be ten TSL meters that qualify, for a monthly per-meter charge of $7,407 per month per meter. As an alternative, this amount could be recovered from low pressure customers based on contract demand therms or service size. These revenues should be offset by a reduction in the volumetric rates.

My second recommendation is to modify the volumetric rate block design to capture the economies of scale that occur within the TSL service class. My recommended block design is set forth in the table below.

Table 3
Nucor Proposed TSL Volumetric Rate Block Design

Nucor Proposed TSL Volumetric Block			
		Dth	Charge
Block 1	First	20,000	$0.95116
Block 2	Next	20,000	$0.66581
Block 3	Next	40,000	$0.46607
Block 4	Over	80,000	$0.32625

This rate design improves over the Enbridge's design by segregating customers consistent with economies of scale attributable to gas delivery through larger diameter pipes.

A. Low Pressure Surcharge

Q. WHAT IS THE LOW PRESSURE SURCHARGE?

A. Nucor proposes the Low Pressure Surcharge as a new charge applied to customers with service lines receiving gas through an IHP Main. This charge assigns the cost of IHP mains to the TSL customers that use these facilities. This surcharge is $7,407 per month per meter and recovers $888,850 in IHP Main-related costs.

Q. PLEASE EXPLAIN WHY YOU PROPOSE TO ASSIGN $888,850 TO TSL CUSTOMERS THAT TAKE SERVICE THROUGH IHP MAINS.

A. Enbridge partitions Account 376, Mains, into three components: Small Diameter Mains, Large Diameter Mains, and Feeder Mains.[13] These costs are then allocated to customers, including TSL, using three distinct allocators, Factor 645 (SD Mains), Factor 250 (Distribution Throughput), and Factor 230 (60% Design Day 40% Throughput) respectively. However, only 10 of 47 TSL meters receive service from Small Diameter Mains and Large Diameter Mains.[14] Under the cost causer, cost payer principle, the 10 customers contributing to the TSL allocation of these costs should pay directly for the costs through a new rate component.

The cost of small and large diameter IHP mains is assigned to customers through the Distribution Plant Study, which generates Allocator 645, SD Mains. I reviewed the underlying study and determined that only 10 of 47 TSL meters contribute to the SD Mains allocator. All ten of these meters are identified as having IHP service lines, while the remaining TSL meters, which do not contribute to the SD Mains allocator, are identified as having HP service lines.

Similarly, the cost of large diameter IHP mains are allocated using the Distribution Throughput Allocator (Allocation Factor 250), which only allocates cost based on throughput of customers with service mains connected to the IHP distribution mains (i.e., it excludes the throughput of customers served directly off feeder mains from the allocator for these mains). While the lower allocation recognizes that not all TSL customers are

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[13] A very small portion of this account are attributed to storage and allocated based on firm sales less NGV.

[14] Nucor Exhibit 1.5, Enbridge Response to Nucor Steel-Utah Data Request No. 2.17 Sheet "Plant Data" Columns C and J.

served via these mains, the recovery of these mains costs is still spread across all TSL customers, regardless of whether they are served via these smaller mains.

Q. HOW DO YOU DETERMINE THE COSTS ASSOCIATED WITH THE IHP DISTRIBUTION MAINS?

A. The Company provided an electronic cost of service model as Enbridge Exhibit 5.14. This model assigns $27,876,422 in revenue requirement to TSL customers. I determined the cost impact of low pressure TSL customers by modifying the TSL component of Factor 645 and Factor 250 to be zero. Under this modification, no Small Diameter Mains or Large Diameter Mains costs are allocated to TSL. This reduces the TSL revenue requirement to $26,987,573, a reduction of $888,850.[15] This calculation is provided in **Nucor Exhibit 1.3**.

Q. HOW DO YOU CALCULATE THE MONTHLY CHARGE?

A. I divided the total IHP distribution main revenue requirement by the ten meters connected to the IHP system and 12 monthly bills per year, or 120. This results in a monthly charge of $7,407 per meter.

