

Cornhusker Economics

Adjusting the Electric Rate to Accelerate Equity Retirement in Rural Electric Cooperatives

148.56Market Report	Year Ago	4 Wks Ago	3-3-17
Livestock and Products,			
Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	132.00	118.56	124.76
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	198.24	157.84	164.82
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	165.76	130.53	131.26
Choice Boxed Beef, 600-750 lb. Carcass.	226.24	192.88	205.86
Western Corn Belt Base Hog Price Carcass, Negotiated	51.55	NA	68.19
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	69.65	83.53	80.81
Slaughter Lambs, woolled and shorn, 135-165 lb. National.	143.71	139.75	140.48
National Carcass Lamb Cutout FOB.	359.79	336.91	336.71
Crops,			
Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	3.93	2.98	3.33
Corn, No. 2, Yellow Columbus, bu.	3.33	3.21	3.25
Soybeans, No. 1, Yellow Columbus, bu.	8.21	9.37	9.32
Grain Sorghum, No.2, Yellow Dorchester, cwt.	5.48	5.07	5.19
Oats, No. 2, Heavy Minneapolis, Mn, bu.	2.66	3.14	2.95
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	250.00	147.50	117.50
Alfalfa, Large Rounds, Good Platte Valley, ton.	82.50	65.00	65.00
Grass Hay, Large Rounds, Good Nebraska, ton.	85.00	65.00	65.00
Dried Distillers Grains, 10% Moisture Nebraska Average.	134.50	105.00	97.00
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	51.50	43.25	40.75
* No Market			

A recent UNL Department of Agricultural Economics study examined strategies for helping rural electric cooperatives (RECs) accelerate the retirement of capital credits held by members. One strategy is for an REC to generate additional margins for retiring capital credits by raising the rate it charges members for electricity. By raising the electric rate, an REC can help ensure that members are financing the organization in proportion to the benefits they receive and each generation of members is carrying its own weight.

Most RECs retire capital credits according to the first-in/first-out (FIFO) method. Under the FIFO method, a cooperative retires, or rotates, capital credits in the order they are allocated as the oldest allocations are replaced by new ones. The pace at which a cooperative can rotate capital credits depends on its rate of return on equity (ROE) and its growth rate. Let T^* represent the target rotation cycle set by a cooperative. Then the rate of return on equity required to rotate equity according to T^* is

$$ROE^* = \frac{g}{1 - (1 + g)^{-T^*}}$$

for the growth rate g and a constant ratio of equity to total capital. This relationship is a simplified version of an equation often referred to as the “Goodwin formula.”

¹ Jeffrey S. Royer, “Assessing the Ability of Rural Electric Cooperatives to Retire Capital Credits,” *Journal of Cooperatives* 31 (2016): 32–50. Download available at <http://digitalcommons.unl.edu/ageconfacpub/132/>.

In turn, the required rate of return on capital (ROC) can be determined from the required rate of return on equity:

$$ROC^* = p \times ROE^*$$

where p represents the ratio of equity to capital employed.

More generally, the rate of return on capital can be calculated from the ratio of net income to capital employed, which can be expressed as

$$ROC = \frac{ES \times ER + OI}{K}$$

where ES represents electric sales, ER represents the electric rate, and K represents capital employed. The product $ES \times ER$ is operating revenue. The OI term consists of the sum of several other components of net income, including operating expenses (-), nonoperating income (+), and interest expense (-). Setting this equation equal to and solving for ER yields the electric rate necessary to rotate equity according to the target rotation cycle T^* :

$$ER^* = \frac{ROC^* \times K - OI}{ES}$$

Based on 2006–11 data from the Rural Utilities Service of the U.S. Department of Agriculture, the average electric

distribution cooperative could have maintained a 28.2-year rotation cycle given an electric rate of 9.34 ct./kWh. Table 1 shows the increases in the electric rate that would be necessary for selected target rotation cycles. It also shows corresponding values for operating revenue and income, the rates of return on equity, capital, and assets, and the times-interest-earned ratio (TIER). TIER is a measure of interest coverage, or the ability of a business to make interest payments. It is calculated by dividing the sum of net income and total interest expense by total interest expense. Financial advisors generally recommend that distribution cooperatives maintain a TIER of at least 1.5.

The REC represented by Table 1 could have reduced its rotation cycle to 25 years by raising the electric rate by only 0.03 ct./kWh or 0.30 percent. Shorter rotation cycles would have required greater rate increases, but the cooperative could have shortened its rotation cycle substantially with less than a 5 percent rate increase. With a 4.85 percent increase, the cooperative could have maintained a 10-year rotation cycle. Raising the electric rate also would have increased the rates of return and TIER value. By raising the electric rate by 4.85 percent, the rate of return on equity would have risen to 0.1369, which is considerably greater than the corresponding baseline value.

Table 1. Required electric rate for selected rotation cycles

	Baseline	Target rotation cycle (years)				
		25	20	15	10	5
Electric rate (ct./kWh)	9.34	9.37	9.44	9.55	9.80	10.55
Increase (percent)		0.30	1.01	2.25	4.85	12.87
<i>Thousand dollars</i>						
Operating revenue	43,627	43,759	44,066	44,608	45,741	49,243
Operating income	3,496	3,628	3,935	4,477	5,610	9,111
Net income	2,606	2,738	3,045	3,587	4,720	8,221
<i>Rates</i>						
Rate of return on equity	0.0756	0.0794	0.0883	0.1040	0.1369	0.2384
Rate of return on capital	0.0356	0.0374	0.0416	0.0490	0.0645	0.1123
Rate of return on assets	0.0306	0.0321	0.0357	0.0421	0.0554	0.0965
TIER	2.36	2.42	2.58	2.87	3.46	5.28

Jeffrey S. Royer, (402) 472-3108
 Professor, Dept. of Agricultural Economics
 University of Nebraska–Lincoln
jroyer@unl.edu