

APPENDIX B

TECHNICAL EFFICIENCY TEXTUAL MODEL FOR THE POWER PLANT EXAMPLE

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

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

1.7579e+007

~ \$

~ |

"Labor Price (pL)"=

20000

~ \$/employee

~ |

"Total Cost technical Efficiency (TCTE)"=

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

~ \$

~ |

"Capital Price (pK)"=

12000

~ \$/megawatt

~ |

"Fuel Price (pF)"=

65

~ \$ /BTU

~ |

"Technical Efficiency (TE)"=

"Total Cost technical Efficiency (TCTE)"/"Total Cost without Optimization (TCw/o)"

~ dmnl

~ |

"Change in Fuel (F)"=

("Desired Fuel (F*)" - "Fuel (F)") / "Fuel Adjustment Time (Fat)"

~ BTUs/Month

~ |
 "Fuel Adjustment Time (Fat)"=
 1
 ~ Month
 ~ |

"Desired Fuel (F*)"=
 "Fuel (F)"*"Relative Production (Q*/Qp)"
 ~ BTUs
 ~ |

"Fuel (F)"= INTEG (
 "Change in Fuel (F)",
 162754)
 ~ BTUs
 ~ |

"Actual Electric Power Production (Q*)"=
 1300
 ~ kilowatt hrs
 ~ |

exponent K=
 0.25
 ~ dmnl
 ~ |

"Capital Adjustment Time (Kat)"=
 6
 ~ Month
 ~ |

"Change in Capital (K)"=
 ("Desired Capital (K*)"-"Capital (K)")/"Capital Adjustment Time (Kat)"
 ~ megawatts/Month
 ~ |

"Change in Labor (L)"=
 ("Desired Labor (L*)"-"Labor (L)")/"Labor Adjustment Time (Lat)"
 ~ employee/sMonth
 ~ |

Coefficient A=
 0.049
 ~ dmnl

~ |

"Desired Capital (K*)"=
 "Capital (K)"*"Relative Production (Q*/Qp)"
 ~ megawatts
 ~ |

"Desired Labor (L*)"=
 "Labor (L)"*"Relative Production (Q*/Qp)"
 ~ employees
 ~ |

exponent F=
 0.7
 ~ dmn1
 ~ |

"Labor Adjustment Time (Lat)"=
 4
 ~ Month
 ~ |

exponent L=
 0.1
 ~ dmn1
 ~ |

"Labor (L)"= INTEG (
 "Change in Labor (L)",
 50)
 ~ employees
 ~ |

"Relative Production (Q*/Qp)"=
 "Actual Electric Power Production (Q*)"/"Potential Electric Power Production
 (Qp)"
 ~ dmn1
 ~ |

"Potential Electric Power Production (Qp)"=
 Coefficient A*("Capital (K)"^exponent K)*("Fuel (F)"^exponent F)*("Labor
 (L)"^exponent L\
)
 ~ kilowatt hrs
 ~ |

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

```
*****
```

```
.Control
```

```
*****~
```

```
Simulation Control Paramaters
```

```
|
```

```
FINAL TIME = 10
~    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.
|
```