[15] Difference due to rounding.

B. TSL Volumetric Rate Block Design

Q. WHAT IS ENBRIDGE'S PROPOSED VOLUMETRIC RATE BLOCK DESIGN FOR TSL?

A. The table below provides current and Enbridge proposed volumetric rate block design for rate TSL.

Table 4
Enbridge Proposed TSL Volumetric Rate Block Design[16]

Utah TSL		Forecasted Revenues at Current Rates Tariff Effective 02/01/25					Revenue Requirement			
Volumetric Rates		Dth	Dth	Curr. Rate	Revenues		Dth	Dth	Prop. Rate	Revenues
	Block 1 First	10,000	4,134,650	$0.68034	$2,812,968	First	10,000	4,134,650	$0.88388	$3,654,540
	Block 2 Next	112,500	18,952,256	$0.64600	$12,243,157	Next	112,500	18,952,256	$0.85562	$16,215,955
	Block 3 Next	477,500	4,591,808	$0.49318	$2,264,588	Next	477,500	4,591,808	$0.72999	$3,351,980
	Block 4 Over	600,000	0	$0.21061	$0	Over	600,000	0	$0.49768	$0
Total Volumetric Charges			27,678,714		$17,320,713			27,678,714		$23,222,475

Q. WHAT DO YOU OBSERVE ABOUT THIS DESIGN?

A. This design makes little (i.e., no) use of the fourth block and creates little separation in average rates across TSL rate customers because 78 percent of TSL customers have volumes which terminate in the second block.[17] This means all customers have a similar average volumetric charge per therm despite widely varying cost burdens to the system. In addition, the block discounts are relatively small within the three effective blocks, at 3 and 15 percent.[18] Given the magnitude of volume increases across the proposed blocks, this is a relatively small discount, and much larger block discounts are cost justified. The small block discounts, combined with the abnormal amount of customers in the second block, restrict the block design from effectively differentiating between high volume, low cost customers and low volume, high cost customers.

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[16] See Enbridge Exhibit No. 5.10.

[17] Nucor Exhibit 1.5, Enbridge Response to American Natural Gas Council Data Request No. 1.04 Attachment.

[18] Calculated using Enbridge's proposed rates from Enbridge Exhibit No. 5.10 as $0.85562 / $0.88388 – 1 and $0.72999 / $0.85562 – 1, respectively.

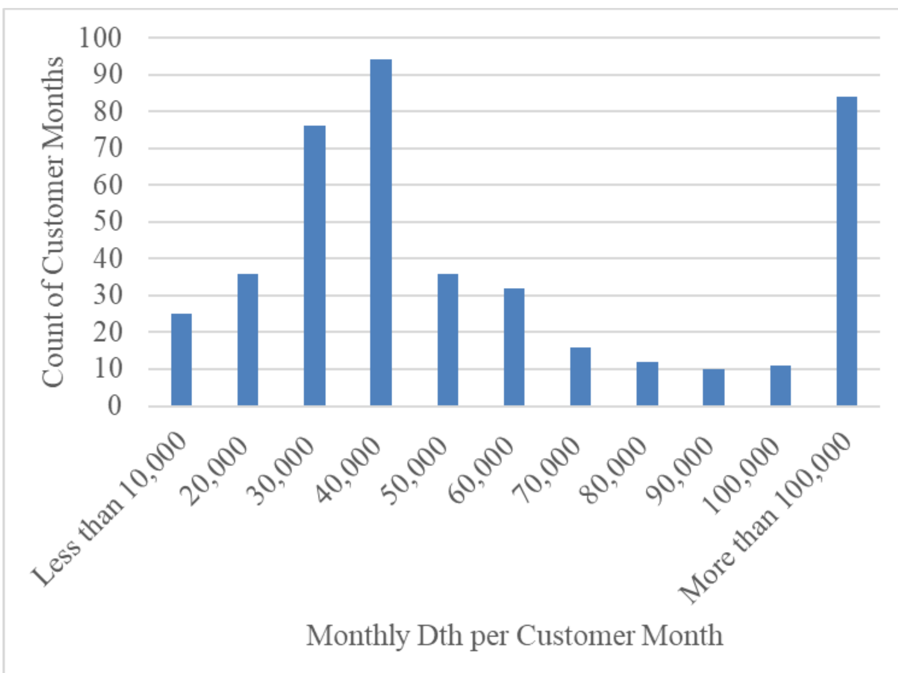
Q. WHY DOES THE COST BURDEN FOR TSL CUSTOMERS VARY SO WIDELY?

