Biomass Scenario Model Documentation: Data and References

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Technical Report
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May 2013

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List of Acronyms

A	Appalachian
AEO	Annual Energy Outlook
BC	biochemical
BCAP	Biomass Crop Assistance Program
BSM	Biomass Scenario Model
BSM2	Biomass Scenario Model, Version 2
CB	corn belt
CHST	collection, harvest, storage, transportation
CM	Feedstock Conversion Module
CPT	cost per ton
CRP	Conservation Reserve Program
D&C	design and construction
DCS	design, construction, startup
DDG	distillers dry grains
DLM	Distribution Logistics Module
Dom	domestic
DS	delta states
DSM	Dispensing Stations Module
EISA	Energy Independence and Security Act
EtOH	ethanol
FCI	fixed capital investment
FFV	fuel-flex vehicle
FLM	Feedstock Logistics Module
FS	feedstock
FSM	Feedstock Supply Module
FUM	Fuel Use Module
GP	grower payment
GPPA	grower payment per acre
HC	herbaceous cellulose
HCCPA	harvest collection cost per acre
HCCPT	harvest collection cost per ton
IBSAL	Integrated Biomass Supply Analysis and Logistics Model
IM	Imports Module
K	logit coefficient
L	natural logarithm
LS	lake states
LT	long term
M	mountain
NE	New England
Nom	nominal
NP	northern plains
NPV	net present value
ORNL	Oak Ridge National Laboratory
P	pacific

PCEC	perennial cellulosic energy crops
PCPA	production cost per acre
PIM	Pricing and Inventory Module
POD	point of distribution
POP	point of production
POU	point of use
PY	process yield
RAT	ratio of attractiveness
RP	repurposing
SE	southeast
SP	southern plains
TC	thermochemical
TPA	tons per acre
USDA	United States Department of Agriculture
VBL	variable
VM	Vehicles Module
W	woody
WC	woody cellulose
YPA	yield per acre

Executive Summary

The Biomass Scenario Model (BSM) is a system dynamics model that represents the entire biomass-to-biofuels supply chain, from feedstock to fuel use. The BSM is a complex model that has been used for extensive analyses; the model and its results can be better understood if input data used for initialization and calibration are well-characterized. It has been carefully validated and calibrated against the available data, with data gaps filled in using expert opinion and internally consistent assumed values. Most of the main data sources that feed into the model are recognized as baseline values by the industry. This report documents data sources and references in Version 2 of the BSM (BSM2), which only contains the ethanol pathway, although subsequent versions of the BSM contain multiple conversion pathways. The BSM2 contains over 12,000 total input values, with 506 distinct variables. Many of the variables are opportunities for the user to define scenarios, while others are simply used to initialize a stock, such as the initial number of biorefineries. However, around 35% of the distinct variables are defined by external sources, such as models or reports. The focus of this report is to provide insight into which sources are most influential in each area of the supply chain. We find that data based on POLYSYS datasets and U.S. Department of Agriculture baseline projections are the most utilized sources in the feedstock sector, whereas the conversion module relies heavily on data found in National Renewable Energy Laboratory technical reports dealing with the techno-economic characteristics of different technologies. The distribution, dispensing, and fuel use modules utilize data on gasoline stations from the National Association of Convenience Stores.

Table of Contents

List of Figures

List of Tables

1 Introduction

This report is a summary of all the data inputs to the Biomass Scenario Model, Version 2 (BSM2). The BSM2 is a state-of-the-art system dynamics model of the domestic biofuels supply chain that explicitly focuses on policy issues, feasibility, and potential side effects. It is built in STELLA (isee systems 2010) and accounts for resource availability, physical constraints, technological constraints, economic constraints, behavior, and policy—while tracking the deployment of biofuels through a dynamic simulation (not optimization). BSM2 focuses on cellulosic ethanol, while the most recent version (Version 3) additionally treats the major infrastructure-compatible fuels such as biomass-based gasoline, diesel, and jet fuel. For more information about the modeling methodology and logic contained in the BSM2, see Newes et al. (2011).

The Biomass Scenario Model (BSM) has been carefully validated and calibrated against the available data, with data gaps filled in using expert opinion and internally consistent assumed values. Most of the main data sources that feed into the model are recognized as baseline values by the industry. There are over 12,000 total input values in the BSM2, contained in 506 distinct variables. Of the 506, any variable may be arrayed by one or two dimensions (e.g., contain subscripts) and/or be represented as a graph, with the ability to describe how values on the y-axis will respond depending on how the x-axis is defined. The six variable types are identified in Table 1.

Table 1. Variable Types

Variable Type	Subscript 1	Subscript 2	X-axis	Description
Class 1: Single data point				The variable has a single scalar value.
Class 2: Graphical function			X	The variable is a single graphical function demonstrating how the y-axis changes depending on the x-axis values.
Class 3: Array data series	X			The variable is one-dimensional array.
Class 4: Matrix data series	X	X		The variable is a two-dimensional array.
Class 5: Arrayed graphical function	X		X	The variable is a one-dimensional array where each element has its own graphical function.
Class 6: Double subscripted graphical function	X	X	X	The variable is a two-dimensional array where each combination of elements has its own graphical function.

The BSM2 is divided into 11 modules, each with a different focus. They are all interconnected in a system of systems, where the major modules (feedstock supply, feedstock conversion, and downstream) can be run separately or in concert with one another. Figure 1 shows a schematic of the different modules in the model and how they interact. The Pricing and Inventory Module

(PIM) receives the most inputs from outside modules whereas the Dispensing Station Module (DSM) Inputs Module and the Vehicle Module (VM) only provide inputs to other modules.

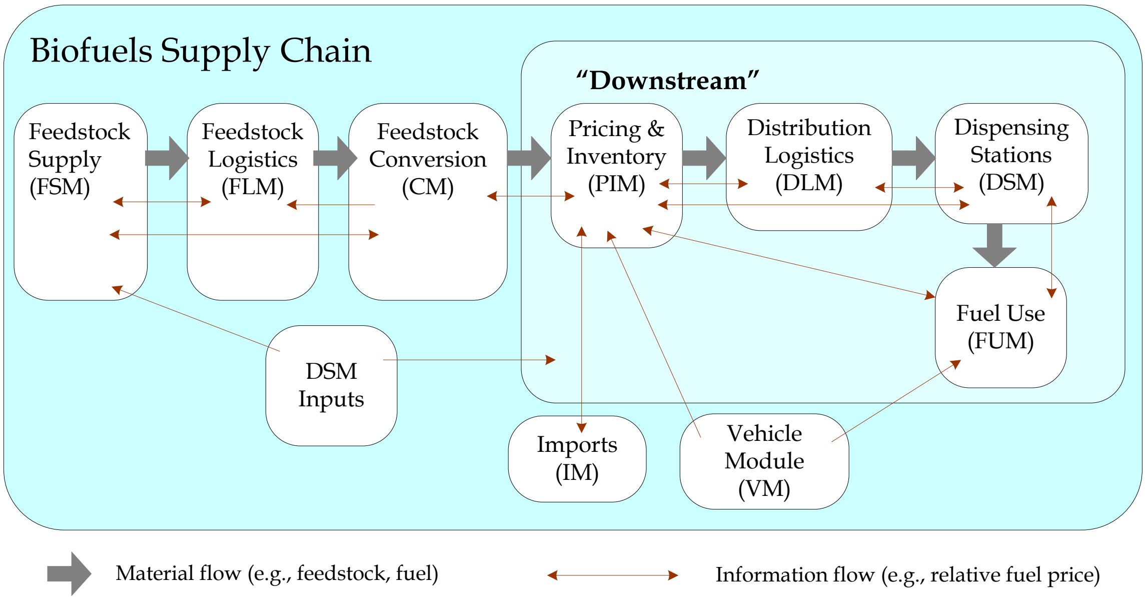


Figure 1. Architecture of the BSM2

The BSM2 contains various types of input data, from modeler assumptions to referenced data values.[1] Figure 2 shows the breakdown of data sources in the model by number of distinct variables (not counting separately each input value of an array or graphical function) and number of total input data points, which includes all values contained in arrays and graphical functions. One distinct variable may have hundreds of data points if it is an arrayed graphical function; therefore, the share of data sources by total input data points can be very different from share by distinct variables. Whereas the calibrated values make up the majority of the total number of data points, distinct variables obtain the majority of their data from outside sources. In addition, a variable can be comprised of multiple data sources. For example, techno-economic data come from different sources for the various ethanol conversion processes—thermochemical, biochemical, and starch. After referenced data, the next-largest shares of variable sources are user-input scenario values (24%) and calibration based on historical data (22%).[2]

[1] See Appendix A for definitions of all data types.
[2] Additional information pertaining to the steps used in model calibration can be found in Appendix A.

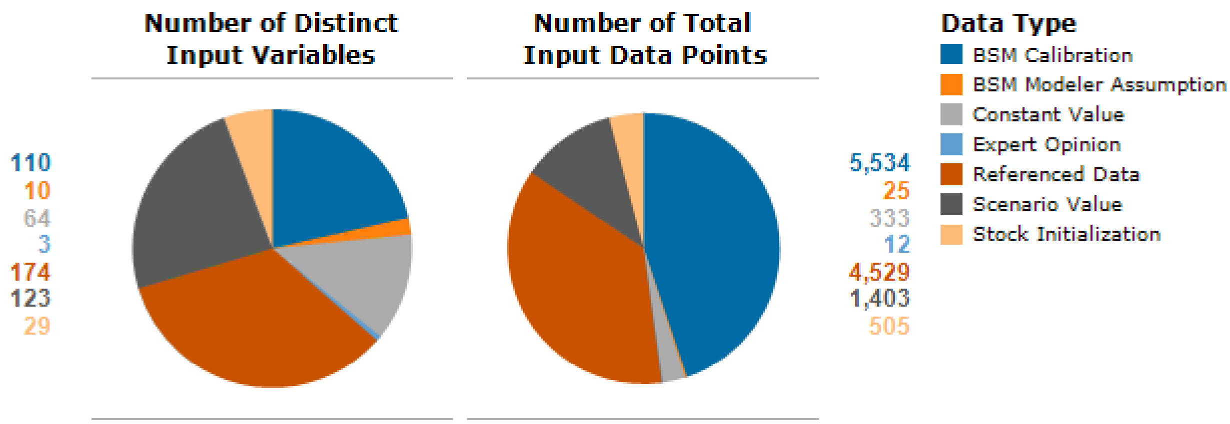


Figure 2. Number of distinct input variables and total input data points by reference type in the BSM2

2 BSM2 Modules

Of the 506 distinct variables, the majority reside in the Feedstock Supply Module (FSM), Feedstock Conversion Module (CM), and the DSM Inputs Module (see Table 2). In the following sections, the data sources for each of the 11 BSM2 modules will be discussed, including the major outside sources upon which each section of the model relies and how the modules are interconnected. A detailed list of every data input variable contained in the BSM2, with corresponding values, references, and graphical functions, can be found in Appendix B.

Table 2. Distinct Input Variables Versus Total Input Data Points, by Module

Modules	Distinct Input Variables	Total Input Data Points
Feedstock Supply	185	4,739
Feedstock Conversion	125	2,646
DSM Inputs	95	955
Feedstock Logistics	52	285
Ethanol Pricing & Inventory	11	248
Ethanol Dispensing Stations	10	1,917
Ethanol Imports	9	38
Important Model Outputs	9	72
Vehicles	4	1,000
Fuel Use	3	330
Ethanol Distribution Logistics	2	111

For the modules with the greatest number of distinct variables, the majority of the data come from outside sources, displayed in Figure 3 as “referenced data.” For modules that have very few data inputs, the data types of “scenario values” and “BSM calibration” play a large role. Modeler assumptions and expert opinion comprise the least number of distinct variables for the majority of the modules.

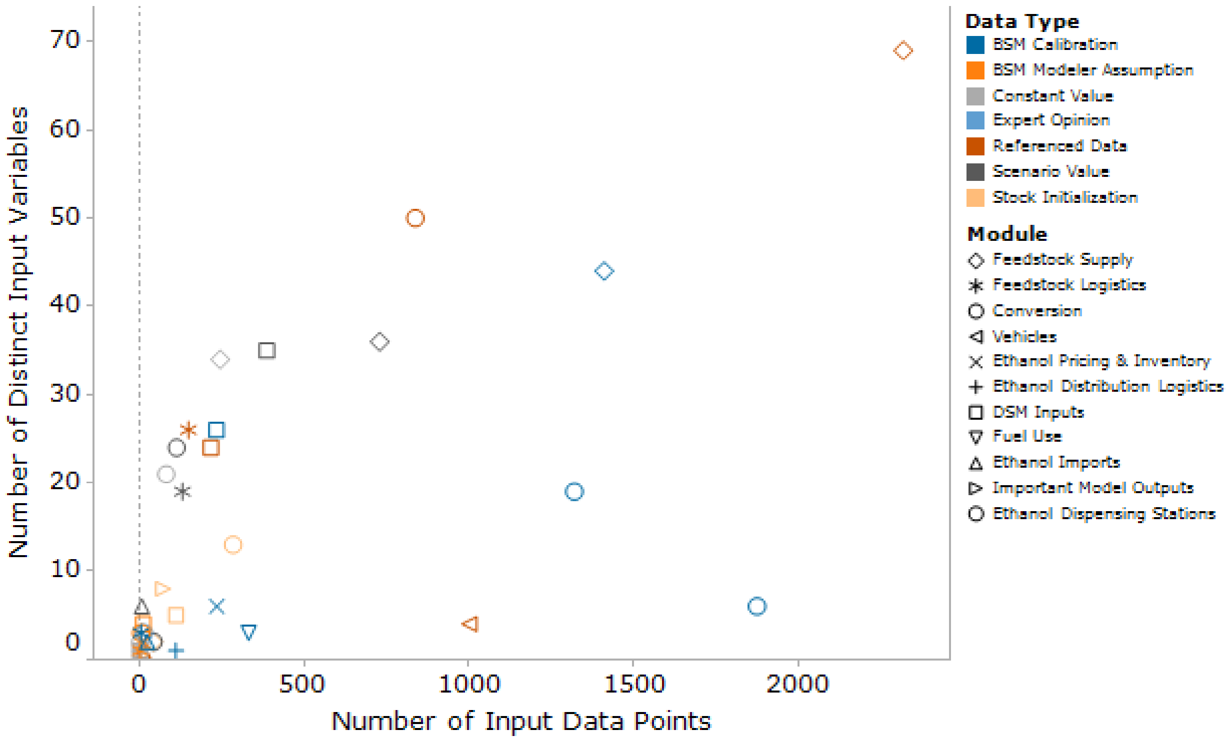


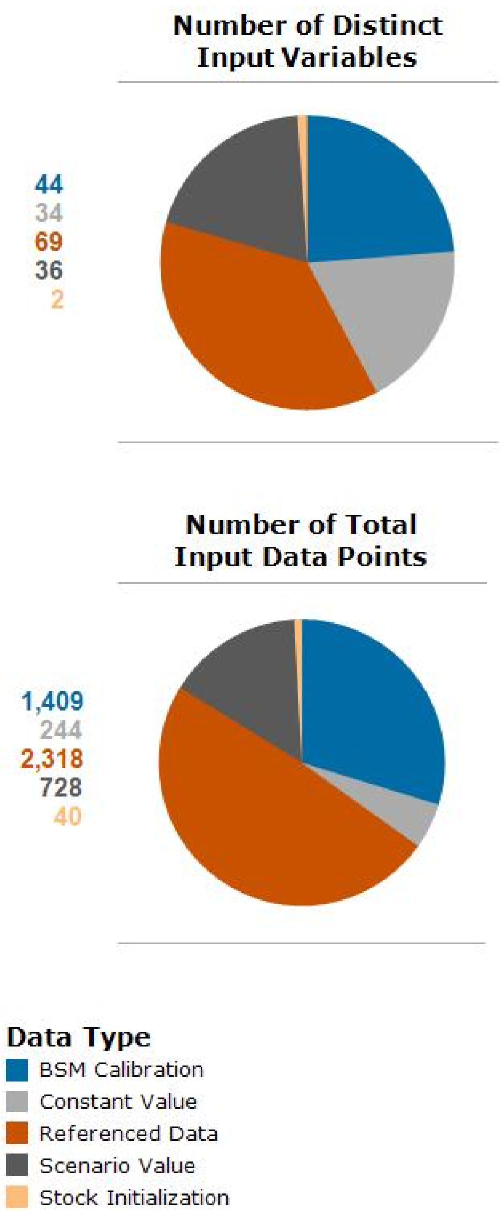
Figure 3. Distinct input variables versus total input data points among reference types and modules

2.1 Feedstock Supply Module

The FSM accounts for 6 feedstock types (commodity crops, herbaceous energy crops, woody energy crops, agricultural residues, forest residues, and urban residues), 10 geographic regions, and different land uses including active crop land (planted with commodity crops or perennial energy crops), pasture land, and Conservation Reserve Program (CRP) land. It models farmer decision logic and land allocation dynamics and also covers new agriculture practices, markets, and prices. For a more detailed explanation of the feedbacks and mechanisms in this module, see Newes et al. (2011).

The FSM is the most data-heavy of all the modules. Almost half of the FSM inputs are based on outside sources, as illustrated in Figure 4. The FSM relies heavily upon datasets provided by Robert Perlack of Oak Ridge National Laboratory (ORNL),[3] most of which are based on the POLYSYS model (The University of Tennessee). These data include feedstock yields, grower payments, costs, acreage by land use, crop prices, and other feedstock-related metrics. USDA projections (Interagency Agricultural Projections Committee 2011), the Biomass Logistics Model (Idaho National Laboratory), and Biomass Crop Assistance Program (Commodity Credit Corporation 2010) regulations are also major sources for the module. Because many of the projections do not provide numbers for the full timespan for which the BSM2 is generally run and/or do not provide points for every year, linear interpolation and/or extrapolation are performed to obtain the missing data.

[3] Robert Perlack retired from Oak Ridge National Laboratory in 2012. See Appendix A for more details on this dataset.



Referenced Data	Distinct Variables	Total Data Points
Data Obtained through Personal Communication with Robert Perlack of Oak Ridge National Laboratory	36	1,160
USDA Agricultural Projections to 2020	8	699
Biomass Logistics Model	7	19
USDA Agricultural Projections to 2018	7	87
Biomass Crop Assistance Program; Proposed Rule	5	5
Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis	5	13
Annual Energy Outlook 2011	2	48
Energy Independence and Security Act of 2007	2	46
U.S. Census 2010 Population Map	2	14
EPA Finalizes Regulations for the National Renewable Fuel Standard Program for 2010 and Beyond	1	1
Regulation of Fuels and Fuel Additives: 2011 Renewable Fuel Standards; Final Rule	1	1
U.S. Billion-Ton Update: Biomass Supply for Bioenergy and Bioproducts	1	210
University of Missouri: G4020 Tables for Weights and Measurements: Crops	1	5
USDA Land Values and Cash Rents: 2010 Summary	1	10

Figure 4. Number of distinct input variables and total input data points by reference type in the FSM (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

In addition to the input data variables that are included within the FSM, the module also receives inputs from the Feedstock Logistics Module (FLM), the CM, and the DSM Inputs Module. The FSM also contributes some of its outputs to the FLM, CM, and Outputs Module (shown in Figure 5).

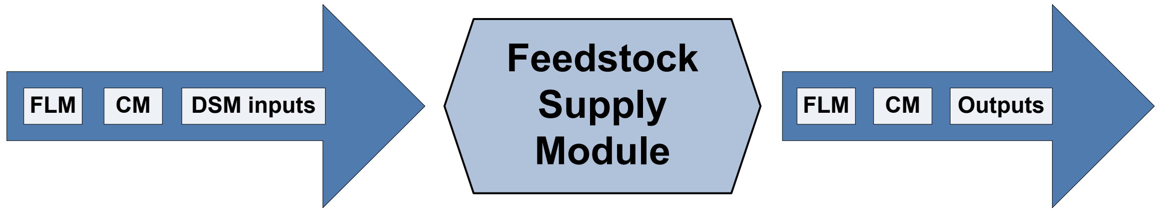


Figure 5. FSM: Interaction with other modules

2.2 Feedstock Logistics Module

The FLM covers transferring feedstock from the field to the conversion facility. It offers the logistics in multiple stages (including conventional and advanced uniform systems), provides cost breakdowns, accounts for transportation distance, and factors in land eligibility constraints. The main type of data source contributing to the FLM is external referenced data, followed by scenarios. As is shown in Figure 7, the FLM relies upon values from the Biomass Logistics Model (Idaho National Laboratory), originally developed by Oak Ridge National Laboratory, for the majority of its inputs dealing with crop transportation (costs, truck capacity, efficiency, loss). Additional sources of information include the Forest Residues Transportation Costing Model (Rummer 2005) for informing the cost of transporting forest residues, communication with Robert Perlack for harvesting and collection costs, and an NREL design report (Dutta et al. 2011) for conversion facility processing capacity characteristics.

The FLM receives values from variables contained in the FSM and CM and provides outputs into the FSM, as is shown in Figure 6.

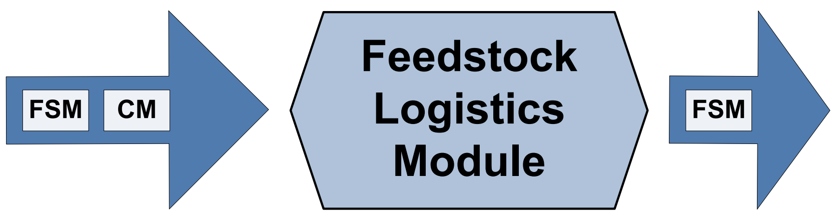
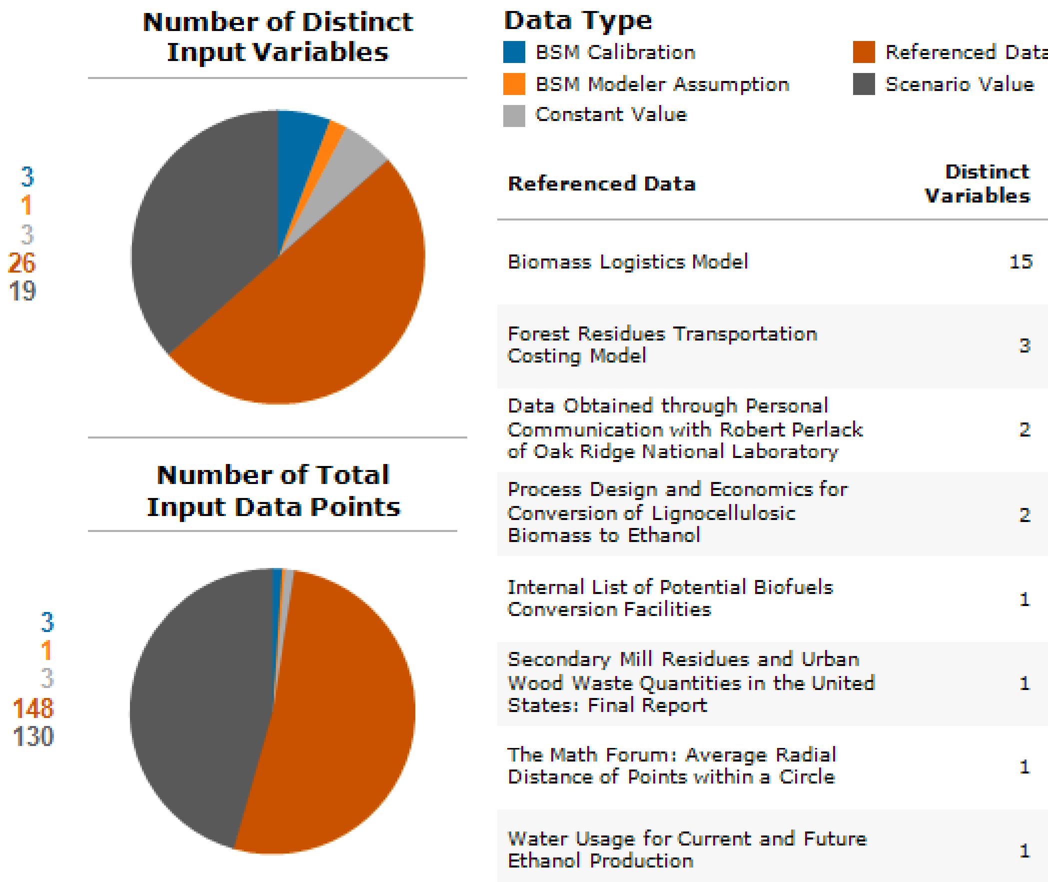


Figure 6. FLM: Interaction with other modules



Referenced Data	Distinct Variables	Total Data Points
Biomass Logistics Model	15	70
Forest Residues Transportation Costing Model	3	3
Data Obtained through Personal Communication with Robert Perlack of Oak Ridge National Laboratory	2	60
Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol	2	2
Internal List of Potential Biofuels Conversion Facilities	1	10
Secondary Mill Residues and Urban Wood Waste Quantities in the United States: Final Report	1	1
The Math Forum: Average Radial Distance of Points within a Circle	1	1
Water Usage for Current and Future Ethanol Production	1	1

Figure 7. Number of distinct input variables and total input data points by reference type in the FLM (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

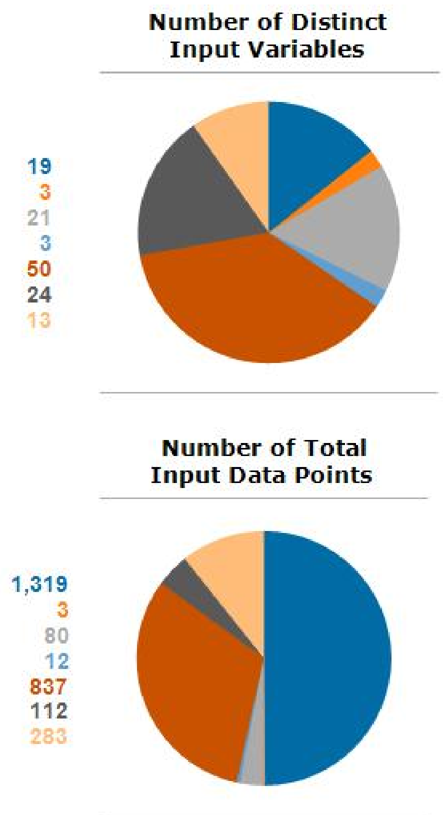
2.3 Feedstock Conversion Module

The CM currently has five conversion platforms, including starch, thermochemical, biochemical, starch plus, and hybrid. It covers four development stages (pilot, demo, pioneer, commercial) of pre-defined scales; six attributes (process yield, probability of success, input capacity, capital cost, risk, and debt fraction); cascading learning curves; and project economics. It also models industry growth and investment dynamics. The CM is the second-most input-intensive module after the FSM.

Outside data play a major role for the inputs to the CM, as is shown in Figure 8. Important references for this module include the NREL technical reports for biochemical, thermochemical, and starch pathways for ethanol conversion (Dutta et al. 2011; Humbird et al. 2011; McAloon et al. 2000). Data from these reports are utilized to inform capital and variable costs, feedstock throughput capacity, facility capacity, product yield, and other related items. Additionally, an internal list of potential biofuels conversion facilities[4] summarizes all the known plants in the pipeline and is used to determine the number of exogenous plant start-ups in the model. These

[4] See Appendix A for more information on the internal list of conversion facilities.

data are also utilized for an optimistic scenario, where all plants that have been announced but have not made much progress are assumed to still begin operations on the most recently publicized date.



Referenced Data	Distinct Variables	Total Data Points
Internal List of Potential Biofuels Conversion Facilities	29	777
Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol	15	17
Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol	12	12
Feasibility Study for Co-Locating and Integrating Ethanol Production Plants from Corn Starch and Lignocellulosic Feedstocks	7	10
Determining the Cost of Producing Ethanol from Corn Starch and Lignocellulosic Feedstocks	3	3
Expert Opinion	3	12
Internal Risk Analysis for GPRA and SEDS	3	18

Figure 8. Number of distinct input variables and total input data points by reference type in the CM (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

The CM is the link between feedstock production and the "downstream" (distribution, dispensing, and fuel use). Therefore, it is interconnected with many modules (see Figure 9). It takes values from the FSM and PIM and feeds values into the FLM, FSM, Outputs, and PIM.

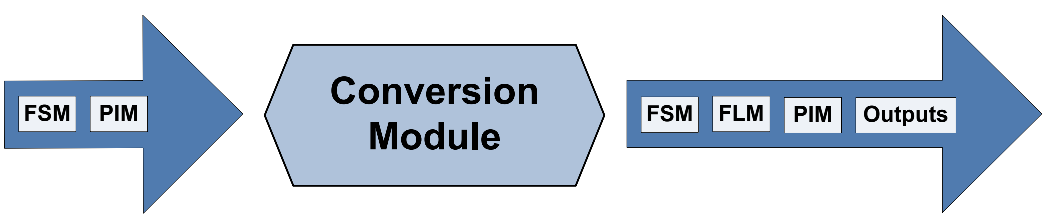


Figure 9. CM: Interaction with other modules

2.4 Dispensing Station Module Inputs

The DSM Inputs Module holds most of the outside references, calibration values, and scenario values for the downstream modules—distribution, dispensing, and fuel use, as is shown in Figure 10. It feeds predominantly into Dispensing Stations Module (DSM) and Distribution Logistics Module (DLM) and does not have any actual logic within its own module. Housing all outside sources for the downstream modules in a separate module is a reasonable method for keeping track of all of the relevant inputs.

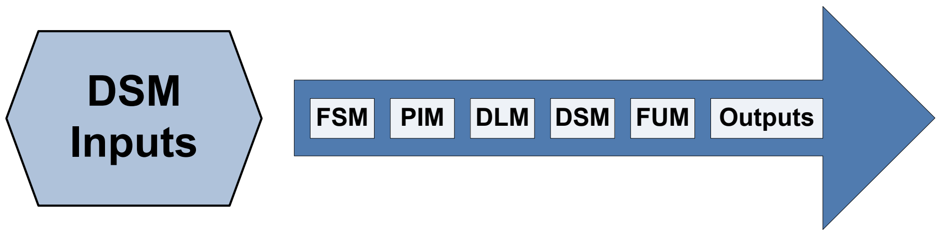
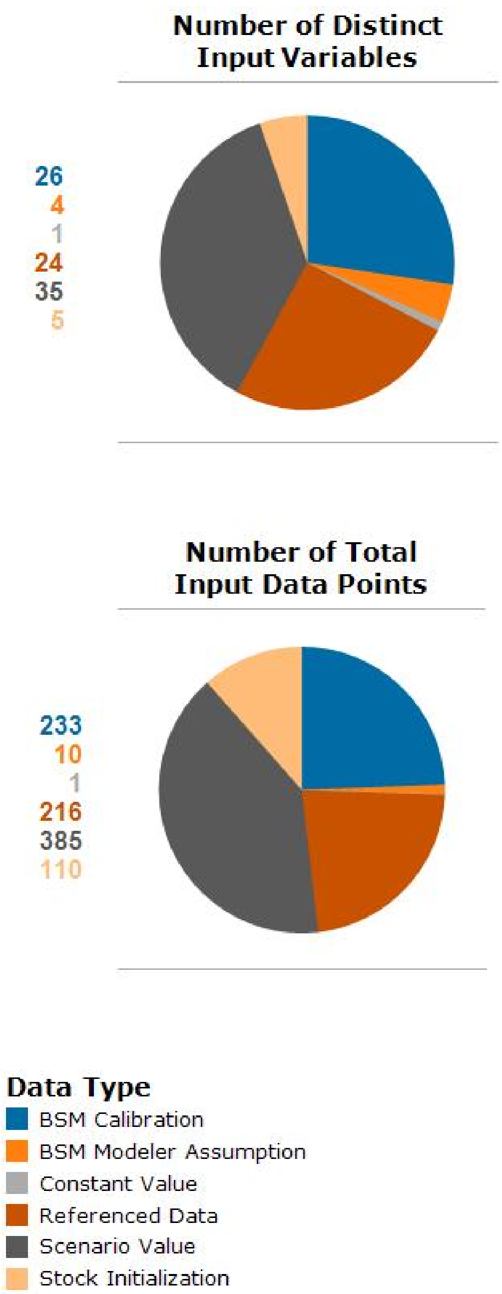


Figure 10. DSM Inputs Module: Interaction with other modules

DSM Inputs has a few key references, as shown in Figure 11.[5] The first is an internal NREL ethanol transportation memo, in which transportation costs for ethanol with and without infrastructure are examined.[6] Another important data source is the National Association of Convenience Stores, which provides information on gasoline station sales and volumes (National Association of Convenience Stores 2011). In addition, an NREL report details ownership of gas stations in the United States (Johnson and Melendez 2007).

[5] In general, available data for the distribution, dispensing, and end use of ethanol are extremely limited. We have collected data from a variety of sources that are not peer-reviewed published papers.

[6] See Appendix A for more information.



Referenced Data	Distinct Variables	Total Data Points
E85 Retail Business Case: When and Why to Sell E85	4	28
Ethanol Transportation Memo	4	40
EPA E15 Factsheet	2	14
NACS Gas Price Kit 2011	2	5
5798-10a: Standard Specification for Fuel Ethanol (Ed75-Ed-85) for Automotive Spark-Ignition Engines	1	10
Aggregation of Tankage Data from State Agencies	1	10
API: Gasoline Taxes July 2011	1	10
Enhancing Nitrogen Use Efficiency in Sorghum in Kansas	1	1
Forest Residues Transportation Costing Model	1	1
NACS 2007 Annual Report	1	40
Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol	1	1
Status and Issues for Ethanol (E85) in the United States	1	40
Summary Real Estate Appraisal Report Gas Station/Convenience Store	1	4
The Demand for E85 Ethanol	1	1
U.S. Census: Gasoline Stations in the US	1	1
USDA Land Values and Cash Rents: 2010 Summary	1	10

Figure 11. Number of distinct input variables and total input data points by reference type in the DSM Inputs Module (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

2.5 Pricing and Inventory Module

Ethanol price is set and inventory is calculated in the PIM. More information on how E85 price is formulated can be found in Newes et al. (forthcoming). Inventory is determined by supply of ethanol and consumption of E10[7] and E85 along with ethanol imports. Any outside references utilized by the PIM are contained in the DSM Inputs Module. The PIM is the most interconnected module in the BSM2. It receives information from 6 of the 10 other BSM2 modules. It sends relevant outputs to five of the modules (see Figure 12).

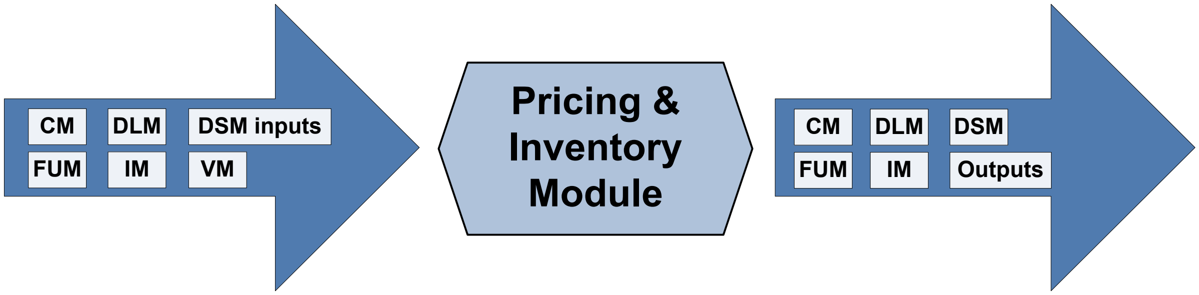


Figure 12. PIM: Interaction with other modules

The PIM contains mainly calibration-related inputs (see Figure 13). The majority of these variables are tuning parameters that temper the model's reaction to environmental changes. For example, one deals with how quickly ethanol production ramps up in response to a change in ethanol price while another determines how quickly a difference between supply and demand will affect ethanol price.

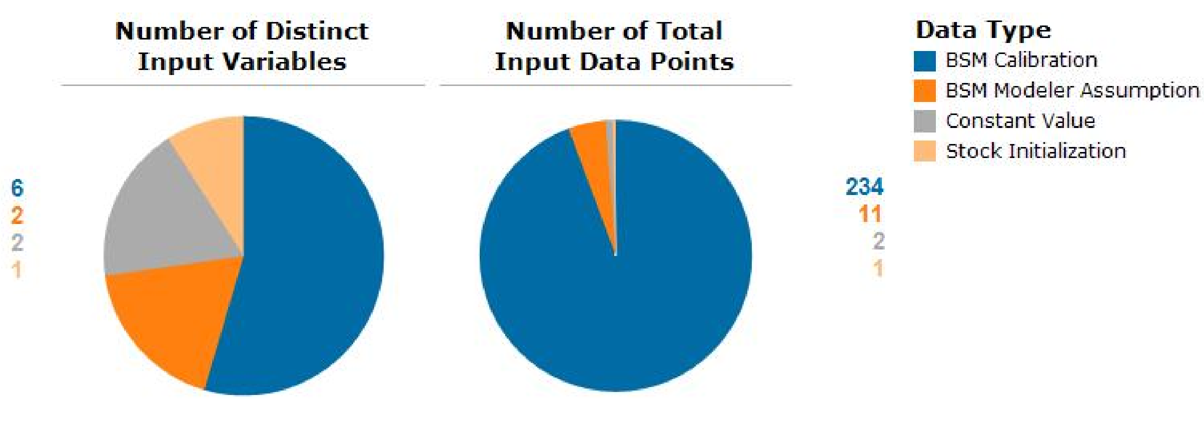


Figure 13. Number of distinct input variables and total input data points by reference type in the PIM

2.6 Distribution Logistics Module

The DLM contains logic regarding implicit ethanol distribution modes, regional depot and storage, transportation costs, and inter-regional transport. For more information on the DLM, see Vimmerstedt et al. (2012). Because most of the downstream (distribution, dispensing, and fuel use) modules' input values are contained in the DSM Inputs Module, there are no references associated directly with this module (see Figure 14). The BSM2 calibration variable deals with

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[7] Although recent regulations for E15 have been passed, there are not many available E15 pumps at the writing of this report. Nonetheless, the BSM2 can be run taking E15 into account.

the relationship between the terminals without ethanol storage capacity and the rate at which terminals are acquiring ethanol storage capability. The lone scenario variable allows the user to enable 100% of the storage facilities to accept ethanol.

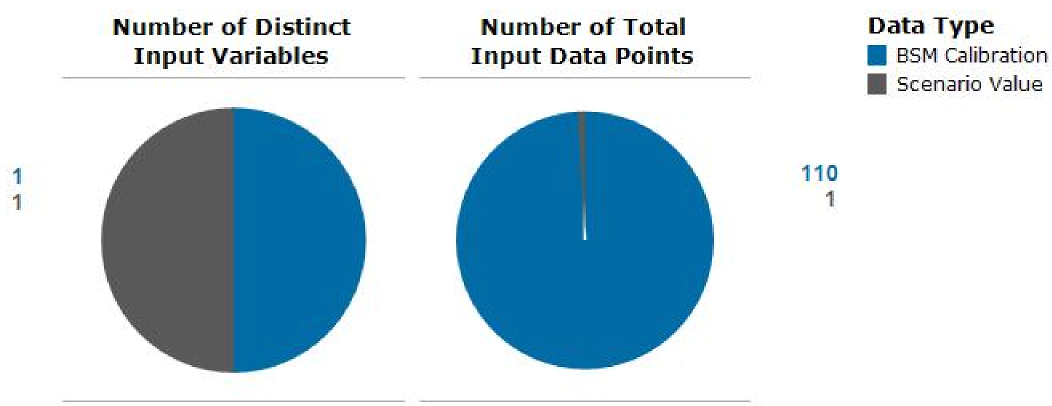


Figure 14. Number of distinct input variables and total input data points by reference type in the DLM

As is shown in Figure 15, the DLM receives inputs from DSM Inputs, the PIM, and the Vehicles Module (VM). Some of its key outputs go to the PIM, the DSM, and Outputs.

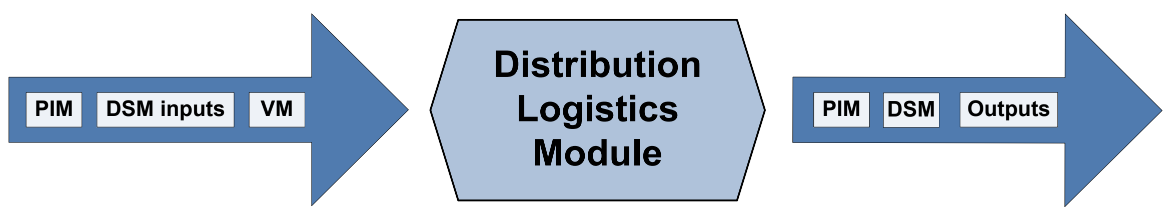


Figure 15. DLM: Interaction with other modules

2.7 Dispensing Stations Module

The DSM provides fueling-station economics and houses fuel-choice dynamics. It also looks at the distribution-coverage effects across the different regions. For more information on the DSM, see Vimmerstedt et al. (2012). As was previously stated in Section 2.4, most of the inputs for the DSM are contained in the DSM Inputs Module; therefore, the DSM consists entirely of calibration, constants, and scenario values. There are no outside sources associated directly with this module (see Figure 16).

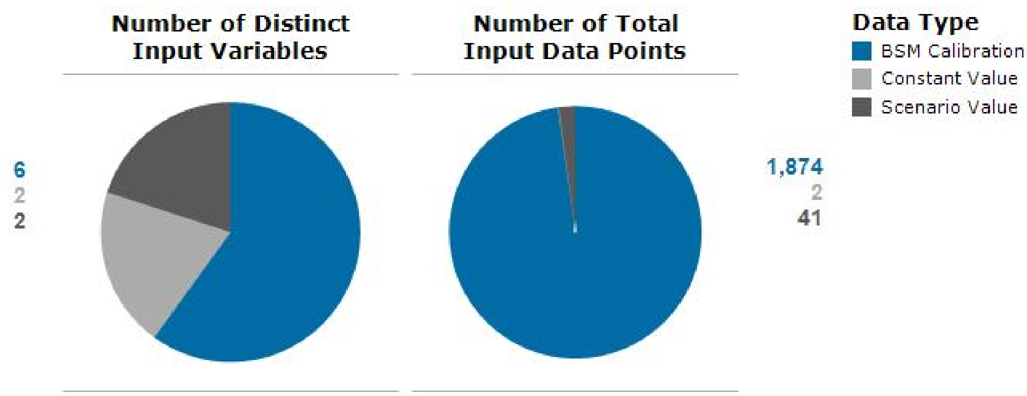


Figure 16. Number of distinct input variables and total input data points by reference type in the DSM

As shown in Figure 17, the DSM receives information from the FUM, DSM inputs, DLM, PIM, and VM. Selected outputs from the DSM go to the FUM and Outputs Module.

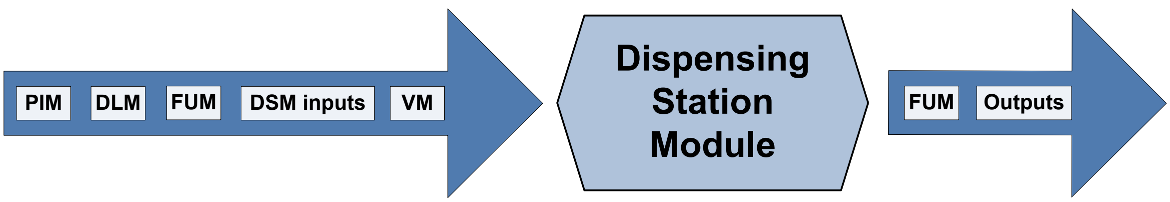


Figure 17. DSM: Interaction with other modules

2.8 Fuel Use Module

The FUM contains fuel choice logic. Consumers are categorized as three types of users: regular high-blend users, occasion high-blend users, and non-high-blend users. The major constraints to this module are the number of stations offering high-blend fuel, the price differential between high-blend fuel and gasoline, and the number of flex-fuel vehicles in the vehicle fleet. As a base-case scenario, the model uses projections from the 2011 Annual Energy Outlook (Energy Information Administration 2011a) for gasoline prices (listed as a scenario variable in the DSM Inputs Module). As shown in Figure 18, the FUM contains only calibration variables: the percent of flex-fuel vehicle owners who will choose E85 on a regular basis, the rate at which E85 consumption increases with the number of stations offering E85, and the rate at which occasional E85 users become regular users.

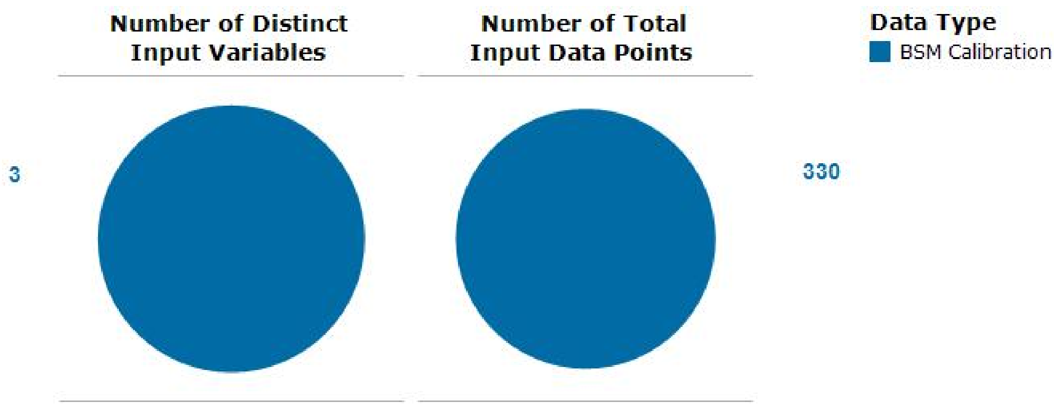


Figure 18. Number of distinct input variables and total input data points by reference type in the FUM

The FUM receives information from DSM Inputs, the VM, DSM, and PIM. It sends outputs to the DSM, PIM, and the Outputs Module (see Figure 19).

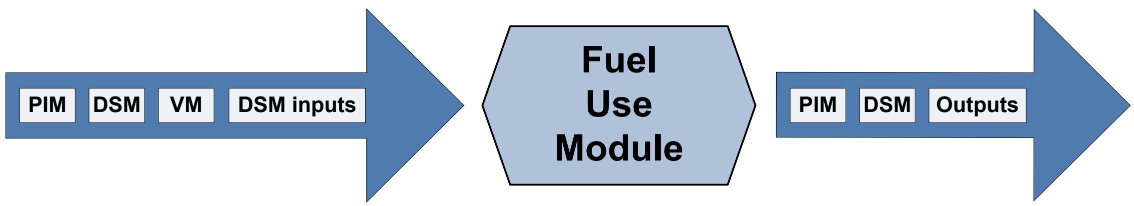
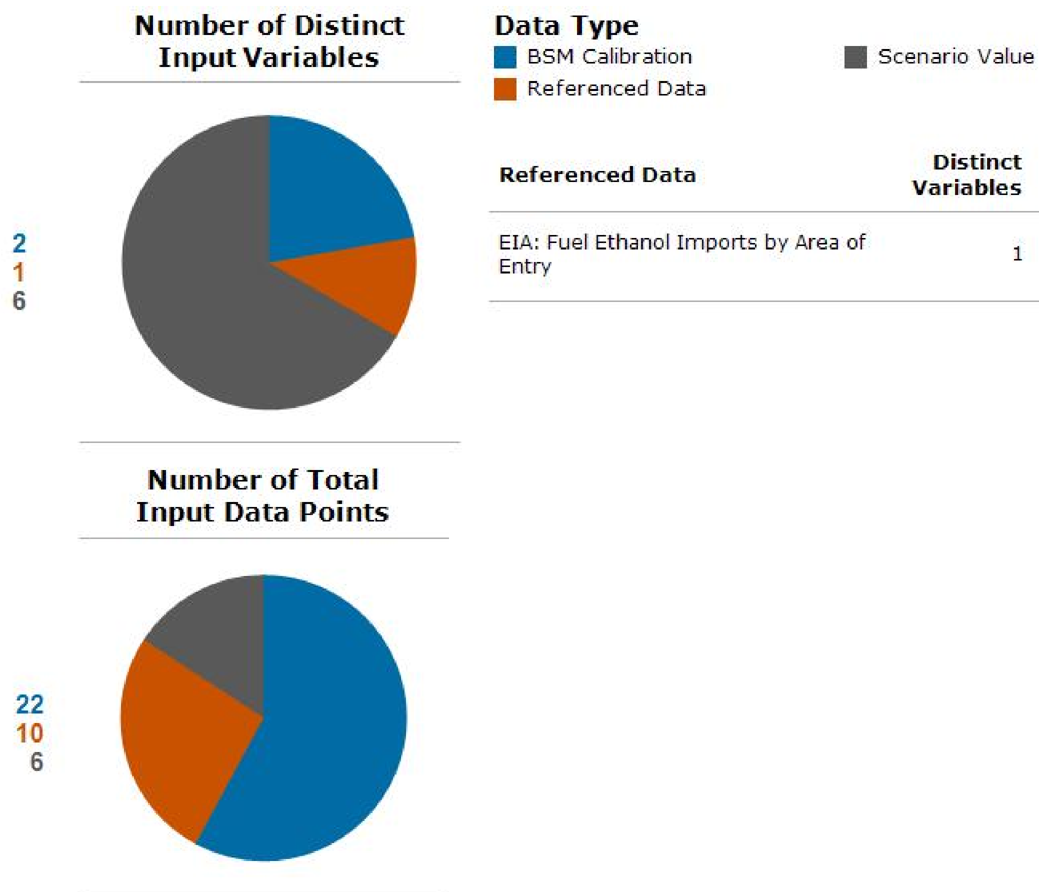


Figure 19. FUM: Interaction with other modules

2.9 Imports Module

The Imports Module (IM) looks at costs, taxes, and regulations associated with importing ethanol. Most of the variables are scenario values that give different options for import scenarios (see Figure 20). The one external source used is the Energy Information Administration's compilation of ethanol imports (Energy Information Administration 2011b).



