SOAH DOCKET NO. 473-19-3864
PUC DOCKET NO. 49421

APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR AUTHORITY TO CHANGE RATES	§ § § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

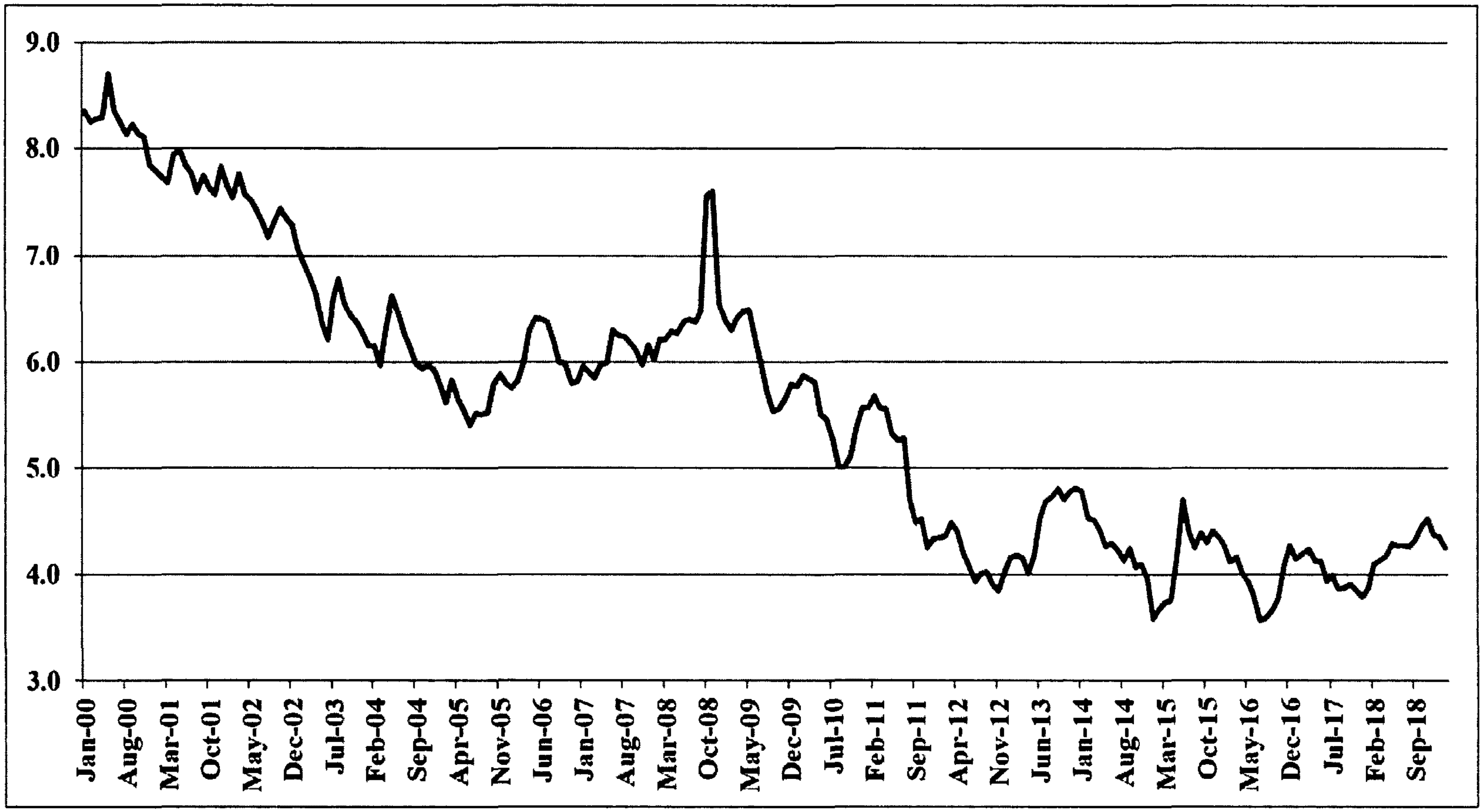
OF

J. RANDALL WOOLRIDGE

EXHIBIT JRW-5:

Public Utility Capital Cost Indicators

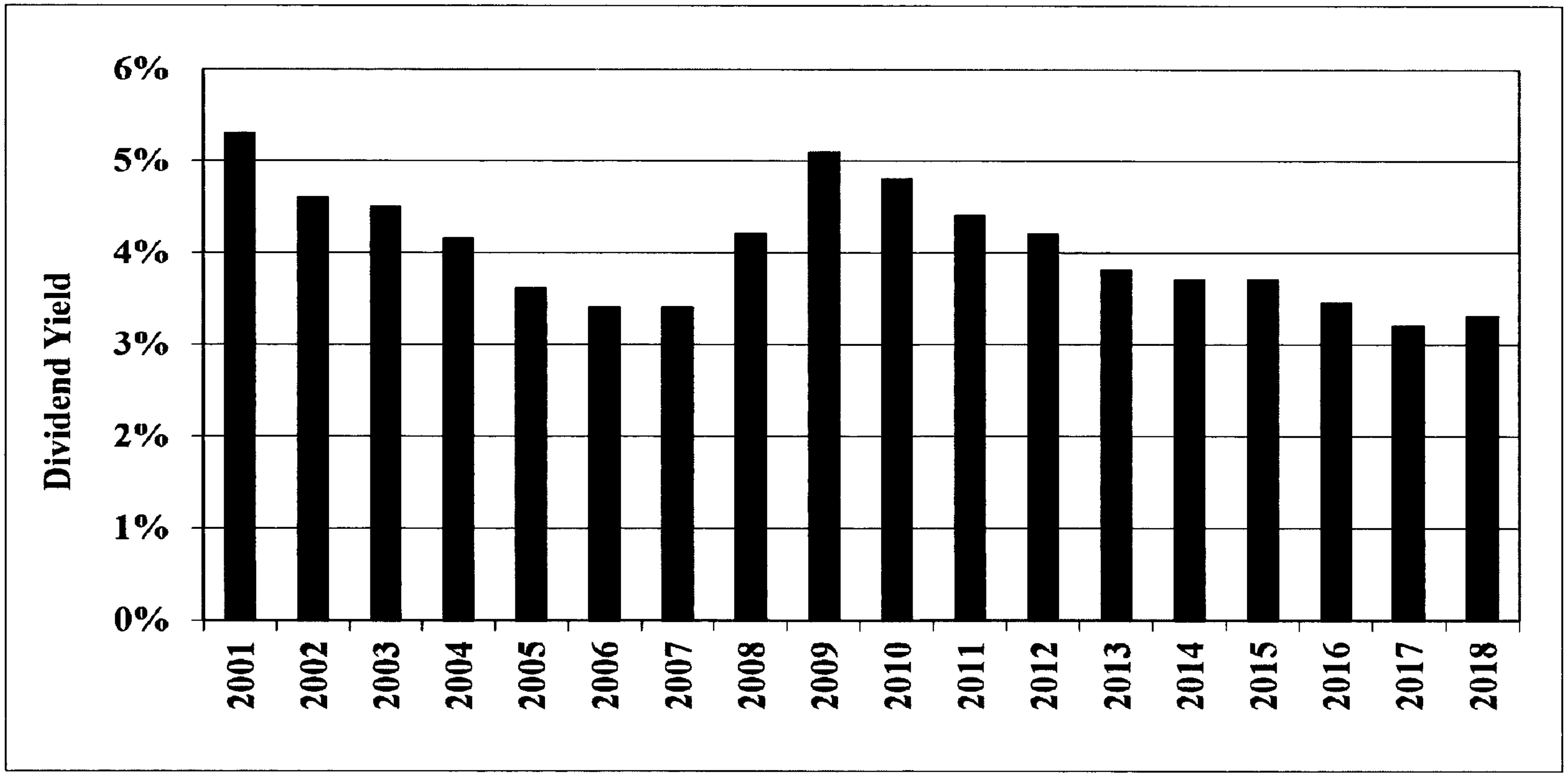
Exhibit JRW-5
Long-Term 'A' Rated Public Utility Bonds



Data Source: Mergent Bond Record

Exhibit JRW-5

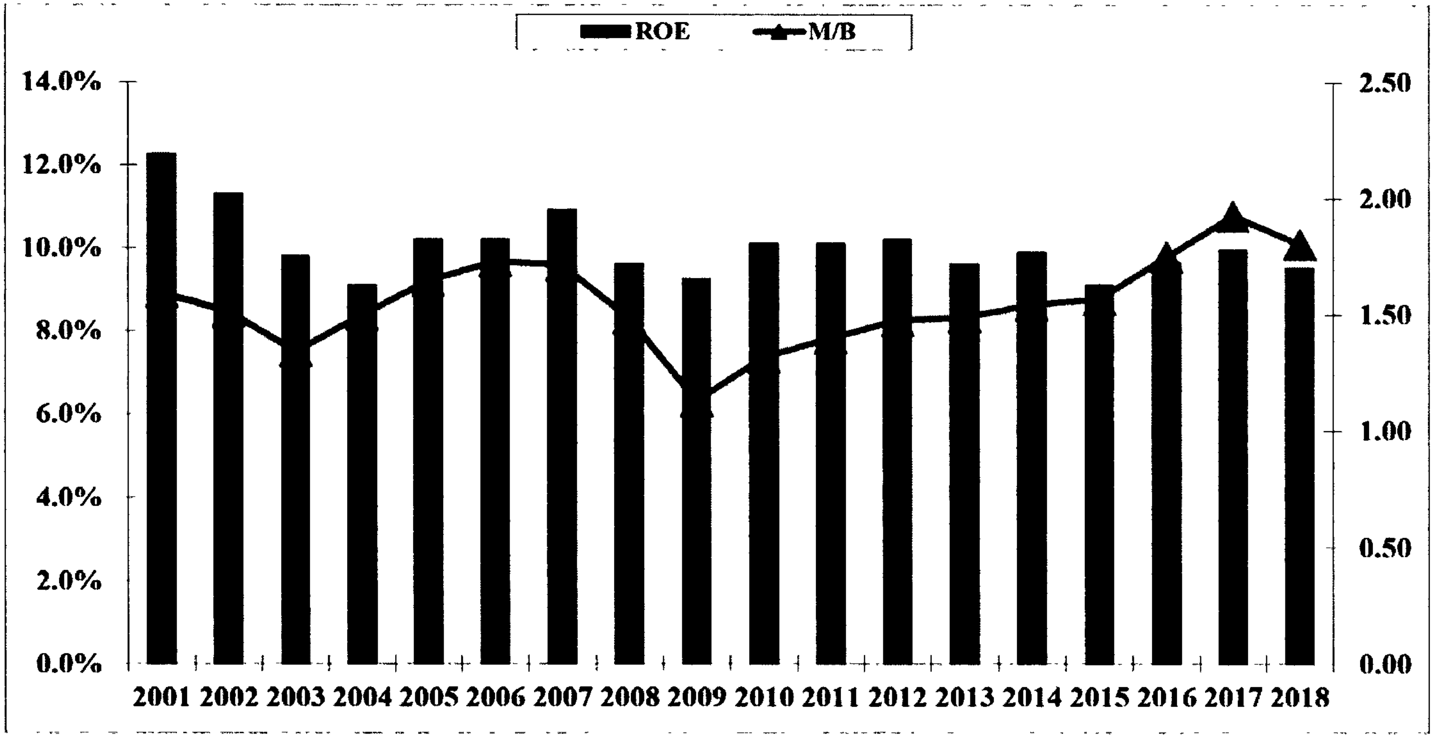
Electric Utility Average Dividend Yield



Data Source: ***Value Line Investment Survey.***

Exhibit JRW-5

Electric Utility Average Return on Equity and Market-to-Book Ratios



Data Source: *Value Line Investment Survey.*

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Exhibit JRW-5
Industry Average Betas*
Value Line Investment Survey* Betas*
22-Jan-19

