

APPENDIX C

ALLOCATIVE EFFICIENCY TEXTUAL MODEL FOR THE ELECTRIC POWER PLANT EXAMPLE

The following model is the text model that corresponds to the allocative efficiency model for the oil-fired, steam-generating electric power plant example.

"Total Cost Technical Efficiency (TCTE)"=

1.51142e+007

~ \$

~ |

"Total Cost without Optimization (TCw/o)"=

1.7579e+007

~ \$

~ |

"Allocative Efficiency (AE)"=

"Total Cost Allocative Efficiency(TCAE)"/"Total Cost Technical Efficiency (TCTE)"

~

~ |

"Overall Productive Efficiency (OPE)"=

"Total Cost Allocative Efficiency(TCAE)"/"Total Cost without Optimization (TCw/o)"

~

~ |

"Total Cost Allocative Efficiency(TCAE)"=

"Capital (K)"* "Capital Price (pK)" + "Fuel (F)" * "Fuel Price (pF)" + "Labor (L)" * "Labor Price (pL)"

~ \$

~ |

"Capital Initial Value (Ki)"=

500

~

~ |

"Fuel (F)"= INTEG (

"Change in Fuel (F)",

"Fuel Initial Value (Fi)")

~ BTU

~ |

"Labor (L)"= INTEG (
 "Change in Labor (L)",
 "Labor Initial Value (Li)"
 ~ employees
 ~ |

"Capital Price (pK)"=
 12000
 ~ \$/Megawatt
 ~ |

"Fuel Price (pF)"=
 65
 ~ \$/hundred million BTUs
 ~ |

"Labor Initial Value (Li)"=
 (("Capital Price (pK)"*exponent L)/("Labor Price (pL)"*exponent K))*"Capital
 Initial Value (Ki)"
 ~ employees
 ~ |

"Labor Price (pL)"=
 20000
 ~ \$/employee
 ~ |

"Fuel Initial Value (Fi)"=
 (("Capital Price (pK)"*exponent F)/("Fuel Price (pF)"*exponent K))*"Capital
 Initial Value (Ki)"
 ~ BTU
 ~ |

"Change in Fuel (F)"=
 ("Desired Fuel (F*)"-"Fuel (F)"/Fuel Adjustment Time
 ~ BTU/Month
 ~ |

Fuel Adjustment Time=
 1
 ~ months
 ~ |

"Desired Fuel (F*)"=
 "Fuel (F)"*Relative Production

~ BTU
~ |

Actual Electric Power Production=

1300
~ kilowatt hrs
~ |

exponent K=

0.25
~ dmnl
~ |

Capital Adjustment Time=

1
~ Month
~ |

"Change in Capital (K)"=

("Desired Capital (K*)"-"Capital (K)"/Capital Adjustment Time
~ megawatts/Month
~ |

"Change in Labor (L)"=

("Desired Labor (L*)"-"Labor (L)"/Labor Adjustment Time
~ employees/Month
~ |

Coefficient A=

0.049
~
~ |

"Desired Capital (K*)"=

"Capital (K)"*Relative Production
~ megawatts
~ |

"Desired Labor (L*)"=

"Labor (L)"*Relative Production
~ employees
~ |

exponent F=

0.7
~ dmnl

~ |
 Labor Adjustment Time=
 1
 ~ months
 ~ |

exponent L=
 0.1
 ~ dmnl
 ~ |

Relative Production=
 Actual Electric Power Production/Potential Electric Power Production
 ~
 ~ |

Potential Electric Power Production=
 Coefficient A*($\text{Capital (K)}^{\text{exponent K}}$)*($\text{Fuel (F)}^{\text{exponent F}}$)*($\text{Labor (L)}^{\text{exponent L}}$)
)
 ~ kilowatt hrs
 ~ |

"Capital (K)"= INTEG (
 "Change in Capital (K)",
 500)
 ~ megawatts
 ~ |

.Control

*****~

Simulation Control Paramaters

|

FINAL TIME = 100
 ~ Month
 ~ The final time for the simulation.
 |

INITIAL TIME = 0
 ~ Month
 ~ The initial time for the simulation.
 |

SAVEPER =
TIME STEP
~ Month
~ The frequency with which output is stored.
|

TIME STEP = 1
~ Month
~ The time step for the simulation.
0,45,0,0,64,0,-1--1--1,,1|(611,370)|