Referenced Data	Distinct Variables	Total Data Points
EIA: Fuel Ethanol Imports by Area of Entry	1	10

Figure 20. Number of distinct input variables and total input data points by reference type in the IM (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

The IM receives information from the PIM, while providing data to the PIM after a series of internal calculations (see Figure 21).

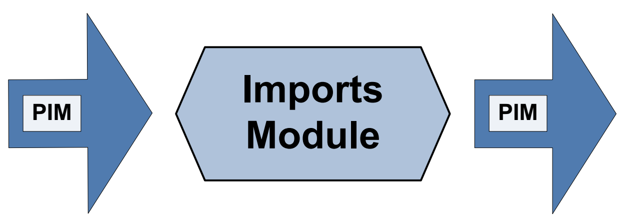
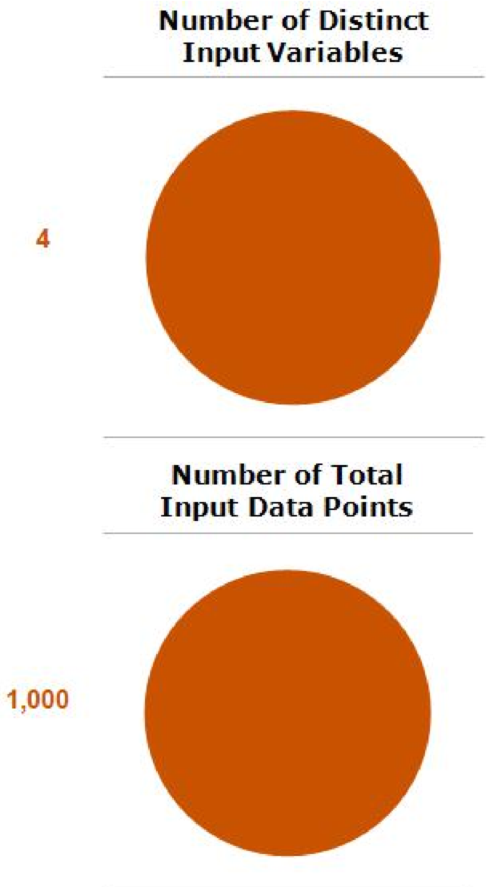


Figure 21. IM: Interaction with other modules

2.10 Vehicles Module

The VM is a separate model, not embedded within the BSM, that generates different portfolios of vehicle shares by type within the fleet, with the attention focused on the number of available flex-fuel vehicles and overall demand for liquid fuel. Four output variables that address the potential consumption of gasoline versus E85 are then fed into the BSM2 (see Figure 22). The baseline scenario for the BSM2 uses the Annual Energy Outlook's projections for vehicle fleet composition (Energy Information Administration 2011a).



Data Type

Referenced Data

Referenced Data	Distinct Variables	Total Data Points
Annual Energy Outlook 2011	4	1,000

Figure 22. Number of distinct input variables and total input data points by reference type in the VM (left) and breakdown of referenced data by source, number of distinct variables, and total data points (right)

Note: The sum of the distinct variables column on the right may not equal the number of distinct variables for referenced data because in an arrayed variable, elements may have different sources.

Because the VM is simply outputs from a separate model, it only feeds data into modules of the BSM2, more specifically the DLM, DSM, PIM, FUM, and Outputs Module (see Figure 23).

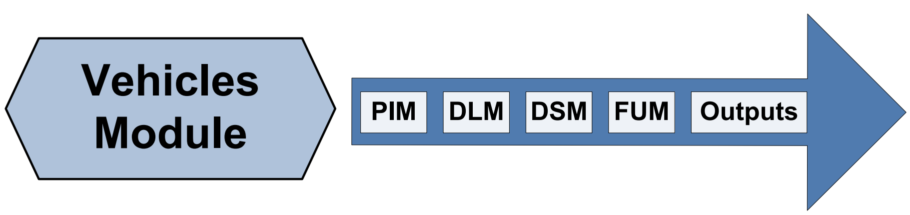


Figure 23. VM: Interaction with other modules

2.11 Outputs

The outputs module is generally a place where many of the important outputs from all of the other modules are gathered in order to have one location where all of them are easily accessible. Many of the variables are aggregated and cumulated here in order to create different ways to look at the output metrics. For this reason, almost all of the input variables are simply stock initializations, as illustrated in Figure 24.

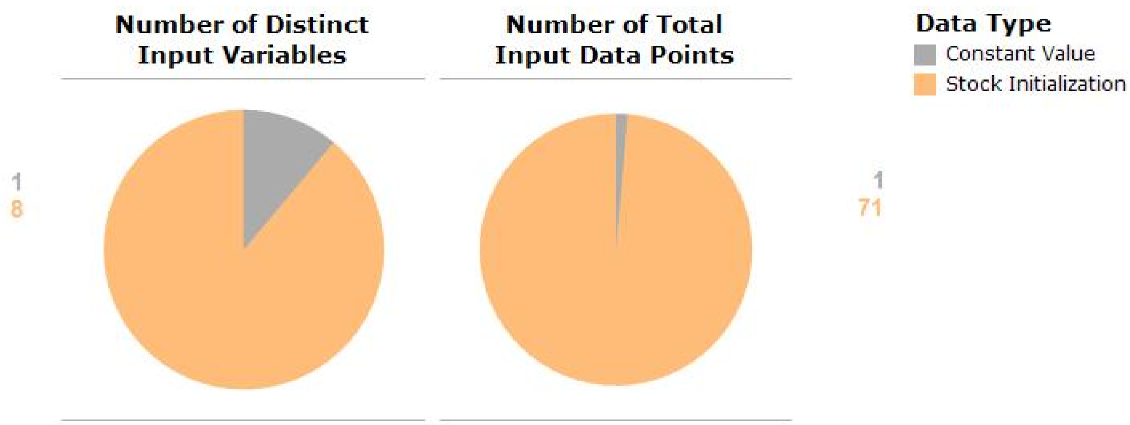


Figure 24. Number of distinct input variables and total input data points by reference type in the Outputs Module

3 Conclusion

The BSM2 is a complex model that contains over 1,500 distinct variables, including over 500 variables with data inputs, that aid in representing the biomass-to-biofuels supply chain and exploring system responses to a variety of scenarios. This report describes the structured modules of the BSM2, the nature of their data sources, and how they interact. The model is calibrated with established industry data and validated against expert opinions, when available. Most of the exogenous data sources that constitute the main inputs to the model are recognized as baseline values by the industry. These values are updated in the model when new data are released. By detailing the input data in this report, the foundation for initialization and calibration of the BSM2 can be easily located by analysts and others interested in the data fundamentals of the model. With this organized input information, we plan to build a more structured data provenance of the BSM2—using the established database that houses all current and historical variables, formulas, and references for the model—that will facilitate users' locations of all important data streams in the model.

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Appendix A

Definitions of input data types:

Scenario Value

A scenario variable is used to simulate a hypothetical situation that is not based on any referenced data. It is generally a user input that can be utilized to run the model under different situations. Scenario variables can be multipliers that are applied to existing values or distinct variables specific to a certain situation.

BSM Calibration

A number of functions, such as logit functions, require appropriate coefficients that cannot be determined through pure assumption or data. In these cases, a calibration method is used to determine the allowable value. Typical steps for calibrating the model include the following:

- Outside data, upon which the model will be calibrated, are entered into the model as a graphical function [i.e., USDA feedstock projections (Interagency Agricultural Projections Committee 2011)].
- The BSM2 is run to see how closely the two trajectories match in the short term.
- Relevant parameters within the BSM2 are then adjusted to obtain a more closely aligned data path.

Constant Value

Constant variables are comprised of scalar values. Many times these variables are simply conversion factors, such as how many days are in a year.

BSM Modeler Assumption

A variable labeled with modeler assumption means that, given the available information, the modeler made a best estimate. This data type differs from calibration in that, in theory, a referenced value for this variable could exist if appropriate research were performed.

Expert Opinion

While published data on these values do not exist, the modelers spoke with experts in the field for their best estimates to arrive at the assigned values.

Stock Initialization

In STELLA (isee systems 2010), stocks must be initialized. Most of these values are set to zero to indicate a lack of accumulation before the model run begins.

Referenced Data

Data from specific sources that are not assumptions made by modelers or outside experts are considered to be referenced data. Most of these publications and models can be found on the internet. The following list details sources that are not available to the public.

- *Internal Conversion Facility List*

  A member of the BSM team compiled a spreadsheet of all the biorefineries currently in the pipeline for various technologies and scales. The spreadsheet is based on data from the U.S. Department of Energy (U.S. Department of Energy 2012), Biofuels Digest (Biofuels Digest 2011), and Hart Energy (Global Biofuels Center 2012), which were carefully crosschecked against available information from additional sources such as press releases and news articles. From that information, plants were divided into a “likely” and “not likely” categories, indicating which plants are not likely to start up on schedule, either due to delays or cancellation. These data were aggregated to determine the number of exogenous plants starting up in the CM.

- *Communication with Robert Perlack of Oak Ridge National Laboratory*

  The datasets obtained from Robert Perlack contain critical information about costs, prices, acreage, and yields for energy crops (woody and cellulosic), conventional crops, and agricultural residues. They also provide a breakdown of acreage by land use. The data were aggregated to the USDA region level, using averages when necessary. The information provided for the BSM2 was based on runs of POLYSYS (The University of Tennessee), USDA projections (Interagency Agricultural Projections Committee 2011), and data provided by the Economic Research Service of the USDA. Although the data were obtained through ORNL, they are not always synonymous with data from the Billion Ton Update (Perlack and Stokes 2011) because they originated from different runs of POLYSYS.

- *Aggregation of Tankage Data from State Agencies*

  The data were researched by state, mostly from the state Oil and Gas Commission websites.

- *Ethanol Transportation Memo*

  The internal transportation memo was compiled in 2011 by Olga Antonia, formerly of NREL, and includes information regarding biofuel delivery costs. Data are provided for terminal costs in addition to transportation by truck, rail, and barge. A simple calculator was also created to derive ethanol.

- *Internal Risk Analysis for GPRA and SEDS*

  This internal document written in 2008 by Robert Wallace, formerly of NREL, details the process and results for the Government Performance and Results Act (GPRA) and the Stochastic Energy Deployment System (SEDS – seds.nrel.gov) risk/uncertainty analysis performed for the biochemical conversion process for lignocellulosic biomass to ethanol.

Appendix B

This section contains a comprehensive list of all input variables in the BSM2 along with a description of the variable, the data source, the actual value (or group of values), and the units of measurement. The listed values are taken from the BSM2 reference policy case, which includes moderate incentives for ethanol production and a $0.50 per gallon gasoline tax—see Newes et al. (forthcoming). The variables are organized in the following manner: single data points are shown in the first list, followed by tables of arrayed functions and graphs of the graphical functions.

CM.Cume_Govt_Exposure_Loan_Guarantee *Stock Initialization*

Value: 0 | Units: USD | An accumulation of government load guarantees; initialized to 0 at the start of the model

---

CM.Cume_Govt_Subs_FCI *Stock Initialization*

Value: 0 | Units: USD | An accumulation of fixed capital investment subsidies; initialized to 0 at the start of the model.

CM.Cume_Govt_Subs_FS *Stock Initialization*

Value: 0 | Units: USD | An accumulation of feedstock subsidies; initialized to 0 at the start of the model.

CM.Days_per_Year_Online *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 0.96 | Units: day/yr | The expected number of days per year that a plant is operational and online. *table 1*

CM.Debt_Interest_Rate_as_Pct *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 8 | Units: 1/yr | The interest rate for debt financing as a percent per year. *table 1*

CM.demo_dev_time *Scenario Value*

Value: 1.5 | Units: yr | The dwell time between the initiation and completion of a demonstration-scale development effort.

CM.demo_op_time *Scenario Value*

Value: 3 | Units: yr | The amount of time that a demonstration-scale development effort spends "on-line".

CM.depreciation_period *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 7 | Units: yr | The depreciation period of capital equipment based on financials from the design report as listed below.

CM.Doubling *Constant Value*

Value: 1 | Units: Doubling | Constant. Keeps units consistent in model.

CM.exogenous_C_initiatiion_interval *Constant Value*

Value: 1E+09 | Units: yr | Length of pulse input for oncoming commercial plants.

CM.exogenous_C_initiatiion_interval_NL *Constant Value*

Value: 1E+09 Units: yr Length of pulse input for oncoming commercial plants that are "not likely" to actually come online.

CM.exogenous_P_initiatiion_interval *Constant Value*

Value: 1E+09 Units: yr Length of pulse input for oncoming pioneer plants.

CM.exogenous_P_initiatiion_interval_NL *Constant Value*

Value: 1E+09 Units: yr Length of pulse input for oncoming pioneer plants that are "not likely" to actually come online.

CM.Expected_Tax_Rate *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Value: 0.35 Units: Unitless Expected tax rate associated with income. *table 1*

CM.fraction_of_PIoneer_cost_growth_anticipated *Scenario Value*

Value: 1 Units: Unitless Enables input of scenarios around investor expectations of cost growth in NPV calculation.

CM.invest_attractiveness_weighting *BSM Calibration*

Value: 15 Units: 1/USD-billions Weighting factor for logit function calculation.

CM.k_C *BSM Calibration*

Value: 0 Units: Unitless An assumed non-$-based utility component of attractiveness of commercial scale operations.

CM.k_OTHER *BSM Calibration*

Value: 0 Units: Unitless An assumed non-$-based utility component of attractiveness of other uses of plant construction capacity.

CM.k_P *BSM Calibration*

Value: 0 Units: Unitless An assumed non-$-based utility component of attractiveness of pioneer-scale operations.

CM.Limit_Plant_Number_for_FCI? *Scenario Value*

Value: 1 Units: Unitless A scenario switch to limit the number of plants for fixed capital investment.

CM.Limit_Plant_Number_for_Loan? *Internal List of Potential Biofuels Conversion Facilities*

Value: 1 Units: Unitless A scenario switch to limit the number of plants for loans.

CM.Mature_Industry_Equity_Fraction *BSM Modeler Assumption*

Value: 0.3 Units: Unitless Expected fraction of investment to be funded through equity financing for commercial plants for mature industry

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CM.Mature_Industry_Rate_of_Return_as_% *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 10 Units: Percent/yr Project rate of return required for mature industry project. *table 1*

CM.Max_Loan_Guarantee_Plants *Internal List of Potential Biofuels Conversion Facilities*

Value: 10 Units: projects Maximum number of plants with loan guarantees.

CM.Max_Starch_Prod'n *Expert Opinion*

Value: 15 Units: billions-gal/yr Maximum number of billion gallons of starch-based EtOH production per year.

CM.neutral_constraint_for_cellulosics *Scenario Value*

Value: 1 Units: Unitless Neutralized input for cellulosic ethanol facilities to counteract the maximum plant constraint that is applied to starch ethanol facilities.

CM.neutral_impact *Scenario Value*

Value: 1 Units: Unitless Used to convert units from nominal units to billions, and from billions to nominal units.

CM.NPV_rel_to_a_billion_OTHER *BSM Calibration*

Value: 0.2 Units: USD-billions Assumed NPV (relative to a billion $) associated with other uses of plant construction capacity.

CM.one *Constant Value*

Value: 1 Units: Unitless Constant; by definition.

CM.one_billion *Constant Value*

Value: 1E+09 Units: 1/billions Constant; by definition.

CM.One_Dollar *Constant Value*

Value: 1 Units: USD Constant; by definition.

CM.one_hundred_% *Constant Value*

Value: 100 Units: Percent Constant; by definition.

CM.one_million *Constant Value*

Value: 1000000 Units: 1/million Constant; by definition.

CM.one_project *Constant Value*

Value: 1 Units: projects Constant; by definition.

CM.Op_Experience_Per_Year *Scenario Value*

Value: 1 Units: 1/projects Years of experience generated per year of operation, for each operation in operation. Applies to demonstration- and pilot-scale operations.

CM.optimistic_exogenous_C_scenario *Scenario Value*

Value: 0 Units: Unitless Switch to bring "unlikely" commercial plants online. See "Internal Conversion Facility List" spreadsheet for judgment on likely/unlikely plants.

CM.optimistic_exogenous_P_scenario *Scenario Value*

Value: 0 Units: Unitless Switch to bring "unlikely" pioneer plants online. See "Internal Conversion Facility List" spreadsheet for judgment on likely/unlikely plants.

CM.pilot_dev_time *BSM Modeler Assumption*

Value: 0.75 Units: yr Dwell time between initiation and completion of pilot-scale development effort.

CM.pilot_op_time *BSM Modeler Assumption*

Value: 1.5 Units: yr Time that pilot-scale development effort spends online and operational.

CM.pioneer_capacity_scale_factor *BSM Calibration*

Value: 0.35 Units: Unitless Scaling factor that relates pioneer-scale to commercial scale capacity.

CM.pioneer_coproduct_scale_factor *BSM Calibration*

Value: 0 Units: Unitless Scaling factor that relates pioneer-scale to commercial scale co-product revenues.

CM.pioneer_cost_scale_factor *BSM Calibration*

Value: 0.6 Units: Unitless Scaling factor that relates pioneer-scale to commercial scale costs.

CM.Plant_Economic_Lifetime *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Value: 30 Units: yr The economic lifetime of a plant in on-line years

---

CM.Policy_Expiration_Time *Scenario Value*

Value: 2022 Units: yr The year in which policy is set to expire.

CM.Policy_Implementation_Time *Scenario Value*

Value: 2011 Units: yr The year in which policy is set to begin.

CM.rate_of_industry_process_yield_adjustment *Scenario Value*

Value: 1 Units: 1/yr Fractional rate of incorporation of state of art knowledge into existing plants in industry.

CM.Regions_in_play *Scenario Value*

Value: 10 Units: Unitless Number of regions in consideration.

CM.Run_CM_in_Isolation? *Scenario Value*

Value: 1 Units: Unitless Switch to determine whether conversion module is to be run in isolation or not.

CM.term_of_loan *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Value: 10 Units: yr Number of years of a project loan.

CM.Util_rate_for_starting_up *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 0.5 Units: Unitless Utilization fraction for start-up commercial-scale plants.

CM.Years_in_Startup_C *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 0.25 Units: yr Assumed time to do start-up for commercial-scale plant.

DLM.Got_Regional_Infrastructure? *Scenario Value*

Value: 0 Units: Unitless A switch that indicates whether there is regional distribution infrastructure available.

DSM.Got_HiBlend_Tankage? *Scenario Value*

Value: 0 Units: Unitless A switch that indicates whether or not there is high blend (E85) tankage available.

DSM.months_per_year *Constant Value*

Value: 12 Units: month/yr Constant; number of months per year.

DSM.one_station *Constant Value*

Value: 1 Units: Stations Constant; represents one station for unit consistency.

DSM_Inputs.add'l_gas_tax_amt *Scenario Value*

Value: 0.5 Units: USD/gal Gasoline tax in dollars per gallon at the pump. Example: carbon tax.

DSM_Inputs.avg_per_gal_markup *NACS Gas Price Kit 2011*

Value: 0.15 Units: USD/gal Assumed dollar markup of gasoline between distributor and retail.

DSM_Inputs.avging_time_for_cons'n *BSM Calibration*

Value: 0.5 Units: yr Averaging time for regional overall EtOH consumption; input to a smoothing function that filters noise from the EtOH consumption pattern.

DSM_Inputs.b_Hi_Plend_Price_coupling_Coeff *The Demand for E85 Ethanol*

Value: 0.75 Units: Unitless The discount applied to gasoline price, and used to set the price of hi-blend, if the scenario selects calculation based on price coupling.

DSM_Inputs.Background_C_EtOH_PoP_implementation_time *Scenario Value*

Value: 2011 Units: yr Start year for EtOH subsidy at the point of production.

DSM_Inputs.Background_C_EtOH_PoP_Subs_stop_time *Scenario Value*

Value: 2051 Units: yr Year in which the EtOH subsidy is to end.

DSM_Inputs.Background_C_ETOH_POP_Subsidy_Amount *Scenario Value*

Value: 0.15 Units: USD/gal EtOH subsidy amount at the point of production.

DSM_Inputs.Background_C_EtOH_PoP_Subsidy_Switch *Scenario Value*

Value: 1 Units: Unitless A switch to determine whether EtOH subsidy at the point of production is available or not.

DSM_Inputs.base_Infras_acquisition_rate *BSM Modeler Assumption*

Value: 0.5 Units: 1/yr Non-constrained baseline rate at which infrastructure gap is eliminated per year.

DSM_Inputs.BTU\gal_ethanol *Enhancing Nitrogen Use Efficiency in Sorghum in Kansas*

Value: 76 Units: btu/gallon Energy content of EtOH.

DSM_Inputs.BTU\gal_gasoline *Forest Residues Transportation Costing Model*

Value: 115 Units: btu/gallon Energy content of gasoline.

DSM_Inputs.c_Cost_Plus_Markup_Coeff *BSM Calibration*

Value: 1.3 Units: Unitless Applied to POD price, and used to set the cost-plus markup pricing rule for hi blend.

DSM_Inputs.C_ETOH_POP_Subsidy_Amount *Scenario Value*

Value: 2.5 Units: USD/gal Amount of subsidy at PoP that is tied to a cellulosic volumetric constraint.

DSM_Inputs.C_EtOH_PoP_Subsidy_Switch *Scenario Value*

Value: 1 Units: Unitless A switch to activate a subsidy for ethanol at the commercial-scale point of production.

DSM_Inputs.C_PoP_subs_stop_time *Scenario Value*

Value: 2051 Units: yr Year in which subsidies are scheduled to turn off.

DSM_Inputs.depreciation_period *BSM Calibration*

Value: 7 Units: yr Depreciation period for capital equipment, in years.

DSM_Inputs.desired_ETOH_inv_adj_time *BSM Calibration*

Value: 0.25 Units: yr Time, in years, to adjust regional overages/shortages in inventories.

DSM_Inputs.Desired_EtOH_inv_coverage *BSM Calibration*

Value: 0.1 Units: yr Size of aggregate system inventory desired measured in years-worth of average consumption.

DSM_Inputs.DistStor_subs_stop_time *Scenario Value*

Value: 2020 Units: yr Year in which the distribution and storage subsidy is scheduled to end.

DSM_Inputs.dwell_time_for_considering_investment *BSM Calibration*

Value: 1 Units: yr Average length of time that a decision is under consideration, in years.

DSM_Inputs.EtOH_Dist'n_Storage_Subsidy_Switch *Scenario Value*

Value: 1 Units: Unitless A switch to activate a subsidy for ethanol in distribution and storage.

DSM_Inputs.Expected_Tax_Rate *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Value: 0.35 Units: Unitless Expected tax rate associated with income from investment.

DSM_Inputs.f_Hi_Blend_Gasoline_Price_Coupling_Weighting_Factor *BSM Calibration*

Value: 0.7 Units: Unitless Weighting factor used to weight price coupling (vs cost-plus pricing) in weighted avg calculation of high blend price. Range between 0 and 1.

DSM_Inputs.FCI_subs_stop_time *Scenario Value*

Value: 2031 Units: yr Year in which the FCI subsidies are scheduled to end.

DSM_Inputs.FCI_subs_switch *Scenario Value*

Value: 1 Units: Unitless A switch to activate a subsidy for FCI.

DSM_Inputs.frac_avg_term_vol_req'd_for_acq *BSM Calibration*

Value: 0.25 Units: Unitless Fraction of average per-terminal gasoline volume that sets threshold for acquiring infrastructure when there is a surplus of EtOH relative to terminals with EtOH infrastructure.

DSM_Inputs.Frac_FCI_subs *Scenario Value*

Value: 0.8 Units: Unitless Fraction of Fixed Capital Expense that is subsidized by the government.

DSM_Inputs.gas_price_averaging_time *BSM Calibration*

Value: 2 Units: yr Provides averaging time for price smoothing of price dynamics. An input to long term price for gasoline, hi-blend.

DSM_Inputs.gas_tax_stop_time *Scenario Value*

Value: 2051 Units: yr Year in which the gas tax is scheduled to turn off.

DSM_Inputs.gas_tax_switch *Scenario Value*

Value: 1 Units: Unitless A switch to control whether a gas tax scenario is in place.

DSM_Inputs.hi_blend_PoU_subsidy_amt *Scenario Value*

Value: 0.5 Units: USD/gal Dollars per gallon of point of use hi-blend subsidy.

DSM_Inputs.hi_blend_subsidy_switch *Scenario Value*

Value: 1 Units: Unitless A switch to turn on the point of use hi-blend subsidy.

DSM_Inputs.HiBlend_subs_stop_time *Scenario Value*

Value: 2024 Units: yr Year in which the hi-blend subsidy is set to end.

DSM_Inputs.implementation_time *Scenario Value*

Value: 2011 Units: yr Year in which all price-oriented DSM initiatives are to be turned on.

DSM_Inputs.import_avg_adj_time *BSM Calibration*

Value: 0.5 Units: yr Averaging time for calculating the fraction of total influx to the region that is imported from the other regions.

DSM_Inputs.k_Gas_Occasional_Users *BSM Calibration*

Value: 1.1 Units: Unitless Assumed non-dollar-based utility component of attractiveness of gasoline for occasional hi-blend users.

DSM_Inputs.k_Gas_Regular_Users *BSM Calibration*

Value: 0 Units: Unitless Assumed non-dollar-based utility component of attractiveness of gasoline for regular hi-blend users.

DSM_Inputs.k_Hi_Blend_Occasional_Users *BSM Calibration*

Value: 0 Units: Unitless Assumed non-dollar-based utility component of attractiveness of hi-blend for occasional hi-blend users.

DSM_Inputs.k_Hi_Blend_Regular_Users *BSM Calibration*

Value: 1.1 Units: Unitless Assumed non-dollar-based utility component of attractiveness of hi-blend for regular hi-blend users.

DSM_Inputs.Max_Cellulosic_Volume_for_PoP_Subsidy *Scenario Value*

Value: 1E+09 | Units: gal | Maximum volume of cellulosic ethanol at the point of production eligible for subsidy. Set to a high value to effectively "turn off" this constraint for PoP subsidy.

DSM_Inputs.max_rate_of_becoming_regular_HiBlend_user *BSM Calibration*

Value: 0.5 | Units: 1/yr | Sets the maximum rate at which the regular hi-blend user-gap is eliminated.

DSM_Inputs.New_hi_blend_pricing_structure_switch *Scenario Value*

Value: 1 | Units: Unitless | Switch activates "new" weighted average pricing structure.

DSM_Inputs.occasional_user_price_attractiveness_weighting *BSM Calibration*

Value: 2 | Units: gal/USD | Weighting factor for logit function calculation.

DSM_Inputs.one_hundred_percent *Constant Value*

Value: 100 | Units: Percent | Constant, by definition.

DSM_Inputs.Pct_Hi_Blend_Subsidy_Accruing_to_End_User *Scenario Value*

Value: 0 | Units: Unitless | The percentage of subsidy at the point of use that gets passed on to the end-user rather than accruing to the retailer.

DSM_Inputs.rate_of_putting_on_table *BSM Calibration*

Value: 1 | Units: 1/yr | Fractional rate at which susceptible stations determine whether they want to consider investing in hi-blend tankage and equipment.

DSM_Inputs.regular_user_price_attractiveness_weighting *BSM Calibration*

Value: 2 | Units: gal/USD | Weighting factor for logit function calculation.

DSM_Inputs.Repurp_subs_stop_time *Scenario Value*

Value: 2031 | Units: yr | Year in which capital subsidy for repurposing is scheduled to end.

DSM_Inputs.Repurpose_subs_switch *Scenario Value*

Value: 1 | Units: Unitless | Policy switch to facilitate testing of capital subsidy for repurposing.

DSM_Inputs.S_EtOH_PoP_implementation_time *Scenario Value*

Value: 2011 Units: yr Year in which the starch subsidy at the point of production begins implementation.

DSM_Inputs.S_EtOH_PoP_Subs_Stop_Time *Scenario Value*

Value: 2012 Units: yr Year in which the starch subsidy at the point of production ends.

DSM_Inputs.S_ETOH_POP_Subsidy_Amount *Scenario Value*

Value: 0.45 Units: USD/gal The amount of money for the starch subsidy at the point of production.

DSM_Inputs.term_of_loan *BSM Modeler Assumption*

Value: 10 Units: yr Length of project loan, in years.

DSM_Inputs.time_to_drop_out *BSM Calibration*

Value: 0.5 Units: yr Time, on average in years, to drop out of regular use when gap takes on a negative value.

DSM_Inputs.total_initial_stations *U.S. Census: Gasoline Stations in the US*

Value: 118154 Units: stations Initial count of all dispensing stations in the United States.

DSM_Inputs.total_project_length *Scenario Value*

Value: 25 Units: yr Project lifetime for investment in hi-blend equipment.

FLM.acre_threshold_for_YPA_calc *BSM Calibration*

Value: 10000 Units: acre Acre threshold for calculating yield per acre.

FLM.acres_per_square_mile *Constant Value*

Value: 640 Units: acre/mi^2 Constant; the number of acres per square mile.

FLM.Advanced_PrePro_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Advanced preprocessing cost multiplier.

FLM.Advanced_Q_&_H_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Advanced queuing and handling cost multiplier.

FLM.Advanced_Storage_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Advanced storage cost multiplier.

FLM.avg_radial_weighting_factor *The Math Forum: Average Radial Distance of Points within a Circle*

Value: 0.666667 Units: Unitless The average distance to the center of a circle from any point in the circle.

FLM.expected_days_per_yr_online *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 355 Units: day/year Expected days of operation for a conversion plant. *table 1*

FLM.Expected_HC_tons_per_load *Biomass Logistics Model*

Value: 18.9 Units: ton/load Expected herbaceous energy crop tons per load.

FLM.Expected_WC_tons_per_load *Biomass Logistics Model*

Value: 25 Units: ton/load Expected woody energy crop tons per load.

FLM.feedstock_safety_stock_factor *BSM Calibration*

Value: 1.075 Units: Unitless Feedstock safety stock factor.

FLM.Forest_Res_Transport_CPT *Forest Residues Transportation Costing Model*

Value: 5.08 Units: usd/ton Forest residue harvest/collection cost per ton.

FLM.Forest_Residue_HCC_cost_multiplier *Scenario Value*

Value: 1 Units: Unitless Forest residue harvest/collection cost multiplier.

FLM.fraction_of_land_supplying_plant *Water Usage for Current and Future Ethanol Production*

Value: 0.025 Units: Unitless Fraction of land supplying feedstock to plant.

FLM.HC_HCCPA_cost_multiplier *Scenario Value*

Value: 1 Units: Unitless Herbaceous energy crop harvest/collection cost per acre multiplier.

FLM.Initial_Advanced_PrePro_CPT *Biomass Logistics Model*

Value: 6 Units: usd/ton Initial advanced preprocessing cost, in dollars, per ton.

FLM.Initial_Advanced_Q_&_H_CPT *Biomass Logistics Model*

Value: 1.6 Units: usd/ton Initial advanced queuing and handling cost, in dollars, per ton.

FLM.Initial_Advanced_Storage_CPT *Biomass Logistics Model*

Value: 6 Units: usd/ton Initial advanced storage cost per ton.

FLM.Initial_Forest_Residue_HCCPT *Forest Residues Transportation Costing Model*

Value: 22.54 Units: usd/ton Initial forest residue harvest collection cost per ton.

FLM.Initial_Pioneer_PrePro_CPT *Biomass Logistics Model*

Value: 12.96 Units: usd/ton Initial pioneer preprocessing cost per ton.

FLM.Initial_Pioneer_Q_&_H_CPT *Biomass Logistics Model*

Value: 1.98 Units: usd/ton Initial pioneer queuing and handling cost per ton.

FLM.Initial_Pioneer_Storage_CPT *Biomass Logistics Model*

Value: 5 Units: usd/ton Initial pioneer storage cost per ton.

FLM.Initial_Transport_vbl_cost_per_mile *Biomass Logistics Model*

Value: 3.96 Units: usd/load/mi Initial transportation variable cost per mile.

FLM.Initial_Urban_Residue_HCCPT *Forest Residues Transportation Costing Model*

Value: 40 Units: usd/ton Initial urban residue harvest collection cost per ton.

FLM.nominal_FS_adj_rate *BSM Calibration*

Value: 0.2 Units: 1/yr Nominal feedstock adjustment rate used for increasing yield per acre if it is deemed necessary.

FLM.one_million *Constant Value*

Value: 1000000 Units: Unitless Constant, by definition.

FLM.Pioneer_PrePro_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Pioneer preprocessing cost multiplier.

FLM.Pioneer_Q_&_H_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Pioneer queuing and handling cost multiplier.

FLM.Pioneer_Storage_Cost_Multiplier *Scenario Value*

Value: 1 Units: Unitless Pioneer storage cost multiplier.

FLM.plant_input_capacity_tpd *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Value: 2253.52 Units: ton/day Plant input capacity in tons per day.

FLM.road_windage_factor *BSM Modeler Assumption*

Value: 1.41421 Units: Unitless Expected multiplier for converting straight-line distance to distance on roadways.

FLM.Transport_cost_multiplier *Scenario Value*

Value: 1 Units: Unitless Transportation cost multiplier.

FLM.Transport_Fixed_cost_per_load *Biomass Logistics Model*

Value: 10.12 Units: USD/load Fixed transportation cost per load.

FLM.two *Constant Value*

Value: 2 Units: Unitless The number 2. Constant.

FLM.Urban_Res_Transport_CPT *Secondary Mill Residues and Urban Wood Waste Quantities in the United States: Final Report*

Value: 18.86 Units: USD/ton Urban residue transportation cost per ton.

FLM.Urban_Residue_HCC_cost_multiplier *Scenario Value*

Value: 1 Units: Unitless Urban residue harvest collection cost multiplier.

FLM.use_IBSAL_cost_data? *Scenario Value*

Value: 0 Units: Unitless A switch for the use of IBSAL (now BLM) cost data.

FLM.Use_only_one_FS__logistic_design? *Scenario Value*

Value: 0 Units: Unitless A switch to use only one feedstock logistic design.

FLM.WC_HCCPA_cost_multiplier *Scenario Value*

Value: 1 Units: Unitless Woody crop harvest collection cost per acre cost multiplier.

FSM.acres_per_square_mile			*Constant Value*
Value: 640	Units: acre/mi^2	Acres per square mile. Constant.	
FSM.Averaging_time_for_LT_stock\use_ratio			*BSM Calibration*
Value: 3	Units: yr	Averaging time for long-term crop inventory/consumption ratio.	
FSM.BCAP_Ann_Payment_Sunset_Time			*Biomass Crop Assistance Program; Proposed Rule*
Value: 2051	Units: yr	Year to switch off BCAP legislation.	*table 1*
FSM.BCAP_Ann_Payment_Switch			*Scenario Value*
Value: 1	Units: Unitless	Turns on/off annual payments as part of BCAP regulation.	
FSM.BCAP_CHST_Start_Time			*Biomass Crop Assistance Program; Proposed Rule*
Value: 2011	Units: yr	Year to switch on CHST (collection, harvest, storage & transportation) payments.	*table 1*
FSM.BCAP_CHST_Sunset_Time			*Biomass Crop Assistance Program; Proposed Rule*
Value: 2013	Units: yr	Year to switch off CHST (collection, harvest, storage & transportation) payments.	*table 1*
FSM.BCAP_CHST_Switch			*Scenario Value*
Value: 1	Units: Unitless	Turns on/off CHST (collection, harvest, storage & transportation) payments as part of BCAP regulation.	
FSM.BCAP_Establishment_Payment_Pct			*Biomass Crop Assistance Program; Proposed Rule*
Value: 0.75	Units: Unitless	Percent of total production costs that are covered by establishment payments as part of BCAP regulation.	
FSM.BCAP_Establishment_Switch			*Scenario Value*
Value: 1	Units: Unitless	A switch that turns on/off establishment payments as part of BCAP regulation.	
FSM.Cell_land_adjustment_time			*BSM Calibration*
Value: 3	Units: yr	Cellulosic land adjustment time in years. Reflects assumed speed of eliminating gap between desired and actual land allocated to producing cellulose.	

FSM.cellulosic_demand_none *Scenario Value*

Value: 0 Units: million-ton/yr Potential cellulosic demand scenario.

FSM.CHST_utilization_factor *Biomass Logistics Model*

Value: 1 Units: Unitless Percent by which to reduce total collection, harvest, storage and transportation payments due to other factors.

FSM.Couple_with_ReEDS? *Scenario Value*

Value: 0 Units: Unitless A switch to allow for the BSM to run coupled with ReEDS.

FSM.Cume_BCAP_Payments *Constant Value*

Value: 0 Units: USD Total cumulative dollars spent on BCAP for all crops and residues.

FSM.Cume_Cellulosic_Feedstock_Prod'n *Constant Value*

Value: 0 Units: million-ton Total cumulative cellulosic feedstock production.

FSM.DDG_EtOH_coproduct_multiplier *Scenario Value*

Value: 0 Units: Unitless The fraction of corn ethanol demand diverted to distillers dry grains coproduct.

FSM.farmer_discount_rate *BSM Calibration*

Value: 0.2 Units: 1/yr Farmer discount rate required for farmers to decide to grow energy crops.

FSM.feedstock_shrinkage_rate *BSM Calibration*

Value: 1 Units: 1/yr Feedstock shrinkage rate per year.

FSM.forest_residue_dwell_time *BSM Calibration*

Value: 5 Units: yr Number of years for forest residue dwell time.

FSM.Forest_Urban_fract *BSM Calibration*

Value: 0.04 Units: Unitless Fraction of woody yield that constitutes urban residue.

FSM.frac_CRP_land_NOT_migrateable *Scenario Value*

Value: 0.6 Units: Unitless Fraction of CRP land that cannot be migrated to crop production.

FSM.frac_DDG_offset *Scenario Value*

Value: 0 | Units: Unitless | Fraction of DDG offsetting domestic corn demand.

FSM.frac_dealloc_pasture *BSM Calibration*

Value: 0.05 | Units: 1/yr | Deallocation rate of pasture, per year.

FSM.Frac_HC_Harvested *Constant Value*

Value: 1 | Units: Unitless | Fraction of herbaceous cellulose harvested.

FSM.Frac_HC_Harvested_Pasture *Constant Value*

Value: 1 | Units: Unitless | Fraction of herbaceous cellulose harvested from pasture.

FSM.frac_Pasture_Land_NOT_migrateable *Scenario Value*

Value: 0.2 | Units: Unitless | Fraction of the pasture land that is not migrateable.

FSM.Harvest_from_CRP_Land? *Scenario Value*

Value: 0 | Units: Unitless | A switch to allow for the harvesting of herbaceous cellulose from CRP land.

FSM.Hay\Pasture_Yield_Factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 0.7 | Units: Unitless | Hay and pasture yield factor as a fraction of pasture land used for hay production.

FSM.Hay_Yield_Growth_Ass'n *Scenario Value*

Value: 0 | Units: unit/acre-yr^2 | The increase in hay yield, in tons, per acre per year per year, due to improved agronomic practices, genetic engineering, etc.

FSM.HC_pasture_PCPA_factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 1 | Units: Unitless | Herbaceous energy crop production cost per acre on pasture land factor, by region for 10 years.

FSM.HC_Pasture_yield_factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 0.85 | Units: Unitless | The fraction of pasture land used for herbaceous energy crop production

FSM.HC_PCPA_input_cost_sensitivity_factor *Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis*

Value: 0.11 Units: Unitless Sensitivity of production costs to changes in energy prices.

FSM.HC_'project_length' *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 8 Units: yr Length of herbaceous energy crop cycle; the lifetime of switchgrass production.

FSM.input_cost_sensitivity_switch *Scenario Value*

Value: 1 Units: Unitless A switch to activate input cost elasticities.

FSM.Is_CM_connected? *Scenario Value*

Value: 1 Units: Unitless A switch the indicate whether the conversion module is connected.

FSM.lambda_annual *BSM Calibration*

Value: 0.5 Units: Unitless A logit coefficient.

FSM.lambda_hay *BSM Calibration*

Value: 0.5 Units: Unitless A logit coefficient for hay, by region.

FSM.lambda_PCEC *BSM Calibration*

Value: 0.5 Units: Unitless A logit coefficient for perennial cellulosic energy crops.

FSM.Max_CHST_Payment *Biomass Crop Assistance Program; Proposed Rule*

Value: 45 Units: USD/ton Maximum CHST (collection, harvest, storage & transportation) payment that will be given to any individual through BCAP legislation.

FSM.max_FS_offer_price_plantgate *BSM Calibration*

Value: 110 Units: usd/ton Maximum offer price for cellulosic feedstock at the plant gate in dollar per ton.

FSM.Move_CRP_Land_to_Active_Land? *Scenario Value*

Value: 0 Units: Unitless A switch to allow CRP land to move to active land or not.

FSM.Move_Pasture_Land_to_Active_Land? *Scenario Value*

Value: 0 Units: Unitless A switch to allow pasture land to active land or not.

FSM.one_million *Constant Value*

Value: 1000000 Units: 1/million One million. Constant.

FSM.one_thousand *Constant Value*

Value: 1000 Units: 1/thousand One thousand. Constant.

FSM.Pasture_as_Cellulose_PCPA_Factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 1 Units: Unitless Pasture as cellulose production cost per acre.

FSM.Pasture_as_Pasture_PCPA_Factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 0.2 Units: Unitless Pasture as pasture production cost per acre.

FSM.period_count *Constant Value*

Value: 1 Units: Unitless An iteration counter for the ReEDS coupling scenario.

FSM.perlack_demand_switch *BSM Calibration*

Value: 0 Units: Unitless A switch for perlack demand.

FSM.spread_in_frac_chg_from_crop_prodn_consn *BSM Calibration*

Value: 1 Units: 1/yr Controls the response of price to a gap between crop production and consumption. Must be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.

FSM.spread_in_frac_chg_from_crop_stock_use *BSM Calibration*

Value: 1 Units: 1/yr Controls the response of price to crop stock use.

FSM.spread_in_frac_chg_from_FS_inventory *BSM Calibration*

Value: 1 Units: 1/yr Controls the response of price to feedstock inventory.

FSM.spread_in_frac_chg_from_FS_prodn_consn *BSM Calibration*

Value: 1 Units: 1/yr Controls the response of price to a gap between feedstock production and consumption.

FSM.spread_in_frac_chg_from_Hay_prodn_consn *BSM Calibration*

Value: 1 Units: 1/yr Controls the response of price to a gap between hay production and consumption.

FSM.study_area_fract *BSM Calibration*

Value: 0.01 Units: Unitless Fraction of total potential collected at Forest Residue "grower payment" price.

FSM.target_feedstock_inv_coverage *BSM Calibration*

Value: 1 Units: yr Target feedstock inventory coverage in years.

FSM.urban_residue_dwell_time *BSM Calibration*

Value: 3 Units: yr Urban residue dwell time in years.

FSM.use_IBSAL_loss_fraction? *Scenario Value*

Value: 0 Units: Unitless Switch to activate the IBSAL (now BLM) loss fraction.

FSM.W_Pasture_yield_factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 0.85 Units: Unitless Multiplier applied to woody cellulosic yields in crop land in order to estimate woody cellulosic yields in pasture lands.

FSM.WC_pasture_PCPA_factor *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Value: 1 Units: Unitless Woody energy crop production cost per acre on pasture land factor, by region.

FSM.WC_PCPA_input_cost_sensitivity_factor *Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis*

Value: 0 Units: Unitless Sensitivity of production costs to changes in energy prices.

IM.annual_cost_reduction__for_imports *Scenario Value*

Value: 0.05 Units: USD Annual cost reduction for imports.

IM.base_threshold_PoP_price_for_import *Scenario Value*

Value: 2 Units: USD/gal Assumed threshold price that makes it profitable to to import into the United States.

IM.ceiling_for_EtOH_import *Scenario Value*

Value: 5E+09 Units: gal/yr Maximum potential imports of EtOH from outside the United States.

IM.EtOH_import_tariff_stop_time *Scenario Value*

Value: 2051 Units: yr Year in which the ethanol import tariff is lifted.

IM.import_tariff *Scenario Value*

Value: 0.45 Units: USD/gal Import tariff on ethanol.

IM.time_at_which_cost_reduction_for_imports_begins *Scenario Value*

Value: 2051 Units: yr Year in which cost reduction for imports is set to begin.

Outputs.Cume_Celllulosic_EtOH_Prod'n *Stock Initialization*

Value: 0 Units: gal/yr Cumulative cellulosic ethanol production.

Outputs.one_station *Constant Value*

Value: 1 Units: Stations One station. Constant for units integrity.

PIM.Baseline_EtOH_POP_price *BSM Modeler Assumption*

Value: 1.64 Units: USD/gal Baseline price for EtOH at point of production.

PIM.Cumulative_Cellulosic_Industry_Output *Stock Initialization*

Value: 0 Units: gal Cumulative cellulosic industry output.

PIM.EtOH_POP_Price_Index *Constant Value*

Value: 100 Units: Percent Ethanol price index relative to baseline value.

PIM.EtOH_price_sensitivity *BSM Calibration*

Value: -3 Units: Unitless Controls the response of price to inventory coverage. Must be negative for high inventory to lead to lower prices. Higher absolute values lead to greater price changes for any given inventory coverage level.

PIM.InterRegion_Transit *Constant Value*

Value: 0 Units: gal 'Dummy' stock that always should be 0 to enable import/export logic.

PIM.spread_in_EtOH_frac_chg_from_inventory *BSM Calibration*

Value: 2 Units: 1/yr Fraction of change in ethanol inventory.

PIM.spread_in_EtOH_frac_chg_from_prodn_consn *BSM Calibration*

Value: 1 Units: 1/yr Spread in ethanol fraction change from production and consumption.

CM.Completed_Demo_Scale_Ops

Stock Initialization

A counter for the number of demonstration scale operations that have been completed as of the start of the model.

Subscript 1:	Value:	Units:
BC	0	projects
Combo	0	projects
S	10	projects
SPlus	0	projects
TC	0	projects

CM.Completed_Pilot_Ops

Stock Initialization

A counter for the number of pilot scale operations that have been completed as of the start of the model.

Subscript 1:	Value:	Units:
BC	14	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	4	projects

CM.Cume_Failures_C

Stock Initialization

A counter for the number of commercial scale operations that have failed as of the start of the model.

Subscript 1:	Value:	Units:
BC	0	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	0	projects

CM.Cume_Failures_P *Stock Initialization*

A counter for the number of pioneer scale operations that have failed as of the start of the model.

Subscript 1:	Value:	Units:
BC	0	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	0	projects

CM.Cumulative__Demo_Experience *Internal List of Potential Biofuels Conversion Facilities*

Cumulative years of experience in demo-scale operations.

Subscript 1:	Value:	Units:
BC	1.23	yr
Combo	0	yr
S	10	yr
SPlus	0	yr
TC	1	yr

CM.Cumulative__Industry_Output *Internal List of Potential Biofuels Conversion Facilities*

Cumulative output from commercial operations.

Subscript 1:	Value:	Units:
BC	0	billions-gal
Combo	0	billions-gal
S	88.838	billions-gal
SPlus	0	billions-gal
TC	0	billions-gal

CM.Cumulative__Pilot_Experience *Internal List of Potential Biofuels Conversion Facilities*

Cumulative years of pilot experience.

Subscript 1:	Value:	Units:
BC	30.5	yr
Combo	0	yr
S	10	yr
SPlus	0	yr
TC	10.1	yr

CM.Demo_Progress_Ratios

BSM Calibration

The fraction of potential change in maturity that is remaining with each doubling of cumulative demonstration experience. This drives the level of maturity of the demonstration effort, by industry.