Rank	Industry	Beta	Rank	Industry	Beta	Rank	Industry	Beta
1	Petroleum (Producing)	1.71	34	Telecom. Equipment	1.15	67	Medical Services	1.01
2	Metals & Mining (Div.)	1.64	35	Internet	1.15	68	Recreation	1.01
3	Natural Gas (Div.)	1.63	36	Financial Svcs. (Div.)	1.15	69	IT Services	1.01
4	Oilfield Svcs/Equip.	1.61	37	Retail (Hardlines)	1.14	70	Med Supp Non-Invasive	0.99
5	Maritime	1.51	38	Semiconductor Equip	1.14	71	Telecom. Services	0.99
6	Steel	1.49	39	Entertainment Tech	1.13	72	Retail Store	0.98
7	Oil/Gas Distribution	1.40	40	Publishing	1.13	73	Pharmacy Services	0.98
8	Metal Fabricating	1.37	41	Computer Software	1.13	74	Information Services	0.97
9	Chemical (Specialty)	1.34	42	Paper/Forest Products	1.13	75	Investment Co.(Foreign)	0.96
10	Chemical (Diversified)	1.33	43	Precision Instrument	1.12	76	Healthcare Information	0.96
11	Pipeline MLPs	1.33	44	Public/Private Equity	1.12	77	Funeral Services	0.95
12	Heavy Truck & Equip	1.31	45	Retail Automotive	1.12	78	Med Supp Invasive	0.95
13	Chemical (Basic)	1.30	46	Power	1.12	79	Reinsurance	0.92
14	Building Materials	1.30	47	Wireless Networking	1.12	80	Environmental	0.91
15	Petroleum (Integrated)	1.30	48	Retail Building Supply	1.11	81	Cable TV	0.90
16	Homebuilding	1.28	49	Bank (Midwest)	1.11	82	Insurance (Prop/Cas.)	0.90
17	Railroad	1.27	50	Packaging & Container	1.11	83	Thrift	0.89
18	Auto Parts	1.27	51	Furn/Home Furnishings	1.11	84	Restaurant	0.88
19	Biotechnology	1.27	52	Human Resources	1.10	85	Tobacco	0.88
20	Engineering & Const	1.25	53	Drug	1.10	86	Household Products	0.86
21	Office Equip/Supplies	1.24	54	Advertising	1.10	87	Investment Co.	0.85
22	Hotel/Gaming	1.24	55	Shoe	1.09	88	Beverage	0.83
23	Automotive	1.24	56	Bank	1.09	89	Food Processing	0.82
24	Insurance (Life)	1.24	57	Newspaper	1.08	90	R.E.I.T.	0.82
25	Semiconductor	1.21	58	Toiletries/Cosmetics	1.08	91	Precious Metals	0.82
26	Machinery	1.20	59	Entertainment	1.07	92	Retail/Wholesale Food	0.80
27	Air Transport	1.20	60	Telecom. Utility	1.07	93	Water Utility	0.70
28	Electrical Equipment	1.20	61	Foreign Electronics	1.07	94	Natural Gas Utility	0.67
29	Electronics	1.20	62	Aerospace/Defense	1.05	95	Electric Util. (Central)	0.63
30	Trucking	1.19	63	Industrial Services	1.05	96	Electric Utility (West)	0.62
31	E-Commerce	1.18	64	Apparel	1.05	97	Electric Utility (East)	0.55
32	Computers/Peripherals	1.16	65	Educational Services	1.03			
33	Diversified Co.	1.16	66	Retail (Softlines)	1.02		Mean	1.10

* Industry averages for 97 industries using *Value Line*'s database of 1,710 companies.

** *Value Line* computes betas using monthly returns regressed against the New York Stock Exchange Index for five years. These betas are then adjusted as follows: *VL* Beta = [{(2/3) * Regressed Beta} + {(1/3) * (1.0)}] to account to tendency for Betas to regress toward average of 1.0. See M. Blume, "On the Assessment of Risk," *Journal of Finance*, March 1971.

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EXHIBIT JRW-6:

DCF Model

Exhibit JRW-6
DCF Model

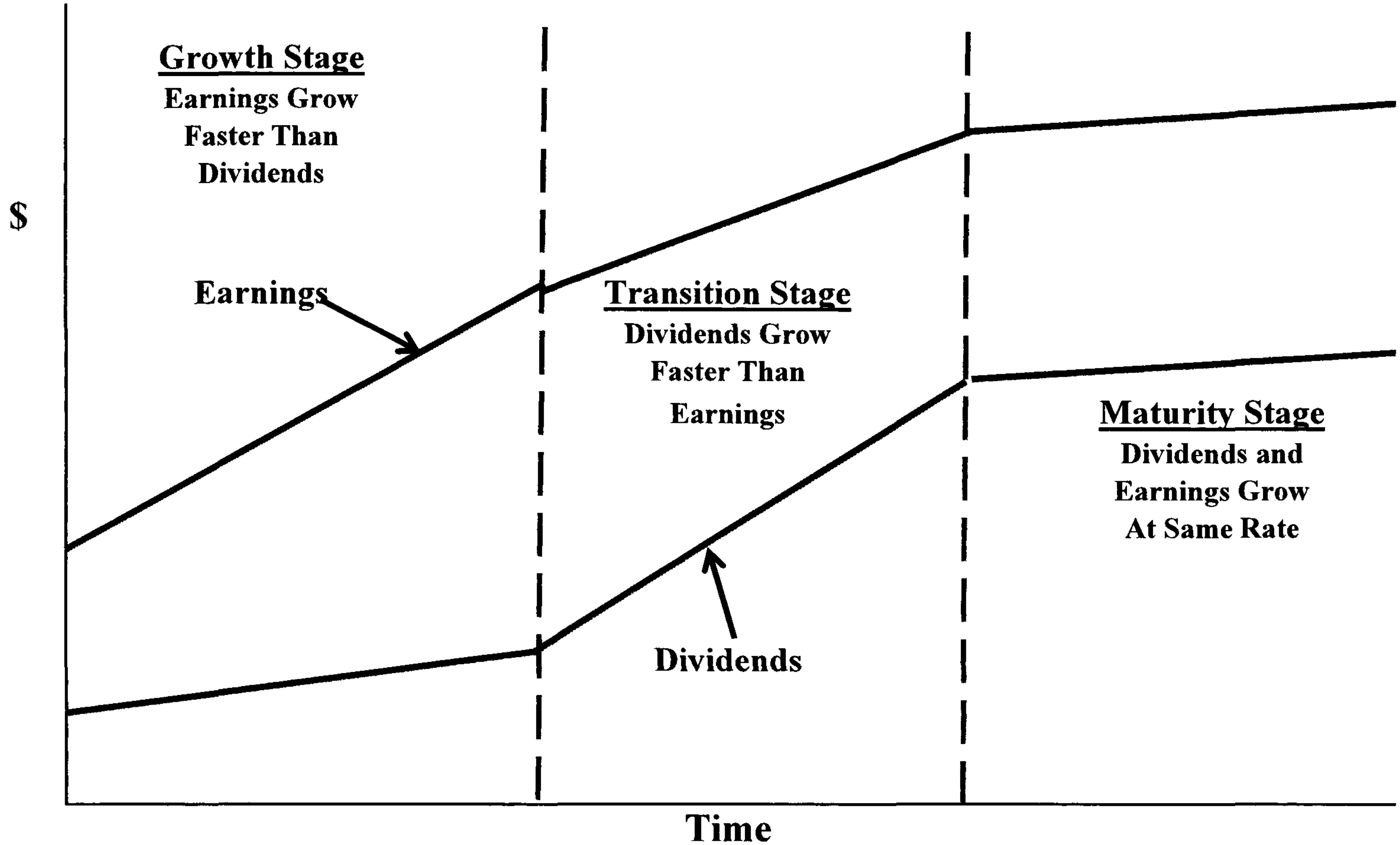

Exhibit JRW-6

DCF Model
Consensus Earnings Estimates
Consolidated Edison. (ED)
www.reuters.com
5/10/2019

Line	Date	# of Estimates	Mean	High	Low
1	Quarter Ending Jun-19	10	0.62	0.72	0.51
2	Quarter Ending Sep-19	10	1.60	1.71	1.53
3	Year Ending Dec-19	15	4.36	4.38	4.32
4	Year Ending Dec-20	18	4.56	4.70	4.45
5	LT Growth Rate (%)	5	3.41	4.90	2.00

Quarter Ending Jun-19	10	0.62	0.72	0.51	0.74
Quarter Ending Sep-19	10	1.6	1.71	1.53	1.49
Year Ending Dec-19	15	4.36	4.38	4.32	4.46
Year Ending Dec-20	18	4.56	4.7	4.45	4.64
LT Growth Rate (%)	5	3.41	4.9	2	3.39

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EXHIBIT JRW-7:

DCF Study

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
Discounted Cash Flow Analysis

Panel A
Electric Proxy Group

Dividend Yield*	3.30%
Adjustment Factor	1.0255
Adjusted Dividend Yield	3.38%
Growth Rate**	5.10%
Equity Cost Rate	8.50%

* Page 2 of Exhibit JRW-7
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-7

Panel B
Hevert Proxy Group

Dividend Yield*	3.20%
Adjustment Factor	1.02675
Adjusted Dividend Yield	3.29%
Growth Rate**	5.35%
Equity Cost Rate	8.65%

* Page 2 of Exhibit JRW-7
** Based on data provided on pages 3, 4, 5, and 6 of Exhibit JRW-7