A. High volume customers are less costly to serve than small volume customers within this rate group. This is because the incremental cost of larger diameter mains is less than the incremental volume delivered by large diameter mains. As a result, there are economies of scale associated with larger TSL customers relative to smaller TSL customers.

Q. HOW DO TSL CUSTOMERS VARY IN SIZE?

A. The figure below presents a histogram of the monthly energy use per customer.

Figure 1
Histogram of Monthly Customer Volumes[19]



This figure shows a broad distribution of customer use, with a long tail truncated and censored at 100,000 Dth for visibility. The tail beyond 100,000 is relatively uniform with a maximum use of 392,020 Dth.[20]

[19] Nucor Exhibit 1.5, Enbridge Response to American Natural Gas Council Data Request No. 1.04 Attachment.

[20] *Id.*

Q. HOW ARE TSL SERVICE LINES DISTRIBUTED?

A. The table below counts the number of meters served by service line diameter. This provides an alternative view of the distribution of TSL customers by size.

Table 5
TSL Service Line Diameter and Count[21]

Service Size (Inches)	Meter Count
4	23
6	14
8	7
10	3

Q. WHY SHOULD THE TSL VOLUMETRIC RATE BLOCK DESIGN DIFFERENTIATE BETWEEN LOW-, MEDIUM-, AND HIGH-COST CUSTOMERS?

A. There are economies of scale in the delivery of natural gas because the incremental cost of larger diameter mains is less than the incremental volume delivered by large diameter mains. The table below compares the pipe cost and approximate capacity for distribution mains at the 4, 6, 8, and 10 inch diameters.

Table 6
Enbridge Service Line Cost per Foot and Dth of Capacity[22]

Pipe Size	Cost per Foot	Monthly Capacity (Dth)	Cost per 1000 Dth	Percent of 4-inch
4-inch	$2,300.43	34,921	$65.88	100%
6-inch	$2,661.72	102,959	$25.85	39%
8-inch	$2,531.46	221,737	$11.42	17%
10-inch	$3,870.95	402,039	$9.63	15%

[21] Nucor Exhibit 1.5, Enbridge Response to American Natural Gas Council Data Request No. 1.04 Attachment.

[22] The cost per foot is from Nucor Exhibit 1.5, Enbridge Response to Nucor Steel-Utah Data Request No. 2.17, Sheet "Input," Cells I124 to I127. Capacity is calculated using the Weymouth method.

Q. DO THESE ECONOMIES OF SCALE PERSIST AT HIGHER LEVELS OF LOAD AGGREGATION AND GAS TRANSMISSION?

A. Yes. The table below provides estimates of gas transmission costs based on the Oil and Gas Journal's 2019 estimated cost of $228,000 per inch-mile.[23]

Table 7
National Average Transmission Line Cost per Mile and Dth of Capacity

Pipe Size	Cost per Mile	Monthly Capacity (Dth)	Cost per 1000 Dth	Percent of 20-inch
20-inch	$4,560,000	916,518	$4,975	100%
24-inch	$5,472,000	1,490,369	$3,672	74%
28-inch	$6,384,000	2,248,127	$2,840	57%
32-inch	$7,296,000	3,209,726	$2,273	46%

Q. WHAT IS A GENERAL APPROXIMATION OF THE IMPACT OF DOUBLING PIPELINE CAPACITY?

A. The table below presents the cost elasticity of capacity for gas transmission pipe. The cost elasticity of capacity is a measure that relates a percentage increase in capacity to a percentage increase in cost. For example, moving from a 20-inch pipe to a 24-inch pipe reduces the cost per Dth of capacity by 42 percent, while moving from a 28-inch pipe to a 32-inch pipe reduces cost per Dth of capacity by 47 percent.