Subscript 1:	Value:	Units:
BC	0.75	1/Doubling
Combo	0.75	1/Doubling
S	0.75	1/Doubling
SPlus	0.75	1/Doubling
TC	0.75	1/Doubling

CM.Demo_Projects_in_Development

Internal List of Potential Biofuels Conversion Facilities

Tracks the number of demonstration-scale operations that are in development before they are operational.

Subscript 1:	Value:	Units:
BC	2	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	0	projects

CM.Demo_Scale_Operations

Internal List of Potential Biofuels Conversion Facilities

Tracks the number of demonstration-scale operations that are currently operational.

Subscript 1:	Value:	Units:
BC	1	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	0	projects

CM.Early_Pilot_Multipliers *Expert Opinion*

For the initial pilot plants, the fraction of different mature technology attributes that has been realized.

Subscript 1:	Value:	Units:
CapitalCost	2	Unitless
DebtFrac	0	Unitless
InputCap	0.8	Unitless
ProcessYield	0.5	Unitless
PSuccess	0.1	Unitless
Risk	10	Unitless

CM.equity_frac_P *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Expected fraction of investment to be funded through equity financing for pioneer plants, after loan guarantees have been applied.

Subscript 1:	Value:	Units:
BC	0.3	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	0.3	Unitless

CM.Exp_Other_Coproduct_Sales_Rev_C *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Expected revenue from other coproducts from commercial plant when fully operational.

Subscript 1:	Value:	Units:
BC	0	USD/yr
Combo	0	USD/yr
S	1.4E+07	USD/yr
SPlus	7700000	USD/yr
TC	1.54E+07	USD/yr

CM.Exp_Power_Sales_Rev_C

Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol

Expected power sales revenue from commercial-scale plant when fully operational.

Subscript 1:	Value:	Units:
BC	6600000	USD/yr
Combo	0	USD/yr
S	0	USD/yr
SPlus	0	USD/yr
TC	0	USD/yr

CM.Expected_Fixed_Op_Cost_C

Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol

Expected fixed operating cost for n-th commercial-scale plant.

Subscript 1:	Value:	Units:
BC	1.07E+07	USD/yr
Combo	1E+09	USD/yr
S	5142300	USD/yr
SPlus	1E+07	USD/yr
TC	2.32E+07	USD/yr

CM.Expected_FS_Cost_$\ton_by_tech

BSM Calibration

Expected cost per ton for feedstock by technology, delivered at throat of reactor.

Subscript 1:	Value:	Units:
BC	44	USD/ton
Combo	35	USD/ton
S	110	USD/ton
SPlus	35	USD/ton
TC	44	USD/ton

CM.Expected_Other_VBL_Op_Cost_C

Expected variable operating costs, excluding feedstock, for n-th commercial plant.

Subscript 1:	Value:	Units:
BC	2.67E+07	USD/yr
Combo	1E+09	USD/yr
S	1.94973E+07	USD/yr
SPlus	2.47E+07	USD/yr
TC	7280000	USD/yr

CM.FCI_Subsidy_Switch

Scenario Value

Fixed capital investment subsidy switch can be turned on/off to create appropriate scenario.

Subscript 1:	Value:	Units:
BC	1	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	1	Unitless

CM.FCI_subz_frac__P

Scenario Value

Defines the degree of capital subsidy specific to pioneer plants, by technology. Applies to expected fixed capital investment for "next" plant. Applies to pioneer only.

Subscript 1:	Value:	Units:
BC	0.6	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	0.6	Unitless

CM.Feedstock_Subsidy_Switch *Scenario Value*

Feedstock subsidy switch can be turned on/off to create appropriate scenario.

Subscript 1:	Value:	Units:
BC	0	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	0	Unitless

CM.FS_Subs_Frac_P *Scenario Value*

Defines the degree of feedstock subsidy specific to pioneer plants, by technology.

Subscript 1:	Value:	Units:
BC	0	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	0	Unitless

CM.Initial_Indices_of__Demo_Maturity *Internal List of Potential Biofuels Conversion Facilities*

The initial level of maturity of demonstration effort, by industry.

Subscript 1:	Value:	Units:
BC	0.167	Unitless
Combo	0	Unitless
S	1	Unitless
SPlus	0	Unitless
TC	0.1	Unitless

CM.Initial_Indices_of_Commercial_Maturity *Internal List of Potential Biofuels Conversion Facilities*

The initial level of maturity of commercial effort, by industry.

Subscript 1:	Value:	Units:
BC	0	Unitless
Combo	0	Unitless
S	0.9	Unitless
SPlus	0	Unitless
TC	0	Unitless

CM.Initial_Indices_of_Pilot_Maturity *Internal List of Potential Biofuels Conversion Facilities*

The initial level of maturity of pilot effort, by industry.

Subscript 1:	Value:	Units:
BC	0.692	Unitless
Combo	0	Unitless
S	1	Unitless
SPlus	0	Unitless
TC	0.584	Unitless

CM.Is_it_Cellulose? *Constant Value*

A scenario switch to indicate whether a technology involves cellulose or not.

Subscript 1:	Value:	Units:
BC	1	Unitless
Combo	1	Unitless
S	0	Unitless
SPlus	1	Unitless
TC	1	Unitless

CM.Loan_Guarantee_Switch *Scenario Value*

A scenario switch to indicate which technologies are eligible for loan guarantees.

Subscript 1:	Value:	Units:
BC	1	Unitless
Combo	0	Unitless
S	0	Unitless
SPlus	0	Unitless
TC	1	Unitless

CM.Mature_Commercial_Multipliers *Internal Risk Analysis for GPRA and SEDS*

In a fully mature commercial industry, multiplier of 1 implies mature industry values for technology attributes.

Subscript 1:	Value:	Units:
CapitalCost	1	Unitless
DebtFrac	1	Unitless
InputCap	1	Unitless
ProcessYield	1	Unitless
PSuccess	1	Unitless
Risk	1	Unitless

CM.Mature_Demo_Multipliers *Internal Risk Analysis for GPRA and SEDS*

In a fully mature demonstration industry, multiplier of 1 implies mature industry values for technology attributes.

Subscript 1:	Value:	Units:
CapitalCost	1.25	Unitless
DebtFrac	0	Unitless
InputCap	0.8	Unitless
ProcessYield	0.85	Unitless
PSuccess	0.95	Unitless
Risk	1.5	Unitless

CM.Mature_FS_Thruput_Capacity_C *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Calculates mature commercial feedstock throughput, measured at throat of reactor.

Subscript 1:	Value:	Units:
BC	2205	ton/day
Combo	2000	ton/day
S	1226	ton/day
SPlus	1497	ton/day
TC	2205	ton/day

CM.Mature_Industry_FCI *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Capital Investment for a commercial-scale project when industry is mature.

Subscript 1:	Value:	Units:
BC	4.006E+08	USD
Combo	1E+30	USD
S	5.69671E+07	USD
SPlus	1.029E+08	USD
TC	4.8975E+08	USD

CM.Mature_Industry_P_Success *Scenario Value*

Sets likelihood of technically successful plant for completely mature industry.

Subscript 1:	Value:	Units:
BC	1	Unitless
Combo	1	Unitless
S	1	Unitless
SPlus	1	Unitless
TC	1	Unitless

CM.Mature_Industry_Process_Yield *Process Design and Economics for Biochemical Conversion of Lignocellulosic Biomass to Ethanol*

Calculates expected process yield for fully mature technology.

Subscript 1:	Value:	Units:
BC	79	gal/ton
Combo	0.01	gal/ton
S	117	gal/ton
SPlus	89.59	gal/ton
TC	83.8	gal/ton

CM.Mature_Pilot_Multipliers

Internal Risk Analysis for GPRA and SEDS

In a fully mature pilot industry, multiplier of 1 implies mature industry values for technology attributes.

Subscript 1:	Value:	Units:
CapitalCost	1.5	Unitless
DebtFrac	0	Unitless
InputCap	0.8	Unitless
ProcessYield	0.75	Unitless
PSuccess	0.5	Unitless
Risk	5	Unitless

CM.Max_Feedstock_prod'n_by_Feedstock_type__tpy

Scenario Value

Cellulosic feedstock production by feedstock type in million tons per year (by cellulose type, by region).

Subscript 1:	Value:	Units:
Forest	8.6E+07	ton/yr
Herb	4.3E+08	ton/yr
Res	1.9E+07	ton/yr
Urban	1.2E+07	ton/yr
Wood	1.7E+07	ton/yr

CM.Min_Cume_Industry_Output_For_Learning

BSM Calibration

Sets threshold of production before calculating rate of growth in industry output, and hence, learning.

Subscript 1:	Value:	Units:
BC	0.005	billions-gal
Combo	0.005	billions-gal
S	0.005	billions-gal
SPlus	0.005	billions-gal
TC	0.005	billions-gal

CM.Min_Demo_Experience_for_Learning *BSM Calibration*

Sets operating time threshold before calculating rate of growth in demonstration experience, and hence, learning.

Subscript 1:	Value:	Units:
BC	0.25	yr
Combo	0.25	yr
S	0.25	yr
SPlus	0.25	yr
TC	0.25	yr

CM.Min_Pilot_Experience_for_Learning *BSM Calibration*

Sets operating time threshold before calculating rate of growth in pilot experience, and hence, learning.

Subscript 1:	Value:	Units:
BC	0.25	yr
Combo	0.25	yr
S	0.25	yr
SPlus	0.25	yr
TC	0.25	yr

CM.Number_of_Doublings_of_Cume_Output *Internal List of Potential Biofuels Conversion Facilities*

Accumulates number of doublings in cumulative commercial output.

Subscript 1:	Value:	Units:
BC	0	Doubling
Combo	0	Doubling
S	6.38	Doubling
SPlus	0	Doubling
TC	0	Doubling

CM.Number_of_Doublings_of_Demo_Experience *Internal List of Potential Biofuels Conversion Facilities*

Accumulates number of doublings in demonstration-scale experience.

Subscript 1:	Value:	Units:
BC	5.25	Doubling
Combo	0	Doubling
S	0	Doubling
SPlus	0	Doubling
TC	5.19	Doubling

CM.Number_of_Doublings_of_Pilot_Experience *Internal List of Potential Biofuels Conversion Facilities*

Accumulates number of doublings in pilot-scale experience.

Subscript 1:	Value:	Units:
BC	1.48	Doubling
Combo	0	Doubling
S	0	Doubling
SPlus	0	Doubling
TC	1.02	Doubling

CM.Pilot_Efforts_in_Development *Internal List of Potential Biofuels Conversion Facilities*

Tracks pilot-scale operations that are in development and not yet operational.

Subscript 1:	Value:	Units:
BC	5	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	0	projects

CM.Pilot_Progress_Ratios *Expert Opinion*

The fraction of potential change in pilot effort that remains after each doubling of cumulative pilot experience.

Subscript 1:	Value:	Units:
BC	0.75	1/Doubling
Combo	0.75	1/Doubling
S	0.75	1/Doubling
SPlus	0.75	1/Doubling
TC	0.75	1/Doubling

CM.Pilot_Scale_Operations *Internal List of Potential Biofuels Conversion Facilities*

Tracks pilot-scale operations that are currently operational.

Subscript 1:	Value:	Units:
BC	7	projects
Combo	0	projects
S	0	projects
SPlus	0	projects
TC	2	projects

CM.Progress_Ratios_Commercial *BSM Calibration*

The fraction of potential change in demo maturity that remains with each doubling of cumulative industry output. Drives level of maturity of demo effort, by industry.

Subscript 1:	Value:	Units:
BC	0.75	1/Doubling
Combo	0.75	1/Doubling
S	0.75	1/Doubling
SPlus	0.75	1/Doubling
TC	0.75	1/Doubling

CM.Regional_coeffs *Stock Initialization*

Set of switches that enable testing of different regions individually or in concert.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

CM.Retirement_Fraction_C *Scenario Value*

Fraction of commercial scale plants retiring per year.

Subscript 1:	Value:	Units:
BC	0	1/yr
Combo	0	1/yr
S	0	1/yr
SPlus	0	1/yr
TC	0	1/yr

CM.technology_trac_coeffs *Constant Value*

Set of switches that enable testing of different technologies individually or in concert.

Subscript 1:	Value:	Units:
BC	1	Unitless
Combo	0	Unitless
S	1	Unitless
SPlus	0	Unitless
TC	1	Unitless

CM.Years_in_D&C_C *Process Design and Economics for Conversion of Lignocellulosic Biomass to Ethanol*

Assumed time in design and construction for commercial-scale plant.

Subscript 1:	Value:	Units:
BC	3	yr
Combo	3	yr
S	1	yr
SPlus	3	yr
TC	3	yr

DSM.NPV_Threshold_for_Investment *BSM Calibration*

Provides normalizing value for investment.

Subscript 1:	Value:	Units:
BrandIndep	100000	USD
HMart	100000	USD
OilOwned	100000	USD
UnbrandIndep	100000	USD

DSM_Inputs.debt_interest_rate_as_frac *BSM Calibration*

Interest rate for debt financing, expressed as a fraction per year.

Subscript 1:	Value:	Units:
BrandIndep	0.07	1/yr
HMart	0.07	1/yr
OilOwned	0.07	1/yr
UnbrandIndep	0.07	1/yr

DSM_Inputs.ETOH_Dist'n_Storage_Subsidy_Amount *Scenario Value*

Amount of money, in dollars per gallon, subsidized for distribution and storage.

Subscript 1:	Value:	Units:
A	0.15	USD/gal
CB	0.15	USD/gal
DS	0.15	USD/gal
LS	0.15	USD/gal
M	0.15	USD/gal
NE	0.15	USD/gal
NP	0.15	USD/gal
P	0.15	USD/gal
SE	0.15	USD/gal
SP	0.15	USD/gal

DSM_Inputs.Expected_FCI__New_Tankage_&_Equip *E85 Retail Business Case: When and Why to Sell E85 table 7*

Expected fixed capital investment, in dollars, for greenfield tankage and equipment.

Subscript 1:	Value:	Units:
A	60000	USD
CB	62407	USD
DS	62407	USD
LS	62407	USD
M	62407	USD
NE	62407	USD
NP	62407	USD
P	62407	USD
SE	62407	USD
SP	62407	USD

DSM_Inputs.Expected_FCI_Repurposing_Midgrade

E85 Retail Business Case: When and Why to Sell E85

Expected fixed capital investment, in dollars, repurposing midgrade tankage to hi-blend.

table 7

Subscript 1:	Value:	Units:
A	24500	USD
CB	24500	USD
DS	24500	USD
LS	24500	USD
M	24500	USD
NE	24500	USD
NP	24500	USD
P	24500	USD
SE	24500	USD
SP	24500	USD

DSM_Inputs.fraction_NonUsers_susceptible

BSM Calibration

Fraction of potential new hi-blend users who are susceptible of becoming users. Default of 1 indicates that all with access are susceptible.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

DSM_Inputs.fuel_excise_tax

API: Gasoline Taxes July 2011

Excise tax on gasoline equivalent, applied at the point of distribution in dollars per gallon.

Subscript 1:	Value:	Units:
A	0.502	USD/gal
CB	0.484	USD/gal
DS	0.385	USD/gal
LS	0.484	USD/gal
M	0.414	USD/gal
NE	0.492	USD/gal
NP	0.484	USD/gal
P	0.604	USD/gal
SE	0.385	USD/gal
SP	0.385	USD/gal

DSM_Inputs.Full_Infas_in_region_dist'n_storage_cost

Ethanol Transportation Memo

Cost per gallon of moving and storing EtOH within a region when there is complete EtOH infrastructure in place.

Subscript 1:	Value:	Units:
A	0.05	USD/gal
CB	0.05	USD/gal
DS	0.05	USD/gal
LS	0.05	USD/gal
M	0.05	USD/gal
NE	0.05	USD/gal
NP	0.05	USD/gal
P	0.05	USD/gal
SE	0.05	USD/gal
SP	0.05	USD/gal

DSM_Inputs.Gasoline_POD_price_scenario_switch *Scenario Value*

Nominal price per gallon for gasoline equivalent at point of distribution before taxes.

Subscript 1:	Value:	Units:
GAS_AD_HOC_1	0	Unitless
GAS_AD_HOC_2	0	Unitless
GAS_AEO_HM	0	Unitless
GAS_AEO_HP	0	Unitless
GAS_AEO_LM	0	Unitless
GAS_AEO_LP	0	Unitless
GAS_AEO_REF	1	Unitless
GAS_USER	0	Unitless

DSM_Inputs.Gross_Expected_Other_Rev_per_visit *Summary Real Estate Appraisal Report Gas Station/Convenience Store*

Expected non-fuel gas station revenue per visit.

Subscript 1:	Value:	Units:
BrandIndep	5	USD/Visit
HMart	8.34	USD/Visit
OilOwned	8.34	USD/Visit
UnbrandIndep	8.34	USD/Visit

DSM_Inputs.hi_blend_Coefficient *5798-10a: Standard Specification for Fuel Ethanol (Ed75-Ed-85) for Automotive Spark-Ignition Engines*

Volumetric fraction of gallon of E85 that is EtOH.

Subscript 1:	Value:	Units:
A	0.755	Unitless
CB	0.755	Unitless
DS	0.755	Unitless
LS	0.755	Unitless
M	0.755	Unitless
NE	0.755	Unitless
NP	0.755	Unitless
P	0.755	Unitless
SE	0.755	Unitless
SP	0.755	Unitless

DSM_Inputs.Hi_Blend_Tax *Scenario Value*

Expected tax for EtOH.

Subscript 1:	Value:	Units:
A	0	USD/gal
CB	0	USD/gal
DS	0	USD/gal
LS	0	USD/gal
M	0	USD/gal
NE	0	USD/gal
NP	0	USD/gal
P	0	USD/gal
SE	0	USD/gal
SP	0	USD/gal

DSM_Inputs.Incremental_Traffic_Fraction *BSM Modeler Assumption*

Fractional increment (relative to current traffic) that is expected to accrue to the station as a result of investment in hiblend capability.

Subscript 1:	Value:	Units:
BrandIndep	0.005	Unitless
HMart	0.005	Unitless
OilOwned	0.005	Unitless
UnbrandIndep	0.005	Unitless

DSM_Inputs.initial_%_stations_ownership_dist'n *E85 Retail Business Case: When and Why to Sell E85*

Initial ownership distribution of all dispensing stations.

Subscript 1:	Value:	Units:
BrandIndep	52	Percent
HMart	2.5	Percent
OilOwned	5	Percent
UnbrandIndep	40.5	Percent

DSM_Inputs.Initial_Non_HiBlend_Users

Stock Initialization

Percent of hi-blend capable owners in the region who do not use hi-blend at all.

Subscript 1:	Value:	Units:
A	100	Percent
CB	100	Percent
DS	100	Percent
LS	100	Percent
M	100	Percent
NE	100	Percent
NP	100	Percent
P	100	Percent
SE	100	Percent
SP	100	Percent

DSM_Inputs.Initial_Occasional_Hi_Blend_Users

Stock Initialization

Percent of hi-blend capable owners in the region who use hi-blend occasionally (per model logic).

Subscript 1:	Value:	Units:
A	0	Percent
CB	0	Percent
DS	0	Percent
LS	0	Percent
M	0	Percent
NE	0	Percent
NP	0	Percent
P	0	Percent
SE	0	Percent
SP	0	Percent

DSM_Inputs.Initial_Regular_Hi_Blend_Users *Stock Initialization*

Percent of hi-blend capable owners in the region who are regular and habituated users of hi-blend.

Subscript 1:	Value:	Units:
A	0	Percent
CB	0	Percent
DS	0	Percent
LS	0	Percent
M	0	Percent
NE	0	Percent
NP	0	Percent
P	0	Percent
SE	0	Percent
SP	0	Percent

DSM_Inputs.initial_total_regional_terminals *Aggregation of Tankage Data from State Agencies*

Initial total number of fuel terminals by region.

Subscript 1:	Value:	Units:
A	146	terminals
CB	183	terminals
DS	60	terminals
LS	91	terminals
M	42	terminals
NE	254	terminals
NP	23	terminals
P	203	terminals
SE	135	terminals
SP	124	terminals

DSM_Inputs.Lo_blend_coefficient *EPA E15 Factsheet*

Volumetric fraction of gallon of E10 that is EtOH.

Subscript 1:	Value:	Units:
A	0.1	Unitless
CB	0.1	Unitless
DS	0.1	Unitless
LS	0.1	Unitless
M	0.1	Unitless
NE	0.1	Unitless
NP	0.1	Unitless
P	0.1	Unitless
SE	0.1	Unitless
SP	0.1	Unitless

DSM_Inputs.Margin_on_Other_Rev *EPA E15 Factsheet*

Assumed margin on non-fuel revenue at gas stations.

Subscript 1:	Value:	Units:
BrandIndep	0.3	Unitless
HMart	0.3	Unitless
OilOwned	0.3	Unitless
UnbrandIndep	0.3	Unitless

DSM_Inputs.Markup_on_Gasoline_Sales *NACS Gas Price Kit 2011*

Assumed markup on gasoline sales in dollars per gallon.

Subscript 1:	Value:	Units:
BrandIndep	0.15	USD/gal
HMart	0.15	USD/gal
OilOwned	0.15	USD/gal
UnbrandIndep	0.15	USD/gal

DSM_Inputs.max_fraction_susceptible_for_considering_by_owner *Scenario Value*

Gives maximum fraction of those stations from among those who possibly could consider hi-blend capability, who are actually susceptible to seriously considering the option.

Subscript 1:	Value:	Units:
BrandIndep	1	Unitless
HMart	1	Unitless
OilOwned	1	Unitless
UnbrandIndep	1	Unitless

DSM_Inputs.No_Infas_in_region_dist'n_storage_cost *Ethanol Transportation Memo*

Cost of moving and storing EtOH within the region when there is no EtOH infrastructure in place.

Subscript 1:	Value:	Units:
A	0.25	USD/gal
CB	0.25	USD/gal
DS	0.25	USD/gal
LS	0.25	USD/gal
M	0.25	USD/gal
NE	0.25	USD/gal
NP	0.25	USD/gal
P	0.25	USD/gal
SE	0.25	USD/gal
SP	0.25	USD/gal

DSM_Inputs.PoD_to_PoU_Delivery_Cost

Cost, in dollars per gallon, to deliver fuel from the point of distribution to the point of use.

Subscript 1:	Value:	Units:
A	0.04	USD/gal
CB	0.04	USD/gal
DS	0.04	USD/gal
LS	0.04	USD/gal
M	0.04	USD/gal
NE	0.04	USD/gal
NP	0.04	USD/gal
P	0.04	USD/gal
SE	0.04	USD/gal
SP	0.04	USD/gal

DSM_Inputs.rate_of_becoming_occasional_HiBlend_user

BSM Calibration

Fractional rate of potential users becoming hi-blend users per year.

Subscript 1:	Value:	Units:
A	0.5	1/yr
CB	0.5	1/yr
DS	0.5	1/yr
LS	0.5	1/yr
M	0.5	1/yr
NE	0.5	1/yr
NP	0.5	1/yr
P	0.5	1/yr
SE	0.5	1/yr
SP	0.5	1/yr

DSM_Inputs.regional_dispensing_station_distn *USDA Land Values and Cash Rents: 2010 Summary*

Regional distribution by percent of all dispensing stations in the United States.

Subscript 1:	Value:	Units:
A	0.13	Unitless
CB	0.134	Unitless
DS	0.051	Unitless
LS	0.076	Unitless
M	0.065	Unitless
NE	0.164	Unitless
NP	0.029	Unitless
P	0.096	Unitless
SE	0.148	Unitless
SP	0.106	Unitless

DSM_Inputs.req'd_rate_of_return *BSM Modeler Assumption*

Project rate of return required to stimulate investment in a project.

Subscript 1:	Value:	Units:
BrandIndep	0.15	1/yr
HMart	0.15	1/yr
OilOwned	0.15	1/yr
UnbrandIndep	0.15	1/yr

DSM_Inputs.Share_Current_HiBlend_CapableTraffic_to_Hi_Blend_Weighting_Factor

BSM Calibration

Weighting factor for calculating the expected share of current hi-blend capable traffic that would make the switch to hi-blend if the tankage was available.

Subscript 1:	Value:	Units:
A	0.95	Unitless
CB	0.95	Unitless
DS	0.95	Unitless
LS	0.95	Unitless
M	0.95	Unitless
NE	0.95	Unitless
NP	0.95	Unitless
P	0.95	Unitless
SE	0.95	Unitless
SP	0.95	Unitless

DSM_Inputs.station_sales_dist'n_by_ownership

E85 Retail Business Case: When and Why to Sell E85

Distribution of fuel sales by ownership of gasoline stations.

Subscript 1:	Value:	Units:
BrandIndep	38.65	Percent
HMart	7.7	Percent
OilOwned	15	Percent
UnbrandIndep	38.65	Percent

DSM_Inputs.x_region_import_cost *Ethanol Transportation Memo*

Cost of moving EtOH into a region from an external region.

Subscript 1:	Value:	Units:
A	0.075	USD/gal
CB	0.075	USD/gal
DS	0.075	USD/gal
LS	0.075	USD/gal
M	0.075	USD/gal
NE	0.075	USD/gal
NP	0.075	USD/gal
P	0.075	USD/gal
SE	0.075	USD/gal
SP	0.075	USD/gal

FLM.Ag_Res_HCCPA_cost_multiplier *Scenario Value*

Agricultural residue harvest cost, in dollars, per acre, by crop and region.

Subscript 1:	Value:	Units:
Corn	0	Unitless
Cotton	0	Unitless
Other_Grains	0	Unitless
Soy	0	Unitless
Wheat	0	Unitless

FLM.Expected_Residue_tons_per_load *Biomass Logistics Model*

Expected agricultural residue tons per load.

Subscript 1:	Value:	Units:
Corn	17	ton/load
Cotton	17	ton/load
Other_Grains	17	ton/load
Soy	17	ton/load
Wheat	17	ton/load

FLM.Fraction_of_Supply_System_Advanced *Scenario Value*

Fraction of supply system that is advanced, as defined by the Biomass Logistics Model (Idaho National Laboratory).

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FLM.Initial_HC_HCCPA *Biomass Logistics Model*

Initial herbaceous energy crop harvest collection cost per acre, by crop and region.

Subscript 1:	Value:	Units:
A	52.96	USD/acre-yr
CB	52.96	USD/acre-yr
DS	52.96	USD/acre-yr
LS	52.96	USD/acre-yr
M	52.96	USD/acre-yr
NE	52.96	USD/acre-yr
NP	52.96	USD/acre-yr
P	52.96	USD/acre-yr
SE	52.96	USD/acre-yr
SP	52.96	USD/acre-yr

FLM.Initial_WC_HCCPA

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial woody crop harvest and collection cost per ton.

Subscript 1:	Value:	Units:
A	754.4	USD/acre-yr
CB	752.4	USD/acre-yr
DS	801.2	USD/acre-yr
LS	784.4	USD/acre-yr
M	786	USD/acre-yr
NE	660.854	USD/acre-yr
NP	801.2	USD/acre-yr
P	808.4	USD/acre-yr
SE	801.2	USD/acre-yr
SP	801.2	USD/acre-yr

FLM.regionalizing_demo

Internal List of Potential Biofuels Conversion Facilities

Percent of demonstration plants in each region.

Subscript 1:	Value:	Units:
A	0.0714	Unitless
CB	0.214286	Unitless
DS	0.0714	Unitless
LS	0.0714	Unitless
M	0.142857	Unitless
NE	0.0714	Unitless
NP	0.0714	Unitless
P	0.142857	Unitless
SE	0.0714	Unitless
SP	0.0714	Unitless

FLM.which_FS__design_to_use?

Scenario Value

Determines which feedstock design to use.

Subscript 1:	Value:	Units:
Advanced	0	Unitless
Conventional	1	Unitless
Pioneer	0	Unitless

FSM.Ag_Attractiveness_Weight

BSM Calibration

Agriculture attractiveness weight, by region. A logit coefficient.

Subscript 1:	Value:	Units:
A	0.004	acre-yr/USD
CB	0.004	acre-yr/USD
DS	0.004	acre-yr/USD
LS	0.004	acre-yr/USD
M	0.004	acre-yr/USD
NE	0.004	acre-yr/USD
NP	0.004	acre-yr/USD
P	0.004	acre-yr/USD
SE	0.004	acre-yr/USD
SP	0.004	acre-yr/USD

FSM.Ag_Attractiveness_Weight_Pasture

BSM Calibration

Agriculture attractiveness weight of pasture, by region. A logit coefficient.

Subscript 1:	Value:	Units:
A	0.05	acres-years/usd
CB	0.05	acres-years/usd
DS	0.05	acres-years/usd
LS	0.05	acres-years/usd
M	0.05	acres-years/usd
NE	0.05	acres-years/usd
NP	0.05	acres-years/usd
P	0.05	acres-years/usd
SE	0.05	acres-years/usd
SP	0.05	acres-years/usd

FSM.annual_residue_rent_factor *BSM Calibration*

Percent by which to reduce rent factor, accounting for land that is not rentable and land that is not used primarily for residue production, by region.

Subscript 1:	Value:	Units:
A	0.5	Unitless
CB	0.5	Unitless
DS	0.5	Unitless
LS	0.5	Unitless
M	0.5	Unitless
NE	0.5	Unitless
NP	0.5	Unitless
P	0.5	Unitless
SE	0.5	Unitless
SP	0.5	Unitless

FSM.Annual_Subsidy_% *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Annual subsidy percentage.

Subscript 1:	Value:	Units:
Corn	0	Unitless
Cotton	0	Unitless
Other_Grains	0	Unitless
Soy	0	Unitless
Wheat	0	Unitless

FSM.Baseline_to_Nominal_Conversion_Factors *Constant Value*

Baseline to Nominal Conversion Factors (effectively only converting cotton from thousand bales to lbs; other crops remain in USDA units of million bushels).

Subscript 1:	Value:	Units:
Corn	1	unit/USDA
Other_Grains	1	unit/USDA
Soy	1	unit/USDA
Wheat	1	unit/USDA

FSM.Cash_Rent_by_Region:_Annual_Payment *USDA Land Values and Cash Rents: 2010 Summary*

Cropland rented for cash; the average cash rent per acre, by region.

Subscript 1:	Value:	Units:
A	71	USD/acre-yr
CB	152	USD/acre-yr
DS	84	USD/acre-yr
LS	107	USD/acre-yr
M	75	USD/acre-yr
NE	53.5	USD/acre-yr
NP	71	USD/acre-yr
P	219	USD/acre-yr
SE	62	USD/acre-yr
SP	33.5	USD/acre-yr

FSM.Cell_in_development_weighting_factors *BSM Calibration*

Weighting factor for anticipated feedstock supply that is represented by acres in development.

Subscript 1:	Value:	Units:
Herbaceous	1	Unitless
Woody	0.1	Unitless

FSM.cellulose_crop_coeffs *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Identifies which annual crops are generating residues, by crop.

Subscript 1:	Value:	Units:
Corn	1	Unitless
Cotton	0	Unitless
Other_Grains	1	Unitless
Soy	0	Unitless
Wheat	1	Unitless

FSM.Cellulosic_Coeffs *Constant Value*

Converts HC and WC contributions to a matrix form.

Subscript 1:	Value:	Units:
Herbaceous	1	Unitless
Woody	0	Unitless

FSM.cellulosic_scenario *Scenario Value*

Switch to select cellulosic demand scenario.

Subscript 1:	Value:	Units:
0	1	Unitless
AEO2009	0	Unitless
EISA2007	0	Unitless
Hi	0	Unitless
Lo	0	Unitless
Med	0	Unitless

FSM.Corn_ETOH_Scenario_switch *Scenario Value*

Switch to select corn demand scenario.

Subscript 1:	Value:	Units:
0	1	Unitless
AEO2009	0	Unitless
EISA2007	0	Unitless
Hi	0	Unitless
Lo	0	Unitless
Med	0	Unitless

FSM.Crop_PCPA_input_cost_sensitivity_factor *Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis*

Sensitivity of production costs to changes in energy prices.

Subscript 1:	Value:	Units:
Corn	0.05	Unitless
Cotton	0.05	Unitless
Other_Grains	0.05	Unitless
Soy	0.04	Unitless
Wheat	0.06	Unitless

FSM.Crop_Price_Index *Constant Value*

Annual crop price index.

Subscript 1:	Value:	Units:
Corn	100	Unitless
Cotton	100	Unitless
Other_Grains	100	Unitless
Soy	100	Unitless
Wheat	100	Unitless

FSM.dealloc_rate_Annual *BSM Calibration*

Deallocation rate of annual crops.

Subscript 1:	Value:	Units:
Corn	0.1	1/yr
Cotton	0.1	1/yr
Other_Grains	0.1	1/yr
Soy	0.1	1/yr
Wheat	0.1	1/yr

FSM.dealloc_rate_Cell_in_Prod'n *BSM Calibration*

Deallocation rate of perennial energy crops in production, by energy crop.

Subscript 1:	Value:	Units:
Herbaceous	0.125	1/yr
Woody	1	1/yr

FSM.degree_of_price_coupling_with_CORN *BSM Calibration*

Degree of price coupling with corn, by crop.

Subscript 1:	Value:	Units:
Corn	0	Unitless
Cotton	0	Unitless
Other_Grains	0.5	Unitless
Soy	0	Unitless
Wheat	0	Unitless

FSM.Feedstock_Inventory

Constant Value

Cellulosic feedstock inventory, by region.

Subscript 1:	Value:	Units:
A	0	million-ton
CB	0	million-ton
DS	0	million-ton
LS	0	million-ton
M	0	million-ton
NE	0	million-ton
NP	0	million-ton
P	0	million-ton
SE	0	million-ton
SP	0	million-ton

FSM.Forest_redidue_Cellulosic_coeffs

Constant Value

Calculates the forest residue contribution to total cellulosic feedstocks produced.

Subscript 1:	Value:	Units:
Forest	1	Unitless
Herb	0	Unitless
Res	0	Unitless
Urban	0	Unitless
Wood	0	Unitless

FSM.forest_residue_factor *Constant Value*

Percent by which to reduce rent factor, accounting for land that is not rentable and land that is not used primarily for residue production, by region.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

FSM.forest_residue_prod'n_by_region *Constant Value*

Forest residue production, by region.

Subscript 1:	Value:	Units:
A	0	million-ton/yr
CB	0	million-ton/yr
DS	0	million-ton/yr
LS	0	million-ton/yr
M	0	million-ton/yr
NE	0	million-ton/yr
NP	0	million-ton/yr
P	0	million-ton/yr
SE	0	million-ton/yr
SP	0	million-ton/yr

FSM.frac__Cell_in_Dev_%_harvestable *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Fraction of acres of cellulosic energy crops in development that are harvestable.

Subscript 1:	Value:	Units:
Herbaceous	0.5	Unitless
Woody	0	Unitless

FSM.FS_Price_PlantGate *Constant Value*

Feedstock price at plant gate.

Subscript 1:	Value:	Units:
A	0	USD/ton
CB	0	USD/ton
DS	0	USD/ton
LS	0	USD/ton
M	0	USD/ton
NE	0	USD/ton
NP	0	USD/ton
P	0	USD/ton
SE	0	USD/ton
SP	0	USD/ton

FSM.grain_lb_per_bu *University of Missouri: G4020 Tables for Weights and Measurements: Crops*

Conversion factor for pounds per bushel, by crop.

Subscript 1:	Value:	Units:
Corn	56	lb/bu
Cotton	0	lb/bu
Other_Grains	45.333	lb/bu
Soy	0	lb/bu
Wheat	60	lb/bu

FSM.harvest_efficiency_HC *Biomass Logistics Model*

Estimated harvest efficiency for herbaceous cellulose.

Subscript 1:	Value:	Units:
Advanced	0.9	Unitless
Conventional	0.77	Unitless
Pioneer	0.77	Unitless

FSM.harvest_efficiency_residue

Biomass Logistics Model

Estimated harvest efficiency for residue.

Subscript 1:	Value:	Units:
Advanced	0.948	Unitless
Conventional	0.53	Unitless
Pioneer	0.53	Unitless

FSM.harvest_efficiency_WC

Biomass Logistics Model

Estimated harvest efficiency for woody cellulose.

Subscript 1:	Value:	Units:
Advanced	1	Unitless
Conventional	1	Unitless
Pioneer	1	Unitless

FSM.hay_and_forage_demand_growth_scenario

Scenario Value

A scenario for the demand for hay and forage relative to 2007 value. A positive number represents a slope for demand growth.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FSM.Hay_Price_Index *Constant Value*

Hay price index, by region.

Subscript 1:	Value:	Units:
A	100	Unitless
CB	100	Unitless
DS	100	Unitless
LS	100	Unitless
M	100	Unitless
NE	100	Unitless
NP	100	Unitless
P	100	Unitless
SE	100	Unitless
SP	100	Unitless

FSM.HC_cellulosic__coefffffs *Constant Value*

Herbaceous energy crop cellulosic coefficients for calculating HC contribution to total cellulosic feedstocks produced.

Subscript 1:	Value:	Units:
Forest	0	Unitless
Herb	1	Unitless
Res	0	Unitless
Urban	0	Unitless
Wood	0	Unitless

FSM.HC_yield_growth_ass'ns *Scenario Value*

The increase in herbaceous energy crop yield, in tons, per acre per year per year, due to improved agronomic practices, genetic engineering, etc.

Subscript 1:	Value:	Units:
Herbaceous	0.25	unit/acre-yr^2
Woody	0	unit/acre-yr^2

FSM.HC_YPA_coeffs *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Herbaceous energy crops yield (in tons) per acre coefficients (10 years). Used to handle yield growth relative to the production year for herbaceous cellulosics.

Subscript 1:	Value:	Units:
1	0	Unitless
2	1	Unitless
3	1	Unitless
4	1	Unitless
5	1	Unitless
6	1	Unitless
7	1	Unitless
8	1	Unitless
9	1	Unitless
10	1	Unitless

FSM.initial_cellulosic_price *BSM Calibration*

Initial cellulosic feedstock price at plant gate in dollars per ton.

Subscript 1:	Value:	Units:
A	45	usd/ton
CB	45	usd/ton
DS	45	usd/ton
LS	45	usd/ton
M	35	usd/ton
NE	45	usd/ton
NP	35	usd/ton
P	35	usd/ton
SE	45	usd/ton
SP	35	usd/ton

FSM.INITIAL_CRP_land_by_region

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial area, in thousand acres, of conservation reserve program land, by region.

Subscript 1:	Value:	Units:
A	533	thousand-acres
CB	3352	thousand-acres
DS	1059	thousand-acres
LS	1828	thousand-acres
M	7226	thousand-acres
NE	83	thousand-acres
NP	7688	thousand-acres
P	2027	thousand-acres
SE	888	thousand-acres
SP	4744	thousand-acres

FSM.INITIAL_Hay_GP

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial grower payment per ton of hay, by region.

Subscript 1:	Value:	Units:
A	119.09	usd/ton
CB	119.09	usd/ton
DS	119.09	usd/ton
LS	119.09	usd/ton
M	119.09	usd/ton
NE	119.09	usd/ton
NP	119.09	usd/ton
P	119.09	usd/ton
SE	119.09	usd/ton
SP	119.09	usd/ton

FSM.initial_Hay_Land_by_region

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial hay land area, in thousand acres and by region.

Subscript 1:	Value:	Units:
A	7163.96	thousand-acres
CB	7470.1	thousand-acres
DS	2596.05	thousand-acres
LS	4740.41	thousand-acres
M	9227.11	thousand-acres
NE	3979.76	thousand-acres
NP	11786	thousand-acres
P	3522.88	thousand-acres
SE	2312.78	thousand-acres
SP	8900.95	thousand-acres

FSM.INITIAL_Hay_PCPA

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial hay production cost per acre per year, by region.

Subscript 1:	Value:	Units:
A	151.462	USD/acre-yr
CB	142.32	USD/acre-yr
DS	131.404	USD/acre-yr
LS	142.318	USD/acre-yr
M	120.725	USD/acre-yr
NE	147.292	USD/acre-yr
NP	133.27	USD/acre-yr
P	110.823	USD/acre-yr
SE	118.998	USD/acre-yr
SP	105.945	USD/acre-yr

FSM.Initial_Hay_YPA

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Initial hay yield per acre per year.

Subscript 1:	Value:	Units:
A	2.21731	ton/acre-yr
CB	2.6228	ton/acre-yr
DS	3.14883	ton/acre-yr
LS	2.49821	ton/acre-yr
M	2.84586	ton/acre-yr
NE	2.40513	ton/acre-yr
NP	2.11112	ton/acre-yr
P	3.49463	ton/acre-yr
SE	2.23871	ton/acre-yr
SP	2.12385	ton/acre-yr

FSM.Initial_Pasture_%_in_Pasture

Constant Value

Initial percentage of pasture land used as pasture, by region.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

FSM.INITIAL_pasture_land_by_region *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Initial crop land used for pasture land, in thousand acres by region.

Subscript 1:	Value:	Units:
A	3678.3	thousand-acres
CB	3627.47	thousand-acres
DS	2093.09	thousand-acres
LS	1422.5	thousand-acres
M	4128.14	thousand-acres
NE	918.241	thousand-acres
NP	3566.25	thousand-acres
P	1679.57	thousand-acres
SE	1953.32	thousand-acres
SP	9438.04	thousand-acres

FSM.Max_Frac_CRP_Harvestable_for_HC *Scenario Value*

Maximum fraction of CRP land harvestable for herbaceous energy crops, by region.

Subscript 1:	Value:	Units:
A	0.4	Unitless
CB	0.4	Unitless
DS	0.4	Unitless
LS	0.4	Unitless
M	0.4	Unitless
NE	0.4	Unitless
NP	0.4	Unitless
P	0.4	Unitless
SE	0.4	Unitless
SP	0.4	Unitless

FSM.migration_rate_from_Pasture_to_Active_Crop_Land *Scenario Value*

Annual migration rate of pasture to active farmland.

Subscript 1:	Value:	Units:
A	0	1/yr
CB	0	1/yr
DS	0	1/yr
LS	0	1/yr
M	0	1/yr
NE	0	1/yr
NP	0	1/yr
P	0	1/yr
SE	0	1/yr
SP	0	1/yr

FSM.New_Practice_Producers_%_by_Region *Constant Value*

Percent of new practice farmers, by region.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FSM.nominal_yield_growth_ass'ns *USDA Agricultural Projections to 2020*

Increase in annual crop yield, in nominal units, per acre per year per year due to improved agronomic practices, genetic engineering, etc. *table 19*

Subscript 1:	Value:	Units:
Corn	2	unit/acre-yr^2
Cotton	5	unit/acre-yr^2
Other_Grains	0.5	unit/acre-yr^2
Soy	0.45	unit/acre-yr^2
Wheat	0.33	unit/acre-yr^2

FSM.Old_Practice_Producers_%_by_Region *Constant Value*

Percent of old practice producers, by region.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

FSM.Pasture\CRP_HC_GPPA_weights *Scenario Value*

Relative value of herbaceous energy crops grown on CRP land to value of herbaceous energy crops grown on pasture land in terms of grower payment per acre per year.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

FSM.Pasture__Switching *Constant Value*

Fraction pastureland switching from pasture to energy crops, by region.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FSM.Perlack_Crop_Prod'n_mm

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Perlack Crop Production in Million Units per Year, by crop.

Subscript 1:	Value:	Units:
Corn	13755	million-units/yr
Cotton	15474.6	million-units/yr
Other_Grains	546.571	million-units/yr
Soy	3355	million-units/yr
Wheat	2125	million-units/yr

FSM.population

U.S. Census 2010 Population Map

The population of the United States, by region.

Subscript 1:	Value:	Units:
A	3.0075E+07	person
CB	3.98862E+07	person
DS	1.04166E+07	person
LS	2.08746E+07	person
M	2.20655E+07	person
NE	6.19887E+07	person
NP	6166230	person
P	4.78096E+07	person
SE	3.78941E+07	person
SP	2.88969E+07	person

FSM.Production_Year_Multiplier *Constant Value*

Selects appropriate production year to apply the establishment payments.

Subscript 1:	Value:	Units:
1	1	Unitless
2	0	Unitless
3	0	Unitless
4	0	Unitless
5	0	Unitless
6	0	Unitless
7	0	Unitless
8	0	Unitless
9	0	Unitless
10	0	Unitless

FSM.rate_of_migration_to_active *BSM Calibration*

Annual migration rate of CRP land to active cropland.

Subscript 1:	Value:	Units:
A	0.15	1/yr
CB	0.15	1/yr
DS	0.15	1/yr
LS	0.15	1/yr
M	0.15	1/yr
NE	0.15	1/yr
NP	0.15	1/yr
P	0.15	1/yr
SE	0.15	1/yr
SP	0.15	1/yr

FSM.regional_dist'n_of_cellulose_capacity *BSM Calibration*

Regional distribution of cellulose capacity, by region.

Subscript 1:	Value:	Units:
A	9	Unitless
CB	20	Unitless
DS	15	Unitless
LS	10	Unitless
M	2	Unitless
NE	4	Unitless
NP	15	Unitless
P	5	Unitless
SE	10	Unitless
SP	10	Unitless

FSM.regional_weather_factor *Scenario Value*

Weather factor, by region.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	1	Unitless
DS	1	Unitless
LS	1	Unitless
M	1	Unitless
NE	1	Unitless
NP	1	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

FSM.Res_Cellulosic_coeffs *Constant Value*

Residue cellulosic coefficients for calculating residue contribution to total cellulosic feedstocks produced.

Subscript 1:	Value:	Units:
Forest	0	Unitless
Herb	0	Unitless
Res	1	Unitless
Urban	0	Unitless
Wood	0	Unitless

FSM.Residue_PCPA_input_cost_sensitivity_factor *Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis*

Sensitivity of residue production costs to changes in energy prices.

Subscript 1:	Value:	Units:
Corn	0.07	Unitless
Cotton	0.07	Unitless
Other_Grains	0.07	Unitless
Soy	0.07	Unitless
Wheat	0.07	Unitless

FSM.Secondary_Crop_PCPA_input_cost_sensitivity_factor *Pacey Economics Internal Report: Energy Price-Production Cost Coupling Analysis*

Sensitivity of secondary crop production costs to changes in energy prices.

Subscript 1:	Value:	Units:
Corn	0.05	Unitless
Cotton	0.05	Unitless
Other_Grains	0.05	Unitless
Soy	0.04	Unitless
Wheat	0.04	Unitless

FSM.storage_loss_HC *Biomass Logistics Model*

Herbaceous crop storage loss.

Subscript 1:	Value:	Units:
Advanced	0.95	Unitless
Conventional	0.95	Unitless
Pioneer	0.95	Unitless

FSM.storage_loss_residue *Biomass Logistics Model*

Residual crop storage loss.

Subscript 1:	Value:	Units:
Advanced	0.95	Unitless
Conventional	0.95	Unitless
Pioneer	0.95	Unitless

FSM.storage_loss_WC *Biomass Logistics Model*

Woody cellulose storage loss.

Subscript 1:	Value:	Units:
Advanced	1	Unitless
Conventional	1	Unitless
Pioneer	1	Unitless

FSM.Sustainable_Residue_as_Frac_of_Yield *BLM Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Fraction of residue that can be removed sustainably.

Subscript 1:	Value:	Units:
Corn	0.38	Unitless
Cotton	0.13	Unitless
Other_Grains	0.45	Unitless
Soy	0	Unitless
Wheat	0.45	Unitless

FSM.Switching

Constant Value

Fraction active farmland switching from annual crops to energy crops, by region.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FSM.Tot_HC_YPA_in_dev

Constant Value

The total HC yield per acre in development.

Subscript 1:	Value:	Units:
A	0	ton/acre-yr
CB	0	ton/acre-yr
DS	0	ton/acre-yr
LS	0	ton/acre-yr
M	0	ton/acre-yr
NE	0	ton/acre-yr
NP	0	ton/acre-yr
P	0	ton/acre-yr
SE	0	ton/acre-yr
SP	0	ton/acre-yr

FSM.Tot_HC_YPA_in_dev_P *Constant Value*

The total HC yield per acre in development in pasture land.

Subscript 1:	Value:	Units:
A	0	ton/acre-yr
CB	0	ton/acre-yr
DS	0	ton/acre-yr
LS	0	ton/acre-yr
M	0	ton/acre-yr
NE	0	ton/acre-yr
NP	0	ton/acre-yr
P	0	ton/acre-yr
SE	0	ton/acre-yr
SP	0	ton/acre-yr

FSM.Tot_HC_YPA_in_Prod'n_P *Constant Value*

Total HC yield per acre in production on pasture land.

Subscript 1:	Value:	Units:
A	0	ton/acre-yr
CB	0	ton/acre-yr
DS	0	ton/acre-yr
LS	0	ton/acre-yr
M	0	ton/acre-yr
NE	0	ton/acre-yr
NP	0	ton/acre-yr
P	0	ton/acre-yr
SE	0	ton/acre-yr
SP	0	ton/acre-yr

FSM.Total_HC_YPA_In_Prod'n

Constant Value

The total herbaceous cellulose yield per acre currently in production.