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
Monthly Dividend Yields

Panel A
Electric Proxy Group*

	Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
1	ALLETE, Inc. (NYSE-ALE)	$2.35	2.9%	2.9%	3.0%
2	Alliant Energy Corporation (NYSE-LNT)	$1.42	3.1%	3.1%	3.2%
3	Ameren Corporation (NYSE-AEE)	$1.90	2.6%	2.7%	2.8%
4	American Electric Power Co. (NYSE-AEP)	$2.68	3.2%	3.3%	3.4%
5	Avangrid (NYSE-AVG)	$1.76	3.5%	3.5%	3.6%
6	CMS Energy Corporation (NYSE-CMS)	$1.53	2.8%	2.9%	3.0%
7	Consolidated Edison, Inc. (NYSE-ED)	$2.96	3.5%	3.6%	3.7%
8	Duke Energy Corporation (NYSE-DUK)	$3.71	4.1%	4.2%	4.3%
9	Edison International (NYSE-EIX)	$2.45	3.9%	4.0%	4.0%
10	El Paso Electric Company (NYSE-EE)	$1.44	2.4%	2.6%	2.6%
11	Entergy Corporation (NYSE-ETR)				
12	Eversource Energy (NYSE-ES)	$2.14	3.0%	3.1%	3.2%
13	Exelon Corp. (NYSE-EXC)	$1.45	2.9%	3.0%	3.1%
14	FirstEnergy Corporation (ASE-FE)				
15	Hawaiian Electric Inductries (NYSE-HE)	$1.28	3.1%	3.3%	3.4%
16	IDACORP, Inc. (NYSE-IDA)	$2.52	2.6%	2.6%	2.6%
17	MGE Energy, Inc. (NYSE-MGEE)	$1.35	2.0%	2.1%	2.1%
18	NextEra Energy Inc. (NYSE-NEE)	$5.00	2.6%	2.7%	2.8%
19	NorthWestern Corporation (NYSE-NWE)	$2.30	3.3%	3.4%	3.6%
20	OGE Energy Corp. (NYSE-OGE)	$1.46	3.5%	3.5%	3.7%
21	Pinnacle West Capital Corp. (NYSE-PNW)	$2.95	3.1%	3.2%	3.3%
22	PNM Resources, Inc. (NYSE-PNM)	$1.16	2.5%	2.6%	2.7%
23	Portland General Electric Company (NYSE-POR)	$1.54	3.0%	3.1%	3.2%
24	PPL Corporation (NYSE-PPL)	$1.65	5.3%	5.3%	5.4%
25	SEMPRA Energy (NYSE-SRE)	$3.87	3.0%	3.2%	3.3%
26	Southern Company (NYSE-SO)	$2.48	4.7%	4.9%	5.2%
27	WEC Energy Group (NYSE-WEC)	$2.36	3.0%	3.1%	3.3%
28	Xcel Energy Inc. (NYSE-XEL)	$1.62	2.9%	3.0%	3.1%
	Mean		3.2%	3.3%	3.4%
	Median		3.0%	3.1%	3.2%

Data Sources: http://quote yahoo com, May 10, 2019

* Entergy and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates

Panel B
Hevert Proxy Group

	Company	Annual Dividend	Dividend Yield 30 Day	Dividend Yield 90 Day	Dividend Yield 180 Day
1	ALLETE, Inc. (NYSE-ALE)	$2.35	2.9%	2.9%	3.0%
2	Alliant Energy Corporation (NYSE-LNT)	$1.42	3.1%	3.1%	3.2%
3	Ameren Corporation (NYSE-AEE)	$1.90	2.6%	2.7%	2.8%
4	American Electric Power Co. (NYSE-AEP)	$2.68	3.2%	3.3%	3.4%
5	Avangrid (NYSE-AVG)	$1.76	3.5%	3.5%	3.6%
6	Black Hills Corporation (NYSE-BKH)	$2.02	2.8%	2.9%	3.1%
7	CMS Energy Corporation (NYSE-CMS)	$1.53	2.8%	2.9%	3.0%
8	Consolidated Edison, Inc. (NYSE-ED)	$2.96	3.5%	3.6%	3.7%
9	DTE Energy Company (NYSE-DTE)	$3.78	3.1%	3.1%	3.2%
10	Duke Energy Corporation (NYSE-DUK)	$3.71	4.1%	4.2%	4.3%
11	El Paso Electric Company (NYSE-EE)	$1.44	2.4%	2.6%	2.6%
13	Evergy (NYSE-EVRG)	$1.90	3.3%	3.3%	3.2%
12	Eversource Energy (NYSE-ES)	$2.14	3.0%	3.1%	3.2%
14	Hawaiian Electric Inductries (NYSE-HE)	$1.28	3.1%	3.3%	3.4%
15	NextEra Energy Inc. (NYSE-NEE)	$5.00	2.6%	2.7%	2.8%
16	NorthWestern Corporation (NYSE-NWE)	$2.30	3.3%	3.4%	3.6%
17	OGE Energy Corp. (NYSE-OGE)	$1.46	3.5%	3.5%	3.7%
18	Otter Tail Corporation (NDQ-OTTR)	$1.40	2.8%	2.8%	2.9%
19	Pinnacle West Capital Corp. (NYSE-PNW)	$2.95	3.1%	3.2%	3.3%
20	PNM Resources, Inc. (NYSE-PNM)	$1.16	2.5%	2.6%	2.7%
21	Portland General Electric Company (NYSE-POR)	$1.54	3.0%	3.1%	3.2%
22	Southern Company (NYSE-SO)	$2.48	4.7%	4.9%	5.2%
23	WEC Energy Group (NYSE-WEC)	$2.36	3.0%	3.1%	3.3%
24	Xcel Energy Inc. (NYSE-XEL)	$1.62	2.9%	3.0%	3.1%
	Mean		3.1%	3.2%	3.3%
	Median		3.0%	3.1%	3.2%

Data Sources: http://quote.yahoo.com, May 10, 2019

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
DCF Equity Cost Growth Rate Measures
***Value Line* Historic Growth Rates**

Panel A
Electric Proxy Group

	Company	*Value Line* Historic Growth					
		Past 10 Years			Past 5 Years		
		Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
1	ALLETE, Inc. (NYSE-ALE)	1.0	3.0	5.5	4.0	3.0	5.5
2	Alliant Energy Corporation (NYSE-LNT)	4.5	7.5	4.0	4.5	7.0	4.5
3	Ameren Corporation (NYSE-AEE)	0.5	-3.5	-0.5	4.5	2.5	0.5
4	American Electric Power Co. (NYSE-AEP)	3.0	4.5	4.0	5.0	5.0	3.5
5	Avangrid (NYSE-AVG)						
6	CMS Energy Corporation (NYSE-CMS)	10.0	21.5	4.5	7.0	7.0	5.5
7	Consolidated Edison, Inc. (NYSE-ED)	2.5	1.5	4.0	2.0	2.0	3.5
8	Duke Energy Corporation (NYSE-DUK)	2.5	10.0	0.5	0.5	2.5	2.0
9	Edison International (NYSE-EIX)	-3.5	6.5	3.0	-9.0	11.0	3.0
10	El Paso Electric Company (NYSE-EE)	4.0		7.0		8.0	5.5
11	Entergy Corporation (NYSE-ETR)						
12	Eversource Energy (NYSE-ES)	10.0	9.5	6.5	7.5	9.0	6.5
13	Exelon Corporation (NYSE-EXC)	-4.0	-3.0	7.0	-5.5	-9.5	5.5
14	FirstEnergy Corporation (NYSE-FE)						
15	Hawaiian Electric Inductries (NYSE-HE)	3.5		2.5	4.5		3.5
16	IDACORP, Inc. (NYSE-IDA)	7.0	6.5	5.5	4.0	10.0	5.0
17	MGE Energy, Inc. (NYSE-MGEE)	4.5	3.0	5.5	3.5	4.0	6.0
18	Nextera Energy, Inc. (NYSE-NEE)	7.5	8.5	8.5	5.5	9.5	8.5
19	NorthWestern Corporation (NYSE-NWE)	8.5	5.0	5.5	7.0	7.0	8.0
20	OGE Energy Corp. (NYSE-OGE)	4.0	6.5	7.5	1.0	9.5	6.0
21	Pinnacle West Capital Corp. (NYSE-PNW)	4.5	2.5	2.5	5.0	3.0	4.5
22	PNM Resources, Inc. (NYSE-PNM)	7.0	2.5		6.0	11.0	1.0
23	Portland General Electric Company (NYSE-POR)	3.5	4.5	2.5	4.0	4.5	3.5
24	PPL Corporation (NYSE-PPL)	0.5	3.5	1.0	-0.5	1.5	-3.5
25	SEMPRA Energy (NYSE-SRE)	1.0	10.0	5.5	2.0	7.5	4.0
26	Southern Company (NYSE-SO)	3.0	4.0	4.5	3.0	3.5	3.5
27	WEC Energy Group (NYSE-WEC)	8.5	15.5	8.5	6.0	11.0	10.5
28	Xcel Energy Inc. (NYSE-XEL)	5.5	4.5	4.5	5.0	6.0	4.5
	Mean	4.0	5.8	4.6	3.2	5.6	4.4
	Median	4.0	4.5	4.5	4.3	6.5	4.5
	Data Source *Value Line Investment Survey*.	Average of Median Figures =			4.7		

* Entergy and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates No growth rate data for Avangrid

Panel B
Hevert Proxy Group

	Company	*Value Line* Historic Growth					
		Past 10 Years			Past 5 Years		
		Earnings	Dividends	Book Value	Earnings	Dividends	Book Value
1	ALLETE, Inc. (NYSE-ALE)	1.0	3.0	5.5	4.0	3.0	5.5
2	Alliant Energy Corporation (NYSE-LNT)	4.5	7.5	4.0	4.5	7.0	4.5
3	Ameren Corporation (NYSE-AEE)	0.5	-3.5	-0.5	4.5	2.5	0.5
4	American Electric Power Co. (NYSE-AEP)	3.0	4.5	4.0	5.0	5.0	3.5
5	Avangrid (NYSE-AVG)						
6	Black Hills Corporation (NYSE-BKH)	2.5	2.5	2.5	14.0	3.0	1.5
7	CMS Energy Corporation (NYSE-CMS)	10.0	21.5	4.5	7.0	7.0	5.5
8	Consolidated Edison, Inc. (NYSE-ED)	2.5	1.5	4.0	2.0	2.0	3.5
9	DTE Energy Company (NYSE-DTE)	8.0	4.5	4.0	8.0	6.5	4.5
10	Duke Energy Corporation (NYSE-DUK)	2.5	10.0	0.5	0.5	2.5	2.0
11	El Paso Electric Company (NYSE-EE)	4.0		7.0		8.0	5.5
12	Evergy (NYSE-EVRG)						
13	Eversource Energy (NYSE-ES)	10.0	9.5	6.5	7.5	9.0	6.5
14	Hawaiian Electric Inductries (NYSE-HE)	3.5		2.5	4.5		3.5
15	Nextera Energy, Inc. (NYSE-NEE)	7.5	8.5	8.5	5.5	9.5	8.5
16	NorthWestern Corporation (NYSE-NWE)	8.5	5.0	5.5	7.0	7.0	8.0
17	OGE Energy Corp. (NYSE-OGE)	4.0	6.5	7.5	1.0	9.5	6.0
18	Otter Tail Corporation (NDQ-OTTR)	2.0	1.0		14.0	1.5	3.5
19	Pinnacle West Capital Corp. (NYSE-PNW)	4.5	2.5	2.5	5.0	3.0	4.5
20	PNM Resources, Inc. (NYSE-PNM)	7.0	2.5		6.0	11.0	1.0
21	Portland General Electric Company (NYSE-POR)	3.5	4.5	2.5	4.0	4.5	3.5
22	Southern Company (NYSE-SO)	3.0	4.0	4.5	3.0	3.5	3.5
23	WEC Energy Group (NYSE-WEC)	7.5	15.5	8.5	5.5	14.0	10.5
24	Xcel Energy Inc. (NYSE-XEL)	5.5	4.5	4.5	5.0	6.0	4.5
	Mean	4.8	5.8	4.4	5.6	6.0	4.5
	Median	4.0	4.5	4.3	5.0	6.0	4.5
	Data Source *Value Line Investment Survey*.	Average of Median Figures =			4.7		