Table 8
Cost Elasticity of Gas Pipe

	Monthly Capacity (Dth)		Cost per 1000 Dth		
Pipe Size	Amount	Pct Change from Prior Size	Amount	Pct Change from Prior Size	Cost Elasticity
20-inch	916,518		$4,975		
24-inch	1,490,369	63%	$3,672	-26%	-0.42
28-inch	2,248,127	51%	$2,840	-23%	-0.45
32-inch	3,209,726	43%	$2,273	-20%	-0.47

[23] *See* U.S. Environmental Protection Agency, *Documentation for EPA's Power Sector Modeling Platform v6—Summer 2021 Reference Case*, *Chapter 8: Natural Gas*, (Sept. 20, 2021), *available at* https://www.epa.gov/system/files/documents/2021-09/chapter-8-natural-gas.pdf.

Q. HOW DOES COST ELASTICITY INFORM BLOCK RATE DESIGN?

A. The cost elasticity can be used as a guidepost for appropriate levels of cost discounts for higher volume customers. In other words, a customer that has double the capacity of gas could justifiably pay 42 to 47 percent less per therm than the smaller customer.[24]

Q. HOW DOES ENBRIDGE'S PROPOSED RATE DESIGN PERFORM RELATIVE TO COST?

A. A user at the top of Enbridge's second block uses ten times more gas than a user in the first block, but pays only three percent less per therm. This discount isn't sufficient to properly reflect economies of scale.

Q. WHY DOES YOUR ELASTICITY ANALYSIS FOCUS ON LARGER PIPE SIZES RATHER THAN THE RESULTS IN TABLE 6?

A. The pipe costs for Table 6 reflect Enbridge's estimate of the cost of high pressure service lines.[25] These estimates are abnormal because they are higher than I expect from industry experience and are not systematic. For example, the 8-inch pipe is asserted to be less expensive than 6-inch pipe. The transmission pipe cost estimates were sourced from a broader base of US gas companies and appear to be better supported.

Q. DO ECONOMIES OF SCALE REMAIN WHEN ALL UTILITY COSTS ARE CONSIDERED?

A. Yes, in fact, recent research indicates even larger economies of scale. For example, regression analysis of Local Distribution Company data show cost economies of scale

[24] Assuming similar load profiles.

[25] Nucor Exhibit 1.5, Enbridge Response to Nucor Steel-Utah Data Request No. 2.17, Sheet "Input" Cells I124 to I127.

closer to 100 percent when total revenue requirement is considered.[26] This indicates my estimated elasticity of -0.42 to -0.47 is conservatively low.

Q. WHAT DO YOU RECOMMEND FOR THE TSL VOLUMETRIC RATE BLOCK VOLUMES?

A. I recommend block break points that begin at 20,000 and double the total volume of the prior block. This sets breaks at the first 20,000 Dth, the next 20,000 Dth, the next 40,000 Dth, and all volumes over 80,000 Dth.[27] This creates a more even spread of the volumetric rate blocks across existing TSL customers and allows rates to differentiate between low-cost, medium-cost, and high-cost customers within the TSL rate class.

Q. WHAT DO YOU RECOMMEND FOR THE RATE DISCOUNT ACROSS TSL VOLUMETRIC RATE BLOCKS?

A. I recommend that the volumetric rate for each subsequent block decline by 30 percent compared to the prior block. The table below compares the percentage change in Dth and rates under my proposed block design. This is approximately two-thirds of the cost-justified block discount under my analysis provided in Table 8 and one-third the cost-justified change under third party regression analysis.[28] The table below summarizes my proposed block design and relative changes from prior blocks.