Subscript 1:	Value:	Units:
A	0	ton/acre-yr
CB	0	ton/acre-yr
DS	0	ton/acre-yr
LS	0	ton/acre-yr
M	0	ton/acre-yr
NE	0	ton/acre-yr
NP	0	ton/acre-yr
P	0	ton/acre-yr
SE	0	ton/acre-yr
SP	0	ton/acre-yr

FSM.Urban_Res_Cellulosic_coeffs

Constant Value

Urban residue cellulosic coefficients for calculating residue contribution to total cellulosic feedstocks produced.

Subscript 1:	Value:	Units:
Forest	0	Unitless
Herb	0	Unitless
Res	0	Unitless
Urban	1	Unitless
Wood	0	Unitless

FSM.urban_residue_prod'n_by_region

Constant Value

Urban residue production, by region.

Subscript 1:	Value:	Units:
A	0	million-ton/yr
CB	0	million-ton/yr
DS	0	million-ton/yr
LS	0	million-ton/yr
M	0	million-ton/yr
NE	0	million-ton/yr
NP	0	million-ton/yr
P	0	million-ton/yr
SE	0	million-ton/yr
SP	0	million-ton/yr

FSM.w_annual

BSM Calibration

Logit coefficient (calibration parameter) for annual crops, by region.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	0	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

FSM.w_hay *BSM Calibration*

Logit coefficient (calibration parameter) for hay, by region.

Subscript 1:	Value:	Units:
A	4.6	Unitless
CB	1.24	Unitless
DS	1.99	Unitless
LS	1.4	Unitless
M	1.18	Unitless
NE	3.87	Unitless
NP	0.8	Unitless
P	2.52	Unitless
SE	1.17	Unitless
SP	1.43	Unitless

FSM.w_PCEC *BSM Calibration*

Logit coefficient (calibration parameter) for perennial cellulosic energy crops.

Subscript 1:	Value:	Units:
A	1.5	Unitless
CB	1.4	Unitless
DS	1.44	Unitless
LS	1.5	Unitless
M	2.055	Unitless
NE	1.6	Unitless
NP	1.035	Unitless
P	3.305	Unitless
SE	2.04	Unitless
SP	1.98	Unitless

FSM.WC_cellulosic_coeffffffs

Constant Value

Woody energy crop cellulosic coefficients for calculating WC contribution to total cellulosic feedstocks produced, by cellulose type.

Subscript 1:	Value:	Units:
Forest	0	Unitless
Herb	0	Unitless
Res	0	Unitless
Urban	0	Unitless
Wood	1	Unitless

FSM.WC_'project_length'

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Length of woody energy crops "project"; lifetime of woody energy crop production.

Subscript 1:	Value:	Units:
A	8	yr
CB	8	yr
DS	8	yr
LS	8	yr
M	8	yr
NE	8	yr
NP	8	yr
P	8	yr
SE	8	yr
SP	8	yr

FSM.yield_offsets

BSM Calibration

Yield offsets by annual crop.

Subscript 1:	Value:	Units:
Corn	1	Unitless
Cotton	0.95	Unitless
Other_Grains	1	Unitless
Soy	0.9	Unitless
Wheat	1.1	Unitless

IM.distribution_of_imports

EIA: Fuel Ethanol Imports by Area of Entry

Assumed regional distribution of imports into the United States from outside the United States.

Subscript 1:	Value:	Units:
A	0	Unitless
CB	0	Unitless
DS	0	Unitless
LS	0	Unitless
M	0	Unitless
NE	1	Unitless
NP	0	Unitless
P	0	Unitless
SE	0	Unitless
SP	0	Unitless

Outputs.Cume_Additional_Tax_on_Gasoline

Stock Initialization

Cumulative point of use subsidy for hi-blend fuel, in dollars.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_C_PoP_Subsidy *Stock Initialization*

Cumulative point of production subsidy.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_Dist'n_Storage_Subsidy *Stock Initialization*

Cumulative distribution and storage subsidy.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_Hi_Blend_PoU_Subsidy *Stock Initialization*

Cumulative hi-blend point of use subsidy.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_S_PoP_Subsidy *Stock Initialization*

Cumulative starch point of production subsidy.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_Station_FCI_subsidy

Stock Initialization

Cumulative station fixed capital investment subsidy.

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

Outputs.Cume_Station_Repurpose_subsidy

Stock Initialization

Cumulative station repurposing subsidy

Subscript 1:	Value:	Units:
A	0	USD
CB	0	USD
DS	0	USD
LS	0	USD
M	0	USD
NE	0	USD
NP	0	USD
P	0	USD
SE	0	USD
SP	0	USD

PIM.avg_frac_total_'prod'n'_imported

Exponentially weighted moving average. Tells on average the total imports to the region from other regions, relative to the total regional production. Defined as internal production plus imports from other regions.

Subscript 1:	Value:	Units:
A	1	Unitless
CB	0	Unitless
DS	1	Unitless
LS	0	Unitless
M	1	Unitless
NE	1	Unitless
NP	0	Unitless
P	1	Unitless
SE	1	Unitless
SP	1	Unitless

CM.exogenous_C_initiation_quantity

Internal List of Potential Biofuels Conversion Facilities

Units: projects

The number of commercial plants likely to be initiated in the specified year and region as indicated by the technology and CM.exogenous_C_initiation_time.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.exogenous_C_initiation_quantity_NL

Internal List of Potential Biofuels Conversion Facilities

Units: projects

The number of commercial plants less likely to be initiated in the specified year and region as indicated by the technology and CM.exogenous_C_initiation_time_NL.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00

CM.exogenous_C_initiation_time

Internal List of Potential Biofuels Conversion Facilities

Units: yr

The year commercial plants are likely to be initiated for specified technologies and regions. The number of plants to come online during the specified year is found in CM.exogenous_C_initiation_quantity.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	2,010.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.exogenous_C_initiation_time_NL

Internal List of Potential Biofuels Conversion Facilities

Units: yr

The year not-likely plants are to be initiated for specified technologies and regions. The number of plants to come online during the specified year is found in CM.exogenous_C_initiation_quantity_NL.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	2,010.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,010.00	0.00

CM.exogenous_P_initiation_quantity

Internal List of Potential Biofuels Conversion Facilities

Units: projects

The number of pioneer plants likely to be initiated in the specified year and region as indicated by the technology and CM.exogenous_P_initiation_time.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.exogenous_P_initiation_quantity_NL

Internal List of Potential Biofuels Conversion Facilities

Units: projects

The number of pioneer plants less likely to be initiated in the specified year and region as indicated by the technology and CM.exogenous_P_initiation_time_NL.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.exogenous_P_initiation_time *Internal List of Potential Biofuels Conversion Facilities*

Units: yr

The year commercial plants are likely to be initiated for specified technologies and regions. The number of plants to come online during the specified year is found in CM.exogenous_P_initiation_quantity.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.exogenous_P_initiation_time_NL *Internal List of Potential Biofuels Conversion Facilities*

Units: yr

The year not-likely plants are to be initiated for specified technologies and regions. The number of plants to come online during the specified year is found in CM.exogenous_P_initiation_quantity_NL.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.In_Design&Cons_C *Internal List of Potential Biofuels Conversion Facilities*

Units: projects

Tracks the number of commercial-scale operations that are in design and construction stages. Values below are for initiation.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.In_Design&Cons_P *Internal List of Potential Biofuels Conversion Facilities*

Units: projects — Tracks the number of pioneer-scale operations that are in design and construction stages. Values below are for initiation.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.OnLine_C *Internal List of Potential Biofuels Conversion Facilities*

Units: projects — Tracks commercial-scale operations that are currently on-line and capable of producing output.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	6.00	158.00	4.00	43.00	6.00	6.00	78.00	9.00	2.00	8.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.OnLine_P *Internal List of Potential Biofuels Conversion Facilities*

Units: projects — Tracks pilot-scale operations that are currently on-line capable of producing output.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.Pioneer_Plant_Start_Batchifier *Constant Value*

Units: projects — Accumulates continuous signal and then ejects discrete quantity to ensure integer values for starting plants.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.Plant_Start_Accumulator *Stock Initialization*

Units: projects — Accumulates a continuous signal and produces discrete quantities of plants.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.PY_in_Startup_C *Stock Initialization*

Units: projects-gal/ton — Tracks the total process yield associated with pioneer-scale plants in start-up.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.PY_in_Startup_P *Stock Initialization*

Units: projects-gal/ton — Tracks the total process yield associated with commercial-scale plants in start-up.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.Starting_Up_C *Stock Initialization*

Units: projects — Tracks commercial-scale operations that are in start-up mode.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

CM.Starting_Up_P *Stock Initialization*

Units: projects — Tracks pioneer-scale operations that are in start-up mode.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SPlus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DSM.Equity_Fraction *Scenario Value*

Units: Unitless — Expected fraction of investment to be funded through equity financing after loan guarantees have been applied.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
HMart	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
OilOwned	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
UnbrandIndep	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70

DSM_Inputs.Expected_Share_Inc_Traffic_to_Hi_Blend *Scenario Value*

Units: Unitless — Fraction of incremental traffic expected to use hi-blend if investment in tankage is made.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
HMart	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
OilOwned	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UnbrandIndep	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

DSM_Inputs.initial_frac_ALL_stations_with_repurposable_tankag *Status and Issues for Ethanol (E85) in the United States*

Units: Unitless — Fraction of stations, by region, that have hi-blend repurposable tankage.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
HMart	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
OilOwned	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
UnbrandIndep	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

DSM_Inputs.initial_frac_stations_considering_invest *Stock Initialization*

Units: Unitless

Initial fraction of stations, by region, without repurposable tankage, that are considering investment in hi-blend tankage.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HMart	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OilOwned	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnbrandIndep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DSM_Inputs.initial_frac_stations_considering_repurpose *Stock Initialization*

Units: Unitless

Initial fraction of stations, by region, with repurposable tankage, that are considering repurposing.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HMart	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OilOwned	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UnbrandIndep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DSM_Inputs.initial_frac_stations_with_hi_blend_invest *BSM Calibration*

Units: Unitless

Initial fraction of stations, by region, without repurposable tankage, that have already invested in hi-blend tankage.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
HMart	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
OilOwned	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
UnbrandIndep	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01

DSM_Inputs.initial_frac_stations_with_repurposed_tankage *BSM Calibration*

Units: Unitless

Initial fraction of stations, by region, with repurposable tankage, that have already repurposed.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
HMart	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
OilOwned	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01
UnbrandIndep	0.01	0.04	0.00	0.07	0.02	0.01	0.08	0.01	0.01	0.01

DSM_Inputs.Volume_Per_Visit

NACS 2007 Annual Report

Units: gal/Visit   Expected average number of gallons per fill-up visit.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
BrandIndep	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60
HMart	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60
OilOwned	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60
UnbrandIndep	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60	9.60

FLM.Initial_Ag_Residue_HCCPA

BLM and POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr   Initial agricultural residue harvest collection cost per acre.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	61.04	71.58	63.92	67.76	69.89	60.66	63.03	79.42	57.94	60.61
Cotton	9.21	10.96	10.59	0.00	15.75	0.00	0.00	34.74	8.76	7.98
Other_Grains	29.07	27.65	36.62	18.31	26.64	22.48	27.35	24.09	15.01	22.32
Soy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat	27.40	27.29	25.19	27.40	18.50	29.57	16.85	27.99	22.15	14.66

FLM.Preprocessing_cost_per_ton

Biomass Logistics Model

Units: USD/ton   Preprocessing cost per ton (general).

	Forest	Res	Urban	Wood	Herb
Advanced	42.44	21.55	42.44	42.44	23.77
Conventional	24.20	17.51	24.20	24.20	12.34
Pioneer	24.20	17.51	24.20	24.20	17.46

FLM.Q_&_H_cost_per_ton

Biomass Logistics Model

Units: USD/ton   Queuing and Handling cost per ton (general).

	Forest	Res	Urban	Wood	Herb
Advanced	1.54	1.38	1.54	1.54	0.70
Conventional	1.55	1.26	1.55	1.55	1.26
Pioneer	1.55	1.26	1.55	1.55	1.26

FLM.Storage_cost_per_ton *Biomass Logistics Model*

Units: USD/ton Storage cost per ton.

	Forest	Res	Urban	Wood	Herb
Advanced	1.53	6.46	1.53	1.53	4.03
Conventional	1.46	5.62	1.46	1.46	5.92
Pioneer	1.46	5.62	1.46	1.46	6.08

FSM.Cell_in__Dev_% *Stock Initialization*

Units: Unitless Fraction of active farmland for crops and cellulose in cellulosic energy crop development, by energy crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Woody	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.Cell_in__Prod'n_% *Stock Initialization*

Units: Unitless Fraction of active farmland for crops and cellulose in cellulosic energy crop production, by energy crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Woody	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.Cell_Transition_Time *POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory*

Units: yr Cellulosic transition time in years, by energy crop and by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Woody	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	7.00	7.00

FSM.crop_switches

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: Unitless — A switch indicating whether annual crops can be grown in a particular region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cotton	1.00	1.00	1.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00
Other_Grains	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Soy	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Wheat	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

FSM.Initial_Annual_YPA_nominal_units

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: units/acre-yr — Initial annual yield, in nominal units, per acre, per year, by region for annual crops.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	139.97	173.91	149.55	161.90	155.89	139.58	149.29	191.23	130.99	141.36
Cotton	782.79	944.98	906.61	0.00	1,367.25	0.00	505.75	2,865.83	749.53	696.13
Other_Grains	67.64	64.43	87.61	41.13	58.96	50.76	64.72	53.99	32.95	51.60
Soy	35.73	47.79	37.75	42.35	0.00	39.20	41.13	0.00	30.10	25.89
Wheat	63.08	63.14	58.04	63.42	39.47	67.95	37.94	63.17	50.06	32.43

FSM.INITIAL_Crop__PCPA

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr — Initial crop production per acre, per year, by region, for annual crops.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	321.44	278.14	315.89	313.57	709.55	500.83	284.91	988.56	284.93	276.24
Cotton	233.17	249.12	317.06	0.00	453.88	0.00	181.06	165.23	393.63	234.18
Other_Grains	159.91	121.13	197.29	85.10	182.69	112.02	133.34	228.47	66.98	149.58
Soy	156.47	129.60	164.55	143.96	0.00	163.06	123.35	0.00	170.82	123.96
Wheat	155.31	120.42	125.89	99.35	127.11	204.91	108.64	192.38	145.52	194.07

FSM.Initial_Crop_regional_prices

USDA Baseline and POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: usd/units — Initial crop regional price per nominal unit, by crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	4.62	4.31	4.61	4.02	4.62	4.59	4.13	5.16	4.77	4.71
Cotton	0.66	0.66	0.66	0.00	0.66	0.00	0.66	0.66	0.66	0.66
Other_Grains	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soy	10.48	10.44	10.61	10.02	0.00	10.37	9.89	0.00	10.37	10.19
Wheat	5.90	5.88	5.94	5.62	5.60	6.03	5.39	6.38	5.52	5.78

FSM.INITIAL_HC_PCPA_by_yr

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr — Initial herbaceous energy crop production cost per acre per year, by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
1	427.45	314.84	377.12	314.11	0.00	340.17	268.02	260.75	433.07	319.85
2	210.70	195.09	202.30	195.28	0.00	199.16	160.91	176.97	199.86	169.14
3	203.70	202.79	194.71	203.01	0.00	207.32	168.57	176.97	193.26	162.05
4	203.70	202.79	194.71	203.01	0.00	207.32	168.57	184.04	193.26	162.05
5	210.77	209.86	201.76	210.07	0.00	214.44	175.63	176.97	199.47	173.96
6	203.70	202.79	194.71	203.01	0.00	207.32	168.57	176.97	234.41	162.05
7	203.70	202.79	194.71	203.01	0.00	207.32	168.57	176.97	193.26	162.05
8	203.70	202.79	194.71	203.01	0.00	207.32	168.57	176.97	193.26	162.05
9	203.70	202.79	194.71	203.01	0.00	207.32	168.57	176.97	193.26	162.05
10	203.70	202.79	194.71	203.01	0.00	207.32	168.57	169.11	193.26	162.05

FSM.Initial_HC_YPA_by_yr

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: ton/acre-yr — Initial herbaceous energy crop yield per acre per year, by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
1	2.56	2.21	1.83	1.39	0.00	2.05	1.57	0.00	0.00	1.56
2	5.13	4.42	3.67	2.77	0.00	4.10	3.15	0.00	4.04	3.13
3	5.13	4.42	3.67	2.77	0.00	5.50	3.15	0.00	4.04	3.13
4	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
5	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
6	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
7	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
8	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
9	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15
10	7.69	6.63	5.50	4.16	0.00	5.50	4.72	0.00	6.06	6.15

FSM.initial_land_dist'ns_by_crop_by_region

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: thousand-acres Initial land distribution by annual crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	3,233.89	39,815.50	1,700.68	13,345.40	1,266.07	2,338.51	19,716.30	272.21	958.41	2,253.10
Cotton	1,178.67	396.85	1,933.27	0.00	393.00	0.00	90.00	362.00	1,812.90	4,432.48
Other_Grains	96.71	237.15	277.98	490.10	1,482.13	224.34	3,905.22	279.54	12.39	2,194.43
Soy	4,996.29	35,843.30	6,040.60	11,073.30	0.00	1,434.38	16,222.20	0.00	1,066.93	423.05
Wheat	1,345.95	3,214.63	1,115.11	2,557.12	8,970.55	475.99	20,718.30	3,362.99	381.70	6,357.60

FSM.Initial_Res_PCPA

BLM and POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr Initial residue production cost per acre per year, by crop and region. Includes cost of collection and nutrient replacement.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	61.04	71.58	63.92	67.76	69.89	60.66	63.03	79.42	57.94	60.61
Cotton	9.21	10.96	10.59	0.00	15.75	0.00	0.00	34.74	8.76	7.98
Other_Grains	29.07	27.65	36.62	18.31	26.64	22.48	27.35	24.09	15.01	22.32
Soy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat	27.40	27.29	25.19	27.40	18.50	29.57	16.85	27.99	22.15	14.66

FSM.Initial_Sec_Crop_PCPA

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr Initial secondary crop production cost per acre per year, by crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cotton	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other_Grains	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.INITIAL_WC_PCPA_by_yr

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: USD/acre-yr   Initial woody energy crop production cost per acre per year, by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
1	281.25	308.02	307.45	308.02	0.00	309.27	369.59	310.63	281.25	309.78
2	103.42	60.58	60.28	60.58	0.00	61.55	134.39	62.27	103.42	61.85
3	111.49	154.93	139.47	154.93	0.00	97.86	23.10	109.21	111.49	138.52
4	44.94	22.16	22.14	22.16	0.00	22.23	48.64	22.28	44.94	22.25
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	44.94	45.01	41.80	45.01	0.00	45.13	48.64	61.14	44.94	52.54
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	11.93	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.K

BSM Calibration

Units: Unitless   A logit coefficient, by crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	3.55	2.05	1.99	2.05	1.13	3.65	1.01	2.56	0.25	0.05
Cotton	2.84	-0.46	1.86	0.00	-2.19	0.00	-0.95	-6.38	1.19	0.62
Other_Grains	-0.25	-1.95	-0.84	-0.75	-0.94	0.01	-1.25	0.68	-2.33	-0.42
Soy	4.20	2.41	3.17	2.20	0.00	3.01	1.12	0.00	1.11	0.22
Wheat	3.47	1.59	2.31	1.50	1.76	2.48	1.96	2.93	0.57	2.12

FSM.Pasture_Cell__in_Dev_%

Constant Value

Units: Unitless   Fraction of pasture in cellulosic energy crop development, by energy crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Woody	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.Pasture_Cell__in_Prod'n_%

Constant Value

Units: Unitless   Fraction of pasture in cellulosic energy crop production, by energy crop and region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Woody	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

FSM.Regional_Cellulosic_Crop_Switches

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: Unitless — A switch indicating which perennial energy crops can be grown, by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Herbaceous	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Woody	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00

FSM.Val_Sec_Crop_as_Frac

ERS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: Unitless — Value of secondary product as fraction of primary crop price.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Cotton	0.19	0.24	0.23	0.00	0.28	0.00	0.00	0.29	0.17	0.24
Other_Grains	0.25	0.26	0.02	0.47	0.06	0.46	0.09	0.10	0.32	0.08
Soy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wheat	0.06	0.06	0.06	0.04	0.04	0.07	0.03	0.03	0.06	0.06

FSM.WC_YPA_by_yr

POLYSYS Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Units: ton/acre-yr — Woody energy crop yield, in tons, per acre per year from cropland, by region.

	A	CB	DS	LS	M	NE	NP	P	SE	SP
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	39.44	36.64	38.56	35.04	0.00	34.32	38.80	48.00	40.00	39.44
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

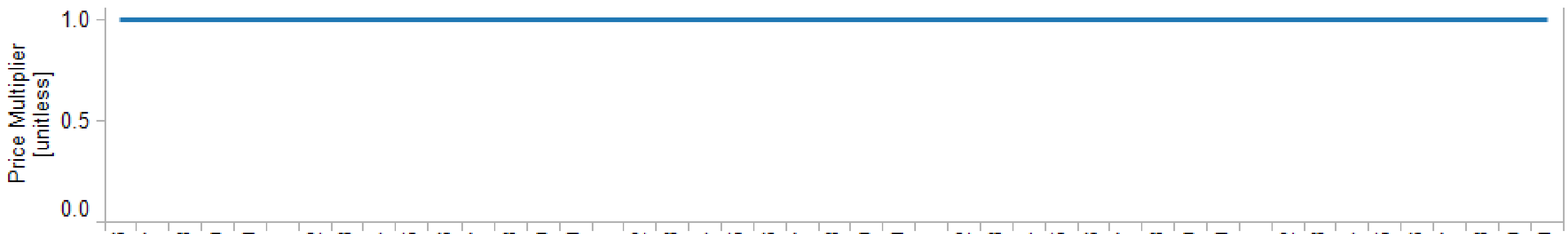
CM.Max_Plant_Construction_Capacity *BSM Calibration*

Maximum number of plants that can be constructed in a given year. Units: projects/yr

Year	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030
Value	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

DSM_Inputs.Gas_Price_Shock_Scenario *Scenario Value*

This graphical input can impose a temporary shock or shift to the chosen gas price scenario in a multiplicative manner. Units: Unitless



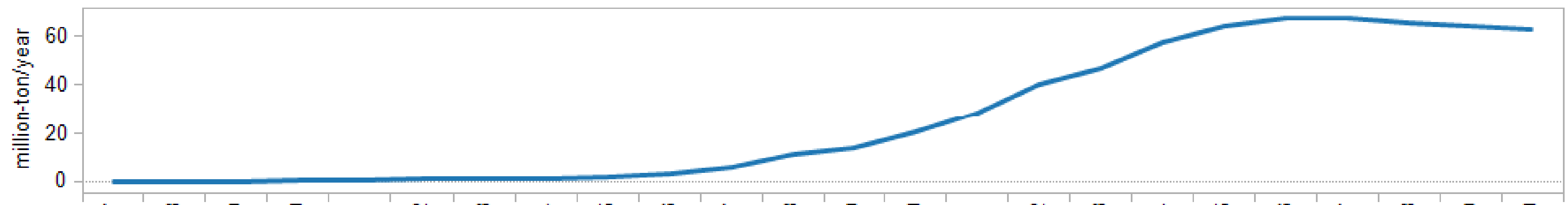
Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Year	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Value	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

FSM.cellulosic_demand_AEO2009 *Annual Energy Outlook 2011*

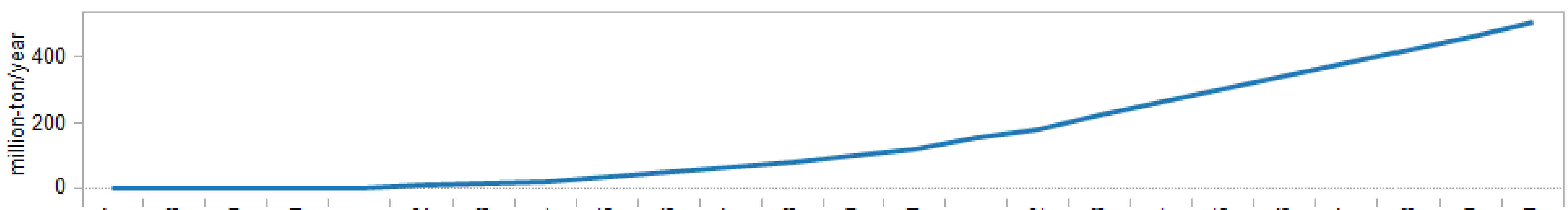
Potential cellulosic demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	0	0	0	0	1	1	1	1	1	3	5	11	13	20	28	40	46	57	64	66	66	65	64	62

FSM.cellulosic_demand_EISA2007 *Energy Independence and Security Act of 2007*

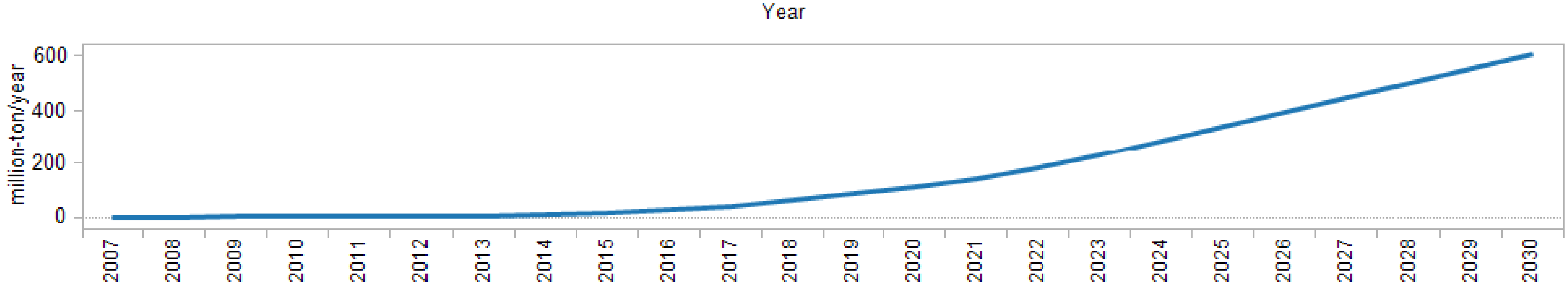
Potential cellulosic demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	0	0	0	0	0	6	11	20	33	47	61	78	95	117	151	178	219	259	300	340	380	421	461	502

FSM.cellulosic_demand_hi *Scenario Value*

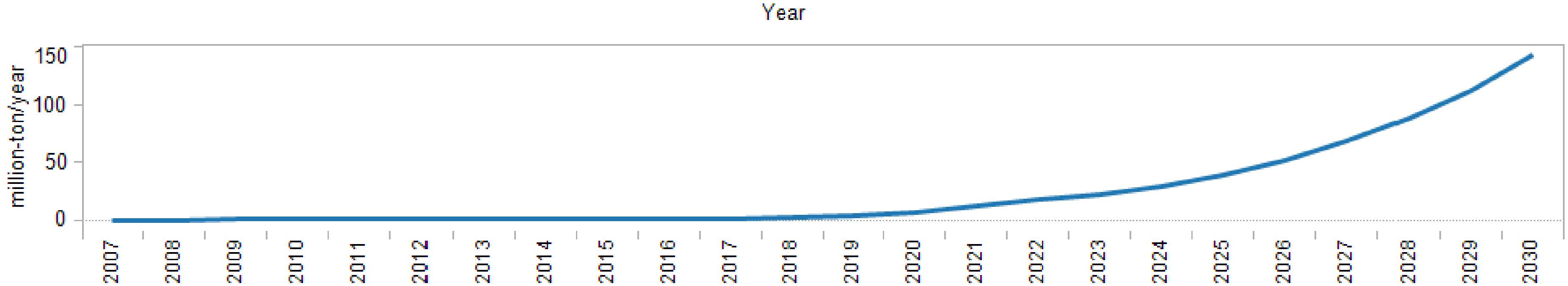
Potential cellulosic demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	0	0	0	0	0	1	4	8	14	25	42	63	85	109	140	181	230	285	339	392	445	497	550	601

FSM.cellulosic_demand_low *Scenario Value*

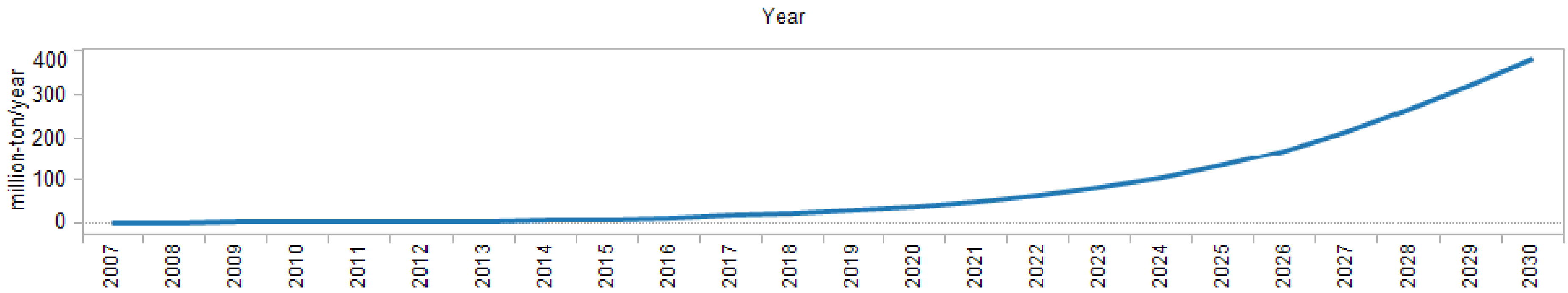
Potential cellulosic demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	0	0	0	0	0	1	1	1	1	1	1	1	3	7	12	17	23	29	39	51	68	88	112	142

FSM.cellulosic_demand_medium *Scenario Value*

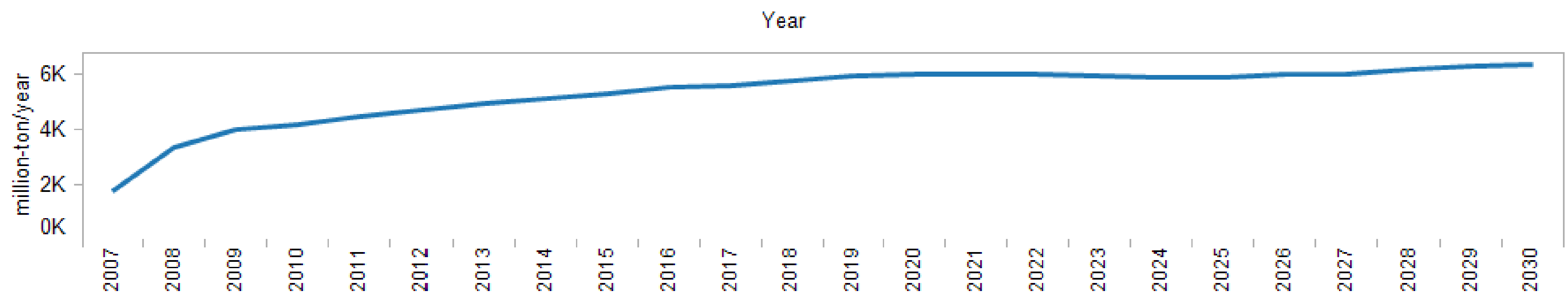
Potential cellulosic demand scenario. Units: million-ton/yr



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	0	0	0	0	0	1	3	4	6	11	16	21	28	36	47	62	81	104	133	168	211	264	322	379

FSM.corn_demand_AEO2009 *Annual Energy Outlook 2011*

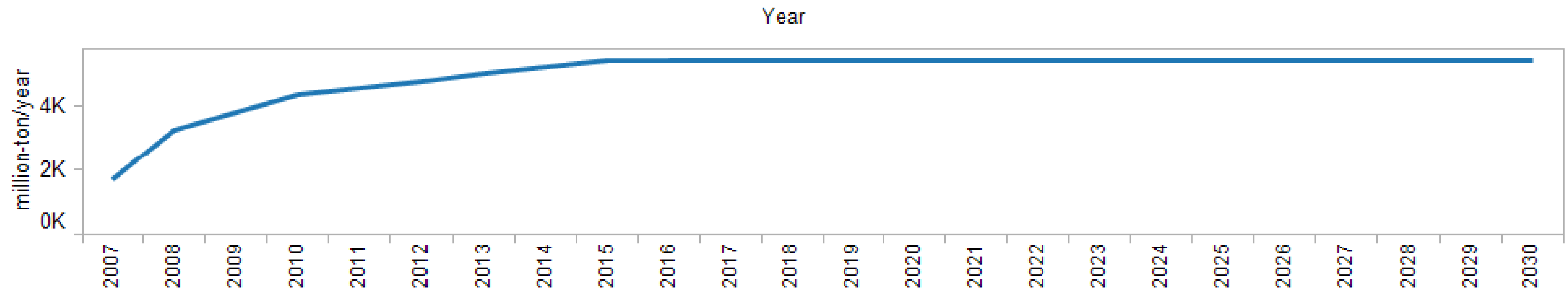
Reference case for corn demand. Potential corn demand scenario. Units: million-ton/yr



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	1.7K	3.3K	4.0K	4.1K	4.5K	4.7K	4.9K	5.1K	5.3K	5.5K	5.6K	5.7K	5.9K	6.0K	6.0K	6.0K	5.9K	5.9K	5.9K	6.0K	6.0K	6.2K	6.2K	6.3K

FSM.corn_demand_EISA2007 *Energy Independence and Security Act of 2007*

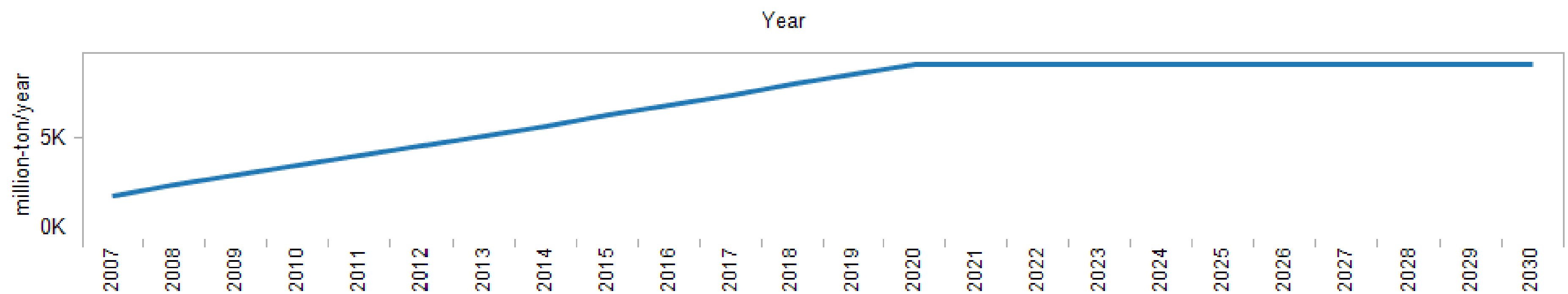
Potential corn demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	1.7K	3.2K	3.8K	4.3K	4.5K	4.7K	4.9K	5.1K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K	5.4K

FSM.corn_ETOH_high *Scenario Value*

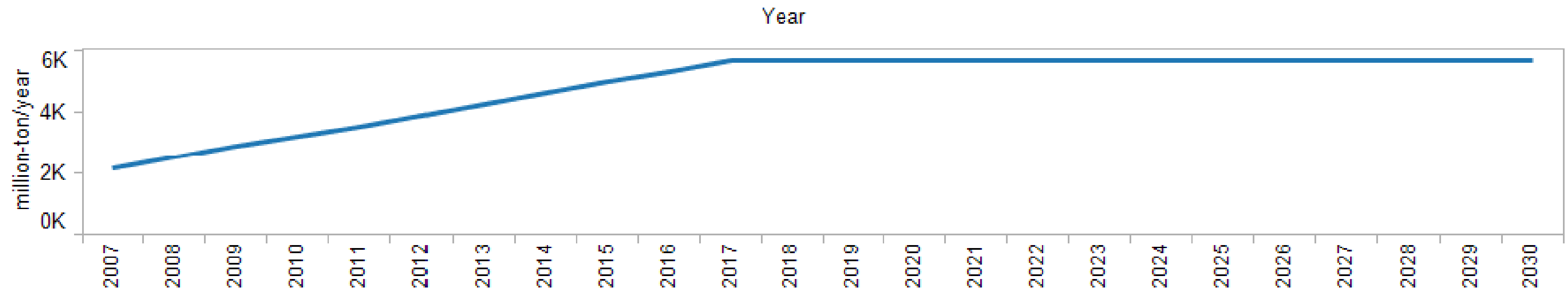
Potential corn demand scenario. Units: million-ton/yr



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	2.1K	2.6K	3.1K	3.6K	4.1K	4.6K	5.1K	5.6K	6.1K	6.6K	7.1K	7.6K	8.1K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K	8.6K

FSM.corn_ETOH_moderate *Scenario Value*

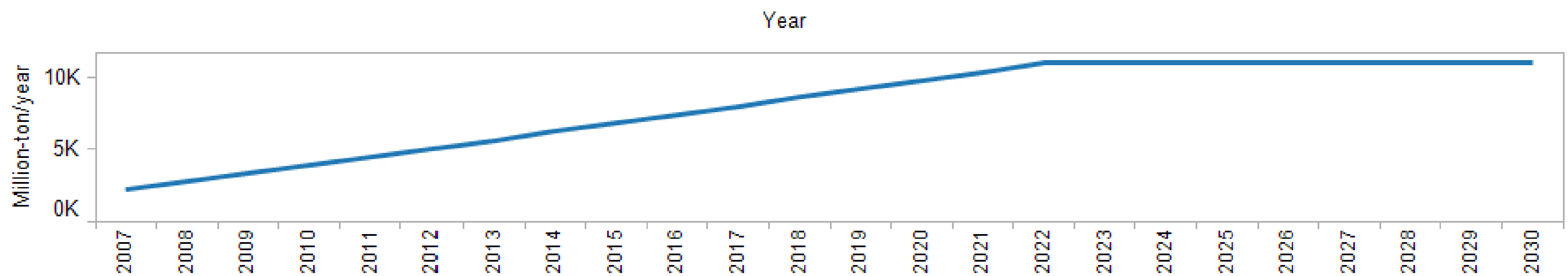
Potential corn demand scenario. Units: million-ton/yr



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	2.1K	2.5K	2.8K	3.2K	3.5K	3.9K	4.2K	4.6K	4.9K	5.3K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K	5.6K

FSM.corn_ETOH_very_high *Scenario Value*

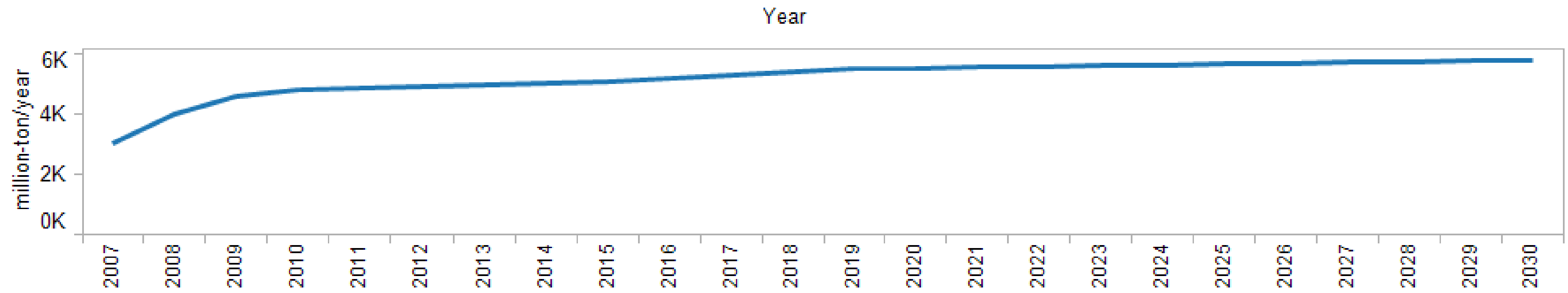
Potential corn demand scenario. Units: million-ton/yr



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	2.1K	2.7K	3.3K	3.9K	4.4K	5.0K	5.6K	6.2K	6.8K	7.4K	8.0K	8.6K	9.1K	9.7K	10.3K	10.9K	10.9K	10.9K	10.9K	10.9K	10.9K	10.9K	10.9K	10.9K

FSM.USDA_corn_EtOH_mm *USDA Agricultural Projections to 2020*

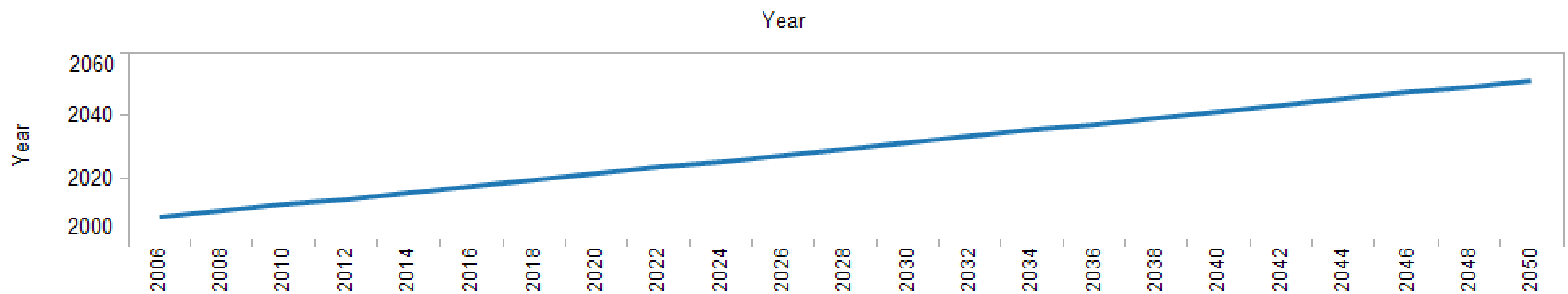
USDA corn ethanol demand scenario. Units: million-ton/yr *table 19*



Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Value	3K	4K	5K	5K	5K	5K	5K	5K	5K	5K	5K	5K	5K	6K	6K	6K	6K	6K	6K	6K	6K	6K	6K	6K

FSM.Year *Scenario Value*

Year in model. Units: yr

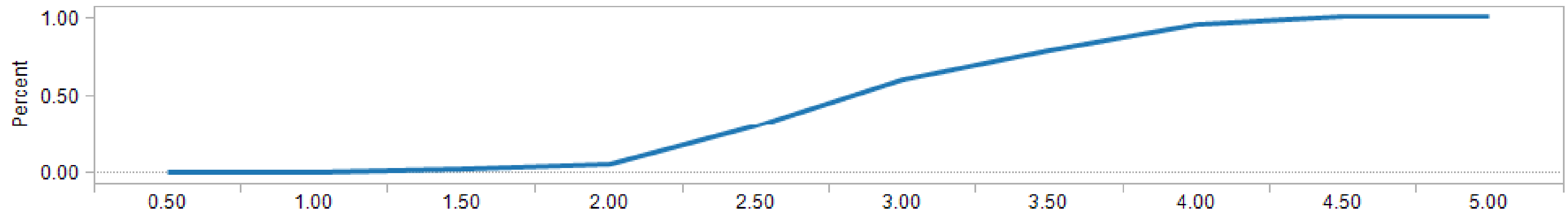


Year	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044	2046	2048	2050
Value	2007	2009	2011	2013	2015	2017	2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039	2041	2043	2045	2047	2049	2051

IM.frac__import_capacity_utilized *BSM Calibration*

Fractional utilization of potential import capacity of EtOH from outside the United States. Units: Unitless

Non-subsidized point of production price relative to import threshold [unitless]

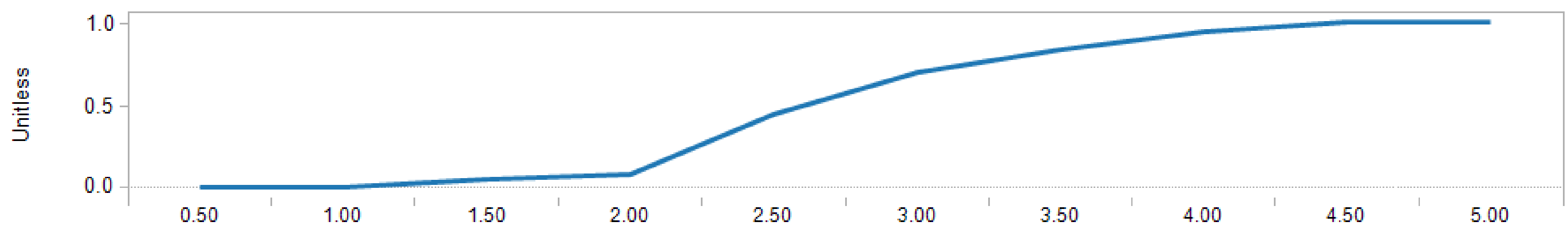


Value	0.00	0.00	0.02	0.05	0.30	0.60	0.79	0.95	1.00	1.00

IM.old_values_for_frac_import_capacity_utilized *BSM Calibration*

Fractional utilization of potential import capacity of EtOH from outside the United States. Units: Unitless

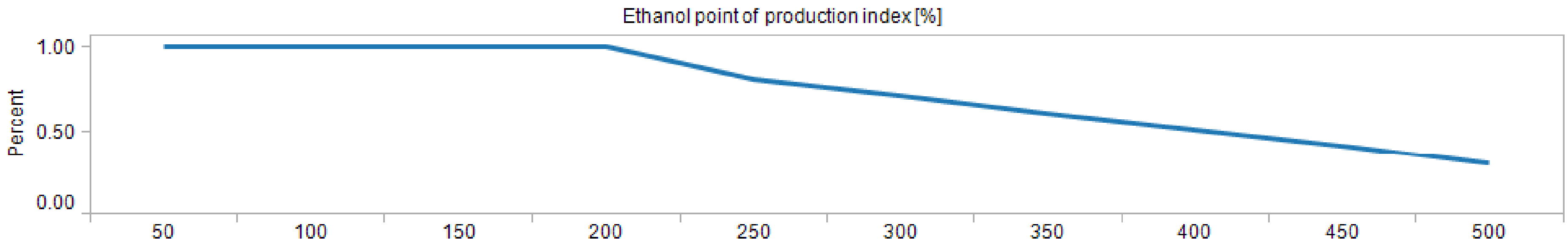
Non-subsidized point of production price relative to import threshold [unitless]