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
DCF Equity Cost Growth Rate Measures
Value Line Projected Growth Rates

Panel A
Electric Proxy Group

		Value Line			*Value Line*		
		Projected Growth			Sustainable Growth		
	Company	Est'd. '15-'17 to '21-'23			Return on Equity	Retention Rate	Internal Growth
		Earnings	Dividends	Book Value			
1	ALLETE, Inc. (NYSE-ALE)	5.0	5.0	3.0	9.0%	33.0%	3.0%
2	Alliant Energy Corporation (NYSE-LNT)	6.5	6.0	5.0	10.0%	38.0%	3.8%
3	Ameren Corporation (NYSE-AEE)	6.5	6.0	5.0	10.5%	40.0%	4.2%
4	American Electric Power Co. (NYSE-AEP)	4.0	6.0	4.5	11.0%	30.0%	3.3%
5	Avangrid (NYSE-AVG)	12.0	5.5	1.5	6.5%	33.0%	2.1%
6	CMS Energy Corporation (NYSE-CMS)	7.0	7.0	7.5	14.0%	41.0%	5.7%
7	Consolidated Edison, Inc. (NYSE-ED)	3.0	3.5	3.5	8.5%	32.0%	2.7%
8	Duke Energy Corporation (NYSE-DUK)	5.5	4.0	2.0	8.5%	23.0%	2.0%
9	Edison International (NYSE-EIX)	NMF	3.5	3.0	13.5%	48.0%	6.5%
10	El Paso Electric Company (NYSE-EE)	4.5	6.5	4.0	8.5%	35.0%	3.0%
11	Entergy Corporation (NYSE-ETR)						
12	Eversource Energy (NYSE-ES)	5.5	6.0	4.0	9.5%	37.0%	3.5%
13	Exelon Corporation (NYSE-EXC)	7.5	5.0	5.5	9.5%	56.0%	5.3%
14	FirstEnergy Corporation (NYSE-FE)						
15	Hawaiian Electric Inductries (NYSE-HEC)	4.5	3.0	4.0	10.0%	39.0%	3.9%
16	IDACORP, Inc. (NYSE-IDA)	3.5	6.0	4.0	9.5%	40.0%	3.8%
17	MGE Energy, Inc. (NYSE-MGEE)	7.5	4.5	6.0	10.5%	50.0%	5.3%
18	Nextera Energy, Inc. (NYSE-NEE)	9.0	10.5	7.0	13.5%	39.0%	5.3%
19	NorthWestern Corporation (NYSE-NWE)	3.0	4.5	3.0	9.0%	32.0%	2.9%
20	OGE Energy Corp. (NYSE-OGE)	6.5	7.5	3.5	11.5%	28.0%	3.2%
21	Pinnacle West Capital Corp. (NYSE-PNW)	5.0	6.0	3.5	10.5%	35.0%	3.7%
22	PNM Resources, Inc. (NYSE-PNM)	8.5	7.0	4.5	9.5%	44.0%	4.2%
23	Portland General Electric Company (NYSE-POR)	4.5	6.5	3.0	9.0%	35.0%	3.2%
24	PPL Corporation (NYSE-PPL)	3.0	2.5	5.5	13.5%	36.0%	4.9%
25	SEMPRA Energy (NYSE-SRE)	11.0	8.0	6.5	12.0%	42.0%	5.0%
26	Southern Company (NYSE-SO)	3.5	3.0	3.0	13.0%	27.0%	3.5%
27	WEC Energy Group (NYSE-WEC)	6.0	6.0	3.5	12.5%	33.0%	4.1%
28	Xcel Energy Inc. (NYSE-XEL)	5.5	6.0	4.5	11.0%	38.0%	4.2%
	Mean	5.9	5.6	4.2	10.5%	37.1%	3.9%
	Median	5.5	6.0	4.0	10.3%	36.5%	3.8%
	Average of Median Figures =		5.2			Median =	3.8%

* 'Est'd. '15-'17 to '21-'23' is the estimated growth rate from the base period 2015 to 2017 until the future period 2021 to 2023.
Data Source: *Value Line Investment Survey*
* Entergy and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates

Panel B
Hevert Proxy Group

		Value Line			*Value Line*		
		Projected Growth			Sustainable Growth		
	Company	Est'd. '15-'17 to '21-'23			Return on Equity	Retention Rate	Internal Growth
		Earnings	Dividends	Book Value			
1	ALLETE, Inc. (NYSE-ALE)	5.0	5.0	3.0	9.0%	33.0%	3.0%
2	Alliant Energy Corporation (NYSE-LNT)	6.5	6.0	5.0	10.0%	38.0%	3.8%
3	Ameren Corporation (NYSE-AEE)	6.5	6.0	5.0	10.5%	40.0%	4.2%
4	American Electric Power Co. (NYSE-AEP)	4.0	6.0	4.5	11.0%	30.0%	3.3%
5	Avangrid (NYSE-AVG)	12.0	5.5	1.5	6.5%	33.0%	2.1%
6	Black Hills Corporation (NYSE-BKH)	6.5	6.0	6.0	10.0%	43.0%	4.3%
7	CMS Energy Corporation (NYSE-CMS)	7.0	7.0	7.5	14.0%	41.0%	5.7%
8	Consolidated Edison, Inc. (NYSE-ED)	3.0	3.5	3.5	8.5%	32.0%	2.7%
9	DTE Energy Company (NYSE-DTE)	5.0	6.0	5.5	10.5%	37.0%	3.9%
10	Duke Energy Corporation (NYSE-DUK)	5.5	4.0	2.0	8.5%	23.0%	2.0%
11	El Paso Electric Company (NYSE-EE)	4.5	3.0	4.0	10.0%	39.0%	3.9%
12	Evergy (NYSE-EVRG)				9.5%	37.0%	3.5%
13	Eversource Energy (NYSE-ES)	5.5	6.0	4.0	9.5%	37.0%	3.5%
14	Hawaiian Electric Inductries (NYSE-HEC)	3.5	2.0	4.0	9.5%	38.0%	3.6%
15	Nextera Energy, Inc. (NYSE-NEE)	9.0	10.0	7.0	13.5%	39.0%	5.3%
16	NorthWestern Corporation (NYSE-NWE)	3.0	4.5	3.0	9.0%	32.0%	2.9%
17	OGE Energy Corp. (NYSE-OGE)	6.0	8.0	4.0	11.5%	29.0%	3.3%
18	Otter Tail Corporation (NDQ-OTTR)	5.0	4.0	4.5	10.5%	34.0%	3.6%
19	Pinnacle West Capital Corp. (NYSE-PNW)	5.0	6.0	3.5	10.5%	35.0%	3.7%
20	PNM Resources, Inc. (NYSE-PNM)	8.5	7.0	4.5	9.5%	44.0%	4.2%
21	Portland General Electric Company (NYSE-POR)	4.5	6.5	3.0	9.0%	35.0%	3.2%
22	Southern Company (NYSE-SO)	3.5	3.0	3.0	13.0%	27.0%	3.5%
23	WEC Energy Group (NYSE-WEC)	6.0	6.0	3.5	12.5%	33.0%	4.1%
24	Xcel Energy Inc. (NYSE-XEL)	5.5	6.0	4.5	11.0%	38.0%	4.2%
	Mean	5.7	5.5	4.2	10.3%	35.3%	3.6%
	Median	5.5	6.0	4.0	10.0%	36.0%	3.6%
	Average of Median Figures =		5.2			Median =	3.6%

* 'Est'd. '15-'17 to '21-'23' is the estimated growth rate from the base period 2015 to 2017 until the future period 2021 to 2023.
Data Source: *Value Line Investment Survey*

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
DCF Equity Cost Growth Rate Measures
Analysts Projected EPS Growth Rate Estimates

Panel A
Electric Proxy Group

	Company	Yahoo	Reuters	Zacks	Mean
1	ALLETE, Inc. (NYSE-ALE)	6.0%	NA	7.2%	6.6%
2	Alliant Energy Corporation (NYSE-LNT)	5.9%	5.9%	5.4%	5.7%
3	Ameren Corporation (NYSE-AEE)	5.8%	5.8%	5.7%	5.7%
4	American Electric Power Co. (NYSE-AEP)	5.0%	5.0%	6.3%	5.4%
5	Avangrid (NYSE-AVG)	6.2%	7.1%	7.7%	7.0%
6	CMS Energy Corporation (NYSE-CMS)	7.1%	7.1%	6.4%	6.8%
7	Consolidated Edison, Inc. (NYSE-ED)	3.4%	3.4%	2.0%	2.9%
8	Duke Energy Corporation (NYSE-DUK)	4.9%	4.9%	5.0%	4.9%
9	Edison International (NYSE-EIX)	4.9%	4.9%	5.5%	5.1%
10	El Paso Electric Company (NYSE-EE)	4.5%	3.8%	4.7%	4.3%
11	Entergy Corporation (NYSE-ETR)	-4.7%	-4.7%	7.0%	
12	Eversource Energy (NYSE-ES)	5.6%	5.6%	5.5%	5.6%
13	Exelon Corporation (NYSE-EXC)	1.0%	1.5%	3.8%	2.1%
14	FirstEnergy Corporation (NYSE-FE)	-6.6%	-6.6%	6.0%	
15	Hawaiian Electric Inductries (NYSE-HE)	6.1%	5.9%	5.4%	5.8%
16	IDACORP, Inc. (NYSE-IDA)	2.4%	2.4%	3.8%	2.9%
17	MGE Energy, Inc. (NYSE-MGEE)	4.0%	NA	NA	4.0%
18	Nextera Energy, Inc. (NYSE-NEE)	7.9%	7.1%	7.8%	7.6%
19	NorthWestern Corporation (NYSE-NWE)	3.2%	3.2%	2.6%	3.0%
20	OGE Energy Corp. (NYSE-OGE)	3.8%	3.8%	4.6%	4.1%
21	Pinnacle West Capital Corp. (NYSE-PNW)	5.0%	5.0%	5.0%	5.0%
22	PNM Resources, Inc. (NYSE-PNM)	5.7%	5.7%	4.8%	5.4%
23	Portland General Electric Company (NYSE-POR)	5.2%	5.2%	4.9%	5.1%
24	PPL Corporation (NYSE-PPL)	0.6%	0.6%	5.0%	2.1%
25	SEMPRA Energy (NYSE-SRE)	8.0%	8.0%	8.3%	8.1%
26	Southern Company (NYSE-SO)	2.2%	3.1%	4.5%	3.3%
27	WEC Energy Group (NYSE-WEC)	5.8%	5.8%	5.6%	5.7%
28	Xcel Energy Inc. (NYSE-XEL)	6.2%	6.2%	5.7%	6.1%
	Mean	4.1%	4.1%	5.4%	5.0%
	Median	5.0%	5.0%	5.4%	5.2%