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[26] Davis, L. W., & Muehlegger, E., *RAND Journal of Economics, 41*(4), Do Americans consume too little natural gas? An empirical test of marginal cost pricing at 791–810 (2010), *available at* https://doi.org/10.1111/j.1756-2171.2010.00116.x.

[27] Or, expressed as volume within each block as done by Enbridge, 20,000, 20,000, 40,000, and over 80,000 Dth.

[28] D Davis, L. W., & Muehlegger, E., *RAND Journal of Economics, 41*(4), Do Americans consume too little natural gas? An empirical test of marginal cost pricing at 791–810 (2010), *available at* https://doi.org/10.1111/j.1756-2171.2010.00116.x.

Table 9
Nucor Proposed TSL Volumetric Rate Block Design

Nucor Proposed TSL Volumetric Block			
		Dth	Charge
Block 1	First	20,000	$0.95116
Block 2	Next	20,000	$0.66581
Block 3	Next	40,000	$0.46607
Block 4	Over	80,000	$0.32625

Table 10 below provides Nucor's proposed complete rate design for the TSL rate class utilizing Nucor's proposed cost allocation for feeder mains, compressor stations, and measuring and regulating stations. Nucor's Proposed TSL Rate Design is provided in full in **Nucor Exhibit 1.4**.

Table 10
Nucor Proposed TSL Volumetric Rate Block Design

Utah TSL			Forecasted Revenues at Current Rates Tariff Effective 02/01/25						Revenue Requirement		
Volumetric Rates			Dth	Dth	Curr. Rate	Revenues		Dth	Dth	Prop. Rate	Revenues
	Block 1	First	10,000	4,134,650	$0.68034	$2,812,968	First	20,000	8,053,424	$0.90179	$7,262,535
	Block 2	Next	112,500	18,952,256	$0.64600	$12,243,157	Next	20,000	5,819,428	$0.63126	$3,673,551
	Block 3	Next	477,500	4,591,808	$0.49318	$2,264,588	Next	40,000	5,633,761	$0.44188	$2,489,443
	Block 4	Over	600,000	0	$0.21061	$0	Over	80,000	8,172,101	$0.30932	$2,527,758
Total Volumetric Charges				27,678,714		$17,320,713			27,678,714		$16,826,518
Fixed Charges				**Meter Count**	**Curr. Rate**	**Revenues**			**Meter Count**	**Prop. Rate**	**Revenues**
Administrative Fee		Primary		348	$200.00	$69,600	Primary		348	$250.00	$87,000
		Secondary		84	$100.00	$8,400	Secondary		84	$125.00	$10,500
				432		$78,000			432		$97,500
BSF	BSF #1			0	$6.75	$0			0	$6.75	$0
	BSF #2			12	$18.25	$219			12	$18.25	$219
	BSF #3			36	$63.50	$2,286			36	$63.50	$2,286
	BSF #4			432	$420.25	$181,548			432	$420.25	$181,548
				480		$184,053			480		$184,053
	Low Pressure Surcharge								120	$7,407.08	$888,850
Annual Demand Charges per Dth of				**Contract Dth**	**Rate**	**Revenues**			**Contract Dth**	**Rate**	**Revenues**
Contract Firm Transportation				891,132	$3.37	$2,999,367			891,132	$4.69	$4,179,409
Total Fixed Charges						$3,261,420					$5,349,812
Utah TSL Total						$20,582,133					$22,176,330
Utah MT Total				0		$0			0		$0
TSL Total Revenue Collection						$20,582,133					$22,176,330
Lakeside Revenue Allocation						$192,986					$192,986
Utah TSL TOTAL						$20,775,119					$22,369,315

Q. DOES THIS CONCLUDE YOUR PHASE II DIRECT TESTIMONY?

A. Yes.