Value	0.00	0.00	0.04	0.08	0.44	0.69	0.84	0.95	1.00	1.00

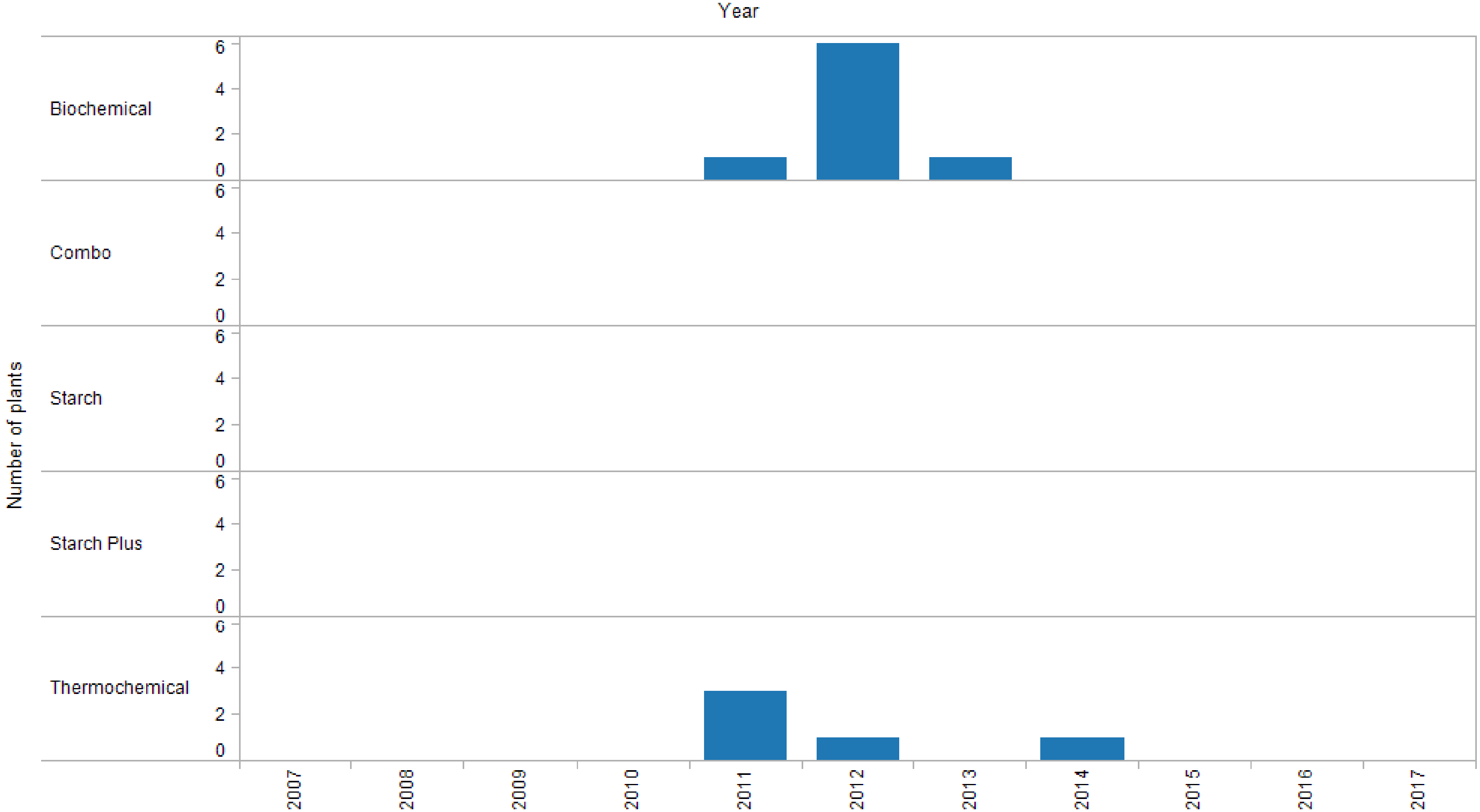
PIM.impact_of_price_on_ramp_up

Impact of PoP price on ramp up of low-blend ethanol consumption. Units: Unitless



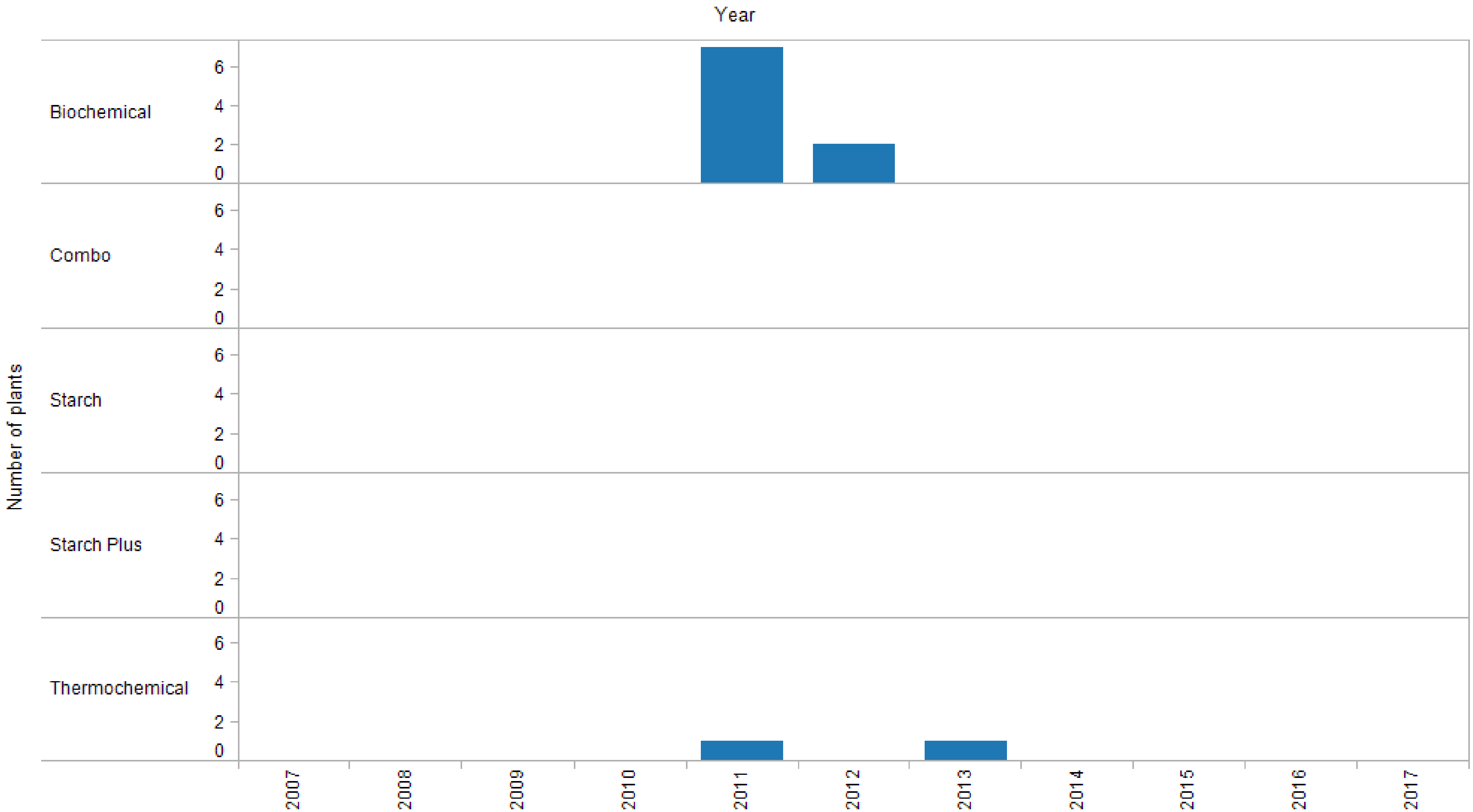
Value										
	1.00	1.00	1.00	1.00	0.80	0.70	0.60	0.50	0.40	0.30

This graphical function drives the initiation of building demonstration-scale operations. Units: projects/yr



Values	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Biochemical	0	0	0	0	1	6	1	0	0	0	0
Combo	0	0	0	0	0	0	0	0	0	0	0
Starch	0	0	0	0	0	0	0	0	0	0	0
Starch Plus	0	0	0	0	0	0	0	0	0	0	0
Thermochemical	0	0	0	0	3	1	0	1	0	0	0

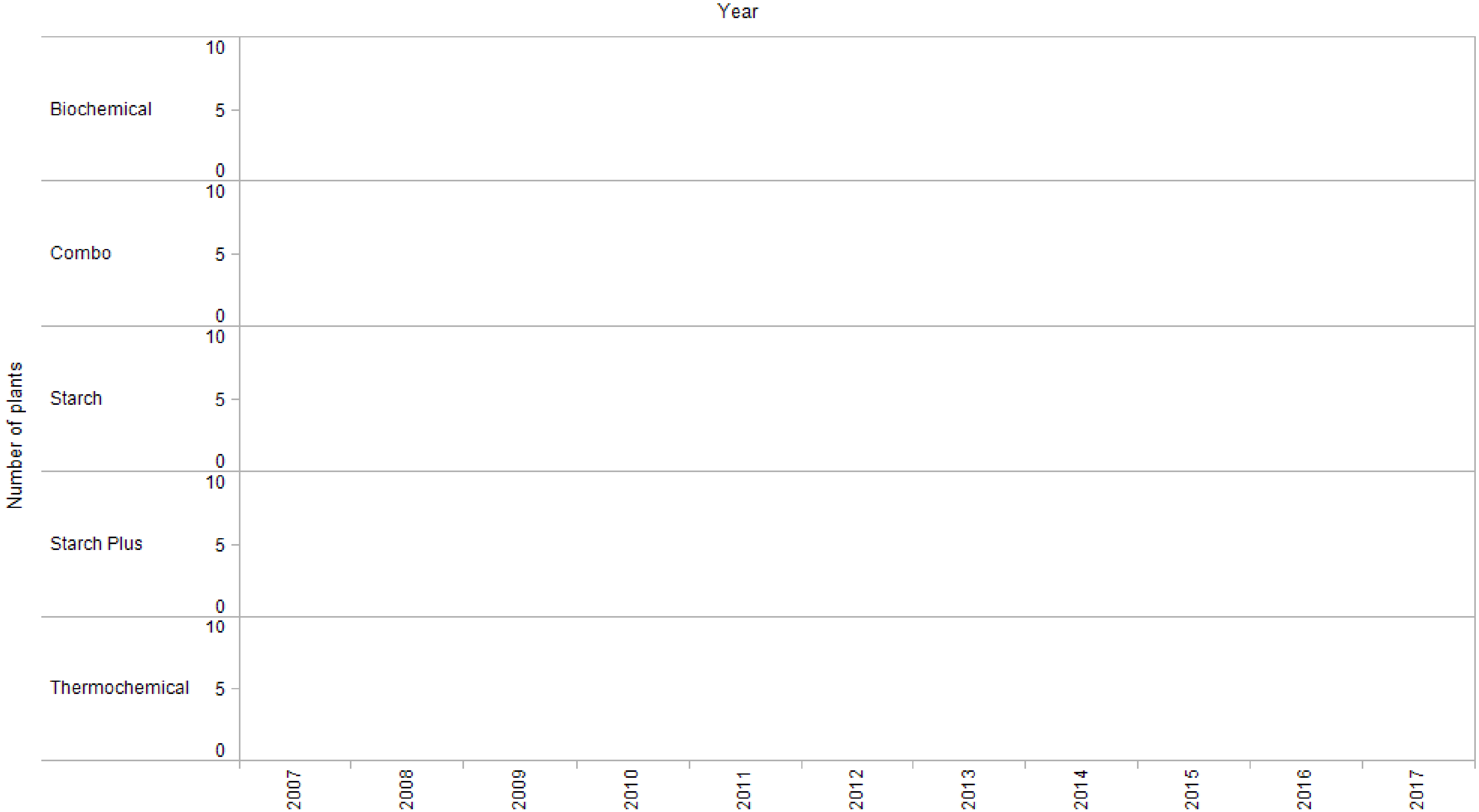
Scenario input driving initiation of pilot-scale operations. Units: projects/yr



Values	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Biochemical	0	0	0	0	7	2	0	0	0	0	0
Combo	0	0	0	0	0	0	0	0	0	0	0
Starch	0	0	0	0	0	0	0	0	0	0	0
Starch Plus	0	0	0	0	0	0	0	0	0	0	0
Thermochemical	0	0	0	0	1	0	1	0	0	0	0

CM.pioneer_scenario *Scenario Value*

Scenario input driving initiation of pioneer plant operation. Units: projects/yr

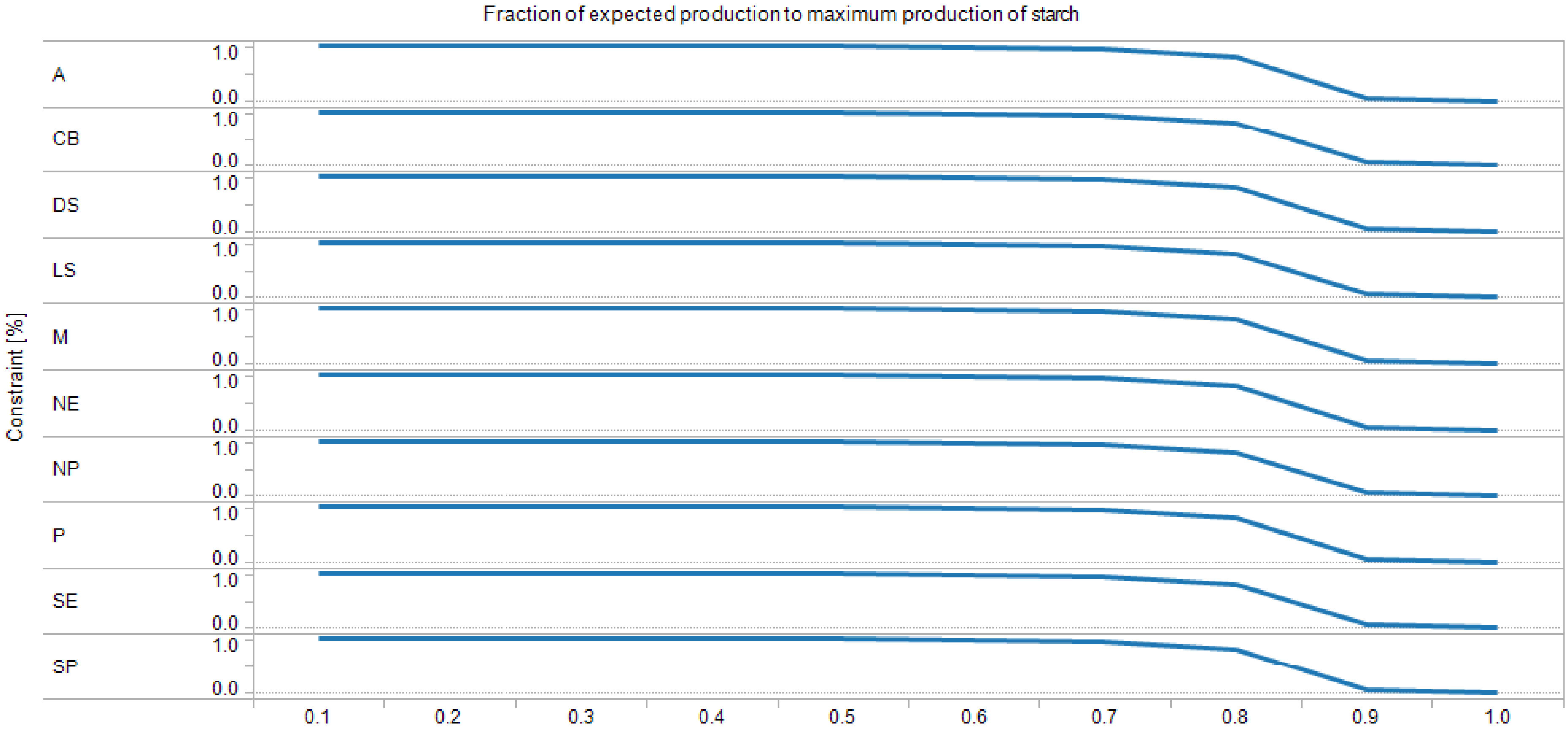


Values

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Biochemical	0	0	0	0	0	0	0	0	0	0	0
Combo	0	0	0	0	0	0	0	0	0	0	0
Starch	0	0	0	0	0	0	0	0	0	0	0
Starch Plus	0	0	0	0	0	0	0	0	0	0	0
Thermochemical	0	0	0	0	0	0	0	0	0	0	0

CM.starch_prod'n_rconstraint

Constrains growth of starch industry as it nears the maximum allowed production. Units: Unitless

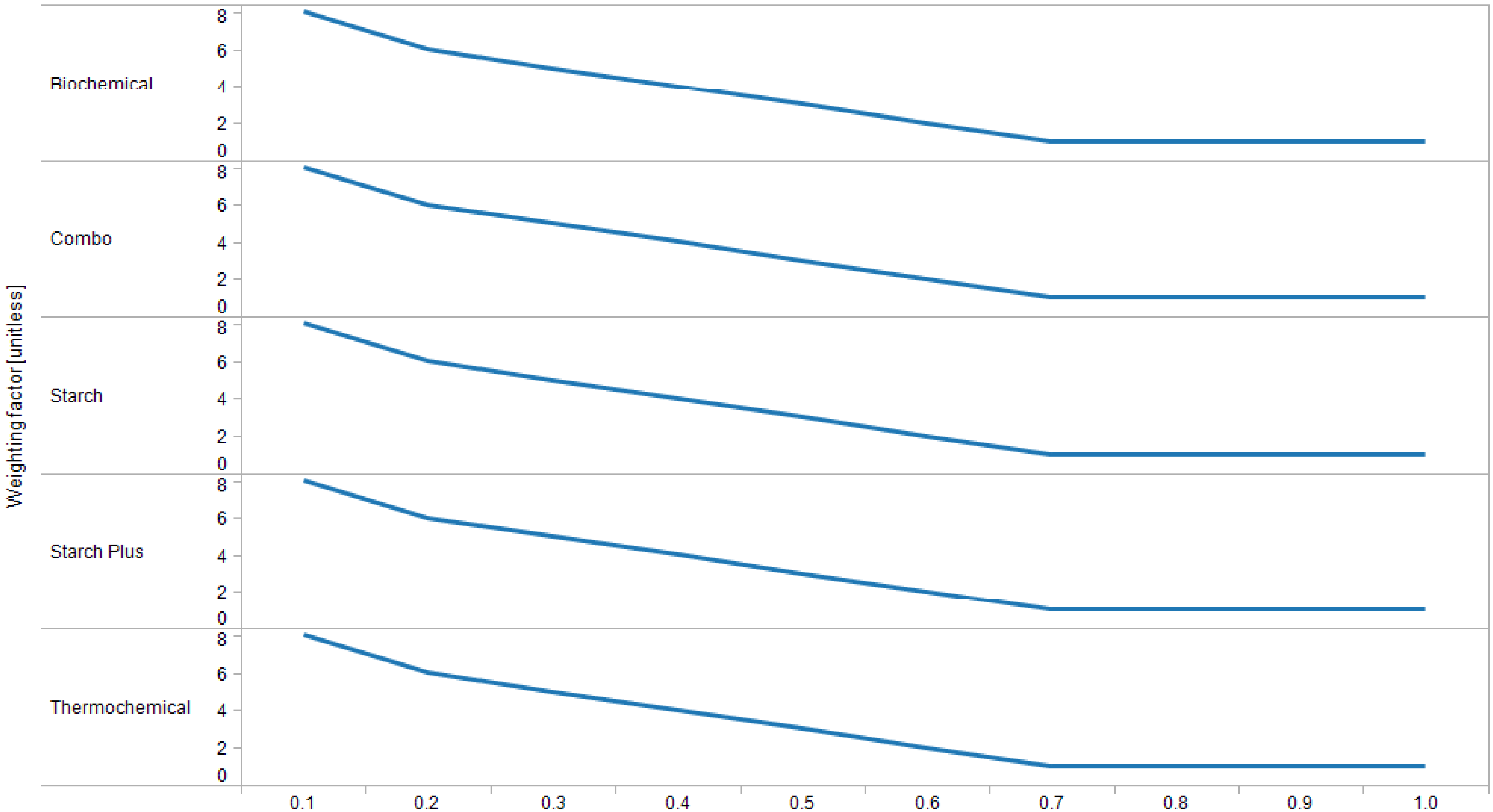


Values	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
A	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
CB	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
DS	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
LS	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
M	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
NE	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
NP	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
P	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
SE	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0
SP	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.1	0.0

CM.Technology_Specific_Regional_Concentration_Weighting_Factor

Graphical function that specifies the degree to which a technology will proliferate in each region. Units: Unitless

Commercial Maturity [unitless]

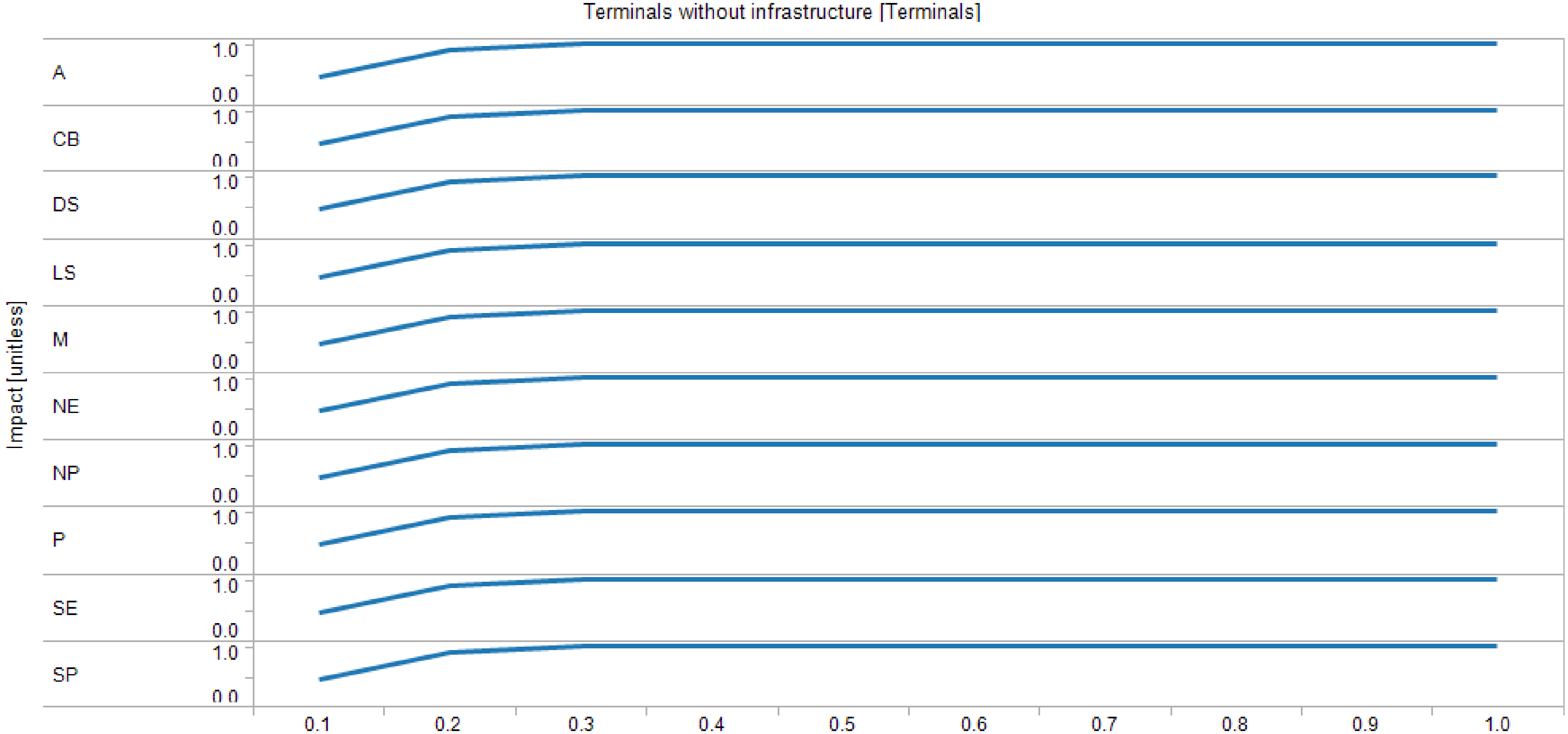


Values	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Biochemical	8.0	6.0	5.0	4.0	3.0	2.0	1.0	1.0	1.0	1.0
Combo	8.0	6.0	5.0	4.0	3.0	2.0	1.0	1.0	1.0	1.0
Starch	8.0	6.0	5.0	4.0	3.0	2.0	1.0	1.0	1.0	1.0
Starch Plus	8.0	6.0	5.0	4.0	3.0	2.0	1.0	1.0	1.0	1.0
Thermochemical	8.0	6.0	5.0	4.0	3.0	2.0	1.0	1.0	1.0	1.0

DLM.impact_of_remaining_terminals_on_acquisition

Relates remaining terminals without EtOH infrastructure to the rate at which infrastructure gap is eliminated per year.

Units: Unitless

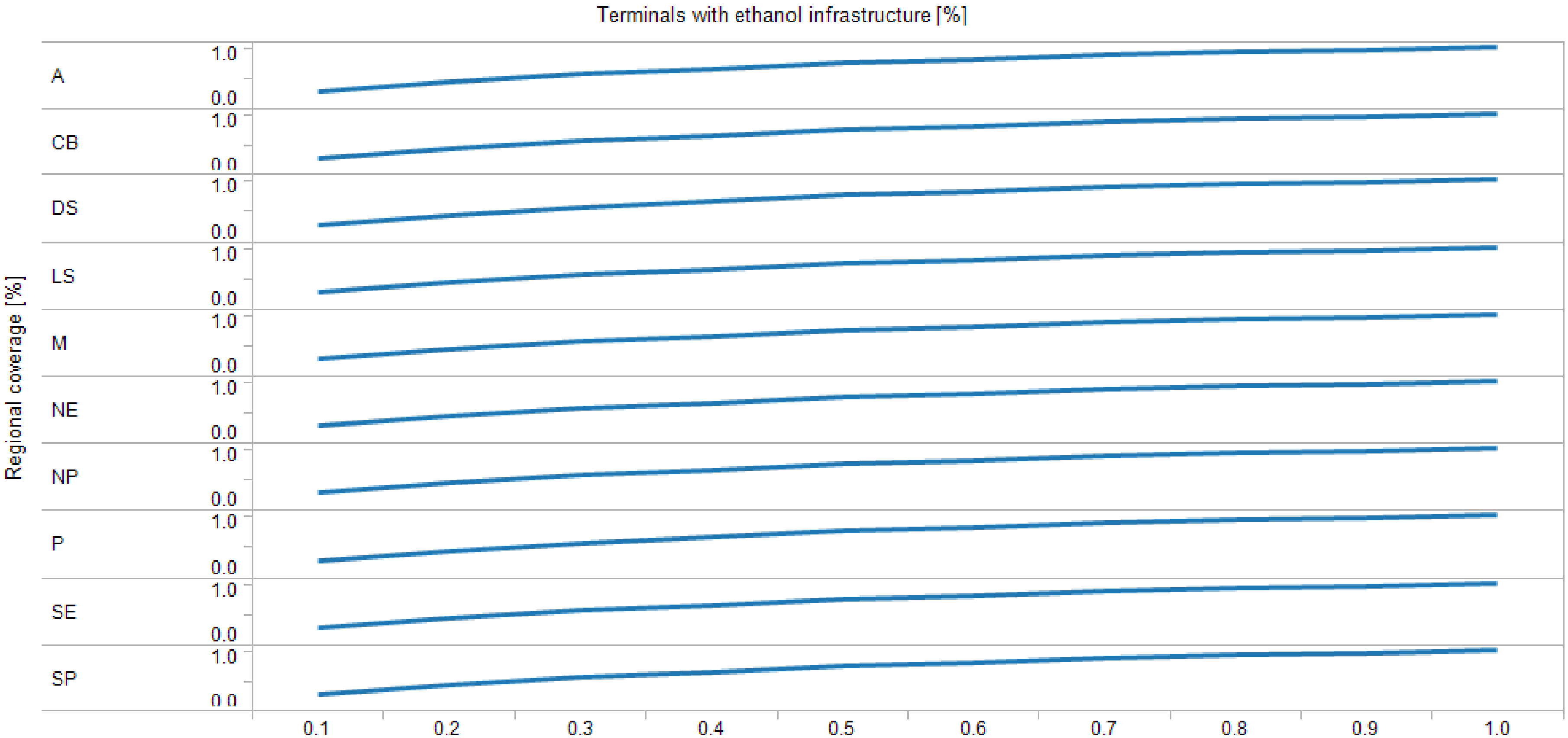


Values

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
A	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CB	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
DS	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
LS	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
M	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NE	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NP	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SE	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SP	0.5	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Relates the fraction of terminals within the region that have EtOH infrastructure to the fraction of stations with access to a terminal with E85 capability.

Units: Unitless

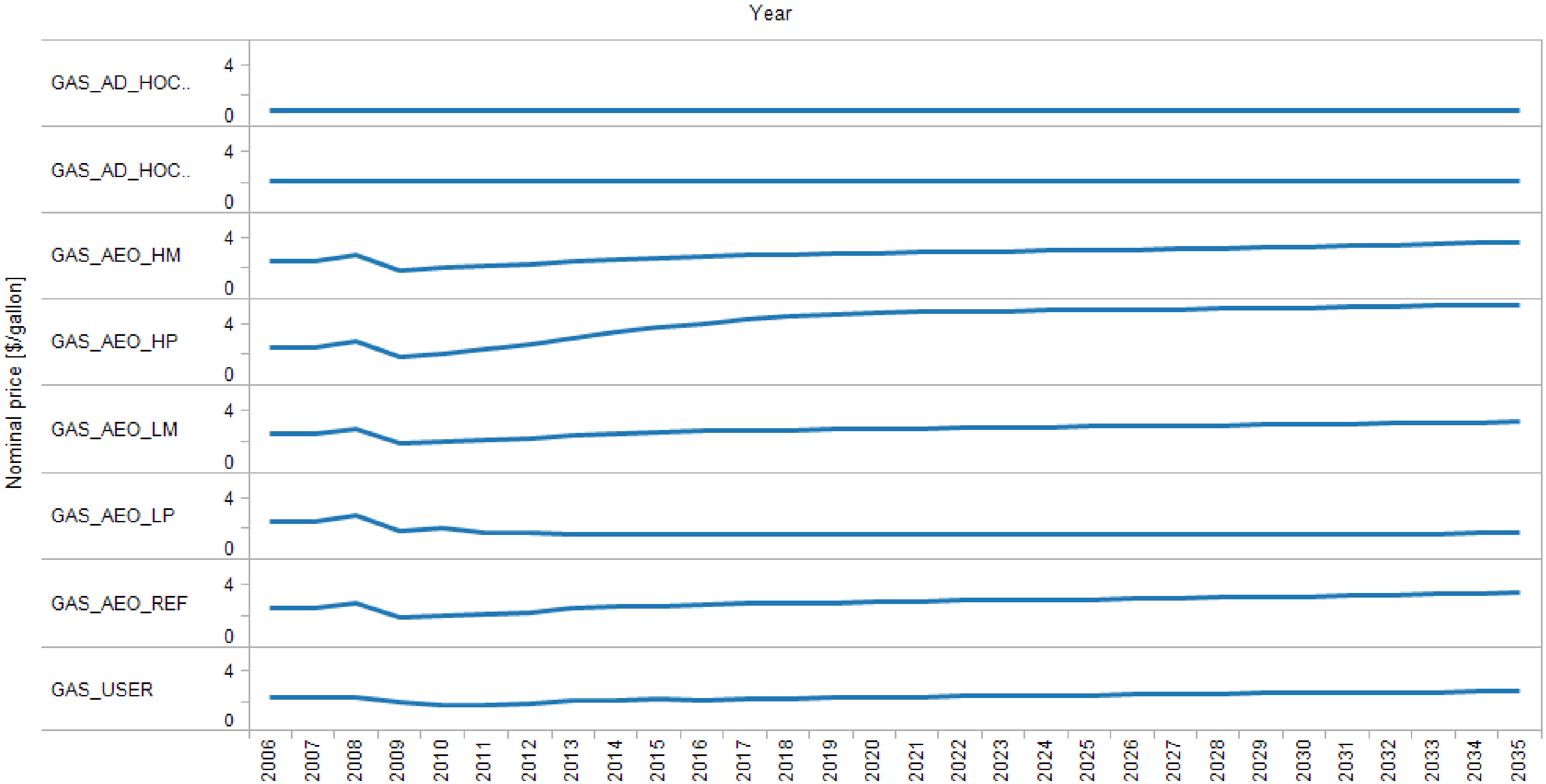


Values

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
A	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
CB	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
DS	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
LS	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
M	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
NE	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
NP	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
P	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
SE	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0
SP	0.3	0.4	0.6	0.6	0.8	0.8	0.9	0.9	1.0	1.0

DSM_Inputs.base_Gasoline_POD_price_before_tax_scenarios *Scenario Value*

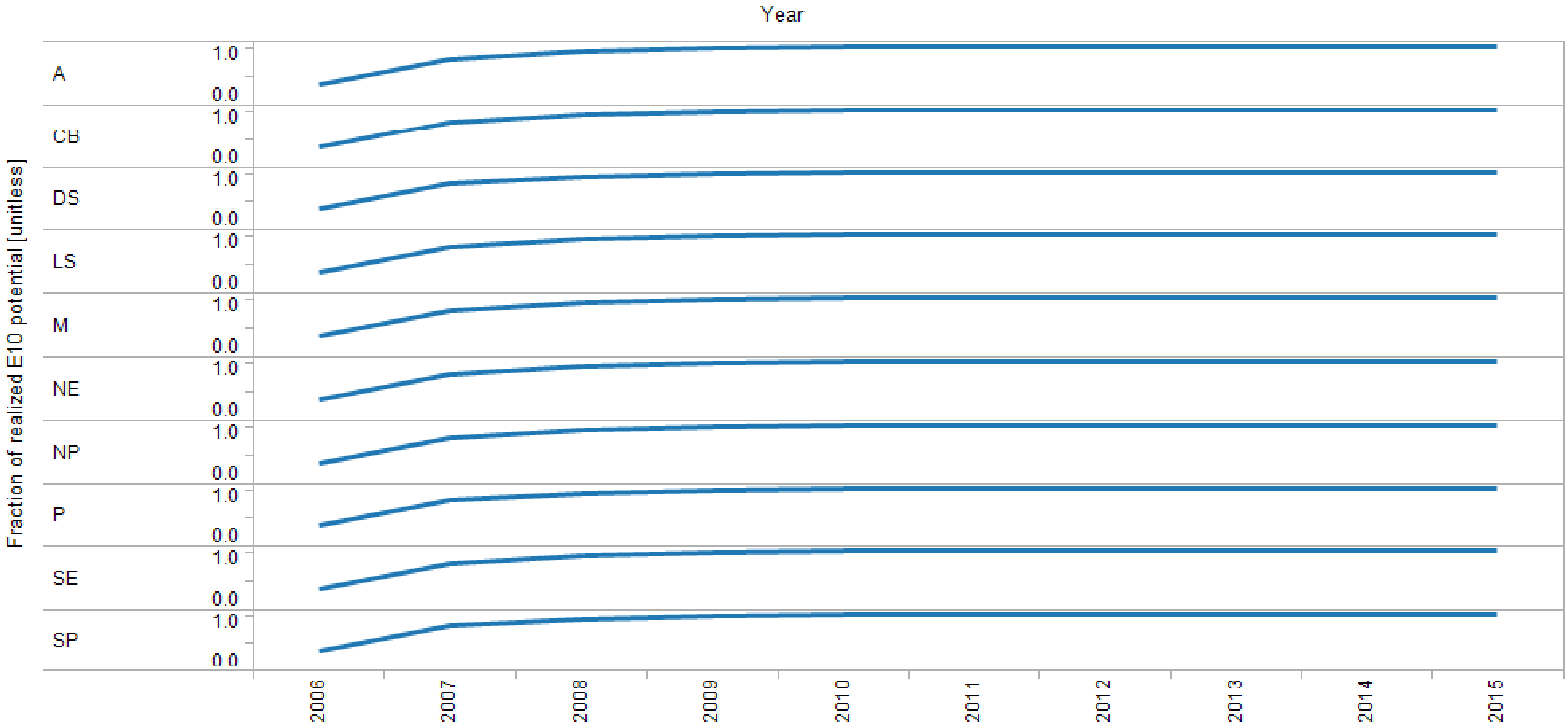
Nominal price per gallon for gasoline equivalent at point of distribution before taxes. Units: USD/gal



Values	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
GAS_AD_HOC_1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
GAS_AD_HOC_2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
GAS_AEO_HM	2.4	2.4	2.8	1.8	2.0	2.0	2.2	2.4	2.5	2.6	2.7	2.8	2.8	2.9	2.9	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.3	3.3	3.3	3.4	3.4	3.5	3.6	3.7
GAS_AEO_HP	2.4	2.4	2.8	1.8	2.0	2.3	2.6	3.0	3.4	3.7	3.9	4.2	4.4	4.5	4.6	4.7	4.7	4.8	4.8	4.8	4.8	4.9	4.9	4.9	5.0	5.0	5.1	5.1	5.1	5.1
GAS_AEO_LM	2.4	2.4	2.8	1.8	2.0	2.0	2.2	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.8	2.8	2.9	2.9	2.9	2.9	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.2
GAS_AEO_LP	2.4	2.4	2.8	1.8	2.0	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
GAS_AEO_REF	2.4	2.4	2.8	1.8	2.0	2.0	2.2	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.8	2.9	2.9	2.9	3.0	3.0	3.0	3.1	3.1	3.2	3.2	3.2	3.3	3.3	3.3	3.4
GAS_USER	2.2	2.2	2.2	1.9	1.7	1.7	1.8	2.0	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.5	2.5	2.5	2.5	2.6	2.6	2.6	2.6

DSM_Inputs.regional_lo_blend_ramp_up

Fraction of potential demand for E10 that is realized, as a function of time. Units: Unitless

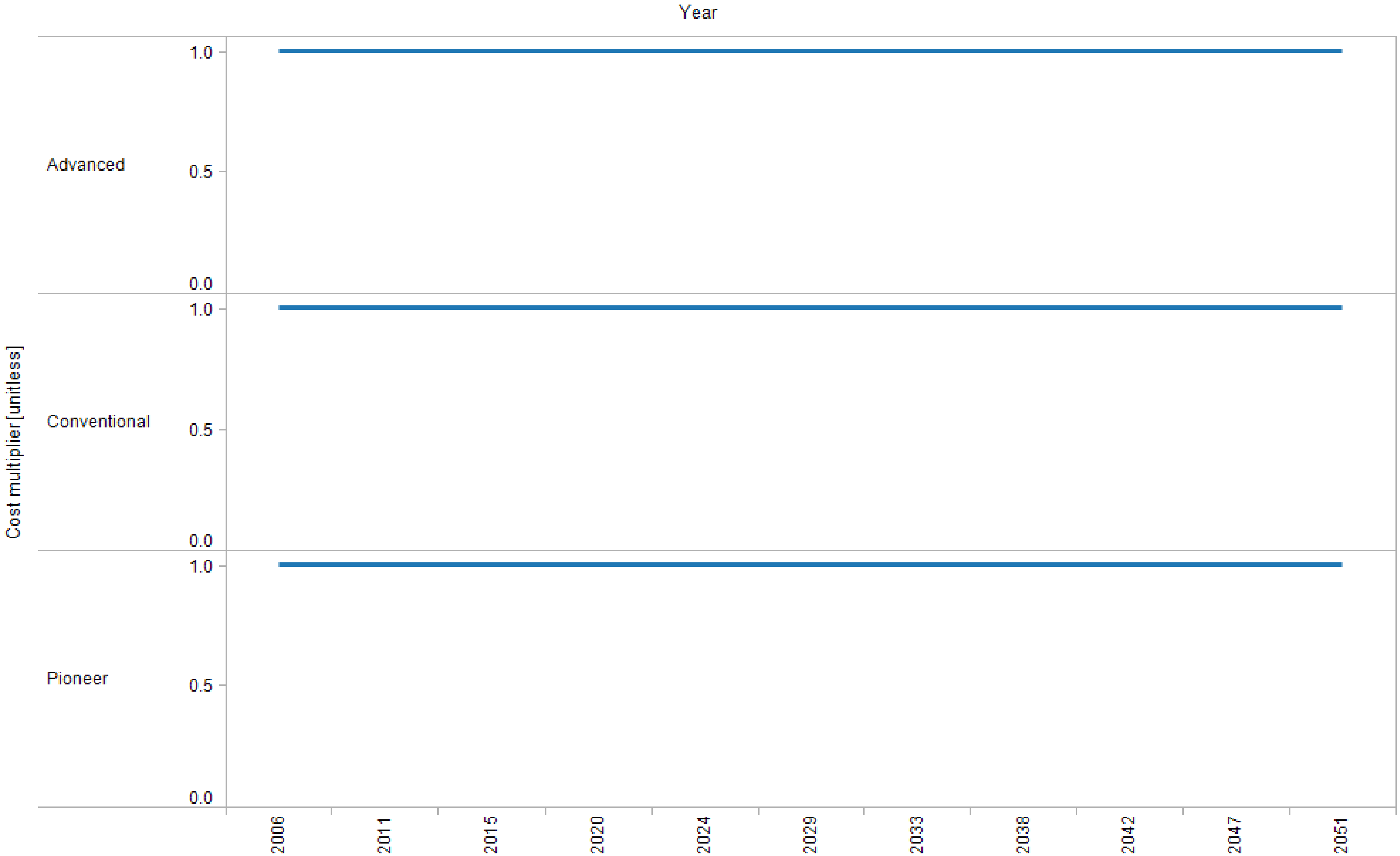


Values

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CB	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
DS	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
LS	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
M	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NE	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NP	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
P	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SE	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SP	0.3	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FLM.PrePro_Cost_Multiplier *Scenario Value*

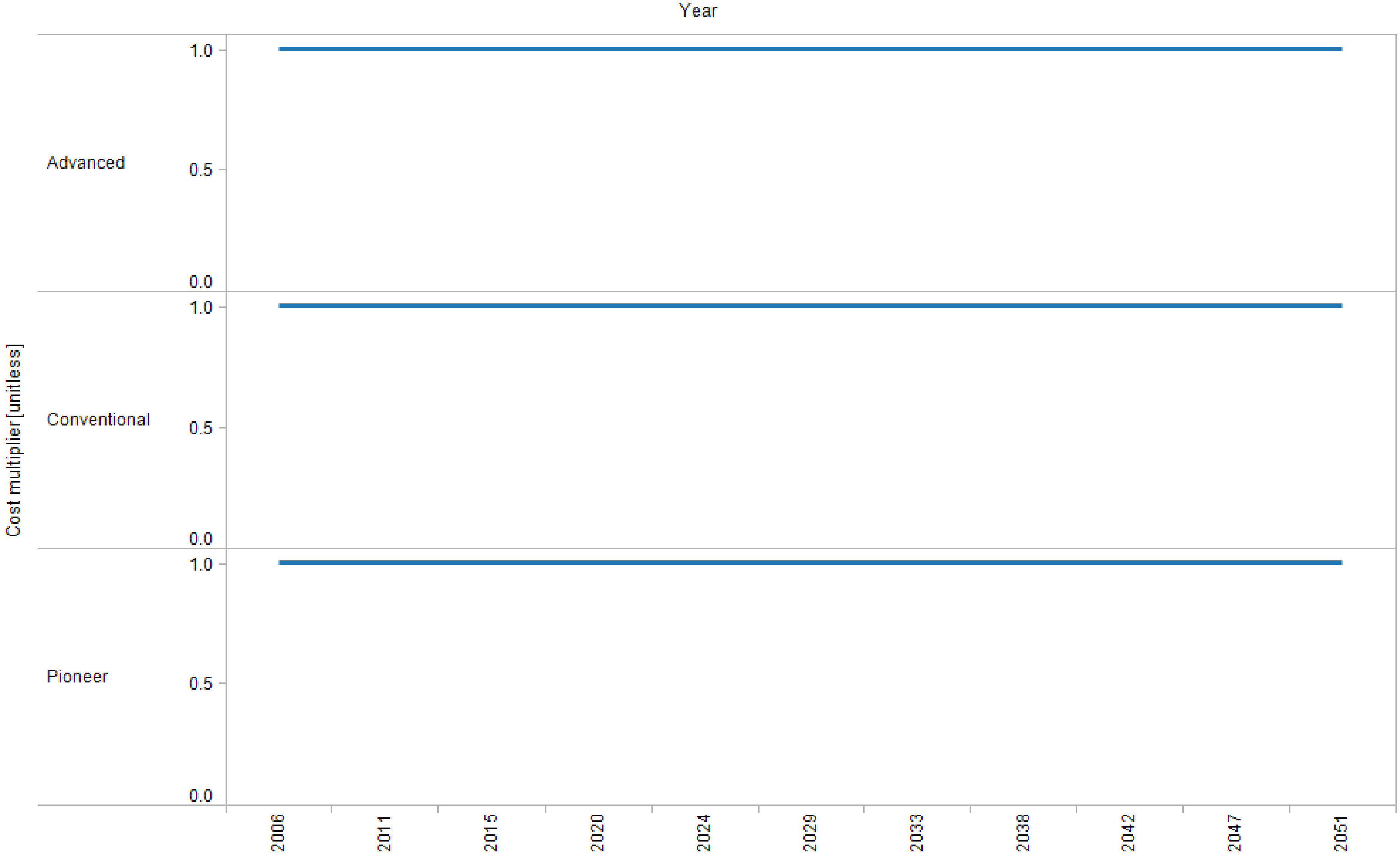
Preprocessing cost multiplier (general). Units: Unitless



Values	2006	2011	2015	2020	2024	2029	2033	2038	2042	2047	2051
Advanced	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Conventional	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pioneer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FLM.Q&H_Cost_Multiplier *Scenario Value*

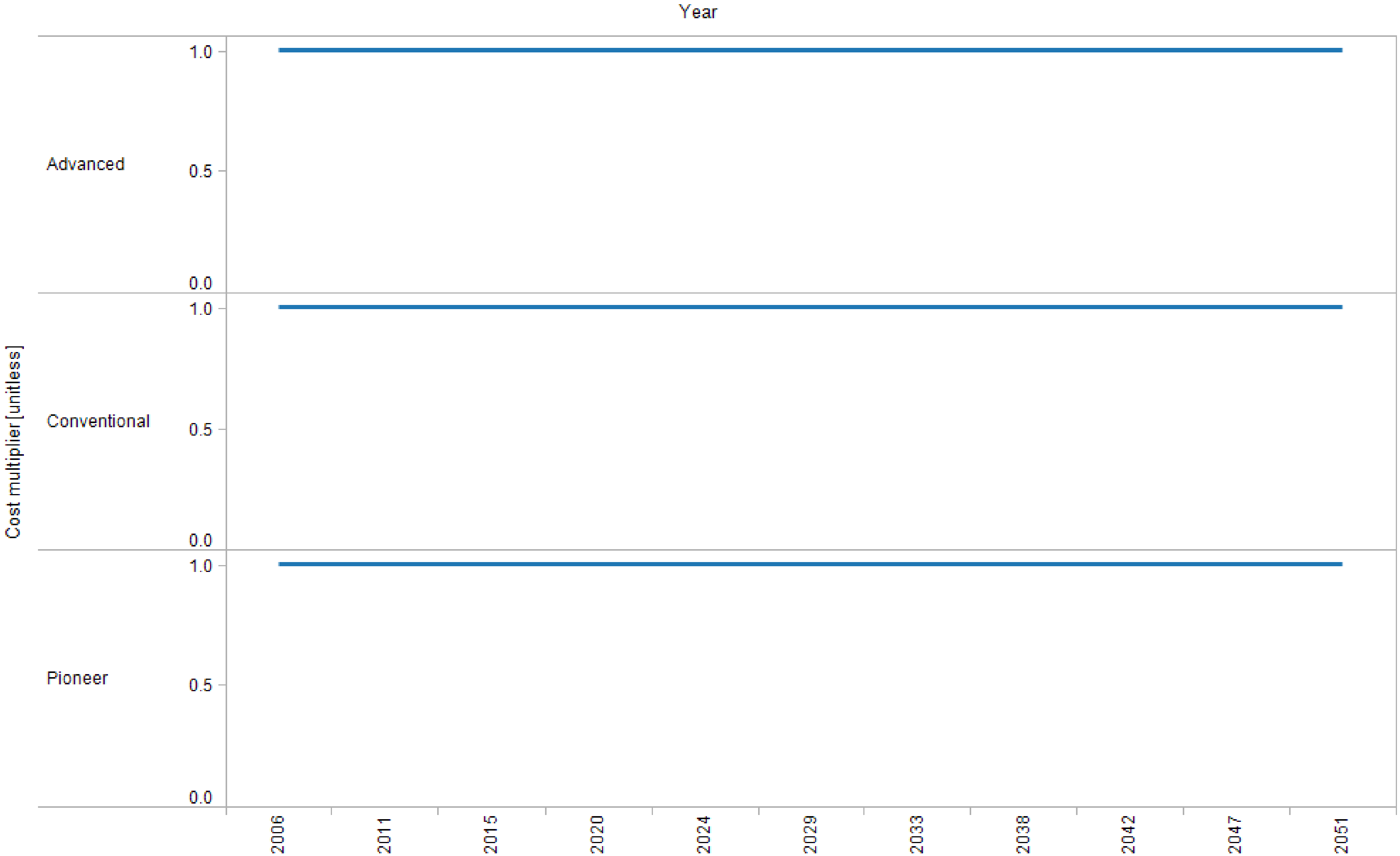
Queuing and Handling cost multipler (general). Units: Unitless



Values	2006	2011	2015	2020	2024	2029	2033	2038	2042	2047	2051
Advanced	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Conventional	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pioneer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FLM.Storage_Cost_Multiplier *Scenario Value*