Data Sources www reuters com, www zacks com, http //quote yahoo com, May 10, 2019
* Entergy and FirstEnergy was excluded from the DCF analysis due to negative projected EPS growth rates

Panel B
Hevert Proxy Group

	Company	Yahoo	Reuters	Zacks	Mean
1	ALLETE, Inc. (NYSE-ALE)	6.0%	NA	7.2%	6.6%
2	Alliant Energy Corporation (NYSE-LNT)	5.9%	5.9%	5.4%	5.7%
3	Ameren Corporation (NYSE-AEE)	5.8%	5.8%	5.7%	5.7%
4	American Electric Power Co. (NYSE-AEP)	5.0%	5.0%	6.3%	5.4%
5	Avangrid (NYSE-AVG)	6.2%	7.1%	7.7%	7.0%
6	Black Hills Corporation (NYSE-BKH)	3.6%	3.6%	4.8%	4.0%
7	CMS Energy Corporation (NYSE-CMS)	7.1%	7.1%	6.4%	6.8%
8	Consolidated Edison, Inc. (NYSE-ED)	3.4%	3.4%	2.0%	2.9%
9	DTE Energy Company (NYSE-DTE)	4.2%	4.2%	6.0%	4.8%
10	Duke Energy Corporation (NYSE-DUK)	4.9%	4.9%	5.0%	4.9%
11	El Paso Electric Company (NYSE-EE)	4.5%	3.8%	4.7%	4.3%
12	Evergy (NYSE-EVRG)	6.2%	6.2%	6.6%	6.3%
13	Eversource Energy (NYSE-ES)	5.6%	5.6%	5.5%	5.6%
14	Hawaiian Electric Inductries (NYSE-HE)	6.1%	5.9%	5.4%	5.8%
15	Nextera Energy, Inc. (NYSE-NEE)	7.9%	7.1%	7.8%	7.6%
16	NorthWestern Corporation (NYSE-NWE)	3.2%	3.2%	2.6%	3.0%
17	OGE Energy Corp. (NYSE-OGE)	3.8%	3.8%	4.6%	4.1%
18	Otter Tail Corporation (NDQ-OTTR)	3.0%	NA	7.0%	5.0%
19	Pinnacle West Capital Corp. (NYSE-PNW)	5.0%	5.0%	5.0%	5.0%
20	PNM Resources, Inc. (NYSE-PNM)	5.7%	5.7%	4.8%	5.4%
21	Portland General Electric Company (NYSE-POR)	5.2%	5.2%	4.9%	5.1%
22	Southern Company (NYSE-SO)	2.2%	3.1%	4.5%	3.3%
23	WEC Energy Group (NYSE-WEC)	5.8%	5.8%	5.6%	5.7%
24	Xcel Energy Inc. (NYSE-XEL)	6.2%	6.2%	5.7%	6.1%
	Mean	5.1%	5.2%	5.5%	5.3%
	Median	5.4%	5.4%	5.5%	5.4%

Data Sources: www reuters com, www zacks com, http //quote yahoo com, May 10, 2019

Exhibit JRW-7

CenterPoint Energy Houston Electric, LLC
DCF Growth Rate Indicators

Electric and Hevert Proxy Groups

Growth Rate Indicator	Electric Proxy Group	Hevert Proxy Group
Historic *Value Line* Growth in EPS, DPS, and BVPS	4.7%	4.7%
Projected *Value Line* Growth in EPS, DPS, and BVPS	5.2%	5.2%
Sustainable Growth ROE * Retention Rate	3.8%	3.6%
Projected EPS Growth from Yahoo, Zacks, and Reuters - Mean/Median	5.2%/5.0%	5.3%/5.4%

SOAH DOCKET NO. 473-19-3864
PUC DOCKET NO. 49421

APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR AUTHORITY TO CHANGE RATES	§ § § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE

EXHIBIT JRW-8:

CAPM Study

Exhibit JRW-8

CenterPoint Energy Houston Electric, LLC
Capital Asset Pricing Model

Panel A
Electric Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.60
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	7.3%

* See page 3 of Exhibit JRW-8
** See pages 5 and 6 of Exhibit JRW-8

Panel B
Hevert Proxy Group

Risk-Free Interest Rate	4.00%
Beta*	0.50
Ex Ante Equity Risk Premium**	5.50%
CAPM Cost of Equity	6.8%

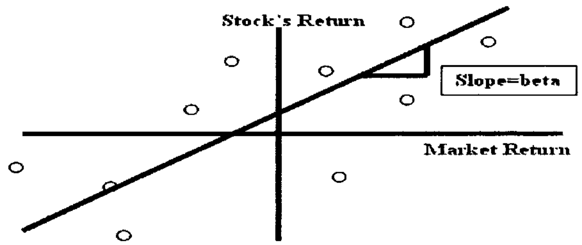
* See page 3 of Exhibit JRW-8
** See pages 5 and 6 of Exhibit JRW-8

Exhibit JRW-8

Thirty-Year U.S. Treasury Yields
2013-2019

Source: Federal Reserve Bank of St. Louis, FRED Database.

Calculation of Beta



Panel A
Electric Proxy Group

	Company Name	Beta
1	ALLETE, Inc. (NYSE-ALE)	0.65
2	Alliant Energy Corporation (NYSE-LNT)	0.60
3	Ameren Corporation (NYSE-AEE)	0.55
4	American Electric Power Co. (NYSE-AEP)	0.55
5	AVANGRID, Inc. (NYSE-AGR)	0.40
6	CMS Energy Corporation (NYSE-CMS)	0.55
7	Consolidated Edison, Inc. (NYSE-ED)	0.45
8	Duke Energy Corporation (NYSE-DUK)	0.50
9	Edison International (NYSE-EIX)	0.60
10	El Paso Electric Company (NYSE-EE)	0.70
11	Entergy Corporation (NYSE-ETR)	0.60
12	Eversource Energy (NYSE-ES)	0.60
13	Exelon Corporation (NYSE-EXC)	0.70
14	FirstEnergy Corporation (NYSE-FE)	0.65
15	Hawaiian Electric Inductries (NYSE-HEC)	0.60
16	IDACORP, Inc. (NYSE-IDA)	0.60
17	MGE Energy, Inc. (NYSE-MGEE)	0.60
18	NextEra Energy, Inc. (NYSE-NEE)	0.60
19	NorthWestern Corporation (NYSE-NWE)	0.60
20	OGE Energy Corp. (NYSE-OGE)	0.85
21	Pinnacle West Capital Corp. (NYSE-PNW)	0.55
22	PNM Resources, Inc. (NYSE-PNM)	0.65
23	Portland General Electric Company (NYSE-POR)	0.60
24	PPL Corporation (NYSE-PPL)	0.70
25	Sempra Energy (NYSE-SRE)	0.75
26	Southern Company (NYSE-SO)	0.50
27	WEC Energy Group (NYSE-WEC)	0.50
28	Xcel Energy Inc. (NYSE-XEL)	0.50
	Mean	0.60
	Median	0.60

Data Source *Value Line Investment Survey*, 2019

Panel B
Hevert Proxy Group

	Company	Beta
1	ALLETE, Inc. (NYSE-ALE)	0.65
2	Alliant Energy Corporation (NYSE-LNT)	0.60
3	Ameren Corporation (NYSE-AEE)	0.55
4	American Electric Power Co. (NYSE-AEP)	0.55
5	AVANGRID, Inc. (NYSE-AGR)	0.40
6	Black Hills Corporation (NYSE-BKH)	0.80
7	CMS Energy Corporation (NYSE-CMS)	0.55
8	Consolidated Edison, Inc. (NYSE-ED)	0.45
9	DTE Energy Company (NYSE-DTE)	0.55
10	Duke Energy Corporation (NYSE-DUK)	0.45
11	El Paso Electric Company (NYSE-EE)	0.70
12	Evergy (NYSE:EVRG)	NMF
13	Eversource Energy (NYSE-ES)	0.60
14	Hawaiian Electric Inductries (NYSE-HEC)	0.60
15	NextEra Energy, Inc. (NYSE-NEE)	0.60
16	NorthWestern Corporation (NYSE-NWE)	0.60
17	OGE Energy Corp. (NYSE-OGE)	0.85
18	Otter Tail Corporation (NDQ-OTTR)	0.75
19	Pinnacle West Capital Corp. (NYSE-PNW)	0.55
20	PNM Resources, Inc. (NYSE-PNM)	0.65
21	Portland General Electric Company (NYSE-POR)	0.60
22	Southern Company (NYSE-SO)	0.50
23	WEC Energy Group (NYSE-WEC)	0.50
24	Xcel Energy Inc. (NYSE-XEL)	0.50
	Mean	0.59
	Median	0.60

Data Source *Value Line Investment Survey*, 2019

Exhibit JRW-8
Risk Premium Approaches

	Historical Ex Post Returns	Surveys	Expected Return Models and Market Data
Means of Assessing The Market Risk Premium	Historical Average Stock Minus Bond Returns	Surveys of CFOs, Financial Forecasters, Companies, Analysts on Expected Returns and Market Risk Premiums	Use Market Prices and Market Fundamentals (such as Growth Rates) to Compute Expected Returns and Market Risk Premiums
Problems/Debated Issues	Time Variation in Required Returns, Measurement and Time Period Issues, and Biases such as Market and Company Survivorship Bias	Questions Regarding Survey Histories, Responses, and Representativeness Surveys may be Subject to Biases, such as Extrapolation	Assumptions Regarding Expectations, Especially Growth

Source: Adapted from Antti Ilmanen, Expected Returns on Stocks and Bonds," *Journal of Portfolio Management*, (Winter 2003).

Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Category	Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Median
Historical Risk	**Historical Risk Premium**										
		Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6 00%	
						Geometric				4 40%	
		Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6 26%	
						Geometric				4 66%	
		Dimson Marsh, Staunton Credit Suisse Repo	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5 50%	
						Geometric					
		Bate	2008	1900-2007	Historical Stock Returns - Bond Returns	Geometric				4 50%	
		Shiller	2006	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				7 00%	
						Geometric				5 50%	
		Siegel	2005	1926-2005	Historical Stock Returns - Bond Returns	Arithmetic				6 10%	
						Geometric				4 60%	
		Dimson Marsh, and Staunton	2006	1900-2005	Historical Stock Returns - Bond Returns	Arithmetic				5 50%	
		Goyal & Welch	2006	1872-2004	Historical Stock Returns - Bond Returns					4 77%	
		Median									5 50%
Ex Ante Mode	**Ex Ante Models (Puzzle Research)**										
		Claus Thomas	2001	1985-1998	Abnormal Earnings Model					3 00%	
		Arnott and Bernstein	2002	1810-2001	Fundamentals - Div Yld + Growth					2 40%	
		Constantinides	2002	1872-2000	Historical Returns & Fundamentals - P/D & P/E					6 90%	
		Cornell	1999	1926-1997	Historical Returns & Fundamental GDP/Earnings		3 50%	5 50%	4 50%	4 50%	
		Easton, Taylor et al	2002	1981-1998	Residual Income Model					5 30%	
		Fama French	2002	1951-2000	Fundamental DCF with EPS and DPS Growth		2 55%	4 32%		3 44%	
		Harris & Marston	2001	1982-1998	Fundamental DCF with Analysts' EPS Growth					7 14%	
		McKinsey	2002	1962-2002	Fundamental (P E, D/P & Earnings Growth)		3 50%	4 00%		3 75%	
		Siegel	2005	1802-2001	Historical Earnings Yield	Geometric				2 50%	
		Grabowski	2006	1926-2005	Historical and Projected		3 50%	6 00%	4 75%	4 75%	
		Maheu & McCurdy	2006	1885-2003	Historical Excess Returns Structural Breaks		4 02%	5 10%	4 56%	4 56%	
		Bostock	2004	1960-2002	Bond Yields, Credit Risk and Income Volatility		3 90%	1 30%	2 60%	2 60%	
		Bakshi & Chen	2005	1982-1998	Fundamentals - Interest Rates					7 31%	
		Donaldson Kamstra, & Kramer	2006	1952-2004	Fundamental, Dividend yld , Returns , & Volatility		3 00%	4 00%	3 50%	3 50%	
		Campbell	2008	1982-2007	Historical & Projections (D P & Earnings Growth)		4 10%	5 40%		4 75%	
		Best & Byrne	2001	Projection	Fundamentals - Div Yld + Growth					2 00%	
		Fernandez	2007	Projection	Required Equity Risk Premium					4 00%	
		DeLong & Magin	2008	Projection	Earnings Yield - TIPS					3 22%	
		Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5 50%	
		Duff & Phelps	2019	Projection	Normalized with 3 5% Long-Term Treasury Yield					5 50%	
		Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5 50%	
		American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6 00%	
		Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4 29%	
		KPMG	2019	Projection	Fundamental Economic and Market Factors					5 50%	
		Damodaran - 3-1-19	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month with adjusted payout)					4 98%	
		Social Security									
		Office of Chief Actuary		1900-1995							
		John Campbell	2001	1860-2000	Historical & Projections (D P & Earnings Growth)	Arithmetic	3 00%	4 00%	3 50%	3 50%	
				Projected for 75 Years		Geometric	1 50%	2 50%	2 00%	2 00%	
		Peter Diamond	2001	Projected for 75 Year	Fundamentals (D/P, GDP Growth)		3 00%	4 80%	3 90%	3 90%	
		John Shoven	2001	Projected for 75 Year	Fundamentals (D/P P/E, GDP Growth)		3 00%	3 50%	3 25%	3 25%	
		Median									4 29%
Surveys	**Surveys**										
		New York Fed	2015	Five-Year	Survey of Wall Street Firms					5 70%	
		Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1 85%	
		Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					3 15%	
		Welch - Academics	2008	30-Year Projection	Random Academics		5 00%	5 74%	5 37%	5 37%	
		Fernandez - Academics Analysts and Compai	2019	Long-Term	Survey of Academics Analysts and Companies					5 60%	
		Median									5 37%
Building Block	**Building Block**										
		Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6 22%	5 21%	
						Geometric			4 20%		
		Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4 00%	
		Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3 00%	
		Grinold Kroner Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4 63%	4 12%	
						Geometric			3 60%		
		Median									4 06%
Mean	**Mean**										**4 80%**
Median	**Median**										**4 83%**

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Exhibit JRW-8

Capital Asset Pricing Model
Market Risk Premium

Summary of 2010-19 Equity Risk Premium Studies

Category	Study Authors	Publication Date	Time Period Of Study	Methodology	Return Measure	Range Low	Range High	Midpoint of Range	Mean	Average
Historical Risk Premium										
	Ibbotson	2016	1928-2015	Historical Stock Returns - Bond Returns	Arithmetic				6 00%	
					Geometric				4 40%	
	Damodaran	2019	1928-2018	Historical Stock Returns - Bond Returns	Arithmetic				6 26%	
					Geometric				4 66%	
	Dimson, Marsh, Staunton _Credit Suisse Report	2019	1900-2018	Historical Stock Returns - Bond Returns	Arithmetic				5 50%	
					Geometric					
	Median									5.36%
Ex Ante Models (Puzzle Research)										
	Siegel - Rethink ERP	2011	Projection	Real Stock Returns and Components					5.50%	
	Duff & Phelps	2019	Projection	Normalized with 3.5% Long-Term Treasury Yield					5.50%	
	Mschchowski - VL - 2014	2014	Projection	Fundamentals - Expected Return Minus 10-Year Treasury Rate					5.50%	
	American Appraisal Quarterly ERP	2015	Projection	Fundamental Economic and Market Factors					6.00%	
	Market Risk Premia	2019	Projection	Fundamental Economic and Market Factors					4.29%	
	KPMG	2019	Projection	Fundamental Economic and Market Factors					5.50%	
	Damodaran - 3-1-19	2019	Projection	Fundamentals - Implied from FCF to Equity Model (Trailing 12 month, with adjusted payout)					4.98%	
	Median									5 50%
Surveys										
	New York Fed	2015	Five-Year	Survey of Wall Street Firms					5 70%	
	Survey of Financial Forecasters	2019	10-Year Projection	About 20 Financial Forecastsers					1.85%	
	Duke - CFO Magazine Survey	2019	10-Year Projection	Approximately 200 CFOs					3 15%	
	Fernandez - Academics, Analysts, and Companies	2019	Long-Term	Survey of Academics, Analysts, and Companies					5.60%	
	Median									4 38%
Building Block										
	Ibbotson and Chen	2015	Projection	Historical Supply Model (D/P & Earnings Growth)	Arithmetic			6.22%	5 21%	
					Geometric			4 20%		
	Chen - Rethink ERP	2010	20-Year Projection	Combination Supply Model (Historic and Projection)	Geometric				4 00%	
	Ilmanen - Rethink ERP	2010	Projection	Current Supply Model (D/P & Earnings Growth)	Geometric				3 00%	
	Grinold, Kroner, Siegel - Rethink ERP	2011	Projection	Current Supply Model (D/P & Earnings Growth)	Arithmetic			4 63%	4 12%	
					Geometric			3.60%		
	Median									4 06%
Mean										**4.82%**
Median										**4.87%**

Duff & Phelps Risk-Free Interest Rates and Equity Risk Premium Estimates

Duff & Phelps Recommended U.S. Equity Risk Premium (ERP) and Corresponding Risk-free Rates (R_f); January 2008–Present

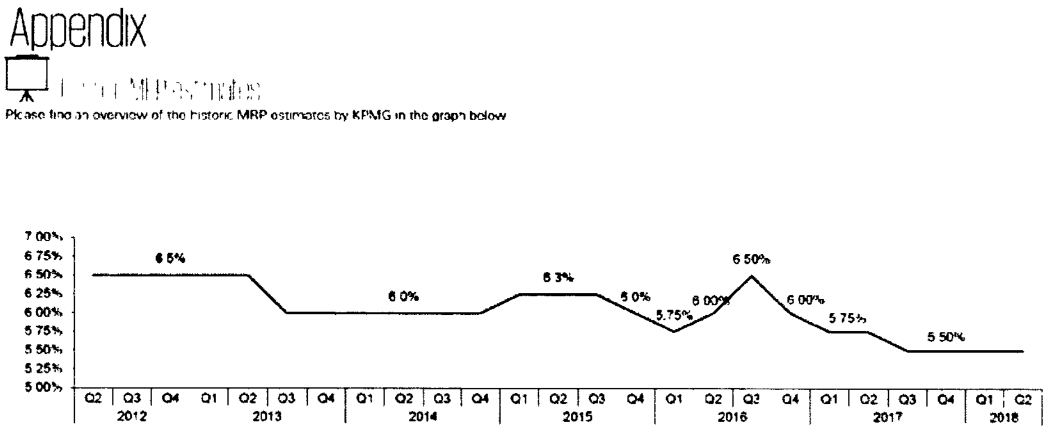
For additional information please visit [illegible]

Date	Risk-free Rate (R_f)	R_f (%)	Duff & Phelps Recommended ERP (%)	What Changed
Current Guidance: December 31, 2018 – UNTIL FURTHER NOTICE	**Normalized 20-year U.S. Treasury yield**	**3.50**	**5.50**	**ERP**
September 5, 2017 – December 30, 2018	Normalized 20-year U.S. Treasury yield	3.50	5.00	ERP
November 15, 2016 - September 4, 2017	Normalized 20-year U.S. Treasury yield	3.50	5.50	R_f
January 31, 2016 - November 14, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]			
February 28, 2013 - January 30, 2016	Normalized 20-year U.S. Treasury yield	4.00	5.00	ERP
[illegible]	[illegible]	[illegible]	[illegible]	
January 15, 2012 – February 27, 2013	Normalized 20-year U.S. Treasury yield	4.00	5.50	ERP
[illegible]	[illegible]	[illegible]	[illegible]	
September 30, 2011 - January 14, 2012	Normalized 20-year U.S. Treasury yield	4.00	6.00	ERP
July 1, 2011 - September 29, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
June 1, 2011 – June 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
May 1, 2011 – May 31, 2011	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
[illegible]	[illegible]			
December 1, 2010 - April 30, 2011	Spot 20-year U.S. Treasury yield	Spot	5.50	R_f
June 1, 2010 – November 30, 2010	Normalized 20-year U.S. Treasury yield	4.00	5.50	R_f
[illegible]	[illegible]	[illegible]	[illegible]	
December 1, 2009 – May 31, 2010	Spot 20-year U.S. Treasury yield	Spot	5.50	ERP
June 1, 2009 - November 30, 2009	Spot 20-year U.S. Treasury yield	Spot	6.00	R_f
[illegible]	[illegible]	[illegible]	[illegible]	
November 1, 2008 – May 31, 2009	Normalized 20-year U.S. Treasury yield	4.50	6.00	R_f
October 27, 2008 – October 31, 2008	Spot 20-year U.S. Treasury yield	Spot	6.00	ERP
January 1, 2008 - October 26, 2008	Spot 20-year U.S. Treasury yield	Spot	5.00	Initialized

"Normalized" in this context means that in months where the risk-free rate is deemed to be abnormally low, a proxy for a longer-term sustainable risk-free rate is used.

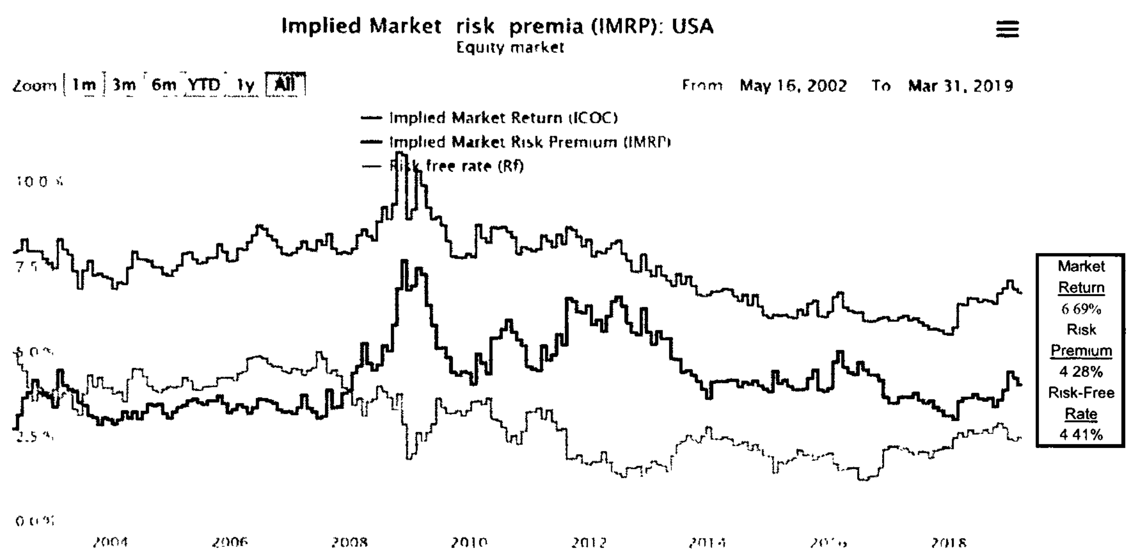
Source. https://www.duffandphelps.com/-/media/assets/pdfs/publications/valuation/coc/erp-risk-free-rates-jan-2008-present.ashx?la=en

Panel A
KPMG Equity Risk Premium Recommendation



Source https //assets.kpmg/content/dam/kpmg/nl/pdf/2019/advisory/equity-market-research-summary.pdf

Panel B
Market-Risk-Premia.com Implied Market Risk Premium
31-Mar-19



Source: http://www market-risk-premia.com/us html

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APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR AUTHORITY TO CHANGE RATES	§ § § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE

EXHIBIT JRW-9:

CEHE's Proposed Cost of Capital

CenterPoint Energy Houston Electric, LLC

Company's Proposed Cost of Capital

Capital Source	Capitalization Ratio	Cost Rate	Weighted Cost Rate
Long-Term Debt	50.00%	4.38%	2.19%
Common Equity	50.00%	10.40%	5.20%
Total	100.00%		7.39%

CenterPoint Energy Houston Electric, LLC
ROE Results

DCF Results

	Mean
30-Day Average	9.22%
90-Day Average	9.24%
180-Day Average	9.32%

Risk Premium Results

	Bloomberg Derived Market Risk Premium	Value Line Derived Market Risk Premium
Average Bloomberg Beta Coefficient		
Current 30-Year Treasury (3.03%)	8.37%	10.05%
Near Term Projected 30-Year Treasury (3.33%)	8.66%	10.35%
Average Value Line Beta Coefficient		
Current 30-Year Treasury (3.03%)	9.27%	11.24%
Near Term Projected 30-Year Treasury (3.33%)	9.57%	11.54%
Bond Yield Plus Risk Premium Approach		
Current 30-Year Treasury (3.03%)	9.93%	
Near Term Projected 30-Year Treasury (3.33%)	9.98%	
Long-Term Projected 30-Year Treasury (4.05%)	10.17%	

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J. RANDALL WOOLRIDGE

EXHIBIT JRW-10:

GDP and S&P 500 Growth Rates

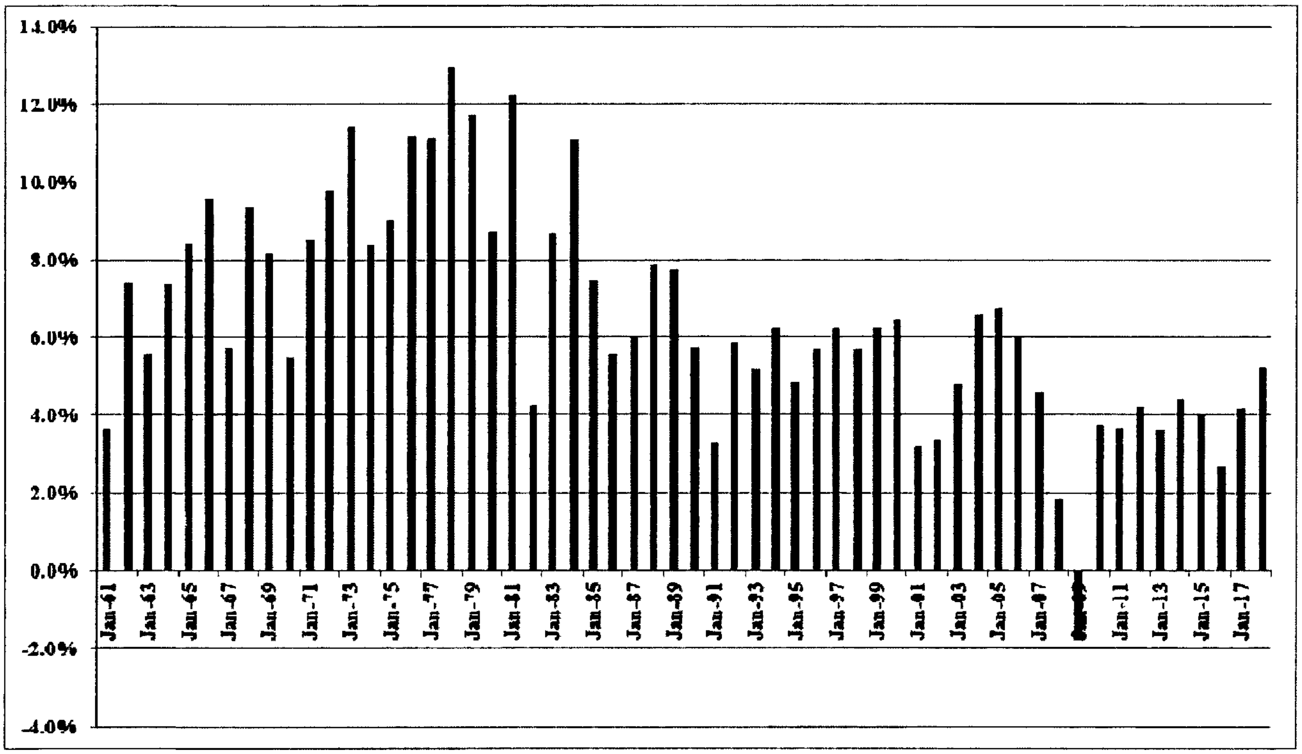
Growth Rates
GDP, S&P 500 Price, EPS, and DPS

		GDP	S&P 500	S&P 500 EPS	S&P 500 DPS	
	1960	542.38	58.11	3.10	1.98	
1	1961	562.21	71 55	3.37	2.04	
2	1962	603 92	63.10	3 67	2.15	
3	1963	637.45	75 02	4 13	2.35	
4	1964	684.46	84 75	4 76	2.58	
5	1965	742.29	92.43	5.30	2 83	
6	1966	813 41	80 33	5 41	2.88	
7	1967	859 96	96 47	5.46	2 98	
8	1968	940 65	103.86	5.72	3.04	
9	1969	1017 62	92.06	6 10	3 24	
10	1970	1073.30	92.15	5.51	3.19	
11	1971	1164 85	102 09	5 57	3.16	
12	1972	1279.11	118 05	6 17	3.19	
13	1973	1425 38	97.55	7 96	3.61	
14	1974	1545.24	68.56	9 35	3.72	
15	1975	1684.90	90.19	7 71	3.73	
16	1976	1873 41	107.46	9.75	4.22	
17	1977	2081 83	95.10	10.87	4.86	
18	1978	2351 60	96.11	11 64	5.18	
19	1979	2627 33	107 94	14.55	5.97	
20	1980	2857 31	135.76	14 99	6.44	
21	1981	3207 04	122.55	15 18	6 83	
22	1982	3343 79	140.64	13 82	6 93	
23	1983	3634 04	164.93	13 29	7 12	
24	1984	4037 61	167.24	16 84	7.83	
25	1985	4338.98	211 28	15 68	8.20	
26	1986	4579.63	242 17	14 43	8.19	
27	1987	4855.22	247.08	16.04	9.17	
28	1988	5236.44	277.72	24 12	10.22	
29	1989	5641.58	353 40	24.32	11 73	
30	1990	5963.14	330.22	22.65	12 35	
31	1991	6158.13	417.09	19.30	12 97	
32	1992	6520 33	435.71	20 87	12 64	
33	1993	6858.56	466.45	26 90	12 69	
34	1994	7287 24	459.27	31 75	13.36	
35	1995	7639 75	615 93	37 70	14.17	
36	1996	8073 12	740.74	40 63	14.89	
37	1997	8577 55	970 43	44 09	15 52	
38	1998	9062 82	1229.23	44.27	16 20	
39	1999	9630.66	1469 25	51.68	16 71	
40	2000	10252 35	1320.28	56 13	16.27	
41	2001	10581 82	1148 09	38 85	15.74	
42	2002	10936.42	879.82	46 04	16.08	
43	2003	11458.25	1111.91	54.69	17.88	
44	2004	12213.73	1211.92	67 68	19.41	
45	2005	13036.64	1248.29	76.45	22.38	
46	2006	13814.61	1418.30	87 72	25.05	
47	2007	14451.86	1468.36	82 54	27.73	
48	2008	14712.85	903 25	65.39	28.05	
49	2009	14448.93	1115.10	59.65	22 31	
50	2010	14992.05	1257.64	83 66	23.12	
51	2011	15542.58	1257.60	97.05	26 02	
52	2012	16197.01	1426.19	102 47	30 44	
53	2013	16784 85	1848.36	107.45	36.28	
54	2014	17521.75	2058.90	113 01	39 44	
55	2015	18219 30	2043.94	106.32	43.16	
56	2016	18707.19	2238 83	108 86	45 03	
57	2017	19485 39	2673.61	124.94	49.73	
58	2018	20500.64	2506 85	148 34	53.61	Average
	Growth Rates	6.46	6.71	6.89	5.85	6.48

A -http //research stlousfed org/fred2 senes/GDPA/downloaddata
, EPS and DPS - http·//pages stern nyu edu/~adamodar/