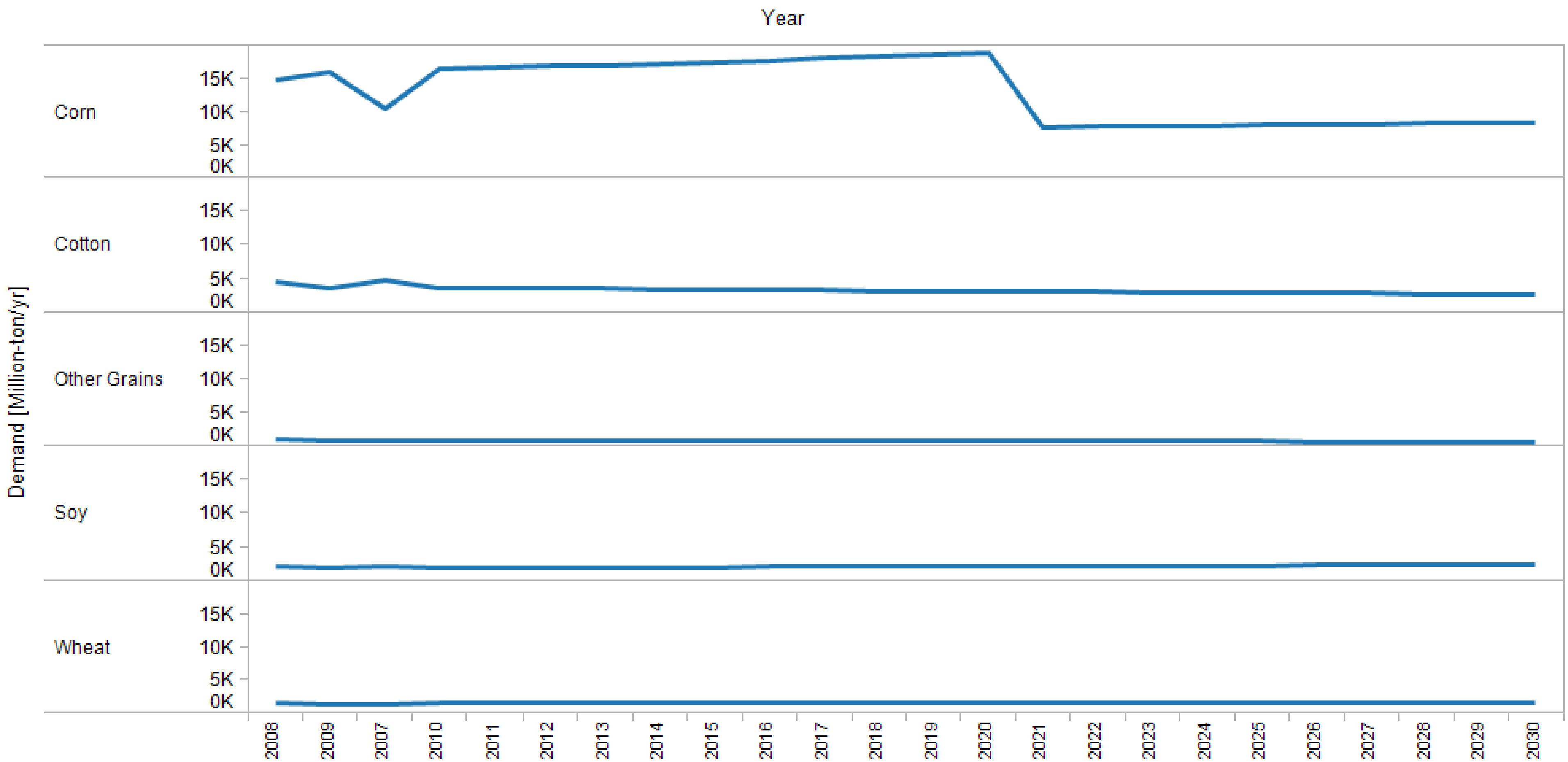
Storage cost multiplier. Units: Unitless



Values	2006	2011	2015	2020	2024	2029	2033	2038	2042	2047	2051
Advanced	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Conventional	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pioneer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

FSM.Dom_Dmand *USDA Agricultural Projections to 2018*

Domestic demand for crops. Units: million-ton/yr *table 8*

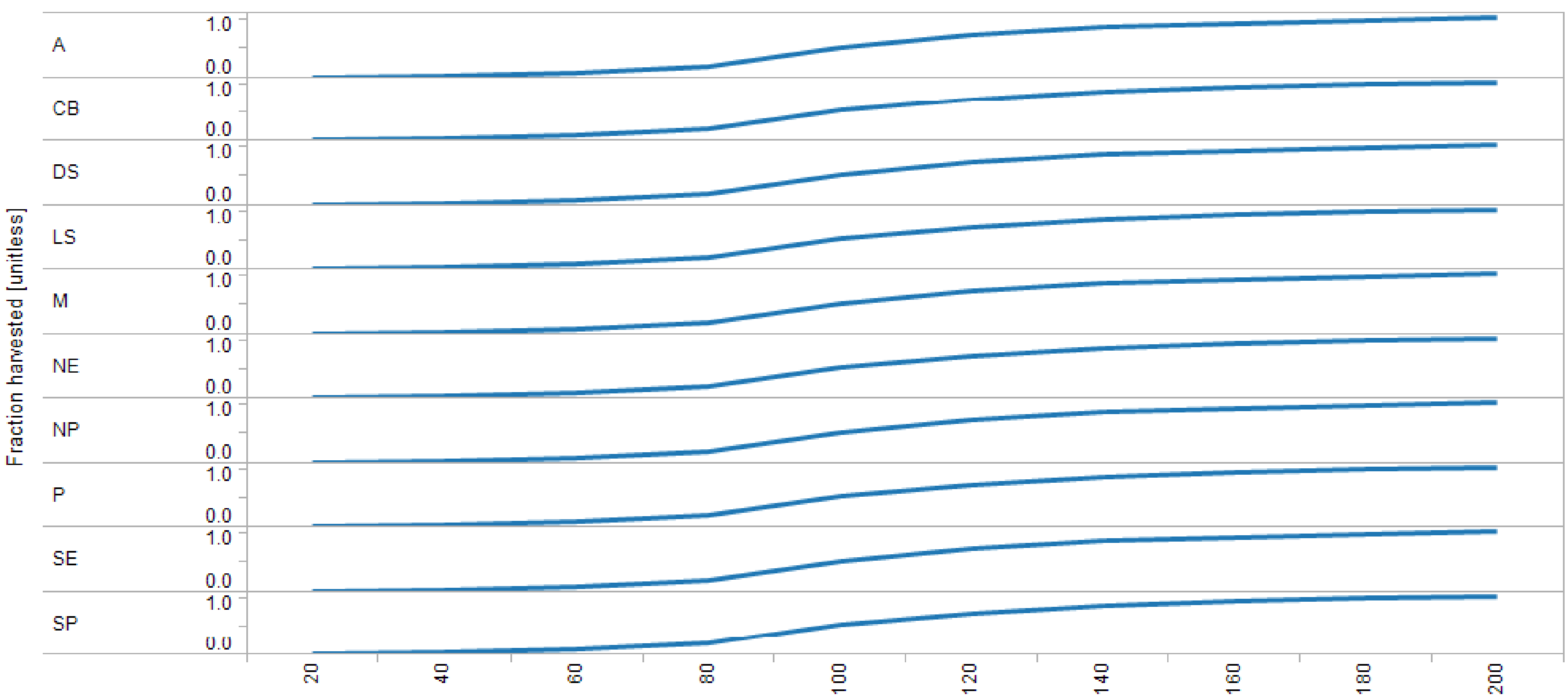


Values

	2008	2009	2007	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Corn	10K	15K	16K	16K	16K	17K	17K	17K	17K	17K	18K	18K	18K	18K	8K	8K	8K	8K	8K	8K	8K	8K	8K	8K
Cotton	5K	4K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	3K	2K	2K
Other Grains	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	0K	0K	0K	0K	0K	0K	0K	0K
Soy	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K
Wheat	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K

FSM.Frac_harvestable_CRP_land_Harvested_for_HC *Scenario Value*

Fraction of harvestable CRP land harvested for herbaceous energy crops, by region. Units: Unitless

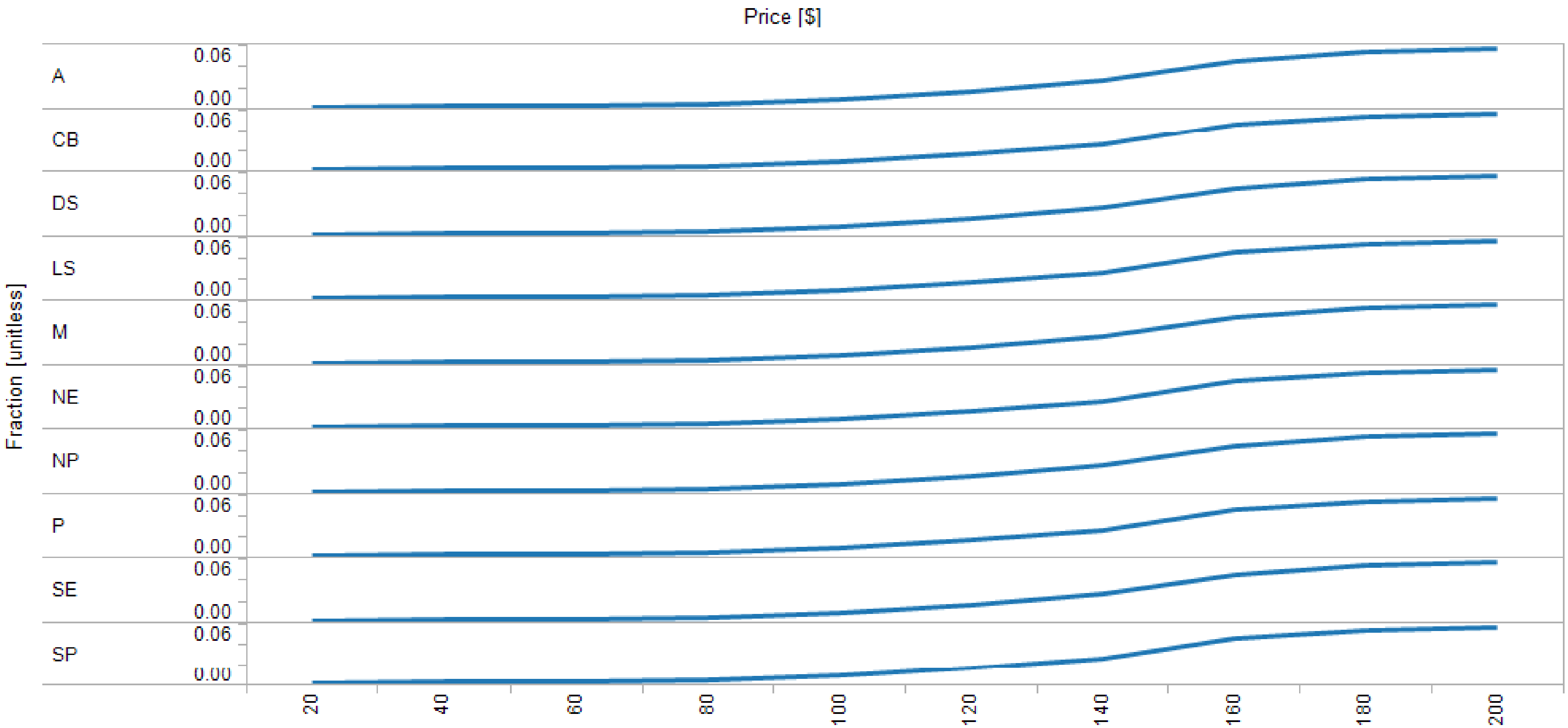


Values

	20	40	60	80	100	120	140	160	180	200
A	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
CB	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
DS	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
LS	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
M	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
NE	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
NP	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
P	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
SE	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0
SP	0.0	0.0	0.1	0.2	0.5	0.7	0.9	0.9	1.0	1.0

FSM.frac_movement_to_New_Practice_from_cell_energy_crop *BSM Calibration*

Fraction of movement from cellulosic energy crop to new practice. Units: 1/yr

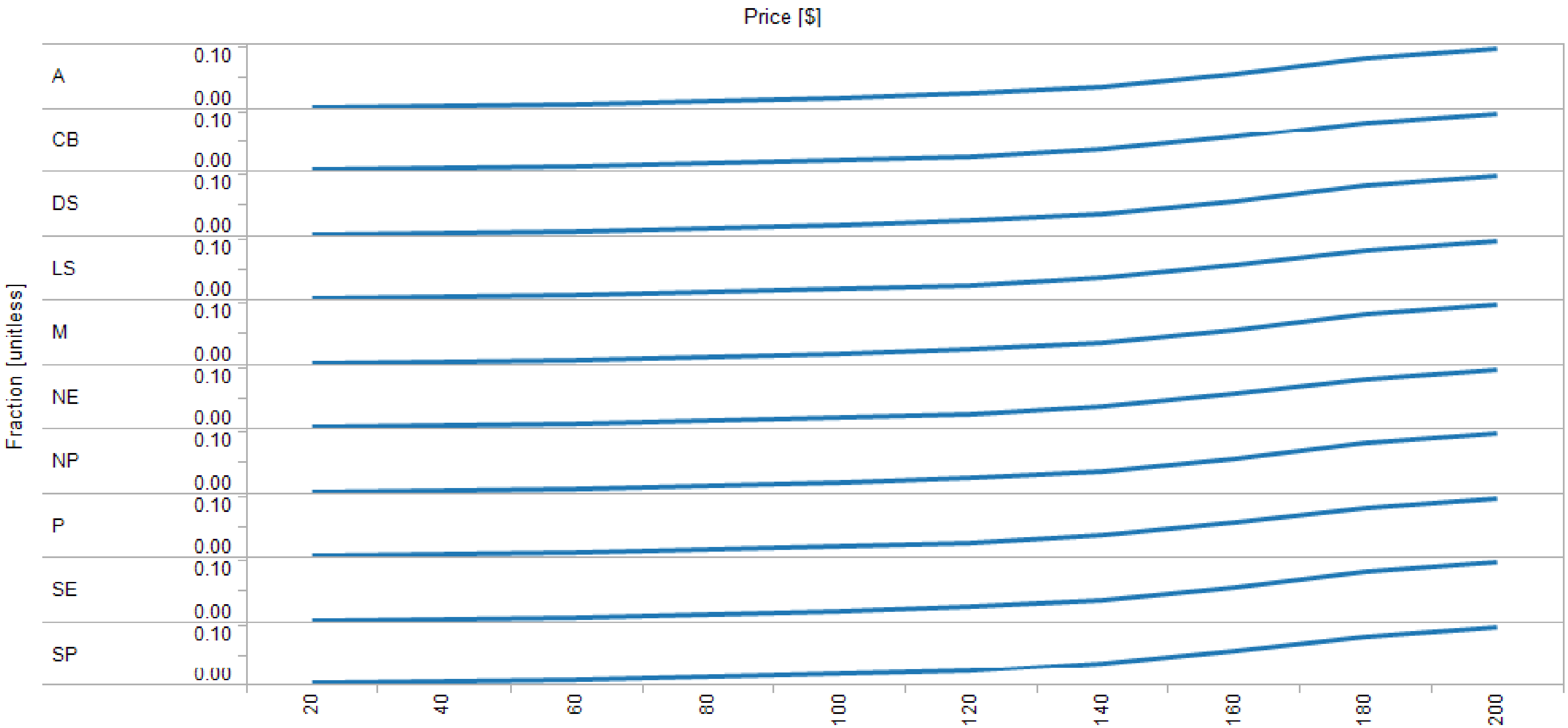


Values

	20	40	60	80	100	120	140	160	180	200
A	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
CB	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
DS	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
LS	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
M	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
NE	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
NP	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
P	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
SE	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06
SP	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.05	0.05	0.06

FSM.frac_movement_to_new_practice_from_residue *BSM Calibration*

Fraction of movement from residue to new practice. Units: 1/yr

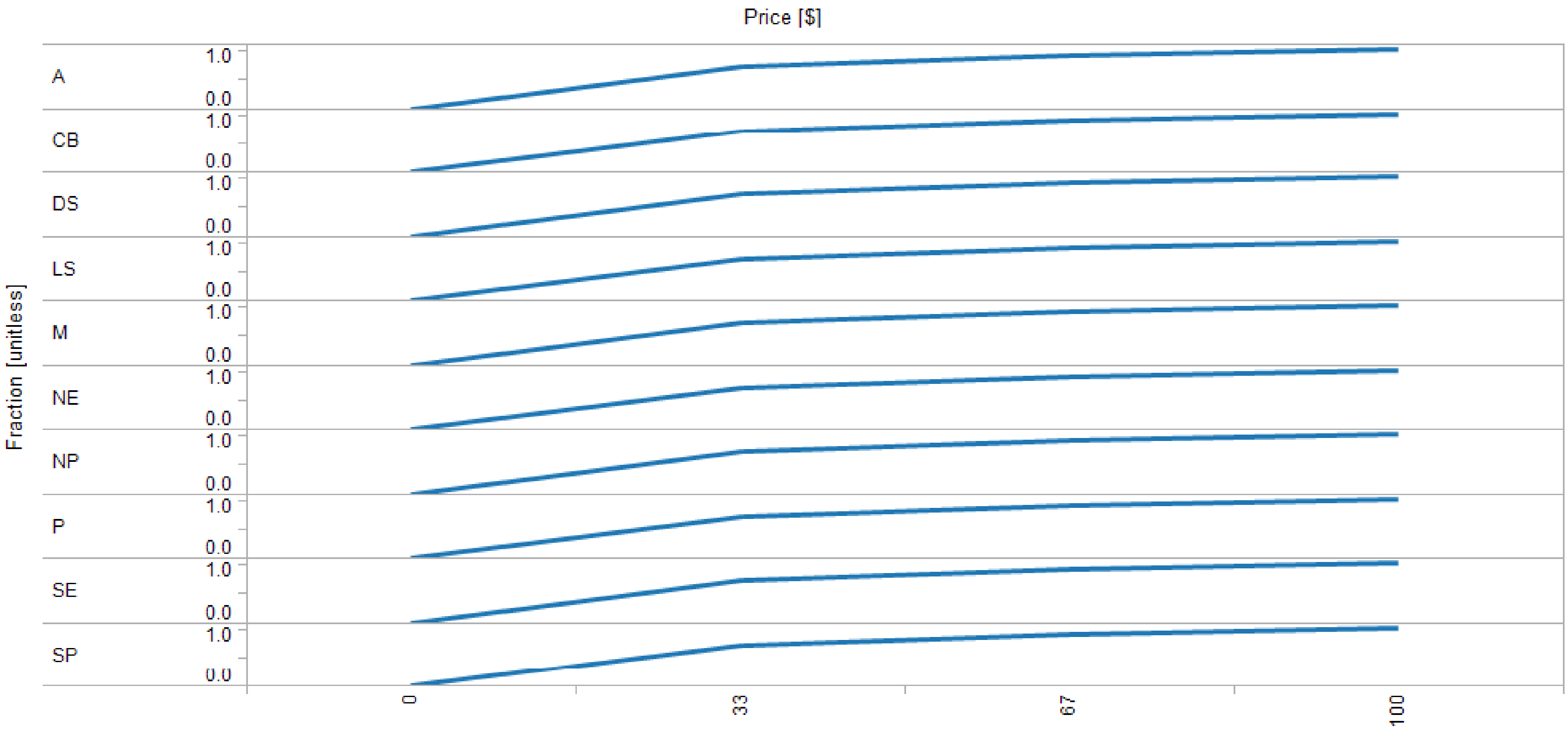


Values

	20	40	60	80	100	120	140	160	180	200
A	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
CB	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
DS	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
LS	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
M	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
NE	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
NP	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
P	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
SE	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09
SP	0.00	0.00	0.01	0.01	0.02	0.02	0.04	0.05	0.08	0.09

FSM.Frac_WC_Harvest_Cell_Land *Scenario Value*

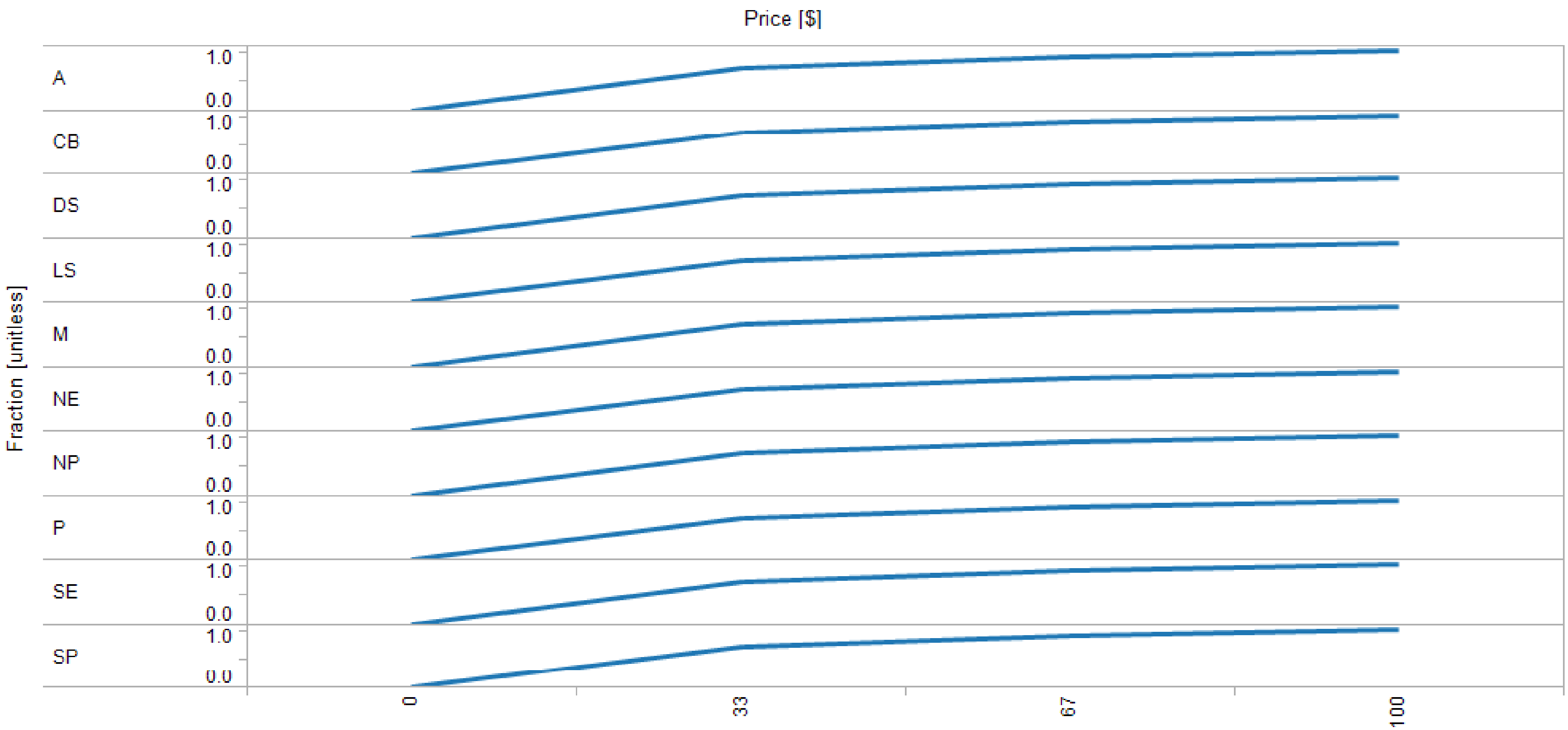
Fraction of crop land in woody cellulose that is harvested. Units: Unitless



Values				
A	0.00	0.70	0.90	1.00
CB	0.00	0.70	0.90	1.00
DS	0.00	0.70	0.90	1.00
LS	0.00	0.70	0.90	1.00
M	0.00	0.70	0.90	1.00
NE	0.00	0.70	0.90	1.00
NP	0.00	0.70	0.90	1.00
P	0.00	0.70	0.90	1.00
SE	0.00	0.70	0.90	1.00
SP	0.00	0.70	0.90	1.00

FSM.Frac_WC_Harvest_Pasture *Scenario Value*

Fraction of pasture in woody cellulose that is harvested. Units: Unitless

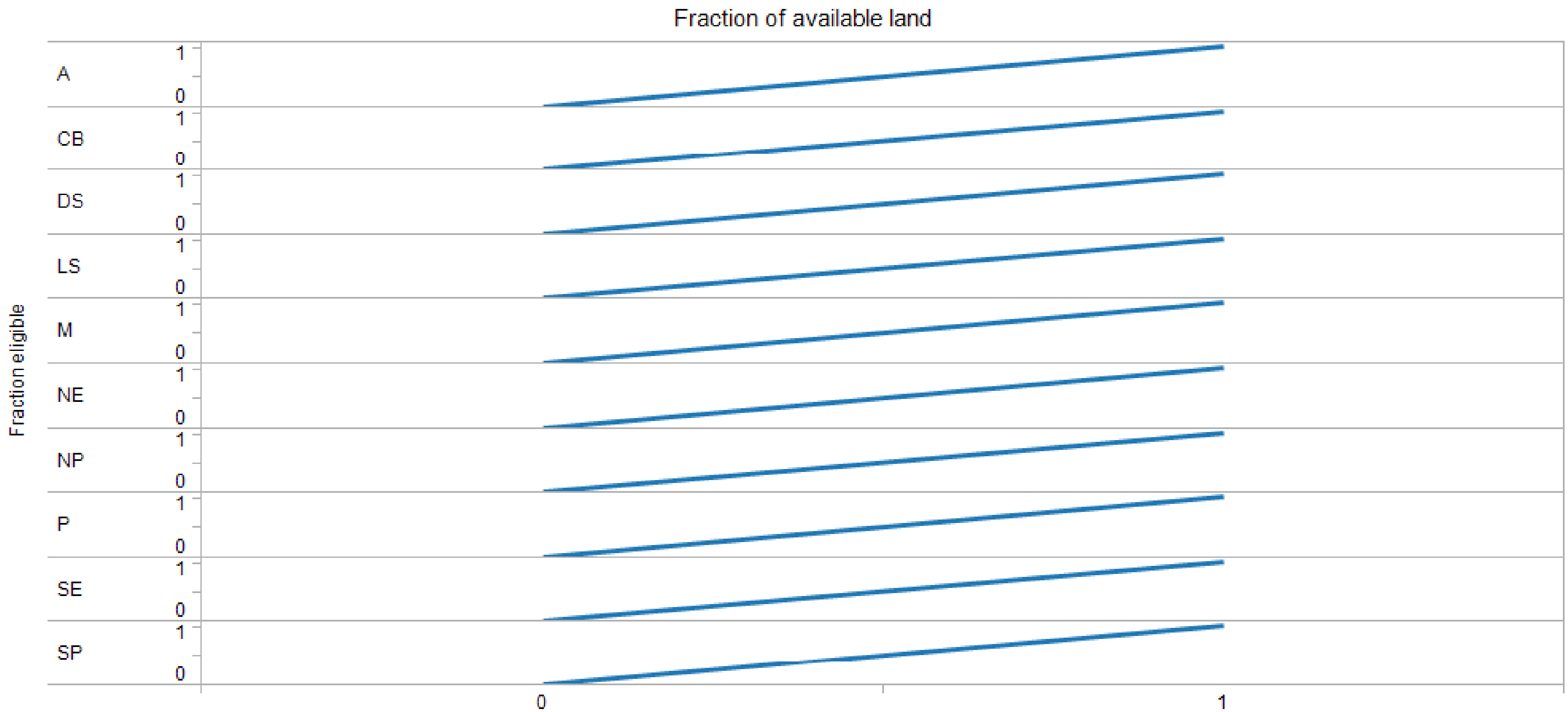


Values

	0	33	67	100
A	0.00	0.70	0.90	1.00
CB	0.00	0.70	0.90	1.00
DS	0.00	0.70	0.90	1.00
LS	0.00	0.70	0.90	1.00
M	0.00	0.70	0.90	1.00
NE	0.00	0.70	0.90	1.00
NP	0.00	0.70	0.90	1.00
P	0.00	0.70	0.90	1.00
SE	0.00	0.70	0.90	1.00
SP	0.00	0.70	0.90	1.00

Fraction of total available land available for cellulosics.

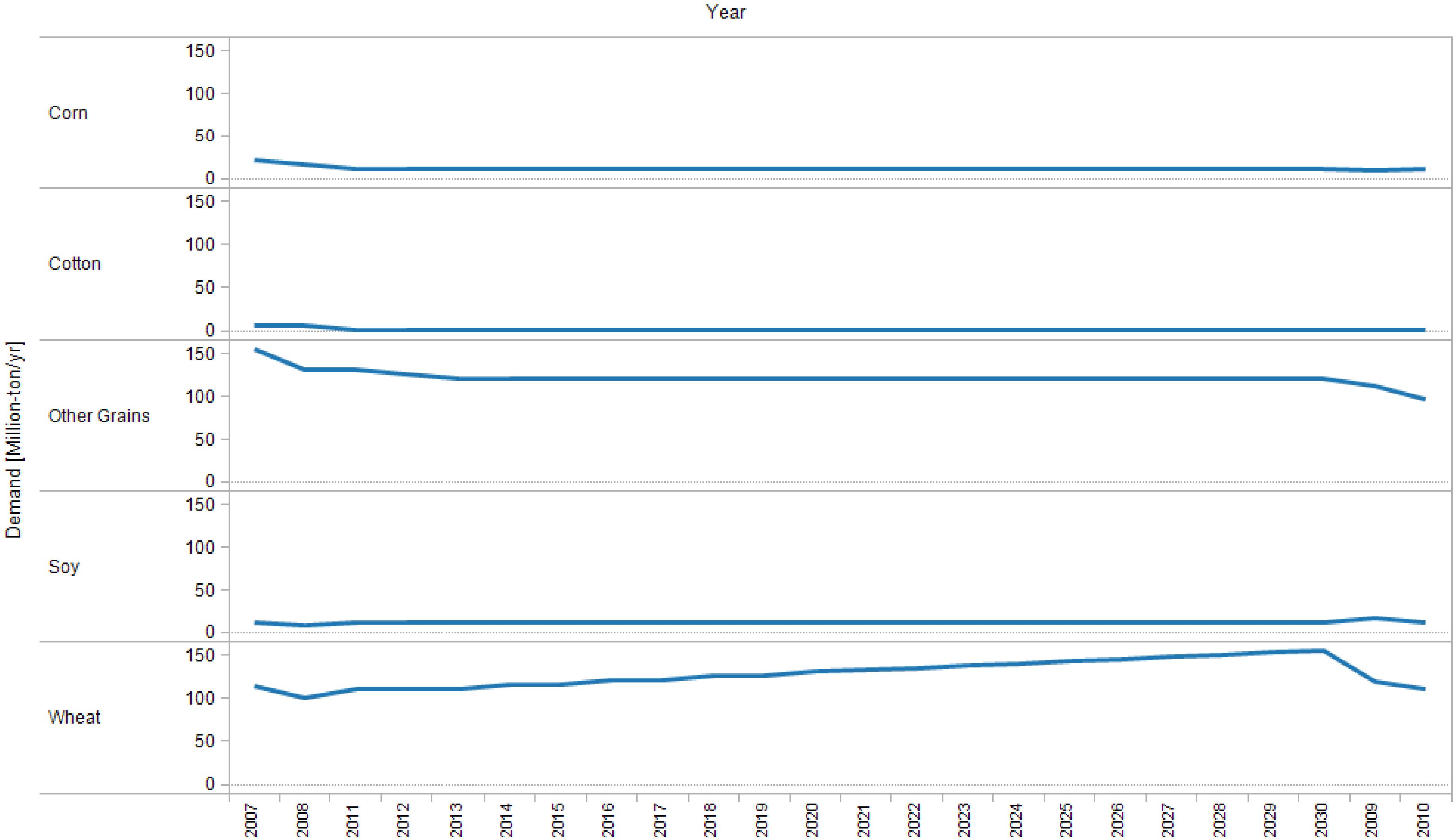
Units: Unitless



Values

A	0	1
CB	0	1
DS	0	1
LS	0	1
M	0	1
NE	0	1
NP	0	1
P	0	1
SE	0	1
SP	0	1

Imports of annual crops, by year and crop. Units: million-ton/yr *table 8*



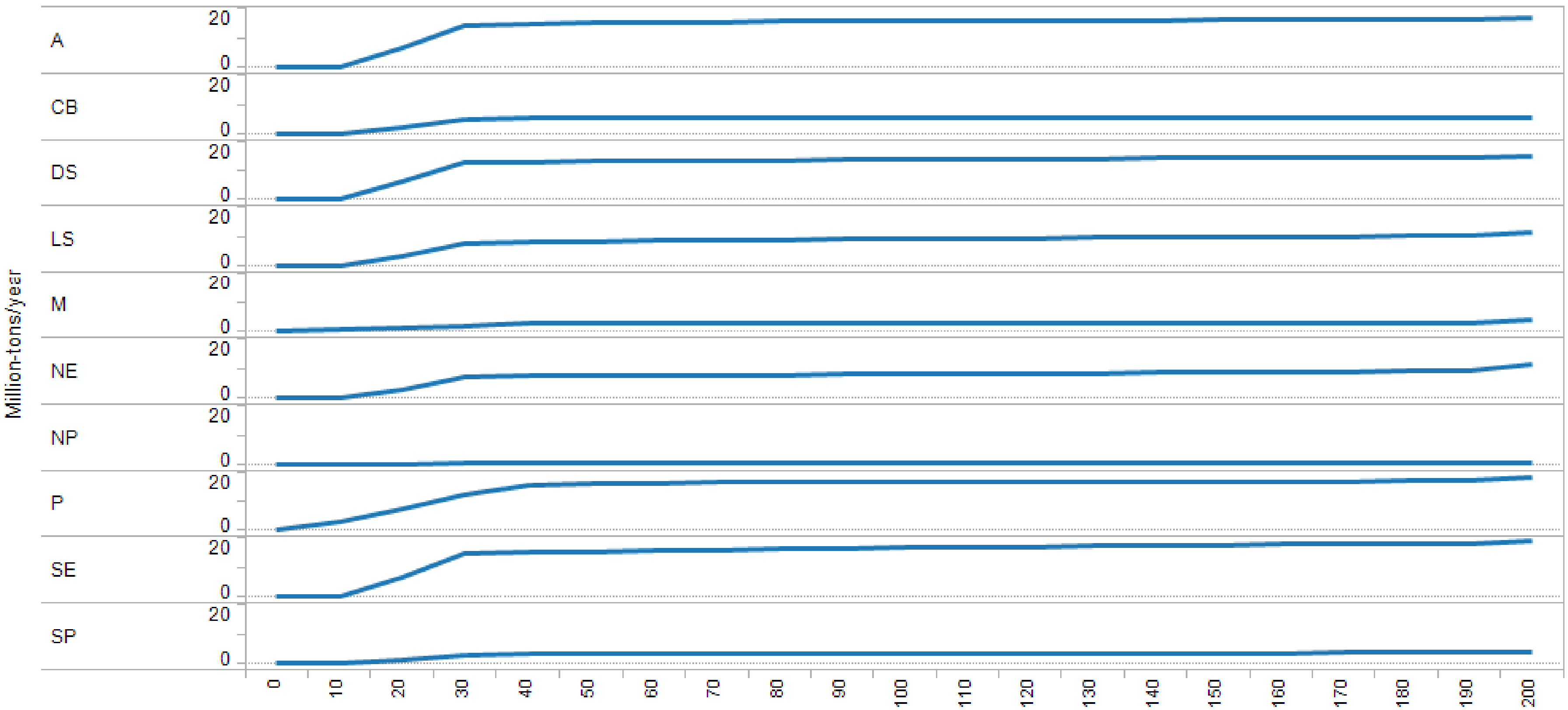
Values	2007	2008	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2009	2010
Corn	20	15	8	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Cotton	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Grains	155	130	112	95	130	125	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Soy	10	7	15	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Wheat	113	100	119	110	110	110	110	115	115	120	120	125	125	130	133	135	138	140	143	145	148	150	153	155

FSM.indic_forest_residue_prod'n_by_region

Data through Personal Communication with Robert Perlack of Oak Ridge National Laboratory

Amount of total potential collected at forest residue "grower payment" price, in million tons per year.

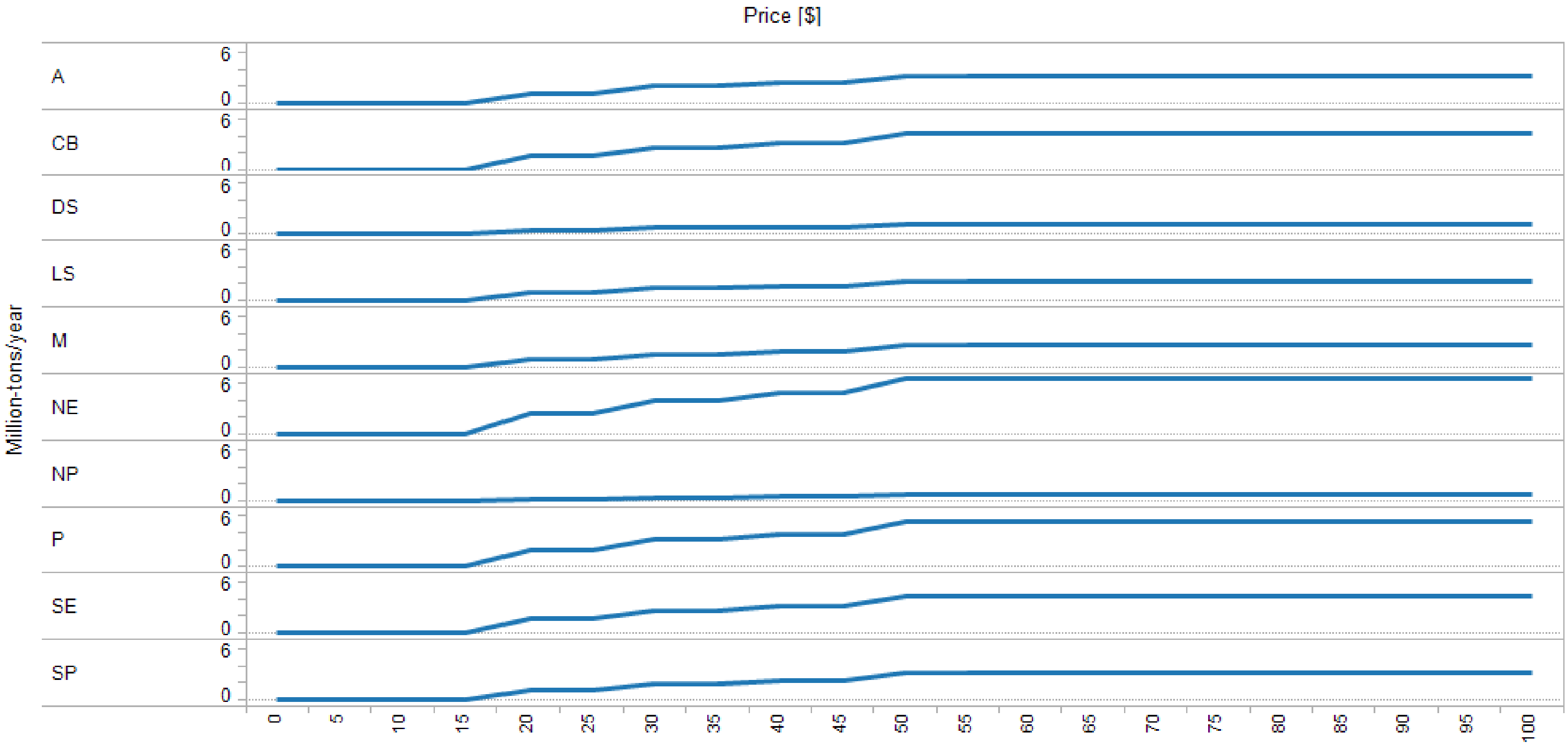
Units: million-ton/yr



Values	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200
A	0	0	6	14	14	15	15	15	15	15	15	15	15	15	16	16	16	16	16	16	16
CB	0	0	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
DS	0	0	6	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14	15
LS	0	0	3	7	8	8	8	8	9	9	9	9	9	9	9	9	10	10	10	10	11
M	0	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
NE	0	0	2	7	7	7	7	7	8	8	8	8	8	8	8	8	9	9	9	9	11
NP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
P	0	3	7	12	15	16	16	16	16	16	16	16	16	16	16	16	16	17	17	17	18
SE	0	0	6	14	15	15	15	15	16	16	16	16	17	17	17	17	17	17	17	17	18
SP	0	0	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4

Amount of total potential collected at urban residue "grower payment" price, in million ton per year.

Units: million-ton/yr



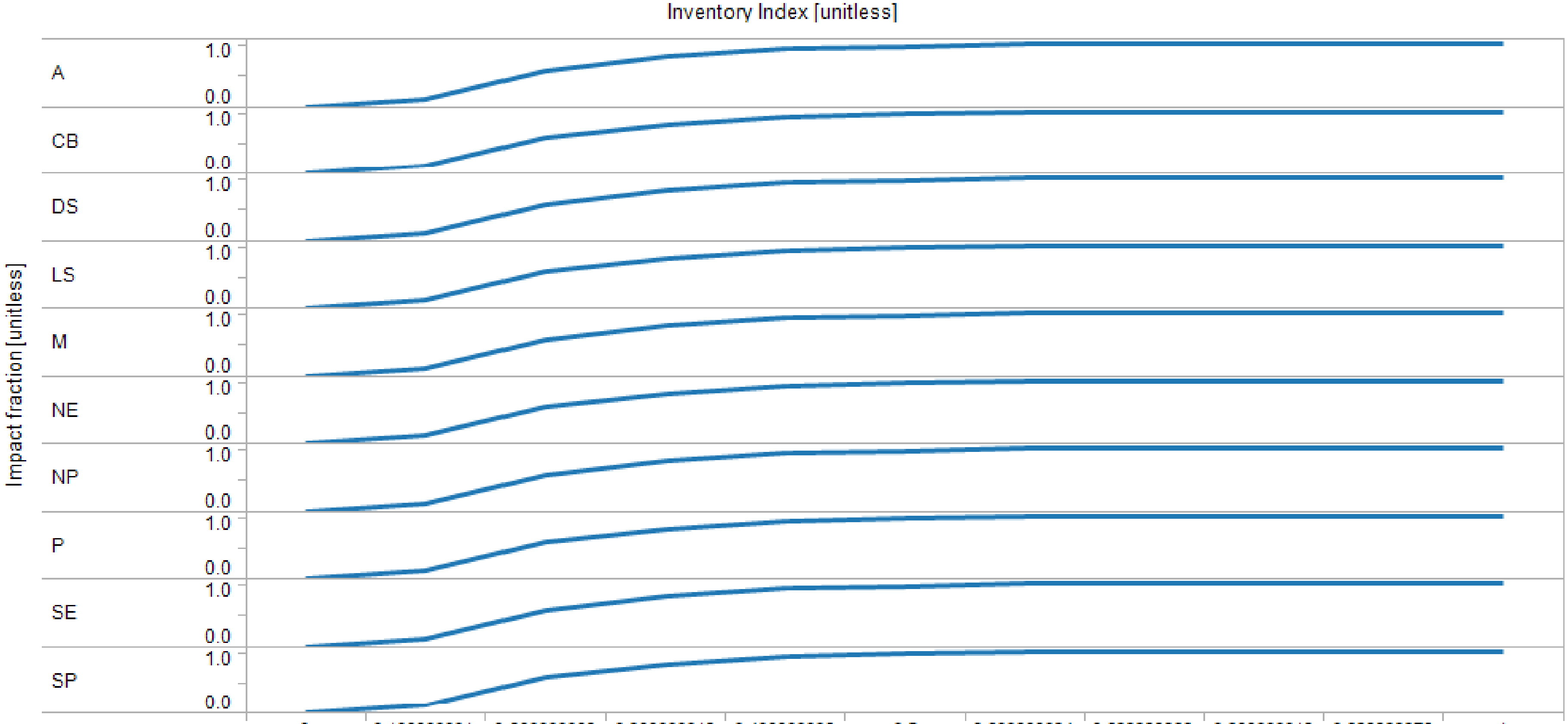
Values

	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
A	0.0	0.0	0.0	0.0	1.2	1.2	1.9	1.9	2.3	2.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
CB	0.0	0.0	0.0	0.0	1.5	1.5	2.5	2.5	3.0	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
DS	0.0	0.0	0.0	0.0	0.4	0.4	0.7	0.7	0.8	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
LS	0.0	0.0	0.0	0.0	0.8	0.8	1.4	1.4	1.6	1.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
M	0.0	0.0	0.0	0.0	0.9	0.9	1.5	1.5	1.8	1.8	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NE	0.0	0.0	0.0	0.0	2.4	2.4	3.9	3.9	4.6	4.6	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
NP	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
P	0.0	0.0	0.0	0.0	1.9	1.9	3.1	3.1	3.8	3.8	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
SE	0.0	0.0	0.0	0.0	1.6	1.6	2.6	2.6	3.0	3.0	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
SP	0.0	0.0	0.0	0.0	1.1	1.1	1.9	1.9	2.2	2.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1

FSM.inv_impact_on__feedstock_cons'n

Fractional change in cellulosic feedstock consumption based on the ratio of cellulosic feedstock inventory to a target cellulosic feedstock inventory.

Units: Unitless



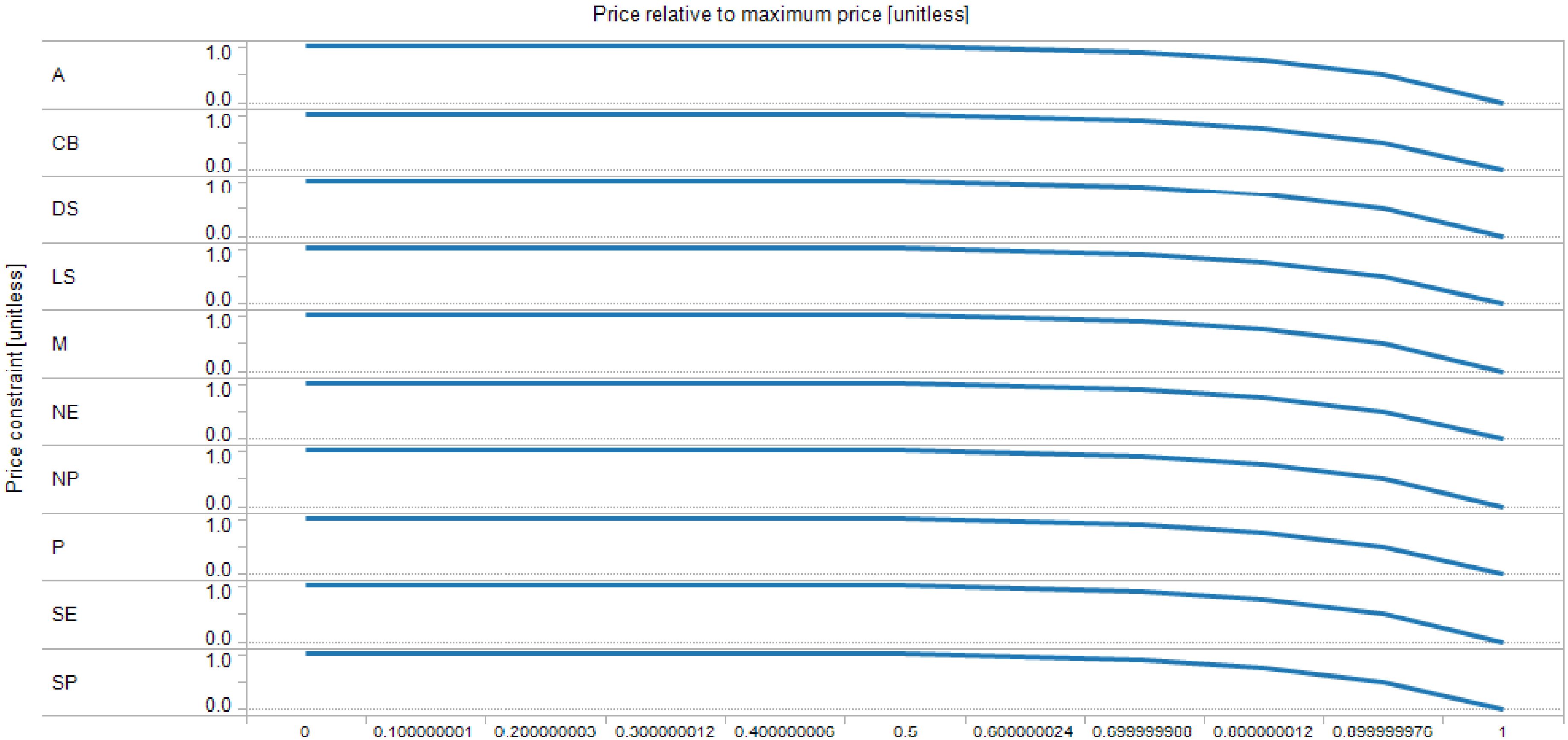
Values

	0	0.100000001	0.200000003	0.300000012	0.400000006	0.5	0.600000024	0.699999988	0.800000012	0.899999976	1
A	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
CB	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
DS	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
LS	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
M	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
NE	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
NP	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
P	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
SE	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0
SP	0.0	0.1	0.6	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0

FSM.Max_offer_price_constraint_on_price_increase

Maximum offer price when constrained by price increases.