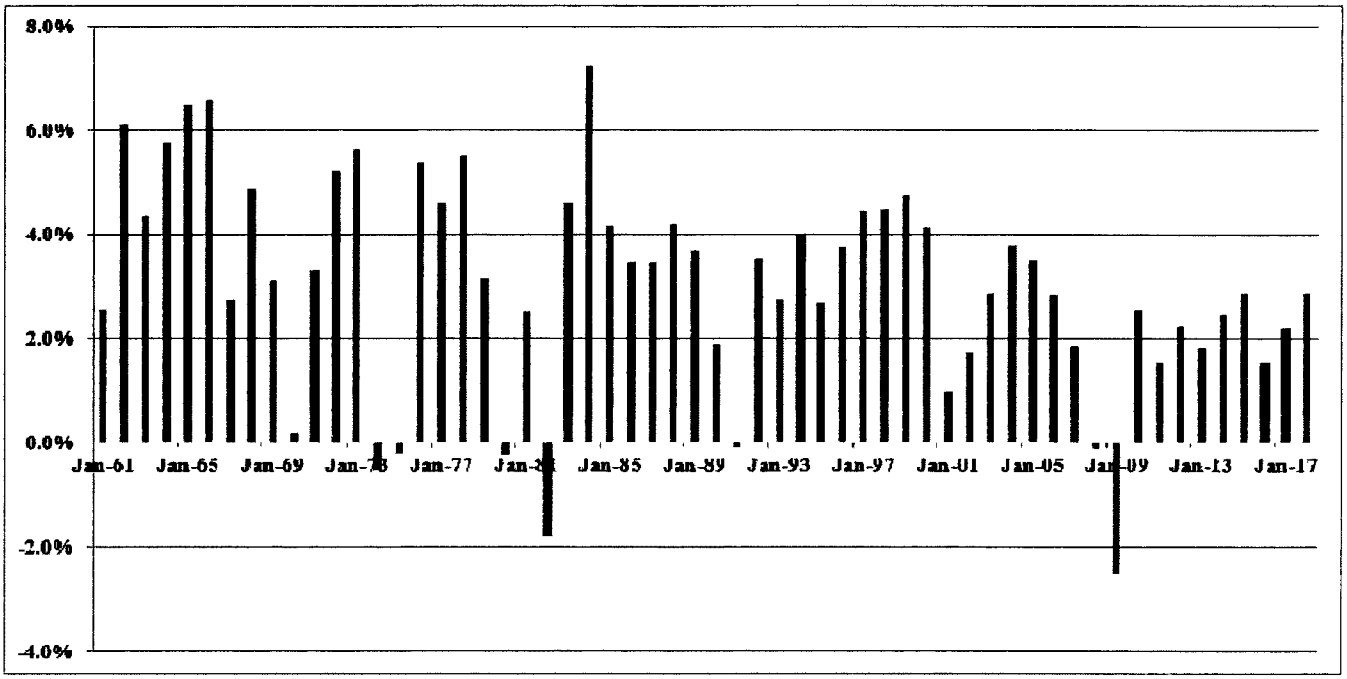
10-Year Averag	3.37%
20-Year Averag	4.17%
30-Year Averag	4.65%
40-Year Averag	5.56%
50-Year Averag	6.36%

Nominal GDP Growth Rates
Annual Growth Rates - 1961-2018



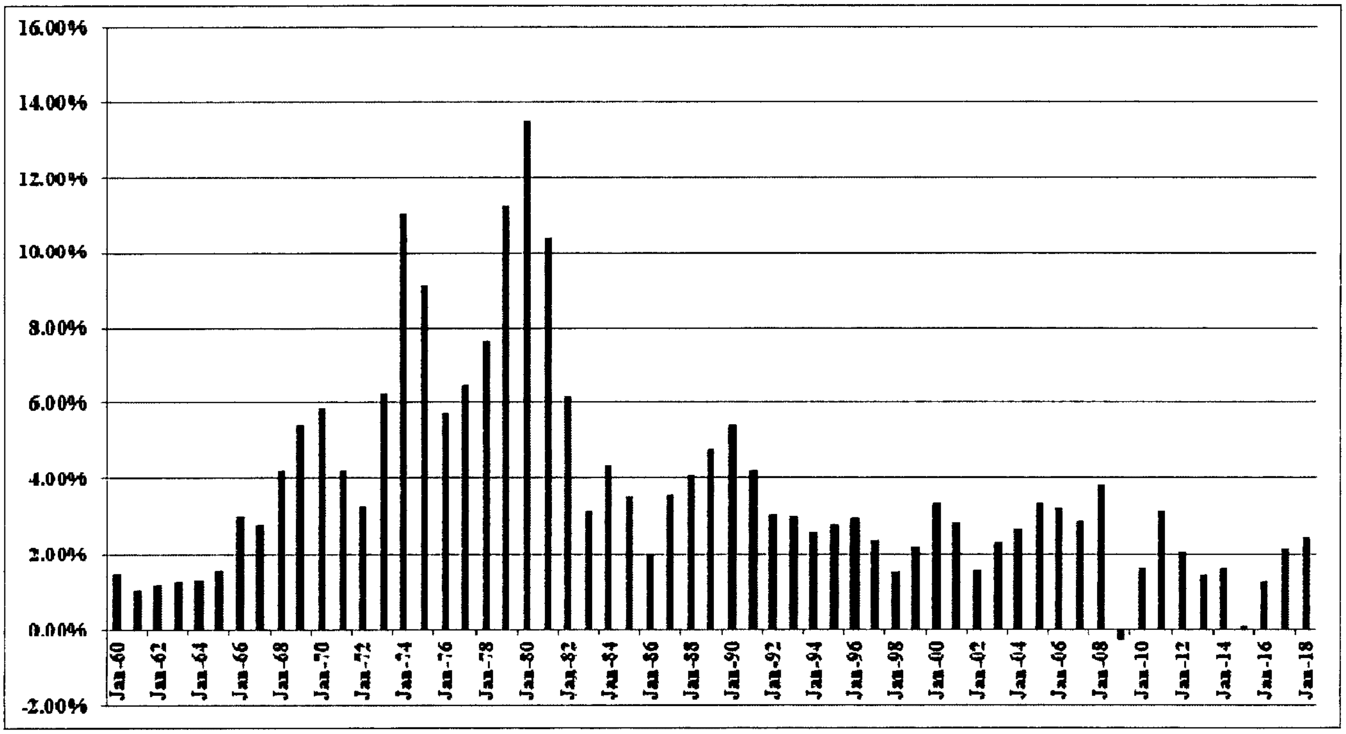
Data Sources GDPA -https //fred stlouısfed org/serıes/GDPA

Annual Real GDP Growth Rates
1961-2018



Data Sources GDPC1 - https //fred stlouisfed org/series/GDPCA

Annual Inflation Rates
1961-2018



Data Sources CPIAUCSL - https //fred stlouisfed org/series/CPIAUCSL

Panel A
Historic GDP Growth Rates

10-Year Average		3.37%
20-Year Average		4.17%
30-Year Average		4.65%
40-Year Average		5.56%
50-Year Average		6.36%

Calculated using GDP data on Page 1 of Exhibit JRW-10

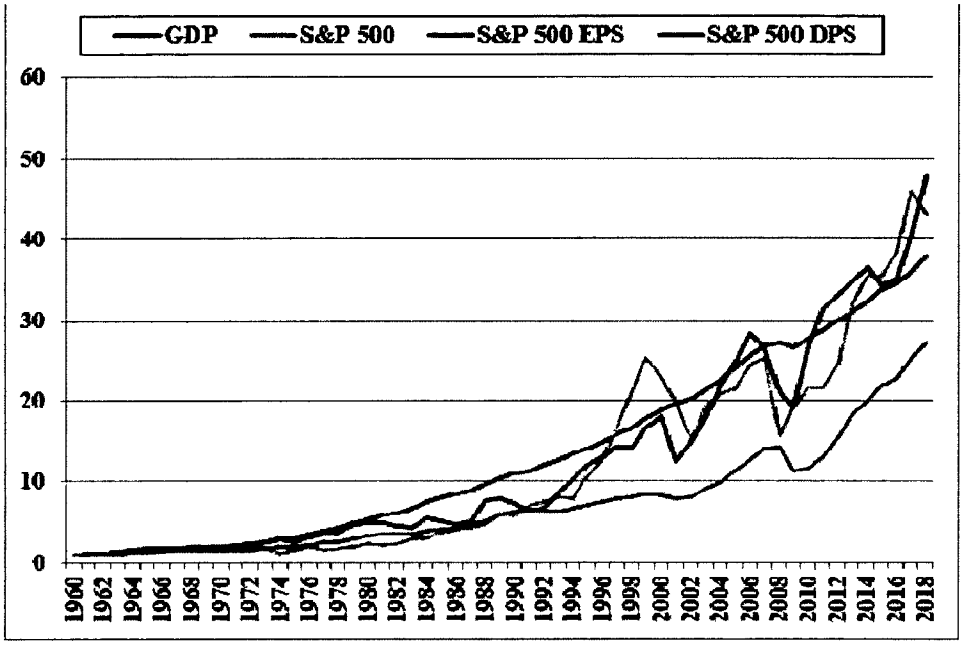
Panel B
Projected GDP Growth Rates

	Time Frame	Projected Nominal GDP Growth Rate
Congressional Budget Office	2018-2048	4.0%
Survey of Financial Forecasters	Ten Year	4.3%
Social Security Administration	2018-2095	4.4%
Energy Information Administration	2017-2050	4.3%

Sources:

Congressional Budget Office,The *2018 Long-Term Budget Outlook*, June 1, 2018.
https://www.cbo.gov/system/files?file=2018-06/53919-2018ltbo.pdf
U.S. Energy Information Administration, *Annual Energy Outlook 2018*, Table: Macroeconomic Indicators,
https://www.eia.gov/outlooks/aeo/data/browser/#/?id=18-AEO2018&sourcekey=0.
Social Security Administration, 2018 Annual Report of the Board of Trustees of the Old-Age, Survivors, and Disability Insurance (OASDI) Program, Table VI.G4, p. 211(June 15, 2018), https://www.ssa.gov/oact/tr/2018/lr6g4.html. The 4.4% represents the compounded growth rate in projected GDP from $20,307 trillion in 2018 to $548,108 trillion in 2095.
https://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/

Long-Term Growth of GDP, S&P 500, S&P 500 EPS, and S&P 500 DPS



	GDP	S&P 500	S&P 500 EPS	S&P 500 DPS
Growth Rates	6.47	6.95	6.70	5.82

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OF

J. RANDALL WOOLRIDGE

NATIVE EXHIBITS (CD)

SOAH DOCKET NO. 473-19-3864
PUC DOCKET NO. 49421

Native Exhibits to the
Direct Testimony & Exhibits of
J. Randall Woolridge

June 6, 2019

SOAH DOCKET NO. 473-19-3864
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APPLICATION OF CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC FOR AUTHORITY TO CHANGE RATES	**§ § § §**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS

OF

J. RANDALL WOOLRIDGE

WORKPAPERS

Provided on the attached CD

SOAH DOCKET NO. 473-19-3864
PUC DOCKET NO. 49421

Workpapers to the
Direct Testimony & Exhibits of
Randall J. Woolridge

June 6, 2019