Units: Unitless

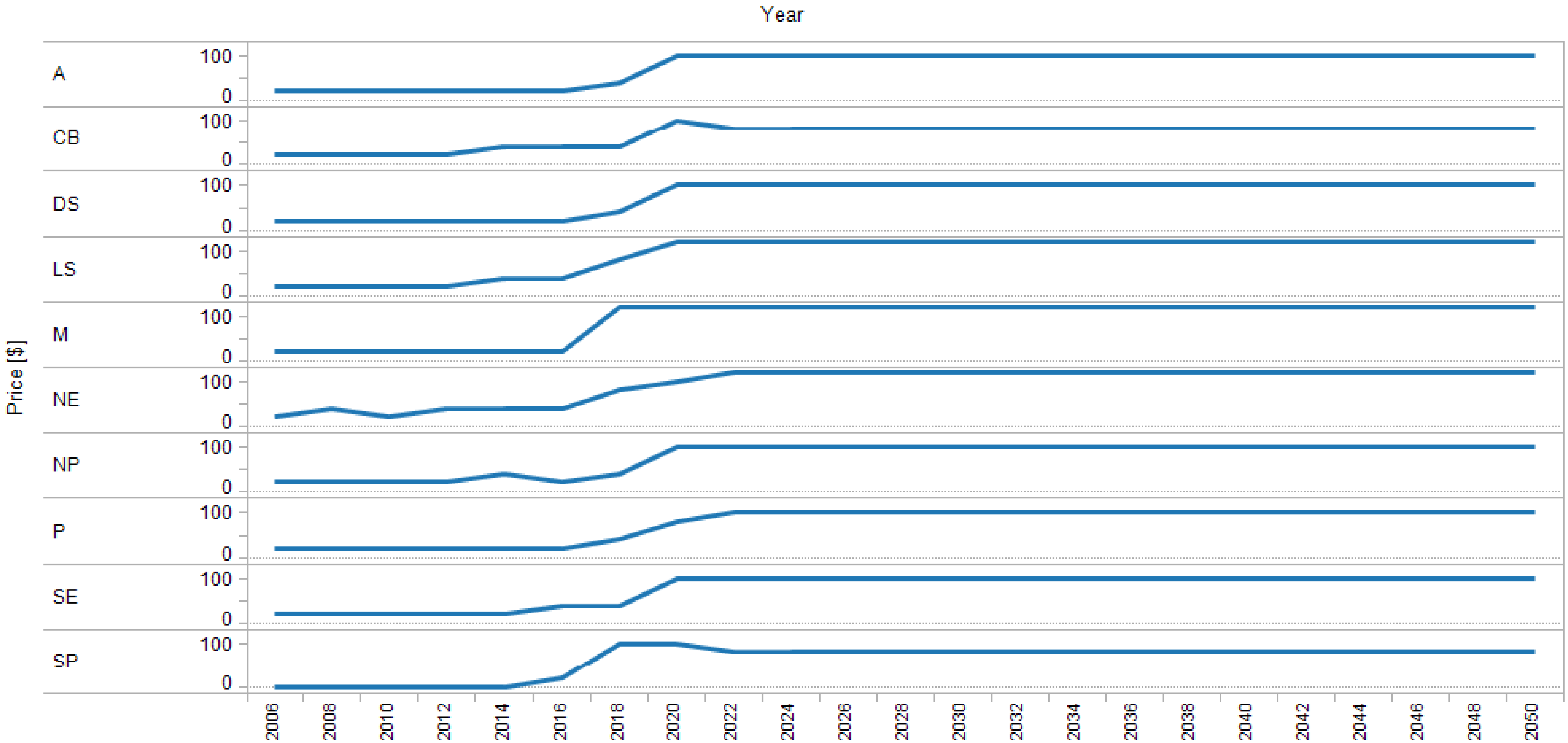


Values

A	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
CB	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
DS	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
LS	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
M	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
NE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
NP	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
P	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
SE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0
SP	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.5	0.0

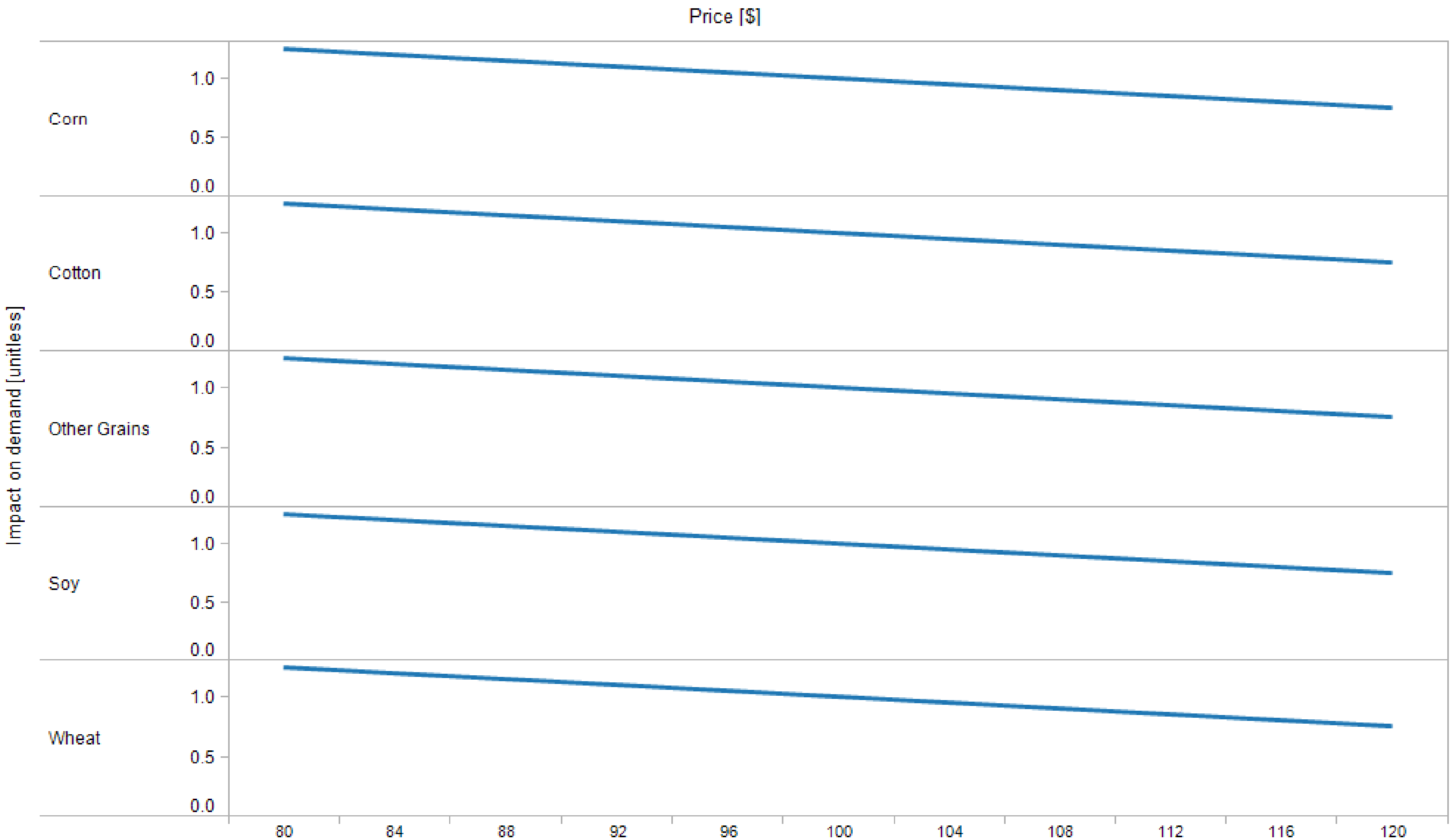
FSM.Price_from_ReEDS *Scenario Value*

Price input from ReEDS coupling scenario. Units: USD



Values	2006	2008	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032	2034	2036	2038	2040	2042	2044	2046	2048	2050
A	20	20	20	20	20	20	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
CB	20	20	20	20	40	40	40	100	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
DS	20	20	20	20	20	20	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
LS	20	20	20	20	40	40	80	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
M	20	20	20	20	20	20	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
NE	20	40	20	40	40	40	80	100	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
NP	20	20	20	20	40	20	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
P	20	20	20	20	20	20	40	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SE	20	20	20	20	20	40	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
SP	0	0	0	0	0	20	100	100	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80

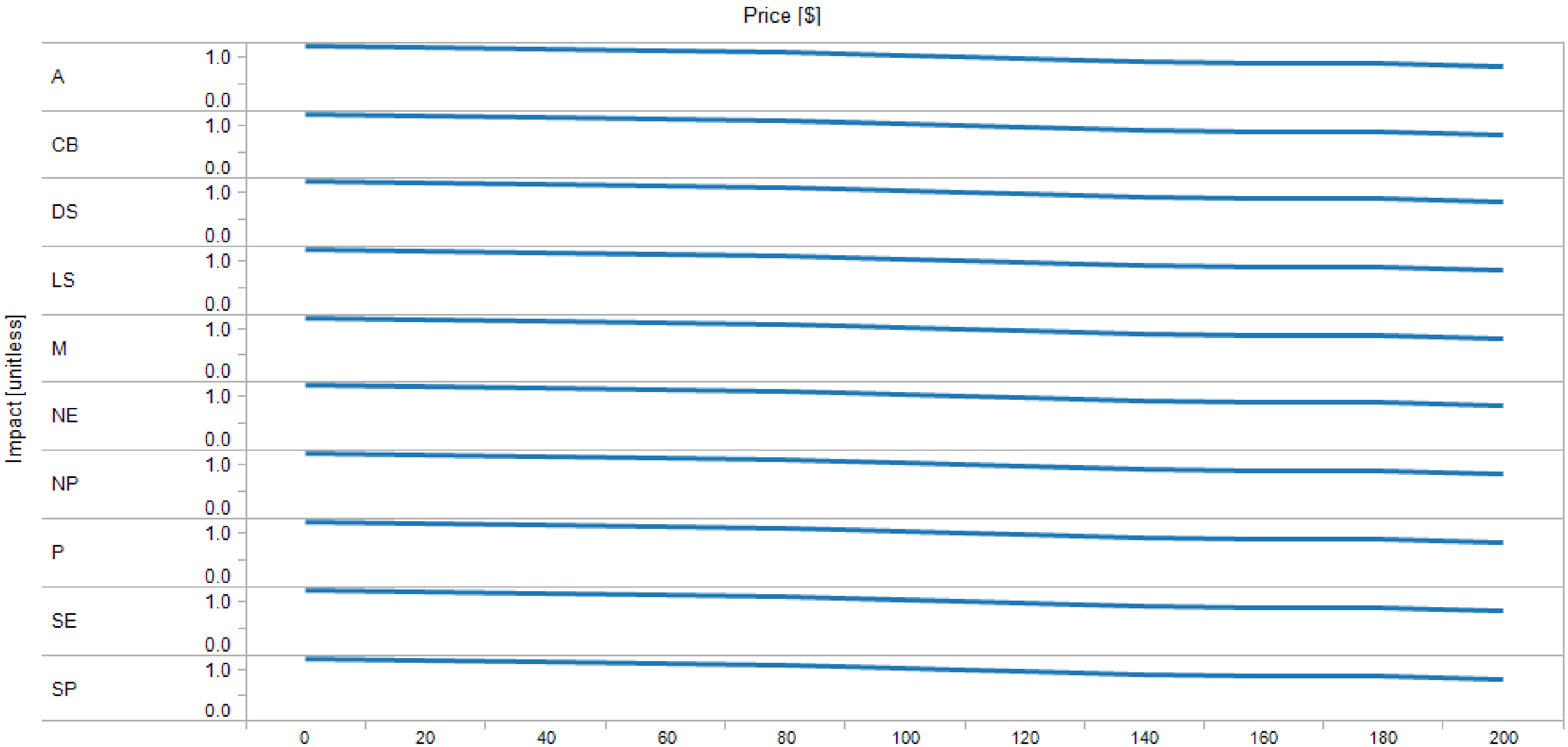
Annual Crop Price Impact on Demand, by annual crop. Units: Unitless



Values	80	84	88	92	96	100	104	108	112	116	120
Corn	1.25	1.20	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.80	0.75
Cotton	1.25	1.20	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.80	0.75
Other Grains	1.25	1.20	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.80	0.75
Soy	1.25	1.20	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.80	0.75
Wheat	1.25	1.20	1.15	1.10	1.05	1.00	0.95	0.90	0.85	0.80	0.75

Adjustment in hay and forage demand based on hay price index in thousand tons per year, by region.

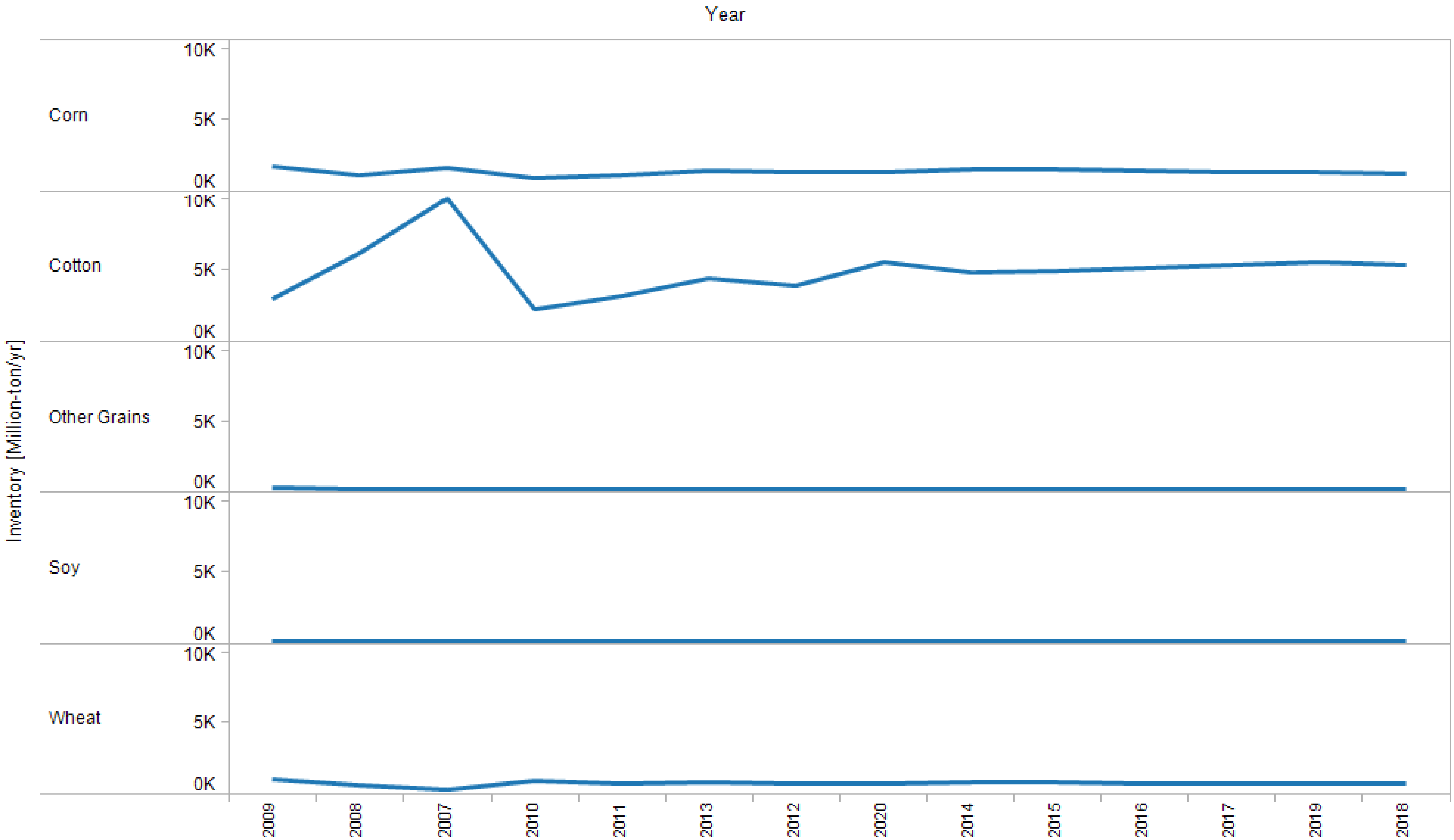
Units: Unitless



Values

	0	20	40	60	80	100	120	140	160	180	200
A	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
CB	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
DS	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
LS	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
M	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
NE	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
NP	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
P	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
SE	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81
SP	1.20	1.16	1.13	1.09	1.06	1.00	0.96	0.90	0.87	0.85	0.81

Raw inventory input in million units from baseline, by crop. Units: million-ton *table 7*



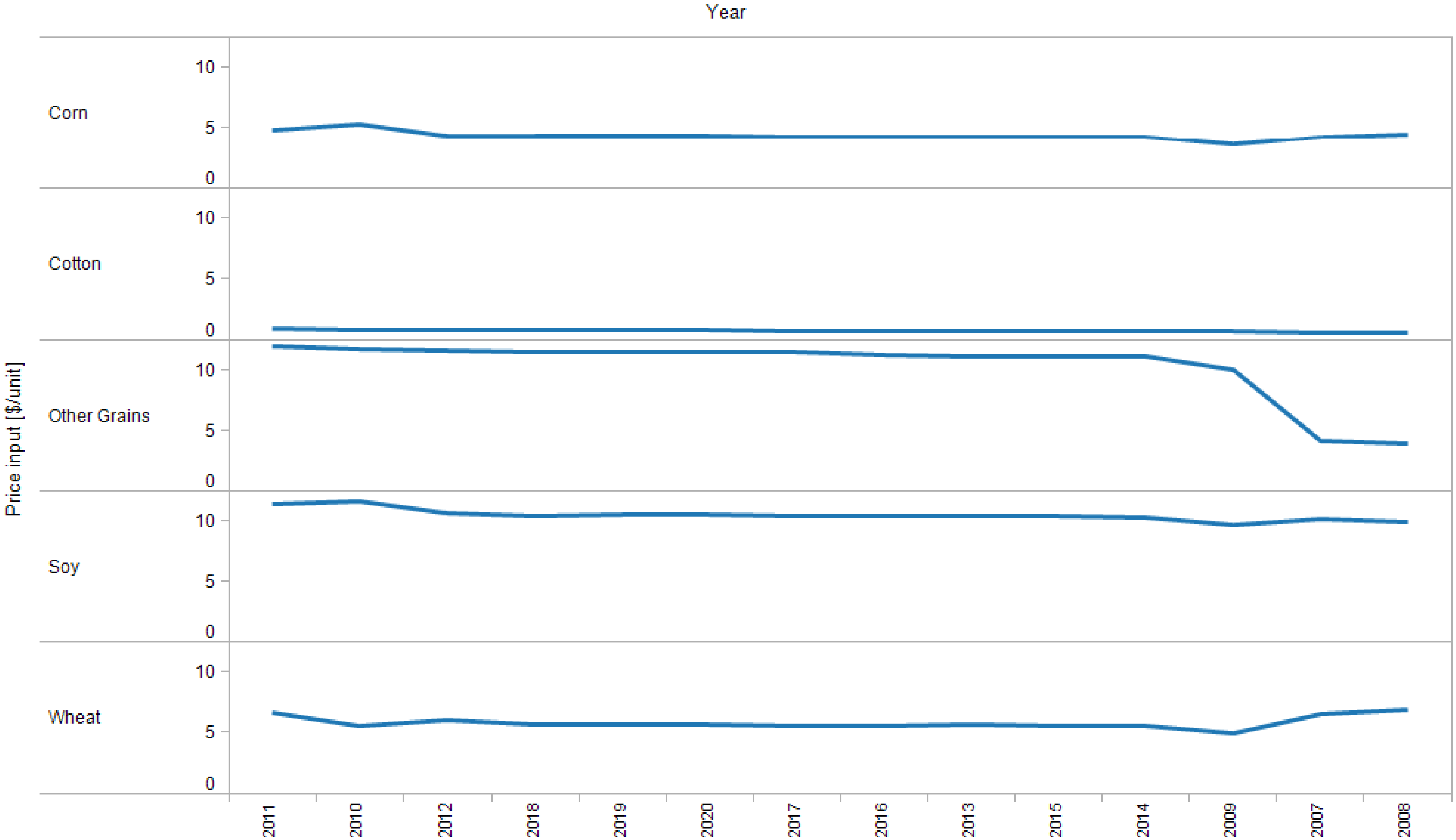
Values

	2009	2008	2007	2010	2011	2013	2012	2020	2014	2015	2016	2017	2019	2018
Corn	1624	1124	1708	827	1127	1332	1437	1447	1442	1342	1262	1227	1242	1242
Cotton	9905	6137	2929	2179	3100	3870	4390	4760	4880	5050	5270	5340	5460	5530
Other Grains	188	198	236	173	171	170	171	169	169	169	167	166	167	170
Soy	205	205	151	185	190	195	194	197	199	196	197	198	199	200
Wheat	306	603	976	848	718	706	746	759	743	718	694	682	661	646

Raw price input in dollars per specified unit from baseline, by crop.

Units: usd/units

table 7



Values	2011	2010	2012	2018	2019	2020	2017	2016	2013	2015	2014	2009	2007	2008
Corn	4	4	4	5	5	4	4	4	4	4	4	4	4	4
Cotton	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other Grains	4	4	10	12	12	11	11	11	11	11	11	11	11	11
Soy	10	10	10	11	11	11	10	10	10	10	10	10	10	10
Wheat	6	7	5	6	7	6	6	5	5	6	6	6	6	6

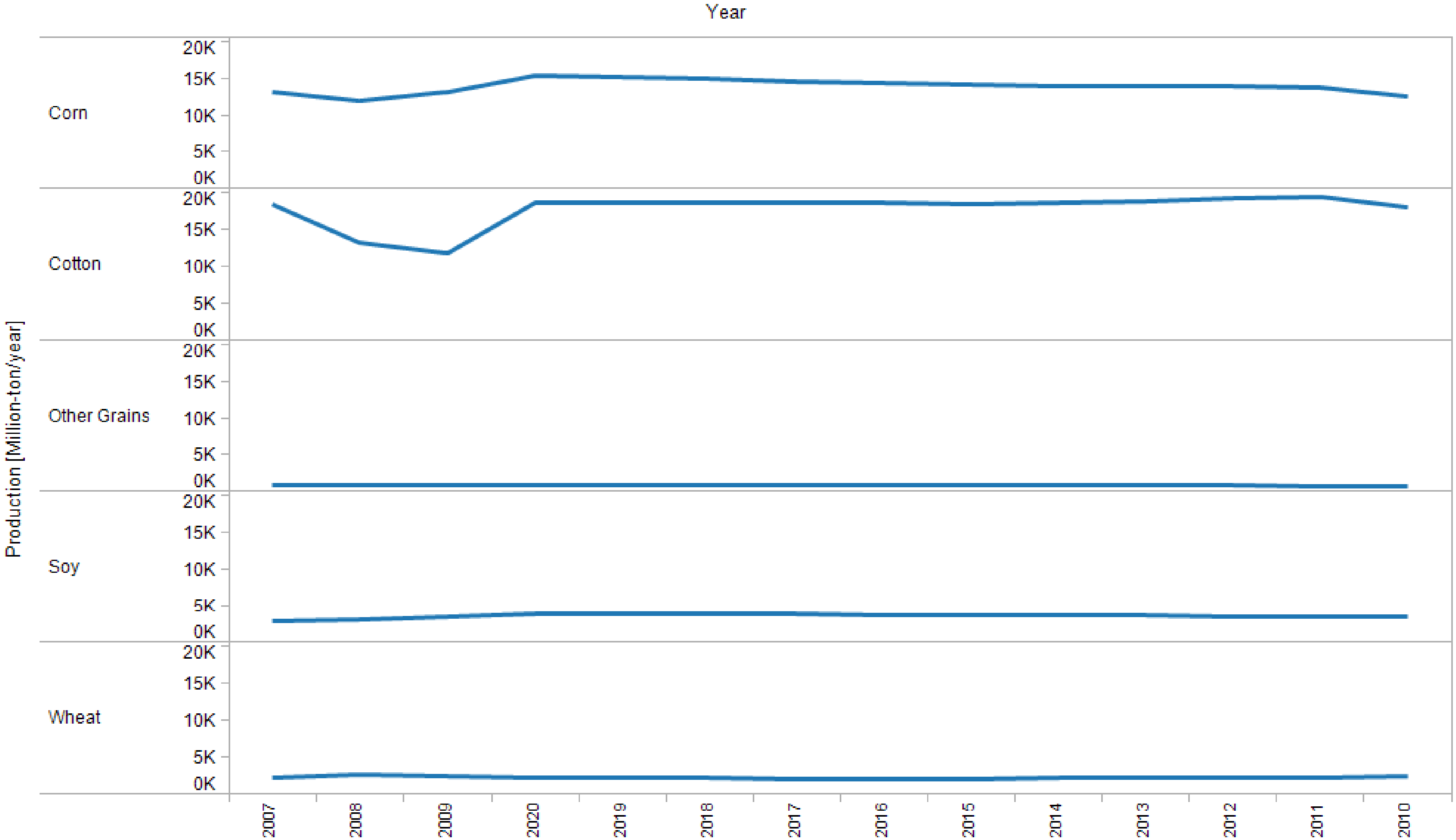
FSM.Raw_Prod'n__Input_From_Baseline

USDA Agricultural Projections to 2018

Raw annual crop production input in million usda from Baseline, by crop.

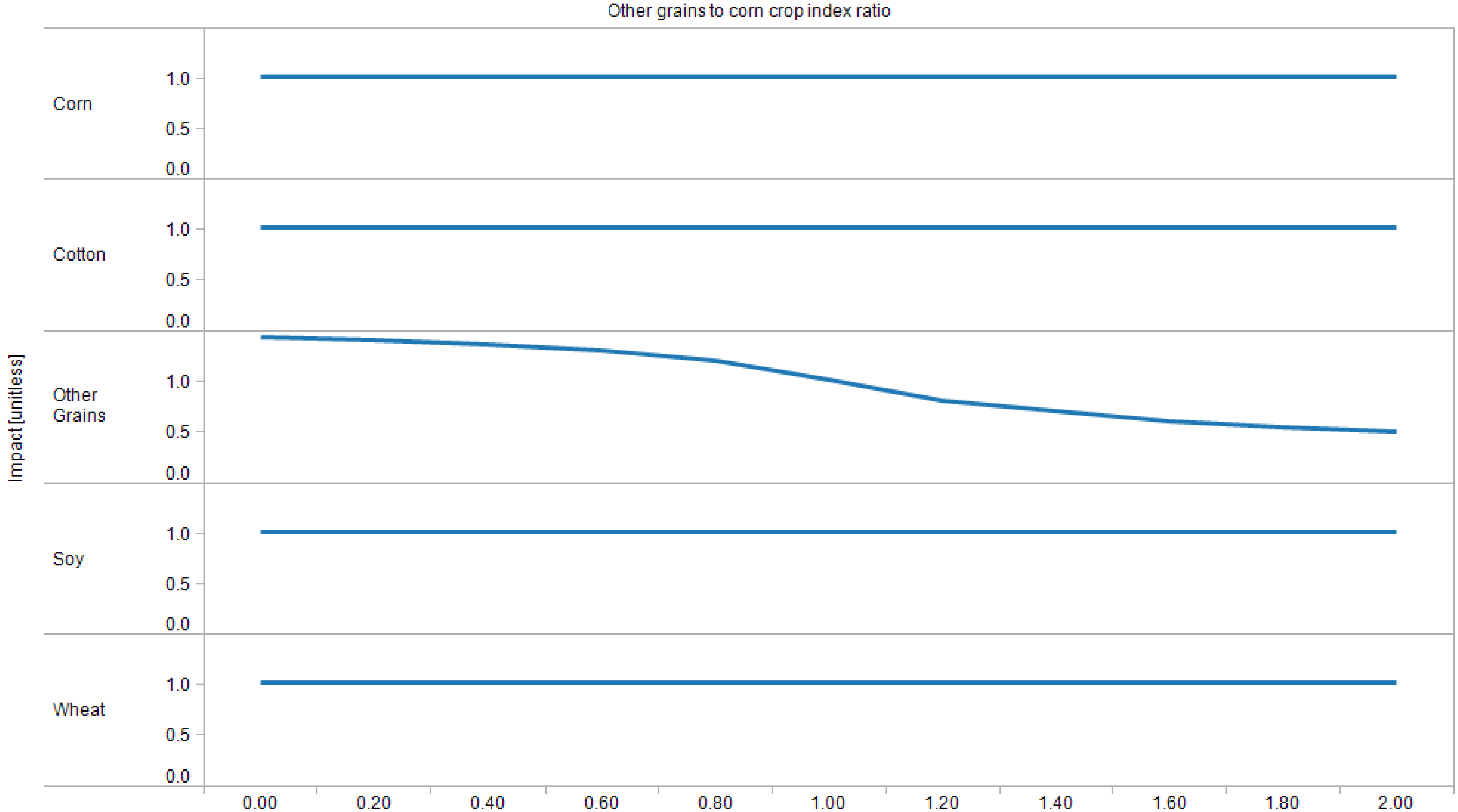
Units: million-ton/yr

table 7



Values	2007	2008	2009	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
Corn	13074	12020	13110	12540	13755	13840	13925	14010	14180	14345	14600	14855	15110	15280
Cotton	18355	13069	11788	17920	19300	19100	18800	18600	18400	18500	18600	18500	18600	18600
Other Grains	809	793	703	599	607	608	611	613	615	617	620	621	624	626
Soy	2676	2921	3359	3375	3355	3395	3445	3505	3540	3590	3625	3660	3695	3735
Wheat	2067	2500	2218	2208	2125	2085	2045	2020	2000	1995	2005	2020	2020	2030

Ratio of crop price index of other grains to crop price index of Corn, by crop. Units: Unitless

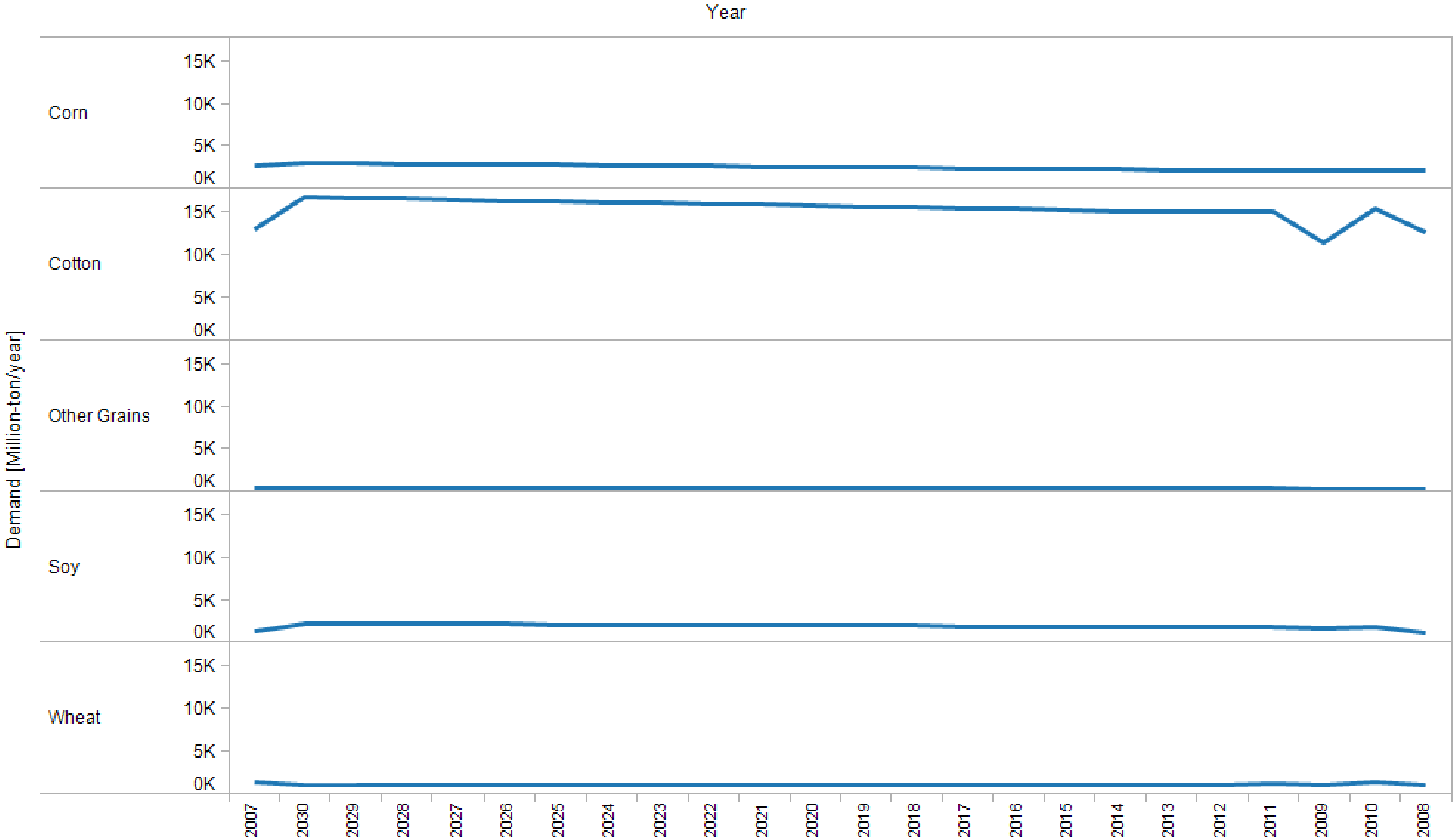


Values

	0.00	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60	1.80	2.00
Corn	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Cotton	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Other Grains	1.42	1.40	1.35	1.30	1.20	1.00	0.80	0.70	0.60	0.55	0.50
Soy	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Wheat	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

FSM.Xport_Dmand *USDA Agricultural Projections to 2018*

Export demand for annual crops in million specified units per year, by crop. Units: million-ton/yr *table 7*

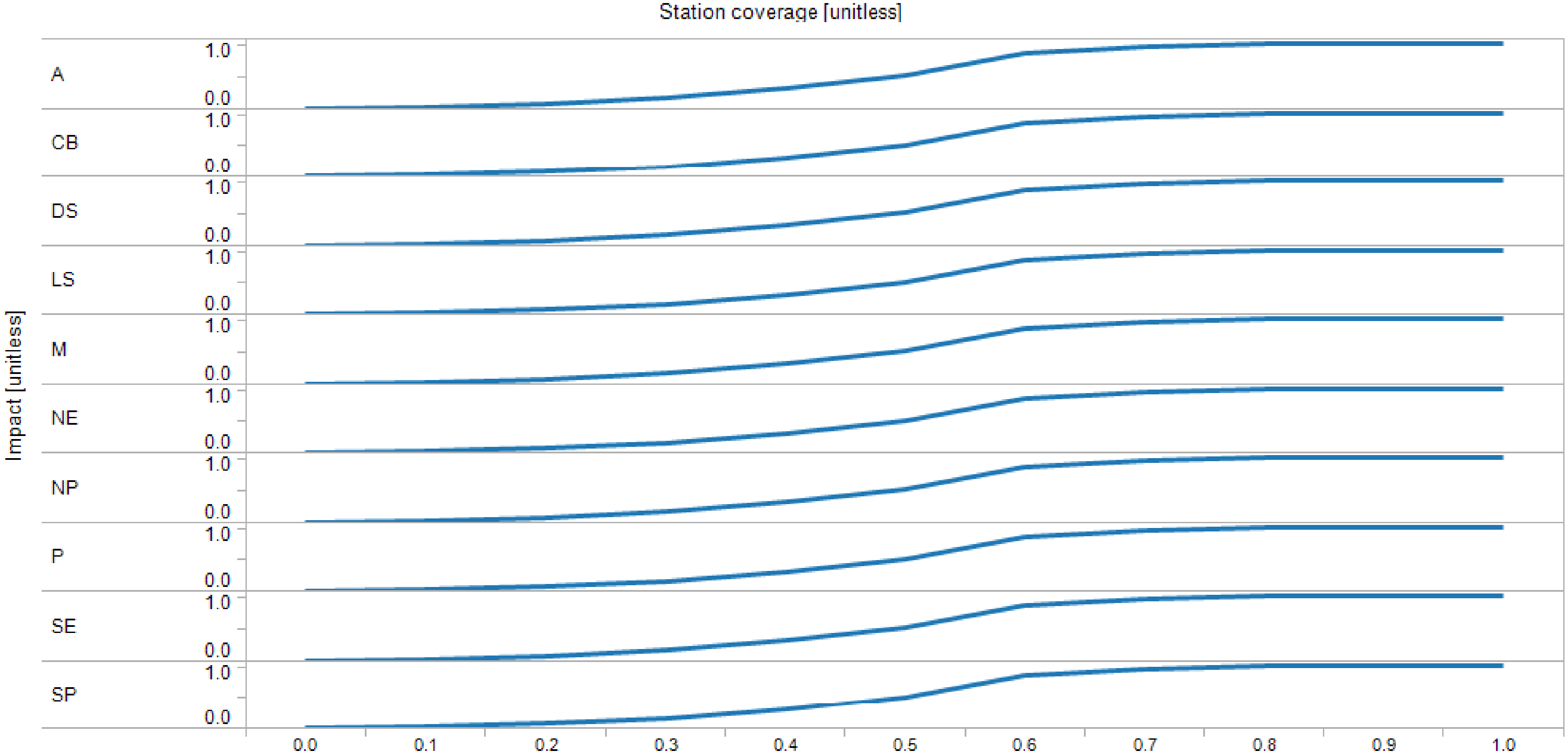


Values

Corn	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	3K	3K	3K	3K	3K	3K	3K	3K
Cotton	13K	13K	11K	15K	15K	15K	15K	15K	15K	15K	15K	15K	16K	16K	16K	16K	16K	16K	16K	16K	16K	16K	17K	17K
Other Grains	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K	0K
Soy	1K	1K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K	2K
Wheat	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K	1K

Relates the percentage of stations in the region with hiblend capability to the fraction of hiblend-capable vehicles/owners with access to dispensing stations.

Units: Unitless



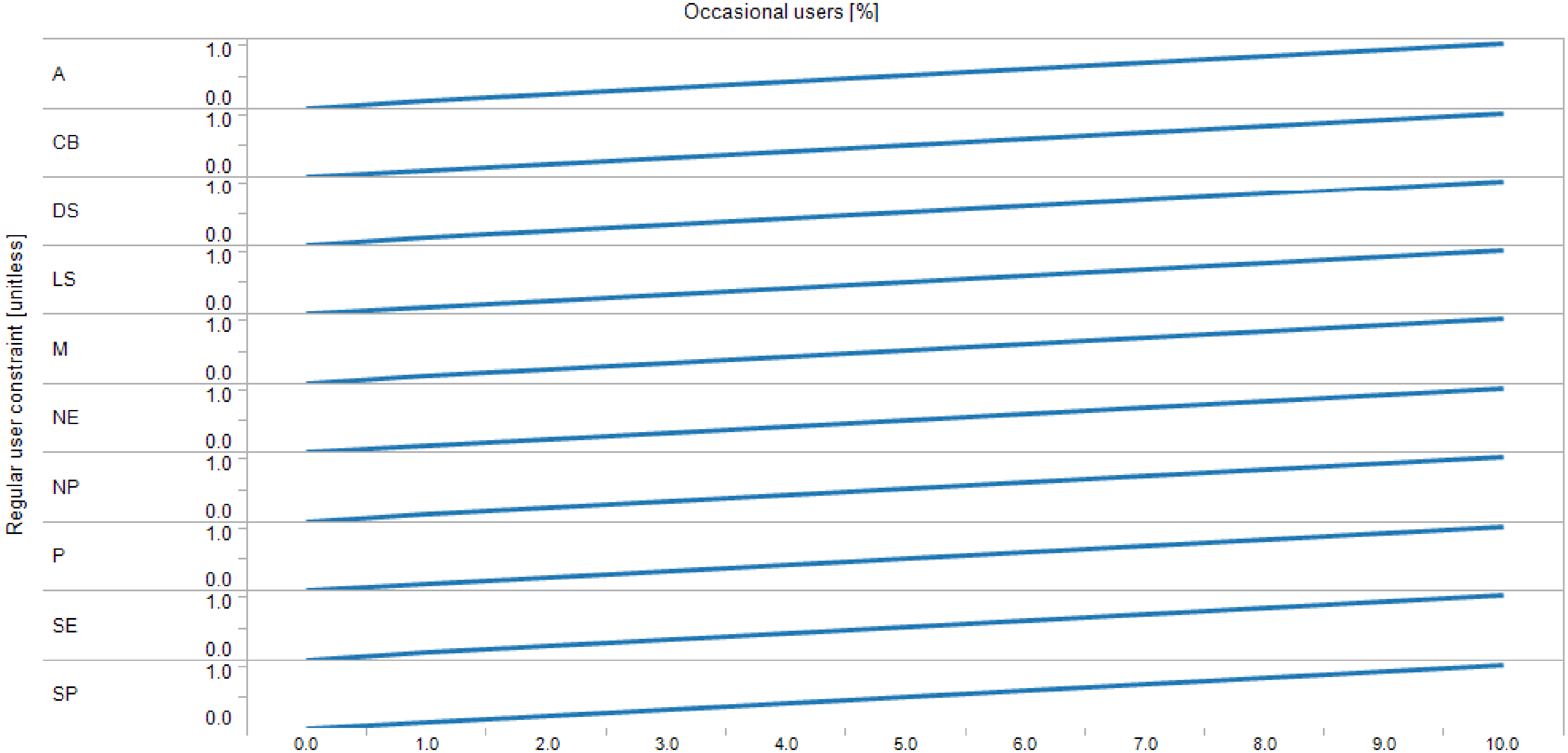
Values

	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
A	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
CB	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
DS	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
LS	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
M	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
NE	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
NP	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
P	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
SE	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0
SP	0.0	0.0	0.1	0.2	0.3	0.5	0.9	1.0	1.0	1.0	1.0

FUM.occasional_user_constraint_on_becoming_regular_HiBlend_User

BSM Calibration

Relates size of occasional user pool to the rate at which the regular user gap is eliminated. Units: Unitless



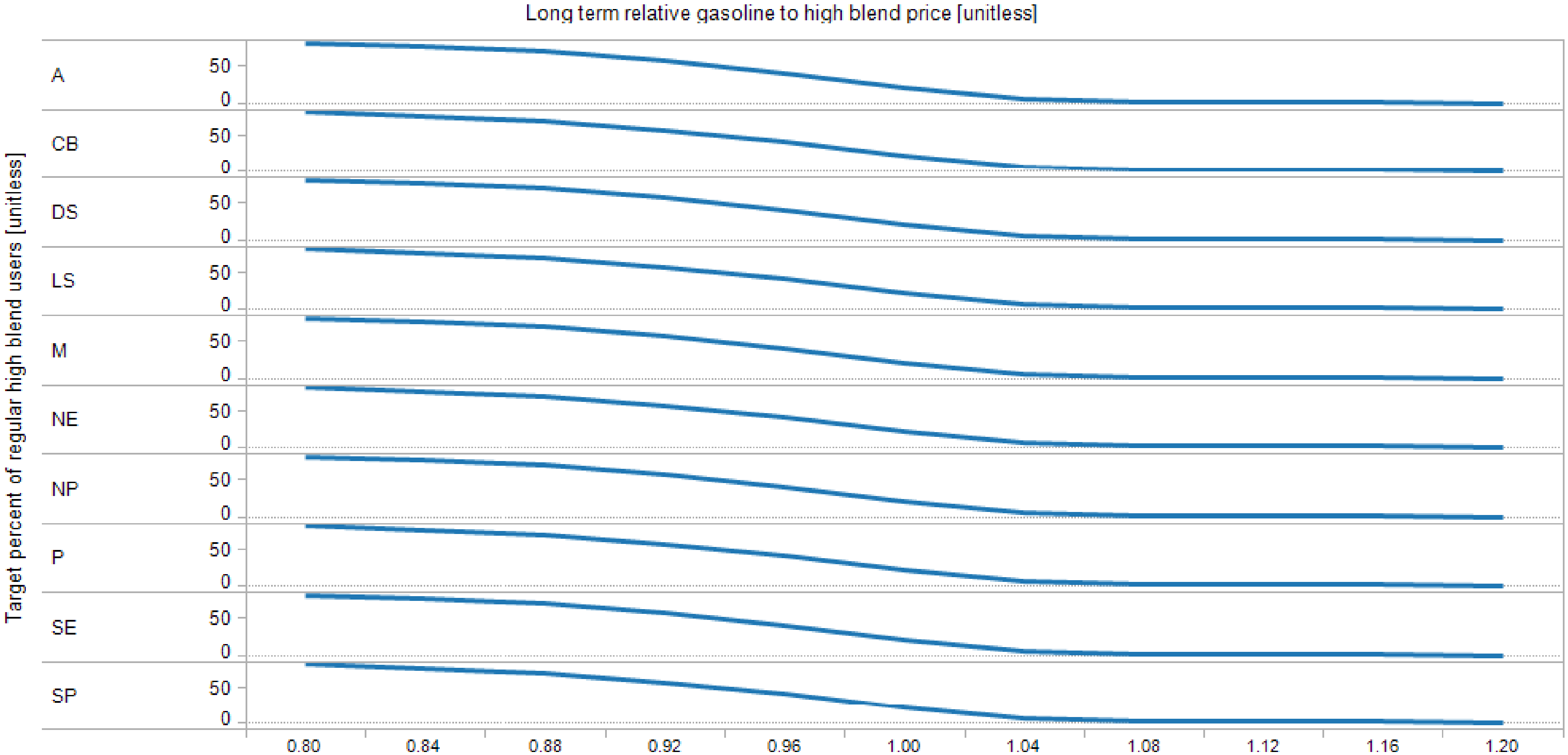
Values

A	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
CB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
LS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
M	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
NE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
NP	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
P	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
SE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
SP	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

FUM.preference_share_Regular_Users *BSM Calibration*

Sets target % of hiblend capable owners who will use hiblend regularly. Based on ratio of long term (smoothed) prices for gasoline/hiblend.

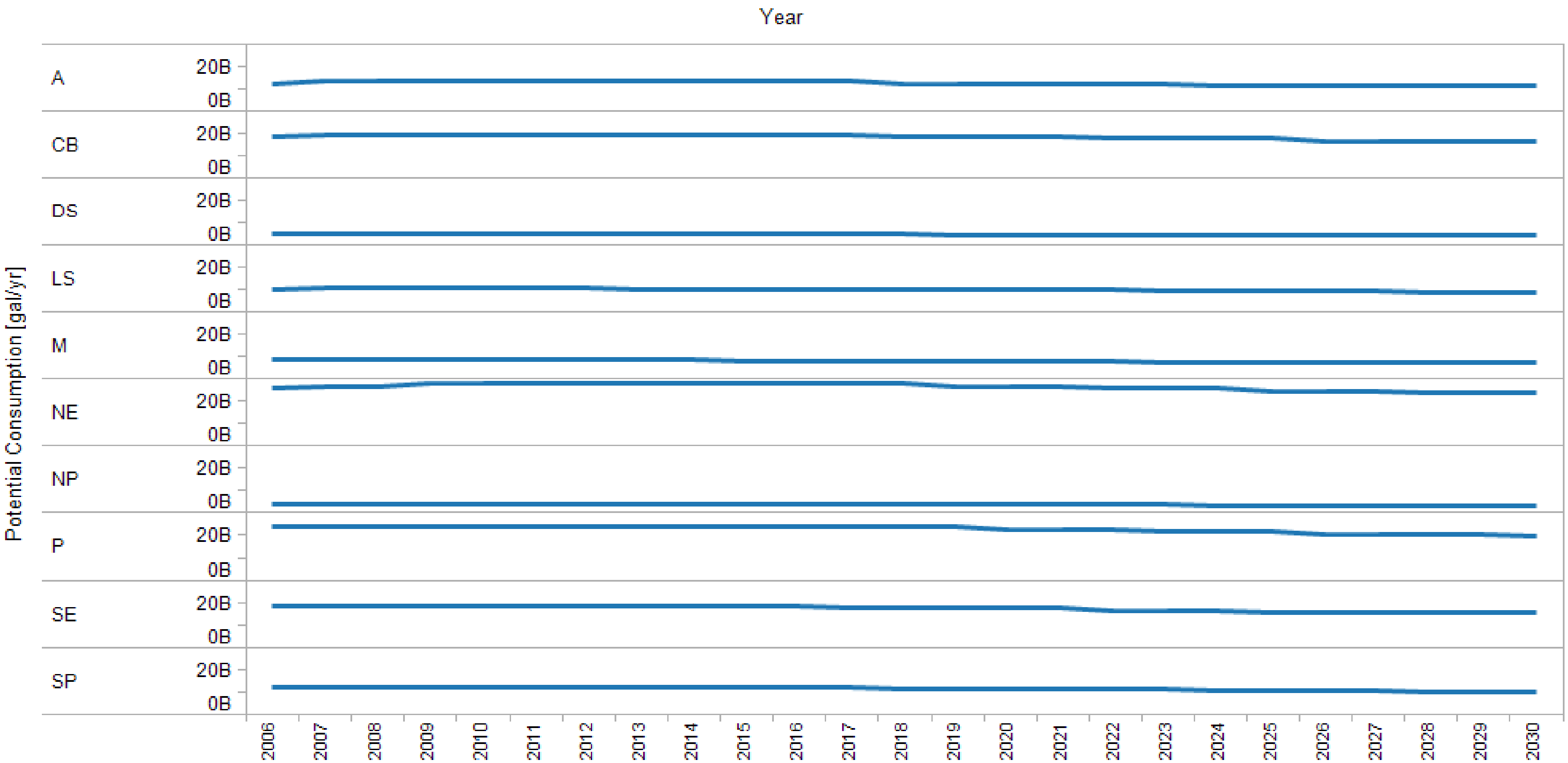
Units: Percent



Values

A	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
CB	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
DS	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
LS	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
M	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
NE	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
NP	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
P	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
SE	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0
SP	80.0	75.0	67.5	55.5	40.0	20.0	6.5	2.5	2.0	1.5	0.0

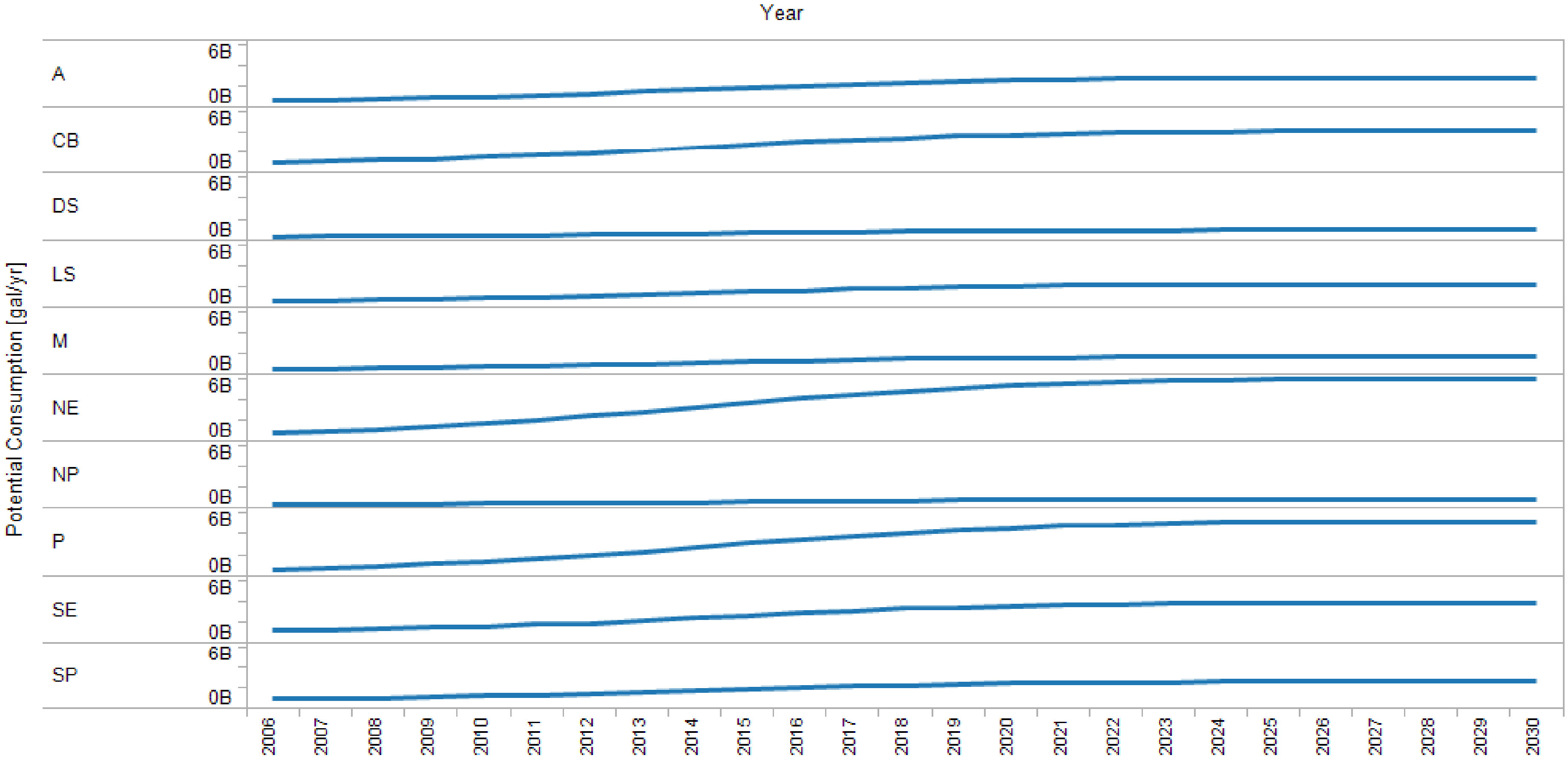
Potential regional gasoline consumption from all vehicles. Units: gal/yr



Values

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
A	12B	13B	13B	13B	13B	13B	13B	13B	13B	13B	13B	13B	12B	12B	12B	12B	12B	12B	11B	11B	11B	11B	11B	11B	11B
CB	18B	19B	19B	19B	19B	19B	19B	19B	19B	19B	19B	19B	18B	18B	18B	18B	17B	17B	17B	17B	16B	16B	16B	16B	16B
DS	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B
LS	10B	10B	10B	10B	10B	10B	10B	10B	10B	10B	10B	10B	10B	10B	9B	9B	9B	9B	9B	9B	9B	8B	8B	8B	8B
M	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	7B	7B	7B	7B	7B	7B	7B	7B	7B	6B	6B	6B
NE	25B	26B	26B	27B	27B	27B	27B	27B	27B	27B	27B	27B	27B	26B	26B	26B	25B	25B	25B	24B	24B	24B	23B	23B	23B
NP	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B
P	23B	23B	23B	23B	23B	23B	23B	23B	23B	23B	23B	23B	23B	23B	22B	22B	22B	21B	21B	21B	20B	20B	20B	20B	19B
SE	18B	18B	18B	18B	18B	18B	18B	18B	18B	18B	18B	17B	17B	17B	17B	17B	16B	16B	16B	15B	15B	15B	15B	15B	15B
SP	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	12B	11B	11B	11B	11B	11B	11B	10B	10B	10B	10B	10B	10B	10B

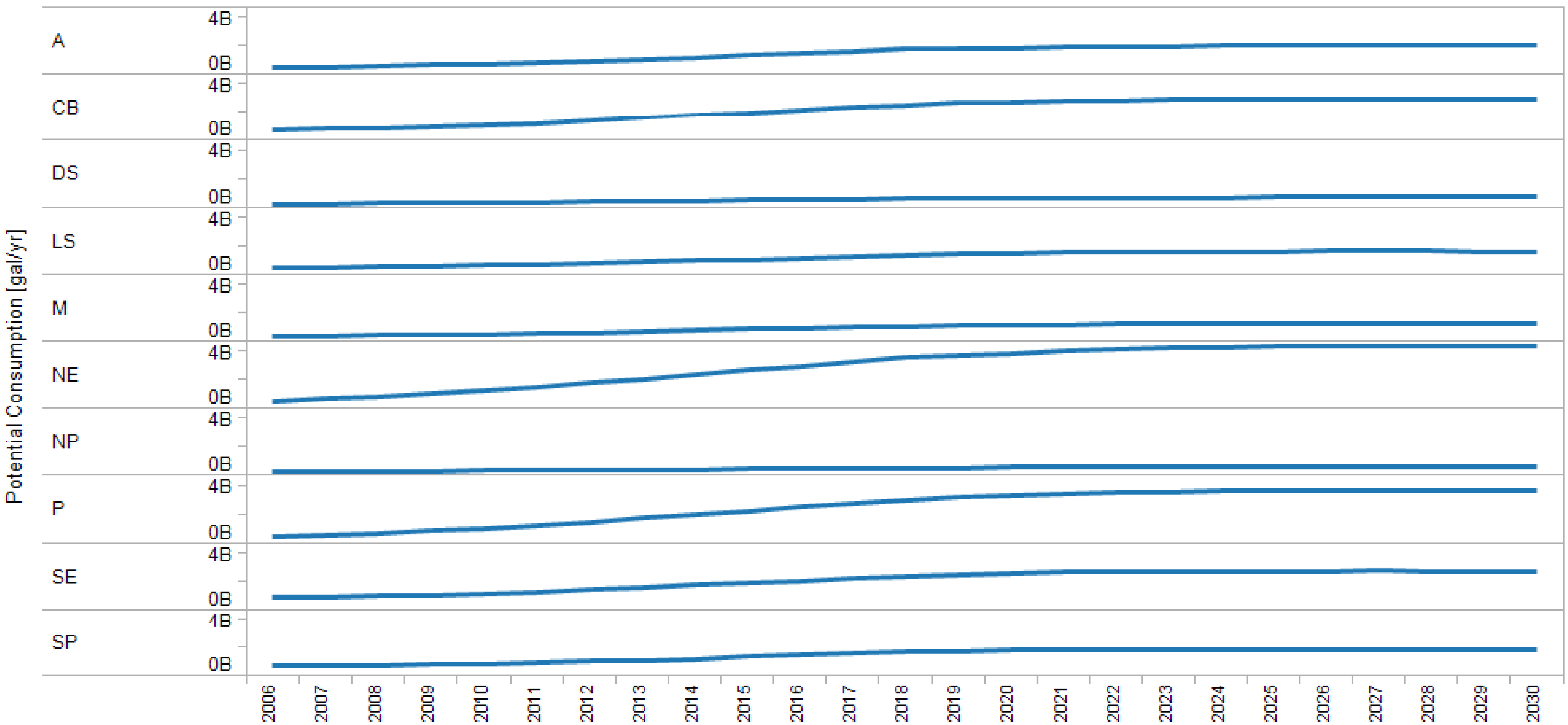
Potential regional hi-blend consumption from flex fuel vehicles. Units: gal/yr



Values	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
A	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B
CB	1B	1B	1B	1B	1B	2B	2B	2B	2B	3B	3B	3B	3B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B
DS	0B	0B	0B	0B	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
LS	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B
M	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B
NE	1B	1B	1B	1B	2B	2B	2B	3B	3B	4B	4B	4B	5B	5B	5B	5B	6B	6B	6B	6B	6B	6B	6B	6B	6B
NP	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
P	1B	1B	1B	1B	1B	2B	2B	2B	3B	3B	3B	4B	4B	4B	4B	5B	5B	5B	5B	5B	5B	5B	5B	5B	5B
SE	1B	1B	1B	1B	2B	2B	2B	2B	2B	3B	3B	3B	3B	3B	3B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B
SP	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	3B	3B	3B	3B	3B	3B	3B

Potential regional lo-blend consumption from flex fuel vehicles.

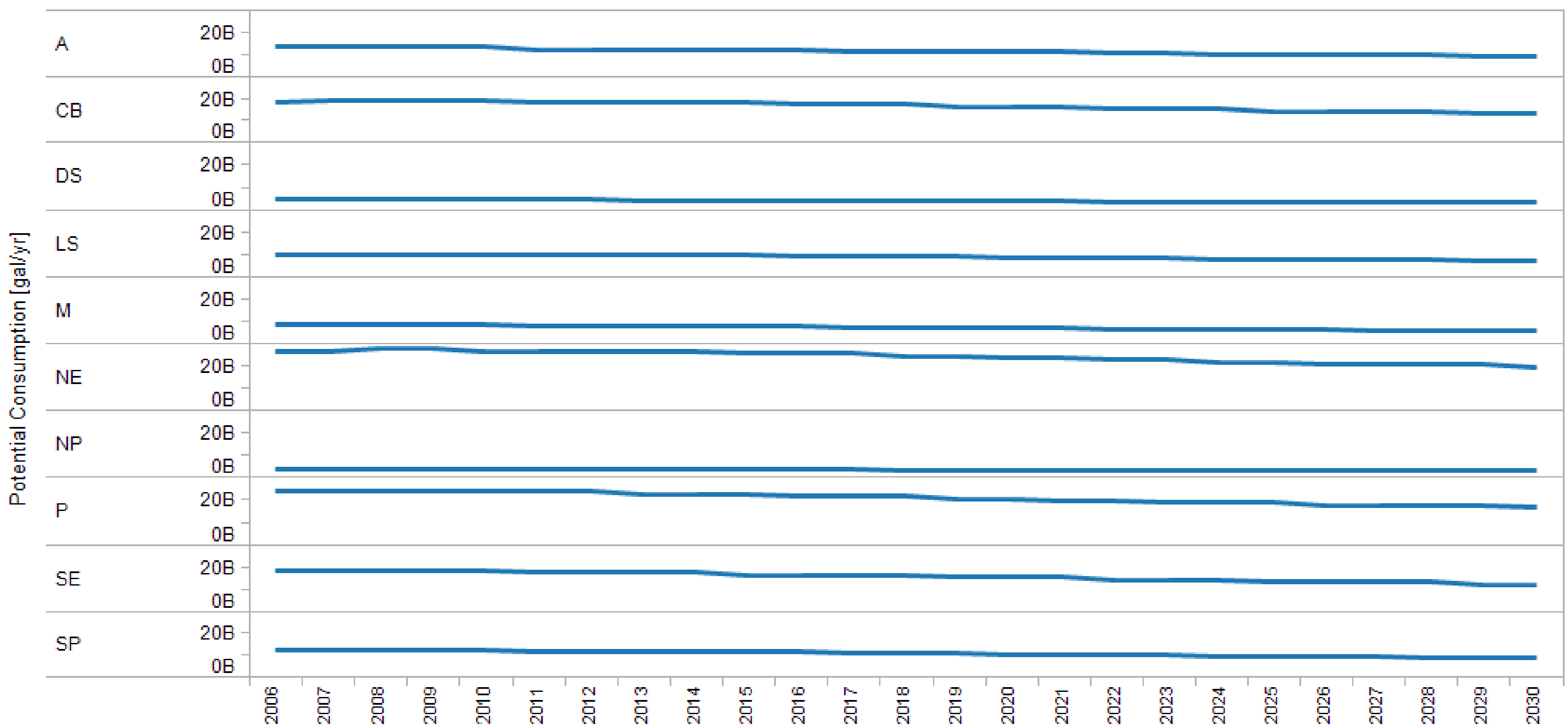
Units: gal/yr



Values

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
A	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B
CB	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B
DS	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
LS	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B
M	0B	0B	0B	0B	0B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B
NE	0B	1B	1B	1B	1B	1B	2B	2B	2B	3B	3B	3B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B
NP	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	0B	1B	1B	1B	1B	0B	0B
P	0B	0B	1B	1B	1B	1B	1B	2B	2B	2B	3B	3B	3B	3B	3B	3B	4B	4B	4B	4B	4B	4B	4B	4B	4B
SE	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B
SP	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	1B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B	2B

Potential regional lo-blend consumption from non-FFV vehicles. Units: gal/yr

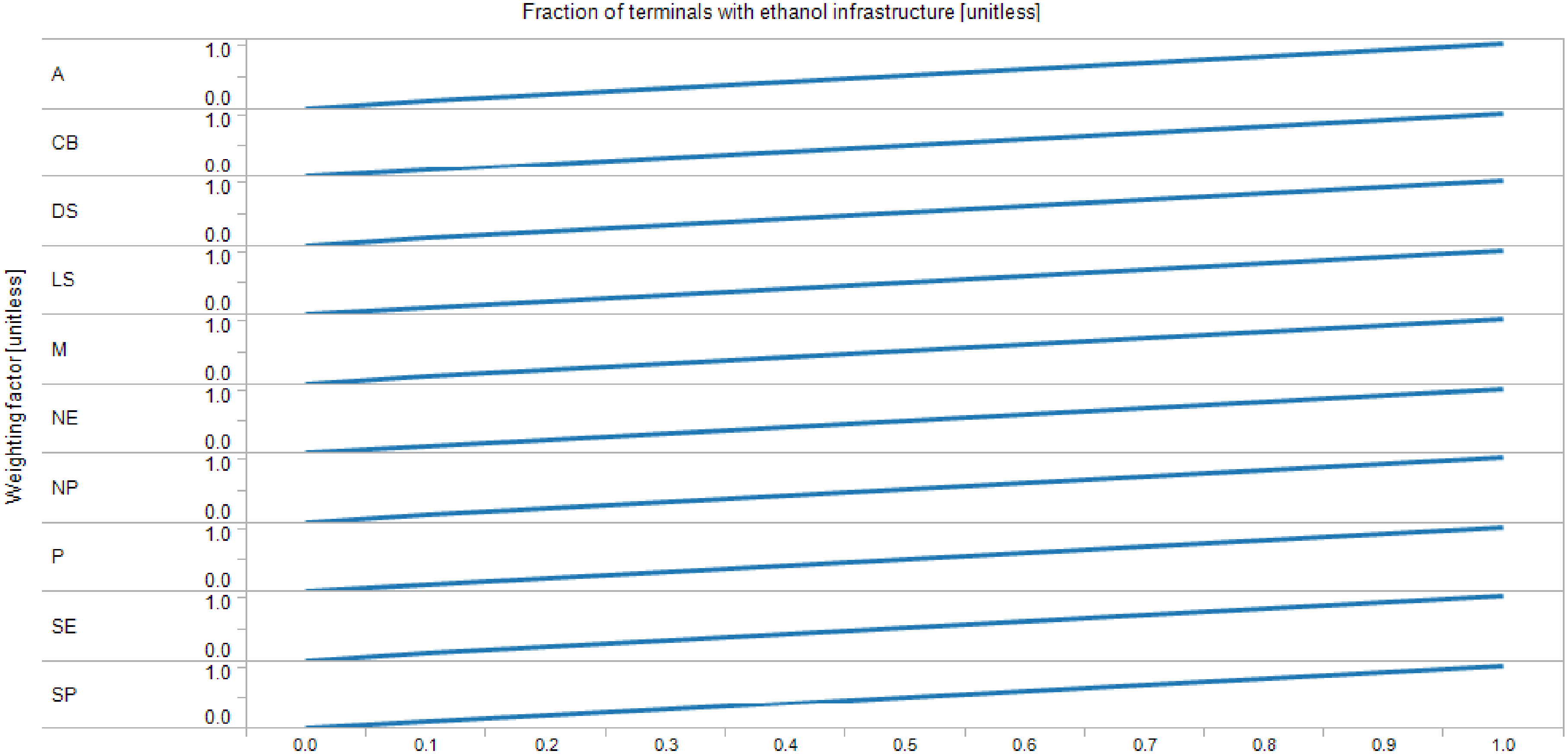


Values	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
A	13B	13B	13B	13B	13B	12B	12B	12B	12B	12B	12B	11B	11B	11B	11B	11B	10B	10B	10B	10B	10B	9B	9B	9B	9B
CB	18B	19B	19B	19B	19B	18B	18B	18B	18B	18B	17B	17B	17B	16B	16B	16B	15B	15B	15B	14B	14B	14B	14B	13B	13B
DS	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	4B	3B	3B	3B	3B	3B	3B	3B	3B	3B
LS	10B	10B	10B	10B	10B	10B	10B	10B	9B	9B	9B	9B	9B	8B	8B	8B	8B	8B	8B	8B	7B	7B	7B	7B	7B
M	8B	8B	8B	8B	8B	8B	8B	7B	7B	7B	7B	7B	7B	7B	6B	6B	6B	6B	6B	6B	6B	6B	6B	5B	5B
NE	26B	26B	27B	27B	26B	26B	26B	26B	26B	25B	25B	25B	24B	24B	23B	23B	22B	22B	21B	21B	20B	20B	20B	20B	19B
NP	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	3B	2B	2B	2B	2B	2B	2B	2B
P	23B	23B	23B	23B	23B	23B	23B	22B	22B	22B	21B	21B	21B	20B	20B	19B	19B	18B	18B	18B	17B	17B	17B	17B	16B
SE	18B	18B	18B	18B	18B	17B	17B	17B	17B	16B	16B	16B	16B	15B	15B	15B	14B	14B	14B	13B	13B	13B	13B	12B	12B
SP	12B	12B	12B	12B	12B	11B	11B	11B	11B	11B	11B	10B	10B	10B	10B	10B	9B	9B	9B	9B	9B	8B	8B	8B	8B

PIM.Regional_Dist'n_storage_cost_weighting_factor *BSM Calibration*

Weighting factor for cost of moving and storing EtOH within the region, based on fraction of terminals which have EtOH infrastructure

Units: Unitless

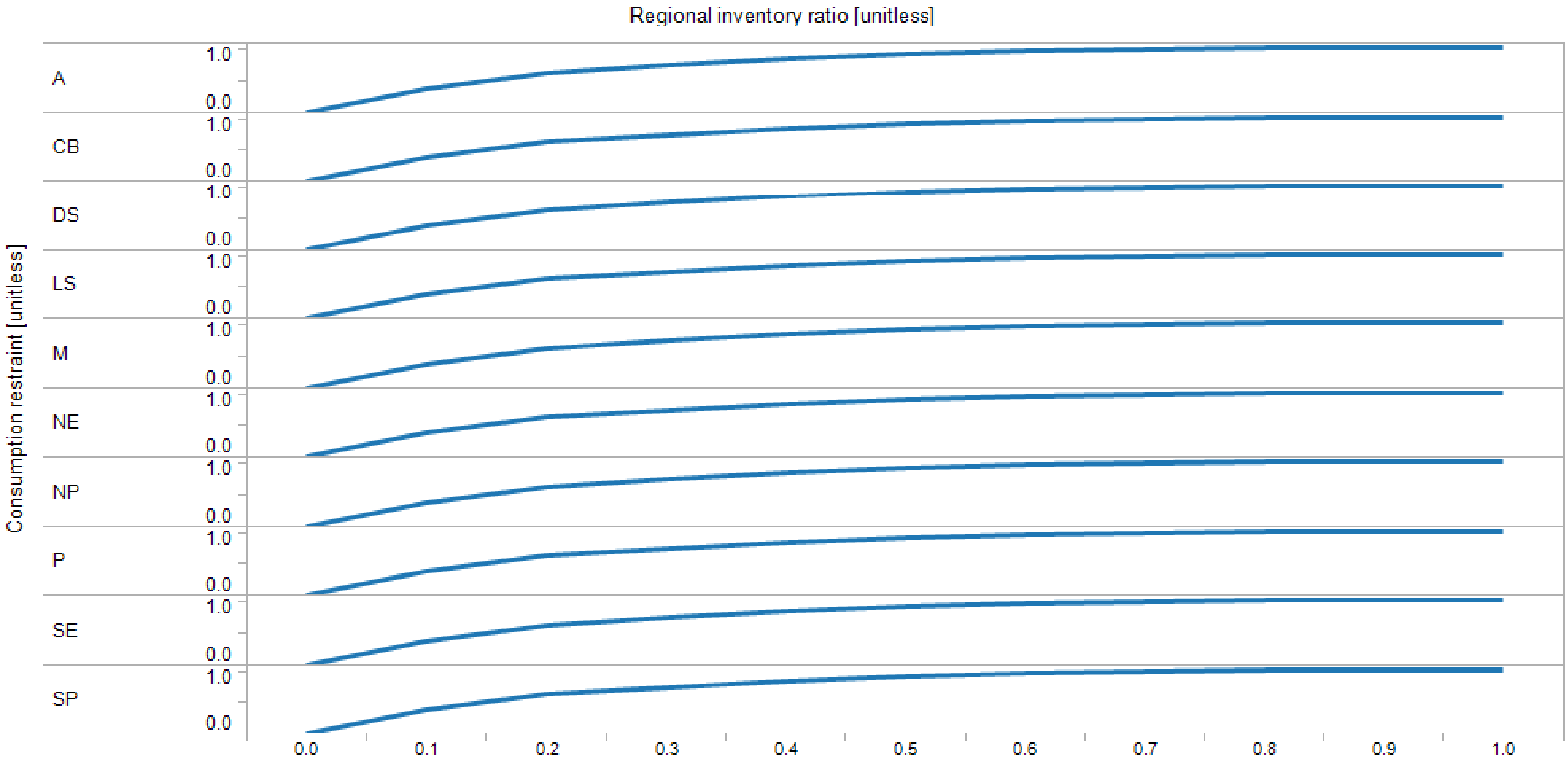


Values

A	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
CB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
DS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
LS	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
M	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
NE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
NP	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
P	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
SE	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
SP	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

PIM.regional_inventory_constraint_on_ETOH_cons'n *BSM Calibration*

1st order controller that relates regional inventory constraints on consumption of ethanol. Units: Unitless



Values

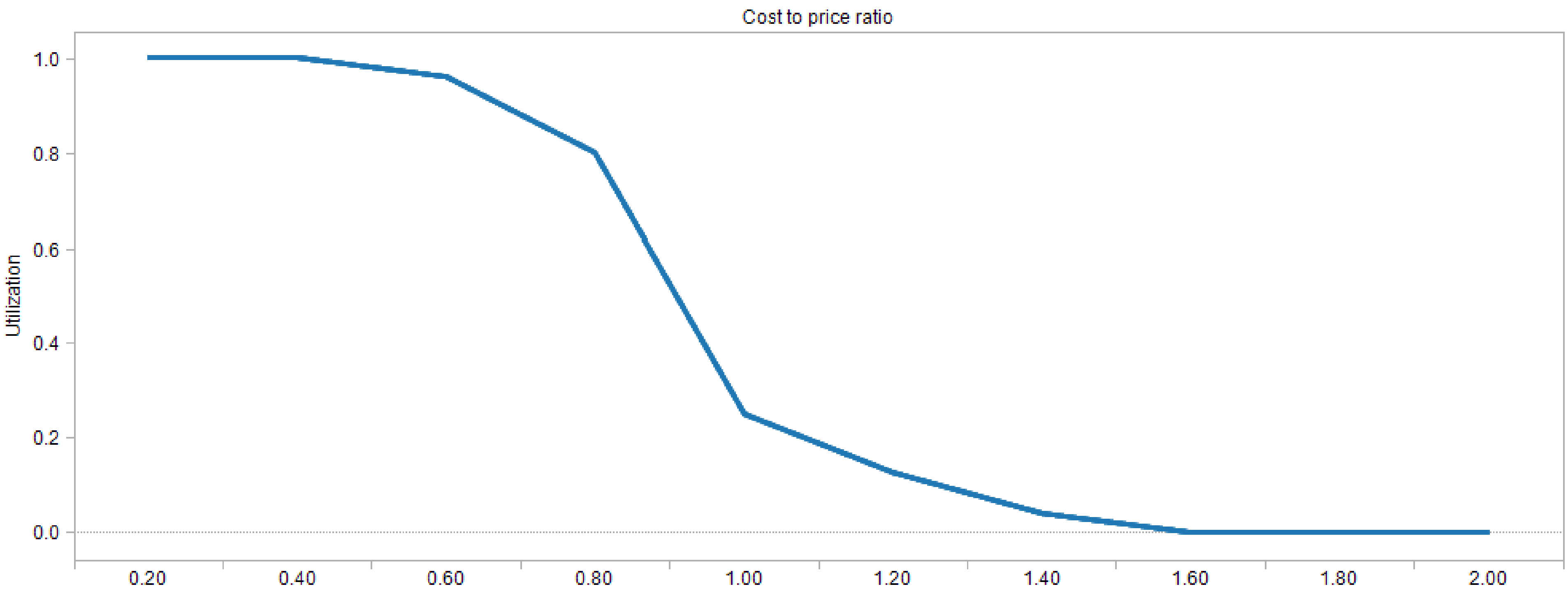
	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
A	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
CB	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
DS	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
LS	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
M	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
NE	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
NP	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
P	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
SE	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0
SP	0.0	0.4	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.0

CM.Nominal_Plant_Utilization_Factors_C

Fractional utilization of output capacity in commercial plants.

Units: Unitless

	Region									
Technology	A	CB	DS	LS	M	NE	NP	P	SE	SP
Biochemical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Combo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Starch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Starch Plus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thermochemical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



Value	1.000	1.000	0.987	0.920	0.670	0.392	0.138	0.055	0.013	0.000

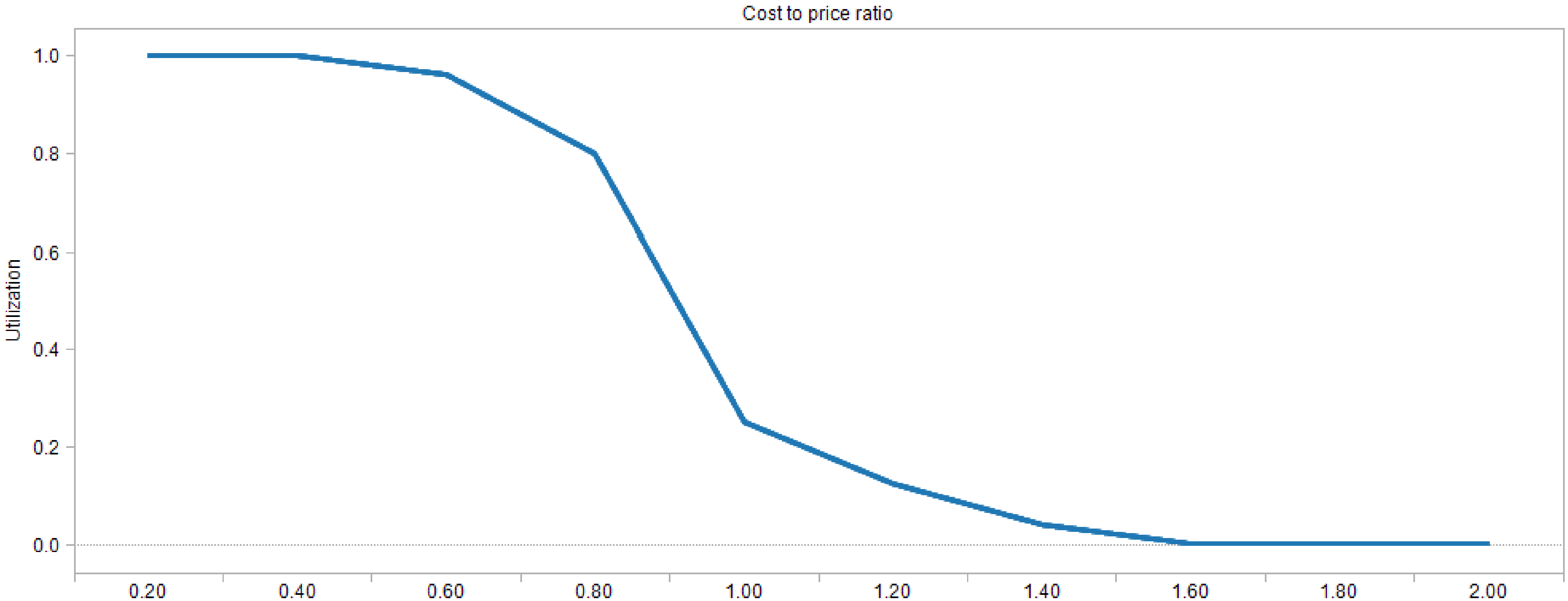
Note: Graph/values apply to all subscripts.

CM.Nominal_Plant_Utilization_Factors_P

Fractional utilization of output capacity in pioneer plants.

Units: Unitless

	Region									
Technology	A	CB	DS	LS	M	NE	NP	P	SE	SP
Biochemical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Combo	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Starch	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Starch Plus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thermochemical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



Value	1.000	1.000	0.987	0.920	0.670	0.392	0.138	0.055	0.013	0.000

Note: Graph/values apply to all subscripts.

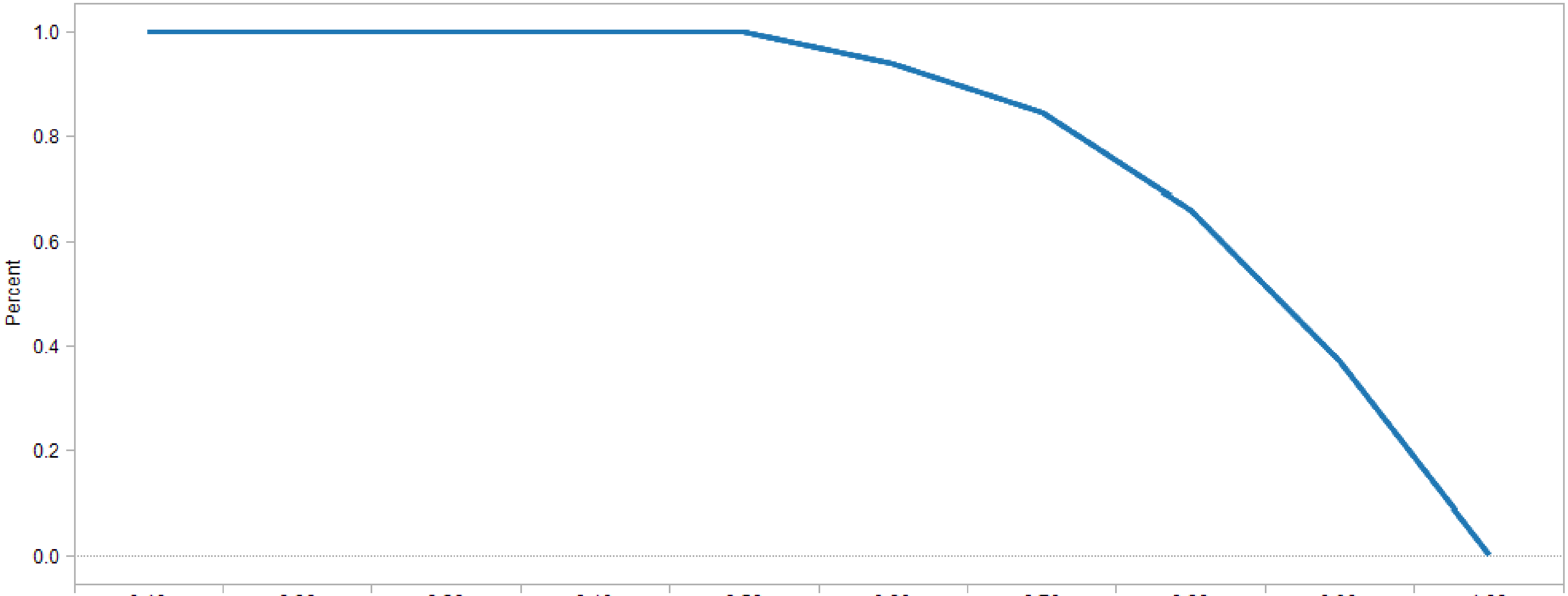
DSM.frac_of_max_considering_from_penetration *BSM Calibration*

Relates penetration of hi blend stations within region to the size of the pool who potentially might consider investment in Hi Blend. Effectively shuts off additional investment as reach constraints imposed by upstream infrastructure.

Units: Unitless

	Region									
Gas Station Type	A	CB	DS	LS	M	NE	NP	P	SE	SP
Hypermart	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent Brand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil-Owned	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unbranded Independent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

High-blend station penetration relative to maximum



	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
Value	1.0000	1.0000	1.0000	1.0000	1.0000	0.9800	0.9283	0.8150	0.6250	0.3433

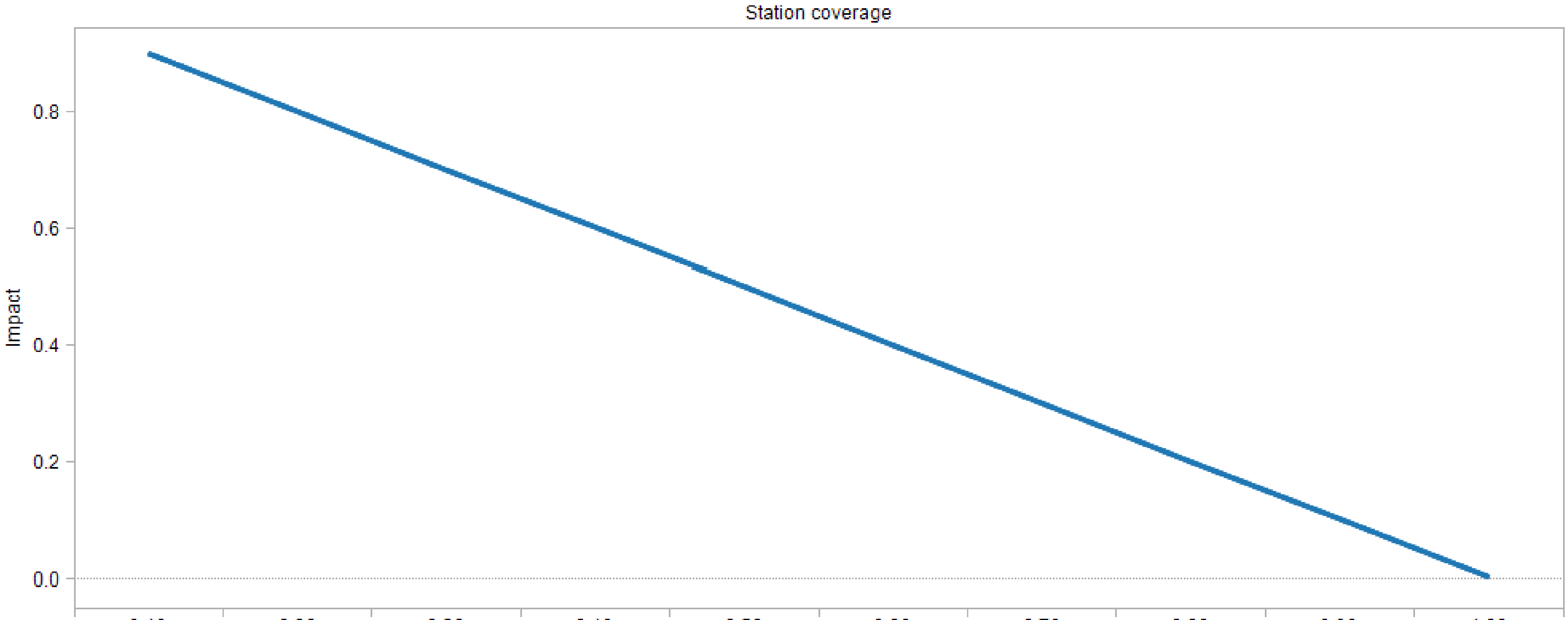
Note: Graph/values apply to all subscripts.

DSM.impact_station_coverage_on_incremental_traffic

Impact of station coverage on incremental traffic. Captures the idea that as market saturates, incremental visits associated with prospective investment will go to 0.

Units: Unitless

	Region									
Gas Station Type	A	CB	DS	LS	M	NE	NP	P	SE	SP
Hypermart	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent Brand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil-Owned	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unbranded Independent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

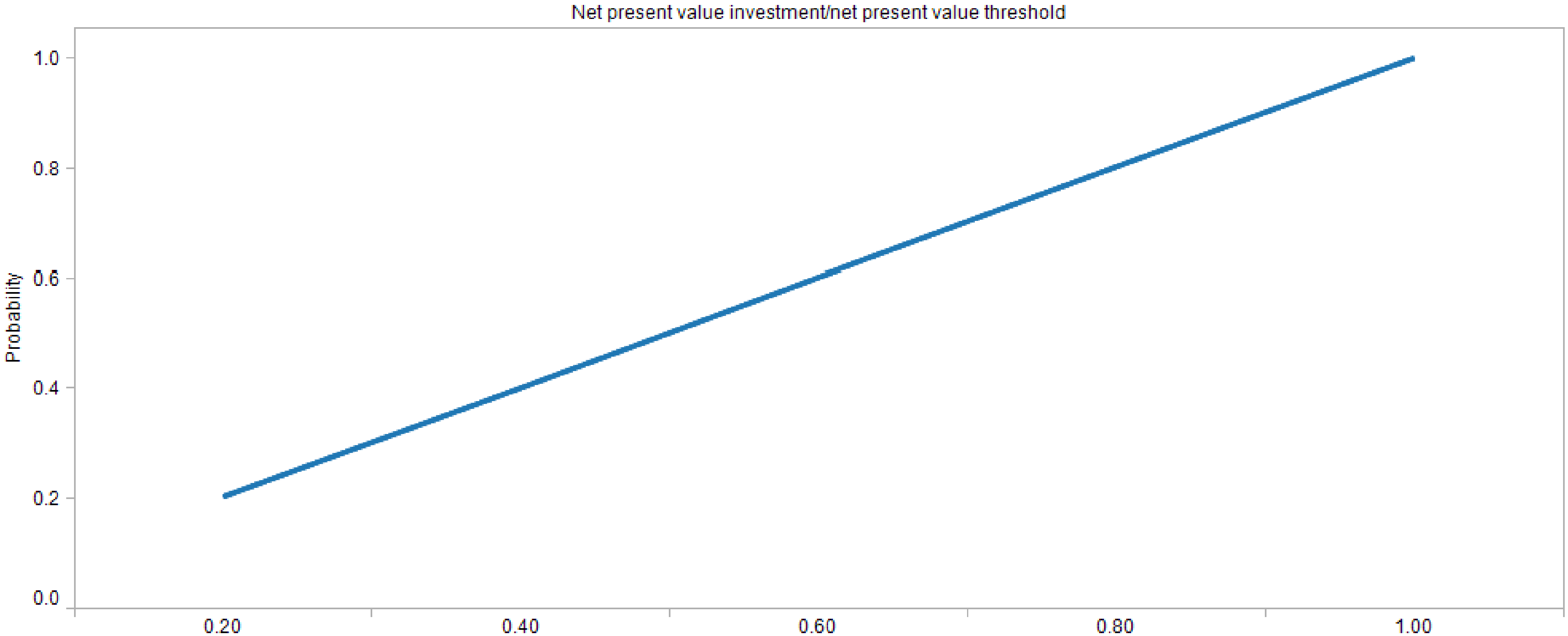


Station coverage	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
Value	0.9000	0.8500	0.8000	0.7000	0.6000	0.5000	0.4000	0.3000	0.2000	0.1000

Note: Graph/values apply to all subscripts.

Probability that a station will decide to invest in hi-blend capability. Units: Unitless

	Region									
Gas Station Type	A	CB	DS	LS	M	NE	NP	P	SE	SP
Hypermart	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent Brand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil-Owned	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unbranded Independent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



Value	0.2000	0.3000	0.4000	0.6000	0.8000

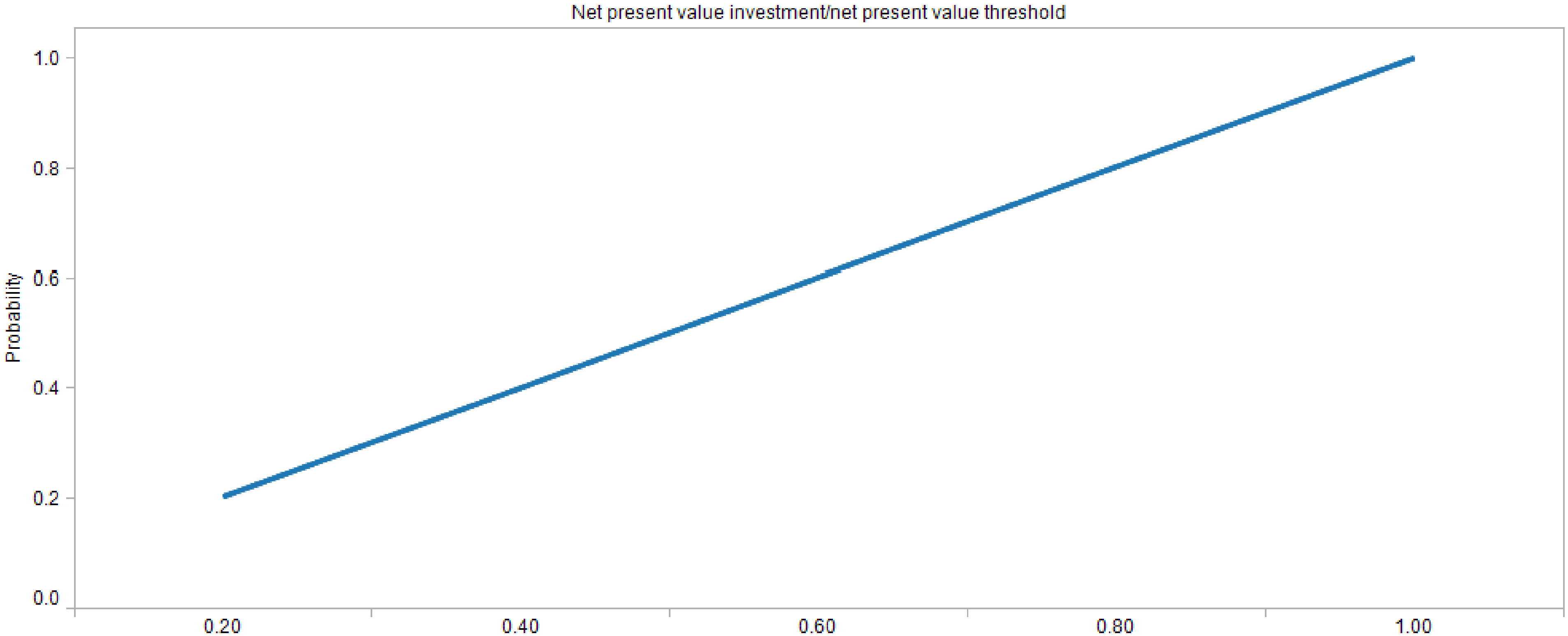
Note: Graph/values apply to all subscripts.

DSM.investment_'hit_rate'_RP

Probability that a station will decide to invest in repurposing.

Units: Unitless

	Region									
Gas Station Type	A	CB	DS	LS	M	NE	NP	P	SE	SP
Hypermart	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Independent Brand	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil-Owned	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Unbranded Independent	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



Value	0.2000	0.3000	0.4000	0.6000	0.8000

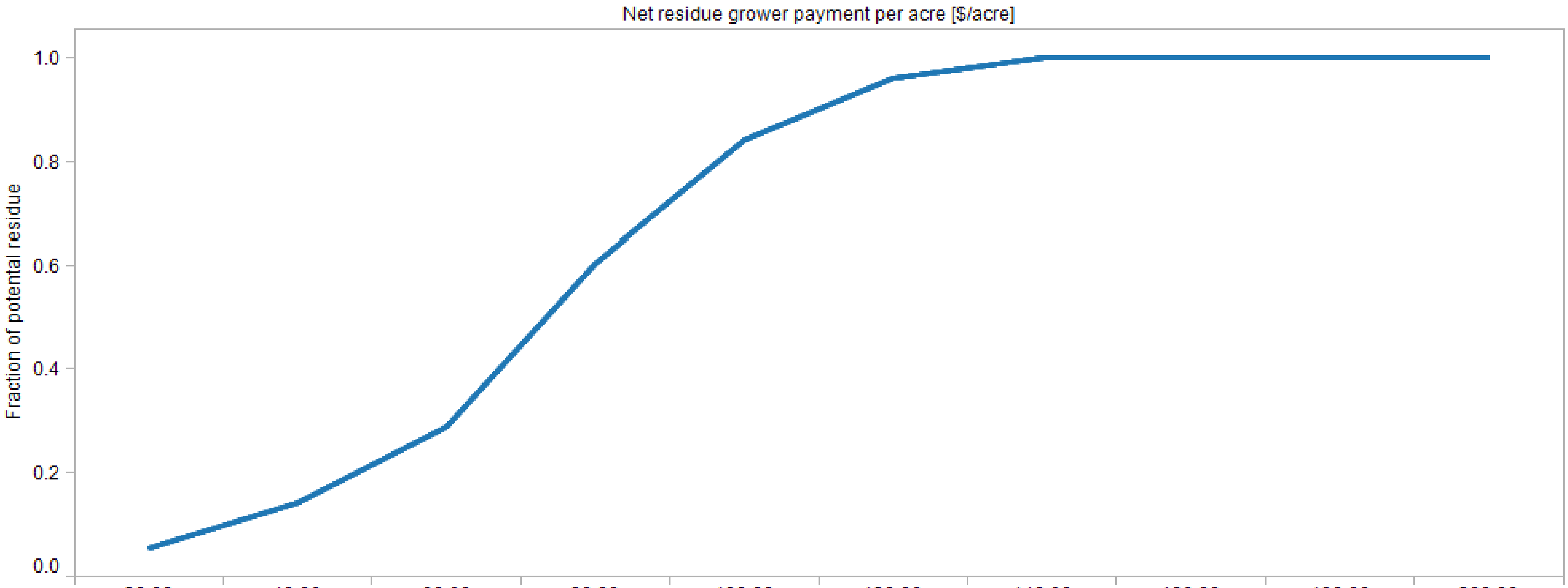
Note: Graph/values apply to all subscripts.

FSM.frac_potential_residue_prod'n_obtained_from_price

Fraction of potential residue production obtained from price.

Units: Unitless

Crop	Region A	CB	DS	LS	M	NE	NP	P	SE	SP
Corn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cotton	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Grains	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Soy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wheat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.00
Value	0.0500	0.0950	0.1583	0.3417	0.5750	0.8000	0.9333	0.9867	1.0000	1.0000

Note: Graph/values apply to all subscripts.